No. 19-1392

In the Supreme Court of the United States

THOMAS E. DOBBS, IN HIS OFFICIAL CAPACITY AS STATE HEALTH OFFICER OF THE MISSISSIPPI DEPARTMENT OF HEALTH, ET AL.,

Petitioners,

v.

JACKSON WOMEN'S HEALTH ORGANIZATION, ET AL.,

Respondents.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

BRIEF FOR THE AMERICAN COLLEGE OF PEDIATRICIANS AND THE ASSOCIATION OF AMERICAN PHYSICIANS & SURGEONS AS *AMICI CURIAE* IN SUPPORT OF PETITIONERS

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QUESTION PRESENTED

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

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INTEREST OF *AMICI CURIAE*

Amici are medical professional organizations that represent health care professionals across the United States. The ethical practice of medicine for all people is of special concern to *amici*. They have a shared interest in providing information on the prenatal development of unborn children.

The American College of Pediatricians is a national organization of pediatricians and other health care professionals dedicated to the health and well-being of children. Formed in 2002, the College is committed to producing policy recommendations based on the best available research. The College currently has members in 47 states. Of particular importance to the College is the sanctity of human life from conception to natural death.

Founded in 1943, the Association of American Physicians & Surgeons includes thousands of physicians nationwide dedicated to preserving ethical medicine and the patient-physician relationship. In addition to participating at the legislative and administrative levels in national, state, and local debates on health issues, AAPS participates in litigation, both as a party and as an *amicus*. *See, e.g.*, *Stenberg v. Carhart*, 530 U.S. 914, 933 (2000); *District of Columbia v. Heller*, 554 U.S. 570, 704 (2008) (Breyer, J., dissenting).*

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* All parties have consented to the filing of this brief. In accordance with Rule 37.6, no counsel for a party authored this brief in whole or in part, and no counsel or party made a monetary contribution intended to fund the preparation or submission of this brief. No person other than *amici curiae*, their members, or their counsel made a monetary contribution to its preparation or submission.

SUMMARY OF THE ARGUMENT

1. When *Roe v. Wade* was decided in 1973, scientific knowledge of fetal development was extremely limited. The evidence before this Court was even more limited. Neither *Roe* nor its companion case, *Doe v. Bolton*, had *any* record evidence about the medical and scientific status of the unborn child. This lack of factual evidence led the Court to rely on shaky reports from Communist countries without verifiable data. Because the Court believed that there was no better evidence "at this point in the development of man's knowledge," it settled on "viability"—when the unborn child is "potentially able to live outside the mother's womb"—as the governing rule. *Roe v. Wade*, 410 U.S. 113, 159–60 (1973). The Court in *Planned Parenthood of Southeastern Pennsylvania v. Casey* adhered to that rule, finding "no change in *Roe*'s factual underpinning." 505 U.S. 833, 860 (1992).

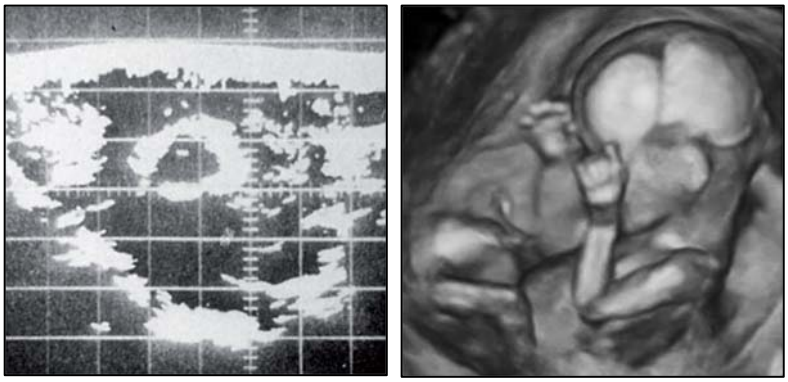
2. What we know today—as uncontroverted scientific fact—is that the child develops much more quickly than the Court in *Roe* presumed. The Court then was told that "in early pregnancy . . . embryonic development has scarcely begun." Brief for Appellant at 20, *Roe*, 410 U.S. 113 (No. 70-18), 1971 WL 128054. But that is wrong. From conception, the unborn child is a unique human being who rapidly develops the functions and form of a child long before viability.

At five weeks' gestation (just three weeks after conception),[1] the unborn child's heart starts beating. By six weeks, brain waves are detectable, and the nervous system is steadily developing. By seven

[1] Ages in this brief, as in Mississippi's law, are dated to gestation or last menstrual period. These ages predate conceptional age by two weeks and are standard in the profession. *See, e.g.*, App. 41a.

weeks, the child can move and starts to develop sensory receptors. By nine weeks, the child's eyes, ears, and teeth are visible. By ten weeks, multiple organs begin to function, and the child has the neural circuitry for spinal reflex, an early response to pain. By twelve weeks, the child can open and close fingers and sense stimulation from the outside world. By fifteen weeks—when Mississippi's law limits abortions—the child can smile and is likely sensitive to pain. Medical interventions after this stage (other than abortion) use analgesia to prevent suffering. And by eighteen weeks, pain induces hormonal responses in the child. All this happens long before viability.

Reflecting these advances in medical knowledge, ultrasound imagery available at the time of *Roe* looks much different from the imagery available today:



Fifteen-Week Ultrasounds Around 1973 when Roe *was Decided and Today*[2]

[2] Stuart Campbell, *A Short History of Sonography in Obstetrics and Gynaecology*, 5 FVV ObGyn 213, 217 (2013); Kristen J. Gough, *Second Trimester Ultrasound Pictures* (last updated Dec. 5, 2019), available at https://www.parents.com/pregnancy/stages/fetal-development/second-trimester-images-of-your-developing-baby/ [https://perma.cc/J2NV-GT6M] (last visited

3. As what we know about the unborn child's rapid development has changed, so too must this Court's jurisprudence change. What mattered in *Roe* and its progeny was "the measure of the State's interest in 'the light of present medical knowledge.'" *Planned Parenthood of Cent. Mo. v. Danforth*, 428 U.S. 52, 61 (1976) (quoting *Roe*, 410 U.S. at 163). "Nearly 50 years later," medical knowledge about unborn children has "changed dramatically." *Shelby County v. Holder*, 570 U.S. 529, 547 (2013). "[A]dvances in genetics and related fields make clear that a new and unique human being is formed at the moment of conception, when two cells, incapable of independent life, merge to form a single, individual human entity." *Hamilton v. Scott*, 97 So. 3d 728, 746 (Ala. 2012) (Parker, J., concurring specially). And the state's interest in protecting unborn life is clearly compelling at fifteen weeks, when the child has fully taken the human form.

Because medical knowledge about fetal development has overtaken the outdated theories in *Roe* and *Casey*, those decisions must be reconsidered. To the extent any "medical and scientific uncertainty" remains, *June Medical Servs. LLC v. Russo*, 140 S. Ct. 2103, 2136 (2020) (Roberts, C.J., concurring in the judgment), States must be returned "the right to readjust [their] views and emphases in the light of the advanced knowledge" showing that pre-viability children are quickly developing human beings with the capacity to move, smile, and feel pain. *Doe v. Bolton*, 410 U.S. 179, 191 (1973). This Court's constitutional analysis should reflect what we now know about the early and rapid development of life.

July 28, 2021) (picture from the American Institute of Ultrasound in Medicine).

ARGUMENT

I. *Roe* and *Casey* relied on limited information about prenatal development.

When the Court decided *Roe* nearly fifty years ago, scientific knowledge about fetal development was limited, with fetology only recognized as a new field of science the year that *Roe* was decided. And the scientific evidence available to the Court was even more limited because of the procedural posture of the case. The limited state of knowledge and the lack of record evidence led the Court to base its ultimate opinion on information that we now know is wrong.

Justice Blackmun, *Roe*'s author, explained that the choice to hear *Roe* and *Doe* was premised on the cases involving a technical question about federal jurisdiction and ongoing state proceedings, "nothing more than an application of *Younger v. Harris*."[3] The cases were, after all, much better suited to resolution of a jurisdictional question. Both cases arose on a motion to dismiss, so the trial courts had not engaged in any fact-finding.[4] Because of the preliminary posture of the cases, the record contained almost nothing in the way of factual evidence about fetal development.[5] The record had no factual hearings, examinations, testimonies, exhibits, medical data, or

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[3] *See* Linda Greenhouse, *Becoming Justice Blackmun: Harry Blackmun's Supreme Court Journey* 80 (2005).

[4] *See Doe v. Bolton*, 319 F. Supp. 1048 (N.D. Ga. 1970), *modified*, 410 U.S. 179 (1973); *Roe v. Wade*, 314 F. Supp. 1217 (N.D. Tex. 1970), *aff'd in part, rev'd in part*, 410 U.S. 113 (1973).

[5] *See* Clarke D. Forsythe & Bradley N. Kher, *A Road Map Through the Supreme Court's Back Alley*, 57 Vill. L. Rev. 45, 47 (2012).

any other evidence that could have provided a scientific basis for the Court's consideration.[6]

With no record evidence available, the Court relied instead on the parties' briefs and independent research.[7] For instance, Justice Blackmun spent a few days independently researching abortion at the Mayo Clinic, where he had served as general counsel twenty years earlier.[8] Of note, the Mayo Clinic did not routinely perform abortions then.[9]

Because of the insufficient evidentiary record, the eventual majority opinion relied largely on unsubstantiated reports that lacked any verifiable data.[10] Nearly half of the sources that the majority cited "described statistics from various Communist countries of Eastern Europe, none of which contained data to back those statistics up."[11] The remaining sources likewise posed methodological issues: some lacked sufficient (or any) data, others did not use adequate samples, and still others did not have follow-up verification processes.[12]

Discussions of the initial drafts of *Roe* reflect the scientific uncertainty facing the Justices. In an early draft of the opinion, Justice Blackmun suggested drawing the line for abortion regulations at the end of

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[6] *Ibid.*
[7] *Id.* at 48.
[8] Greenhouse, *supra* note 3, at 90.
[9] Nan D. Hunter, *Justice Blackmun, Abortion, and the Myth of Medical Independence*, 72 Brook. L. Rev. 147, 153, 155 (2006).
[10] Forsythe & Kher, *supra* note 5, at 51–54.
[11] David F. Forte, *Life, Heartbeat, Birth: A Medical Basis for Reform*, 74 Ohio. St. L.J. 121, 125 (2012).
[12] *Id.* at 125–26.

the first trimester.[13] In his memo accompanying the draft to the other Justices, Justice Blackmun commented on the ambiguities of the medical evidence at the time: "You will observe that I have concluded that the end of the first trimester is critical. . . . This is arbitrary, but perhaps any other selected point, such as quickening or viability, is equally arbitrary."[14] Justice Powell suggested drawing the line at "viability" instead.[15] In response, Justice Blackmun explained that he thought a first trimester line would "leave the states free to draw their own medical conclusions with respect to the period after the first three months and until viability."[16] But Justice Blackmun also said that he had "no particular commitment" on when to draw the line, given the medical uncertainty at the time.[17]

The Court ultimately settled on viability as the "compelling point" after which States have a sufficient interest in protecting unborn life. *Roe*, 410 U.S. at 163 (cleaned up). In making this decision, the Court purported to rely on what it considered to be "the well-known facts of fetal development" to conclude that a pre-viability "fetus, at most, represents only the potentiality of life." *Id.* at 156, 162. Looking to "the lessons and examples of medical . . . history" and "the

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[13] Tinsley E. Yarbrough, *Harry A. Blackmun: The Outsider Justice* 220 (2008).

[14] Greenhouse, *supra* note 3, at 95.

[15] Yarbrough, *supra* note 13, at 220 (quoting Letter from Lewis Powell to Harry Blackmun (Nov. 29, 1972) (on file with the Library of Congress, Harry Blackmun Papers, in-house online *Roe* and *Doe* files)).

[16] *Ibid.* (quoting Letter from Harry Blackmun to Lewis Powell (Dec. 4, 1972) (on file with Washington & Lee Univ. Sch. of Law, Lewis Powell Papers, Box 150)).

[17] *Ibid.*

demands of the profound problems of the present day," the Court declared that no "important and legitimate interest" exists in the unborn child before viability. *Id.* at 163, 165. The viability line was closely tied to supposed "biological justifications" and the evidence available "at this point in the development of man's knowledge." *Id.* at 159, 163.

To the extent they existed, these "biological justifications" have since been repudiated by scientific breakthroughs in fetology, embryology, and genetics, and by technological advancements in fields such as sonography. For instance, the Court in *Roe* referenced "data that purport[ed] to indicate that conception is a 'process' over time, rather than an event." 410 U.S. at 161. And the Court had been told by the parties that "in early pregnancy . . . embryonic development has scarcely begun." Brief for Appellant at 20, *supra* p. 2.

Today, however, science has proven that conception is not a "process" and that human life and "development begins at fertilization."[18] And we know that significant development takes place right from the moment of conception. *See infra* Part II. But the evidence available today simply did not exist in 1973, which was the very first year that the American College of Gynecologists even recognized the field of fetology as a branch of medical science.[19] Now, fetal medicine is an established field dedicated to treating the fetus as a patient *in utero*.

Likewise, only after *Roe* did ultrasound machines become "standardized products in a high-volume

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[18] Keith L. Moore & T.V.N. Persaud, *The Developing Human: Clinically Oriented Embryology* 3 (7th ed. 2003).

[19] Sara Dubow, *Ourselves Unborn: A History of the Fetus in Modern America* 113 (2011).

global market" that expanded "exponentially" starting in the late 1970s.[20] Unlike the prototypes in limited use when *Roe* was decided, routine ultrasounds can now provide high-quality three-dimensional images in real time that reveal the fetus to be much more developed than the Court in *Roe* could have known. *See supra* p. 3.[21] Indeed, obstetric ultrasounds are now considered "medically necessary" for both the mother and fetus. *Tex. Med. Providers Performing Abortion Servs. v. Lakey*, 667 F.3d 570, 579 (5th Cir. 2012). With modern ultrasounds, physicians can confirm "the presence, size, location, and number of gestational sacs";[22] evaluate the placenta, amniotic fluid, and cervix;[23] and assess prenatal growth and well-being.[24]

In 1992, the evidence before this Court in *Casey* was still meager. Even by then, however, the Court had "seen how time has overtaken some of *Roe*'s factual assumptions." *Casey*, 505 U.S. at 860. For instance, viability had dropped from twenty-eight weeks in 1973 to roughly twenty-four weeks by 1992. *Ibid.* Yet Planned Parenthood told the Court in *Casey* that the notion that "viability will recede with advances in medical technology . . . has no medical

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[20] Malcolm Nicholson & John E.E. Fleming, *Imaging and Imagining the Fetus: The Development of Obstetric Ultrasound* 232 (2013).

[21] *See also* Campbell, *supra* note 2, at 219–20.

[22] Am. Inst. of Ultrasound in Med., *AIUM-ACR-ACOG-SMFM-SRU Practice Parameter for the Performance of Standard Diagnostic Obstetric Ultrasound Examinations*, 37 J. Ultrasound Med. E13, E14 (2018).

[23] Obstetric Ultrasound, RadiologyInfo.org (last updated Jan. 23, 2019), available at https://www.radiologyinfo.org/en/info/obstetricus [https://perma.cc/9VUU-5ZTV] (last visited July 28, 2021).

[24] *Ibid.*

foundation."[25] New York and other States echoed that pessimism: "Medical authorities have concluded that viability exists–and is likely to remain fixed–at the 24th week of pregnancy."[26]

Contrary to these predictions, a healthy child can now be delivered at twenty-one weeks.[27] The Court in *Casey* acknowledged some "advances in neonatal care" but did not find any advances in fetal development that would change "the validity of *Roe*'s central holding, that viability marks the earliest point at which the State's interest in fetal life is constitutionally adequate." 505 U.S. at 860. As shown next, however, an explosion of evidence in the last thirty years has demolished the foundation of the Court's decisions in *Roe* and *Casey*.

II. Scientific knowledge has overtaken *Roe* and *Casey*.

In the decades since *Roe* and *Casey*, scientific advancements and medical breakthroughs have overtaken those decisions' factual underpinnings. Medical advancements have produced scientific evidence that makes clear today what the Court in *Roe* could not understand: the human fetus is a living being from the moment of conception and can move, smile, and feel pain in the womb well before viability.

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[25] Brief for Petitioners & Cross-Respondents at 28 n.48, *Casey*, 505 U.S. 833 (Nos. 91-744, 91-902), 1992 WL 12006398.

[26] Brief for the States of New York et al. as *Amicus Curiae* Supporting Appellant at 13 n.23, *Casey*, 505 U.S. 833 (Nos. 91-744, 91-902), 1992 WL 12006406.

[27] Kaashif A. Ahmad et al., *Two-Year Neurodevelopmental Outcome of an Infant Born at 21 Weeks' 4 Days' Gestation*, 140 Pediatrics, Dec. 2017, e20170103, at 1–2, available at https://pediatrics.aappublications.org/content/140/6/e20170103 [https://perma.cc/D9UR-KHDU] (last visited July 28, 2021).

For all human life, "[d]evelopment begins at fertilization when a male gamete or sperm (spermatozoon) unites with a female gamete or oocyte (ovum) to produce a single cell—a zygote."[28] The fusion of the oocyte and the sperm create the zygote "in less than a single second."[29] Fertilization "is a critical landmark" that occurs around the second week as measured by gestational age.[30] The "unicellular zygote divides many times and becomes progressively transformed into a multicellular human being through cell division, migration, growth, and differentiation."[31] But the child's sex is already determined at fertilization.[32] In a "biological sense," "the embryo or fetus is whole, separate, unique and living" from conception. *Planned Parenthood Minn., N.D., S.D. v. Rounds*, 530 F.3d 724, 736 (8th Cir. 2008) (en banc).

During the fifth week, "[t]he cardiovascular system is the first major system to function in the embryo," with the heart and vascular system appearing in the middle of the week.[33] By the end of the fifth week,

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[28] Moore & Persaud, *supra* note 18, at 3.

[29] Am. Coll. of Pediatricians, *When Human Life Begins* (Mar. 2017), available at https://acpeds.org/position-statements/when-human-life-begins [https://perma.cc/Z9W5-UN9T] (last visited July 28, 2021); *see also* Ulyana Vjugina & Janice P. Evans, *New Insights into the Molecular Basis of Mammalian Sperm-Egg Membrane Interactions*, 13 Frontiers Bioscience 462, 462–76 (2008); Maureen L. Condic, *When Does Human Life Begin? A Scientific Perspective* 5 (2008).

[30] Ronan O'Rahilly & Fabiola Muller, *Human Embryology and Teratology* 8 (2d ed. 1996); *see also* App. 79a n.3.

[31] Moore & Persaud, *supra* note 18, at 3.

[32] *See* John C. Achermann & Larry Jameson, *Disorders of Sex Development*, *in Harrison's Principles of Internal Medicine*, 3046, 3046–48 (Dan L. Longo et al. eds., 18th ed. 2012).

[33] Keith L. Moore et al., *The Developing Human E-Book: Clinically Oriented Embryology* 8945 (Kindle ed. 2020).

"blood is circulating and the heart begins to beat on the 21st or 22nd day" after conception.[34]

By six weeks, "[t]he embryonic heartbeat can be detected."[35] Technological advances permit not only imaging detection at this early stage, but also videography of the unborn child, including footage of the child's heartbeat.[36]

After detection of a fetal heartbeat—and absent an abortion—the overwhelming majority of unborn children will now survive to birth.[37] "[O]nce a fetus possesses cardiac activity, its chances of surviving to full term are between 95%–98%."[38]

Also during the sixth week, the child's nervous system is developing, with the brain already "patterned" at this early stage.[39] The earliest neurons are generated in the region of the brain responsible for thinking, memory, and other higher functions.[40] And

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[34] *Id.* at 2662.

[35] *Id.* at 2755.

[36] *See, e.g.*, Endowment for Hum. Dev., *The Heart in Action: 4 Weeks, 4 Days*, available at https://www.ehd.org/movies/21/The-Heart-in-Action [https://perma.cc/GQN4-Q8QS] (last visited July 28, 2021) (showing footage of a heartbeat at six weeks); *see also, e.g.*, Endowment for Hum. Dev., *Your Life Before Birth* (Mar. 18, 2019), available at https://vimeo.com/325006095 [https://perma.cc/6QBT-UWLK] (last visited July 28, 2021) (displaying video footage of a child's development).

[37] Joe Leigh Simpson, *Low Fetal Loss Rates After Ultrasound Proved-Viability in First Trimester*, 258 J. Am. Med. Ass'n 2555, 2555–57 (1987).

[38] Forte, *supra* note 11, at 140 & nn.121–22 (footnote omitted) (collecting post-*Casey* medical research).

[39] Thomas W. Sadler, *Langman's Medical Embryology* 72 (14th ed. 2019); *see generally id.* at 59–95.

[40] *See, e.g.*, Irina Bystron et al., *Tangential Networks of Precocious Neurons and Early Axonal Outgrowth in the Embryonic Human Forebrain*, 25 J. Neuroscience 2781, 2788 (2005).

the child's face is developing, with cheeks, chin, and jaw starting to form.[41]

At seven weeks, cutaneous sensory receptors, which permit prenatal pain perception, begin to develop.[42] The unborn child also starts to move.[43] During the seventh week, "the growth of the head exceeds that of other regions" largely because of "the rapid development of the brain" and facial features.[44]

At eight weeks, essential organs and systems have started to form, including the child's kidneys, liver, and lungs.[45] The upper lip and nose can be seen.[46]

At nine weeks, the child's ears, eyes, teeth, and external genitalia are forming.[47]

Unborn Child at Ten Weeks Rubbing Head[48]

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[41] *See* Sadler, *supra* note 39, at 72–95.
[42] Kanwaljeet S. Anand & Paul R. Hickey, Special Article, *Pain and Its Effects in the Human Neonate and Fetus*, 317 New Eng. J. Med. 1321, 1322 (1987).
[43] Alessandra Pionetelli, *Development of Normal Fetal Movements: The First 25 Weeks of Gestation* 98, 110 (2010).
[44] Keith L. Moore et al., *The Developing Human: Clinically Oriented Embryology* 65–84.e1 (11th ed. 2020).
[45] *See* Sadler, *supra* note 39, at 72–95.
[46] Moore et al., *supra* note 44, 1–9.e1.
[47] *See* Sadler, *supra* note 39, at 72–95; *see also* App. 66a.
[48] Pionetelli, *supra* note 43, at 65 (2010).

At ten weeks, vital organs begin to function, and the child's hair and nails begin to form.[49] By this point, the neural circuitry has formed for spinal reflex, or "nociception," which is the fetus's early response to pain.[50] Starting around ten weeks, the earliest connections between neurons constituting the subcortical-frontal pathways—the circuitry of the brain that is involved in a wide range of psychological and emotional experiences, including pain perception—are established.[51]

At the time of *Roe*, "the medical consensus was that babies do not feel pain."[52] Only during the late 1980s and early 1990s did any of the initial scientific evidence for prenatal pain begin to emerge.[53] Today, the "evidence for the subconscious incorporation of pain into neurological development and plasticity is incontrovertible."[54] Every modern review of prenatal

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[49] *See* Sadler, *supra* note 39, at 106–127; Moore et al., *supra* note 44, at 65–84.e1; Johns Hopkins Med., *The First Trimester*, available at https://www.hopkinsmedicine.org/health/wellness-and-prevention/the-first-trimester [https://perma.cc/8N6H-M6CN] (last visited July 28, 2021); *see also* App. 66a.

[50] *See, e.g.*, Int'l Ass'n for the Study of Pain, *IASP Terminology* (last updated Dec. 14, 2017), available at https://www.iasp-pain.org/Education/Content.aspx?ItemNumber=1698#Nociception [https://perma.cc/5PV5-5T9H] (last visited July 28, 2021); *see also* App. 80a.

[51] Lana Vasung et al., *Development of Axonal Pathways in the Human Fetal Fronto-Limbic Brain: Histochemical Characterization and Diffusion Tensor Imaging*, 217 J. Anatomy 400, 400–03 (2010).

[52] Am. Coll. of Pediatricians, *Fetal Pain: What is the Scientific Evidence?* (Jan. 2021), available at https://acpeds.org/position-statements/fetal-pain [https://perma.cc/JM3T-XQV8] (last visited July 28, 2021).

[53] *Ibid.*

[54] Curtis L. Lowery et al., *Neurodevelopmental Changes of Fetal Pain*, 31 Seminars Perinatology 275, 275 (2007).

pain consistently issues the same interpretation of the data: by ten to twelve weeks, a fetus develops neural circuitry capable of detecting and responding to pain.[55] Even more sophisticated reactions occur as the unborn child develops further.[56] And new developments have provided still more evidence strengthening the conclusion that fetuses are capable of experiencing pain in the womb.[57]

As early as ten or eleven weeks, the fetus shows awareness of his or her environment.[58] Studies of twins, for example, show that by ten to eleven weeks, twins engage in "inter-twin contact," and that by fourteen weeks, twins "execute movements specifically aimed at the co-twin."[59] The fetus also begins to perform "breathing movements" that "increase progressively" as he or she develops in the womb.[60]

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[55] *See, e.g.*, Carlo V. Bellieni & Giuseppe Buonocore, *Is Fetal Pain a Real Evidence?*, 25 J. Maternal-Fetal & Neonatal Med. 1203, 1203–08 (2012); Richard Rokyta, *Fetal Pain*, 29 Neuroendocrinology Letters 807, 807–14 (2008).

[56] *See* Royal Coll. of Obstetricians & Gynaecologists, *Fetal Awareness: Review of Research and Recommendations for Practice* 5, 7 (Mar. 2010), available at https://www.rcog.org.uk/globalassets/documents/guidelines/rcogfetalawarenesswpr0610.pdf [https://perma.cc/4V84-TEMC] (last visited July 28, 2021); Susan J. Lee et al., *Fetal Pain: A Systematic Multidisciplinary Review of the Evidence*, 294 J. Am. Med. Ass'n 947, 948–49 (2005); *see also* App. 76a, 84a–85a.

[57] *See* Lisandra Stein Bernardes et al., *Acute Pain Facial Expressions in 23-Week Fetus*, *Ultrasound Obstetrics & Gynecology* (June 2021), available at https://obgyn.onlinelibrary.wiley.com/doi/10.1002/uog.23709?af=R [https://perma.cc/V8BU-PZK4] (last visited July 28, 2021).

[58] Umberto Castiello et al., *Wired to Be Social: The Ontogeny of Human Interaction*, 5 PLOS One, Oct. 2017, e13199, at 1, 9.

[59] *Ibid.*

[60] Pionetelli, *supra* note 43, at 40.

Twins in the Womb at Eleven Weeks[61]

At eleven weeks, the unborn child's diaphragm is developing, so the child can hiccup.[62] At this point the child "has a distinctly human appearance."[63] The child has hands and feet, ears, open nasal passages on the tip of the nose, and a tongue.[64]

At twelve weeks, the unborn child has assumed "the human form" in all relevant aspects. *Gonzales v. Carhart*, 550 U.S. 124, 160 (2007); *see also* App. 66a. The child can open and close fingers, starts to make sucking motions, and senses stimulation from the world outside the womb.[65] The child's digestive system begins to function, white blood cells develop in his or her bone marrow, and the pituitary gland begins to

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[61] *Id.* at 99.
[62] *Id.* at 31.
[63] Moore et al., *supra* note 44, at 65–84.e1.
[64] *Id.* at 1–9.e1; Prachi Jain & Manu Rathee, *Embryology, Tongue* (last updated Aug. 11, 2020), available at https://www.ncbi.nlm.nih.gov/books/NBK547697/ [https://perma.cc/FCP4-7788] (last visited July 28, 2021).
[65] Pionetelli, *supra* note 43, at 50, 61–62; Slobodan Sekulic et al., *Appearance of Fetal Pain Could Be Associated with Maturation of the Mesodiencephalic Structures*, 9 J. Pain Rsch. 1031, 1034–35 (2016).

produce reproductive hormones.[66] And the child's vocal cords are developing.[67]

Moreover, by twelve weeks, the parts of the central nervous system leading from peripheral nerves to the brain are sufficiently connected to permit the peripheral pain receptors to detect painful stimuli.[68] Thus, the unborn "baby develops sensitivity to external stimuli and to pain much earlier than was believed" when *Roe* and *Casey* were decided. *MKB Mgmt. Corp. v. Stenehjem*, 795 F.3d 768, 774 (8th Cir. 2015) (cleaned up).

At thirteen weeks, the bone structure is forming in the child's arms and legs.[69] At least by this time, the intestines are in place within his or her abdomen.[70]

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[66] Sadler, *supra* note 39, at 230–55.

[67] Johns Hopkins All Children's Hosp., *A Week-by-Week Pregnancy Calendar: Week 12*, available at https://www.hopkinsallchildrens.org/Patients-Families/Health-Library/HealthDocNew/Week-12?id=13484 [https://perma.cc/32GP-WZYX] (last visited July 28, 2021.

[68] Sekulic et al., *supra* note 65, at 1034–35.

[69] Mayo Clinic, *Pregnancy Week by Week: Fetal Development: The 2nd Trimester* (June 30, 2020), available at https://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/fetal-development/art-20046151 [https://perma.cc/M7PA-6T9A] (last visited July 28, 2021).

[70] Mayo Clinic, *Pregnancy Week by Week: Fetal Development: The 1st Trimester* (June 30, 2020), available at https://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/prenatal-care/art-20045302 [https://perma.cc/D7JW-H6YW] (last visited July 28, 2021).

Unborn Child at Thirteen Weeks[71]

At fourteen weeks, the roof of the child's mouth has formed, and his or her eyebrows begin to fill in.[72] The intestines are developing the initial meconium, which will form part of the child's first bowel movement after birth.

By fifteen weeks, when Mississippi's law limits abortions, "the fetus is extremely sensitive to painful stimuli," and physicians (other than those performing abortions) take this fact "into account when performing invasive medical procedures on the fetus."[73] Even more neural circuitry for pain detection and transmission develops between sixteen and twenty weeks, including spinothalamic fibers, which are responsible for the transmission of pain from the periphery to the thalamus.[74] By the time the unborn child reaches eighteen weeks, painful stimuli will

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[71] Moore et al., *supra* note 44, at 85–98.e1.

[72] Peter J. Taub & John M. Mesa, *Embryology of the Head and Neck*, *in Ferraro's Fundamentals of Maxillofacial Surgery* 3, 4, 6 (Peter J. Taub et al. eds., 2d ed. 2015).

[73] Sekulic et al., *supra* note 65, at 1036.

[74] Ritu Gupta et al., *Fetal Surgery and Anesthetic Implications*, 8 Continuing Educ. Anesthesia, Critical Care & Pain 71, 74 (2008).

cause the baby *in utero* to exhibit stress-induced hormonal responses.[75] Studies show that "the fetus reacts to intrahepatic vein needling with vigorous body and breathing movements."[76] The fetus also reacts to such stimuli with "hormonal stress responses," with rising hormone levels "independent of those of the mother."[77]

These recent discoveries have led scientists to conclude that "the human fetus can feel pain when it undergoes surgical interventions and direct analgesia must be provided to it."[78] For this reason, anesthesiologists commonly recommend pain relievers for the fetus during potentially painful procedures.[79] As one group of scholars explains, "the fetus is extremely sensitive to painful stimuli," and "[i]t is necessary to apply adequate analgesia to prevent the suffering of the fetus."[80] Other scholars agree with this assessment.[81]

Thus, in every other medical practice at this stage of fetal development, physicians recognize the need to

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[75] Stuart W. G. Derbyshire, *Can Fetuses Feel Pain?*, 332 Brit. Med. J. 909, 910 (2006).

[76] Xenophon Giannakoulopoulos et al., *Fetal Plasma Cortisol and β-endorphin Response to Intrauterine Needling*, 344 Lancet 77, 77–78 (1994).

[77] Rachel Gitau et al., *Fetal Hypothalamic-Pituitary-Adrenal Stress Responses to Invasive Procedures are Independent of Maternal Responses*, 86 J. Clinical Endocrinology & Metabolism 104, 104 (2001).

[78] Carlo V. Bellieni, *Analgesia for Fetal Pain During Prenatal Surgery: 10 Years of Progress*, 89 Pediatrics Rsch. 1612, 1612 (2021).

[79] Sekulic et al., *supra* note 65, at 1036.

[80] *Ibid.*

[81] *See, e.g.*, Carlo V. Bellieni et al., *Use of Fetal Analgesia During Prenatal Surgery*, 26 J. Maternal-Fetal Neonatal Med. 90, 94 (2013).

protect the unborn child in the womb and prioritize the child's health, even when making treatment plans for the child's mother.[82] Abortions after fifteen weeks, by contrast, typically involve "the use of surgical instruments to crush and tear the unborn child apart before removing the pieces of the dead child from the womb." App. 66a. No analgesia is used to prevent the unborn child from experiencing pain while being dismembered.

At fifteen to sixteen weeks, sonographic imaging has shown that "[o]ccasional smiles can be noted," and unborn children smile "more consistently" by eighteen to twenty weeks.[83] At fifteen weeks, unborn children kick their legs, move their arms, and start curling their toes.[84] And by sixteen weeks, the child's eyes are moving side-to-side, and they can perceive light.[85]

At seventeen weeks, the child's fat stores are developing under his or her skin, and they will continue to accumulate throughout the pregnancy. Between seventeen and eighteen weeks, the unborn child's fingers and toes each develop their own unique prints.[86] By eighteen weeks, the child can hear his or

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[82] *See, e.g.*, Ryan M. Antiel et al., *Weighing the Social and Ethical Considerations of Maternal-Fetal Surgery*, 140 Pediatrics, Dec. 2017, e20170608, at 1, 3–4.

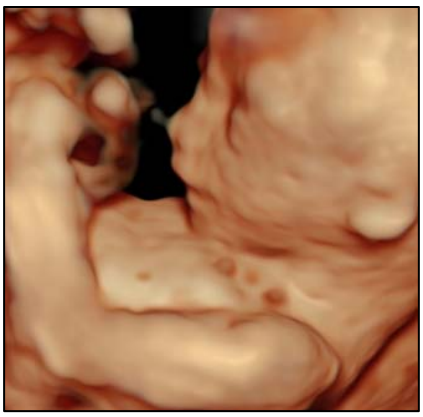
[83] Pionetelli, *supra* note 43, at 79.

[84] Johns Hopkins All Children's Hosp., *A Week-by-Week Pregnancy Calendar: Week 15*, available at https://www.hopkinsallchildrens.org/Patients-Families/Health-Library/HealthDocNew/Week-15?id=13484 [https://perma.cc/62JP-CXL3] (last visited July 28, 2021).

[85] Mayo Clinic, *supra* note 69.

[86] Johns Hopkins Med., *The Second Trimester*, available at https://www.hopkinsmedicine.org/health/wellness-and-prevention/the-second-trimester [https://perma.cc/M7WA-6PC5] (last visited July 28, 2021).

her mother's voice, and the child can yawn.[87] The nervous system in the brain is also developing the circuitry for all the senses: taste, touch, smell, sight, and hearing.



Unborn Child at Seventeen Weeks[88]

Unborn Child Smiling at Seventeen Weeks[89]

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[87] *Ibid.*; *see also* Cleveland Clinic, *Fetal Development: Stages of Growth* (last updated Apr. 16, 2020), available at https://my.clevelandclinic.org/health/articles/7247-fetal-development-stages-of-growth [https://perma.cc/YG92-KRH4] (last visited July 28, 2021).

[88] Med. Univ. of S.C., Ultrasound of Unborn Child at Seventeen Weeks (Dec. 21, 2016) (on file with author).

[89] Pionetelli, *supra* note 43, at 79.

Unborn Child at Twenty Weeks[90]

At nineteen weeks, the vernix caseosa—a protective coating—develops around the child's skin, helping its development throughout the later stages of the pregnancy.[91] At twenty weeks, the sex-specific reproductive organs have developed enough to permit identification of the child's sex by ultrasound, and girls have eggs in their ovaries.[92] Around this time, "facial expressions begin to appear consistently, including 'negative emotions.'"[93] These movements "require the involvement and coordination of more than one muscle."[94]

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[90] *Id.* at 84.

[91] Johns Hopkins All Children's Hosp., *A Week-by-Week Pregnancy Calendar: Week 19*, available at https://www.hopkinsallchildrens.org/Patients-Families/Health-Library/HealthDocNew/Week-19?id=13484 [https://perma.cc/7TWV-GS24] (last visited July 28, 2021).

[92] *See, e.g.*, Kavita Narang et al., *Developmental Genetics of the Female Reproductive Tract*, *in Human Reproductive and Prenatal Genetics* 129, 132, 135 (Peter C. K. Leung & Jie Qiao eds., 2019).

[93] Pionetelli, *supra* note 43, at 80.

[94] *Ibid.*

At twenty-one weeks, the physical and neurological development of the unborn child is sufficiently mature that, in some cases, the child can survive childbirth.[95] As discussed, this is far earlier than was true in 1973 or 1992. *See Casey*, 505 U.S. at 860. At this stage of development, the child can also swallow and experience different tastes depending on what the mother eats. And the cartilage throughout the child's body is turning to bone.

At twenty-two weeks, the child's senses are improving.[96] The child's ability to detect light from outside the womb (such as from a flashlight) can be observed. The child's hearing has improved so that he or she can detect the sounds of the mother's internal organs.

Between 23% and 60% of infants born at twenty-two weeks who receive active hospital treatment survive,[97] many without immediate or long-term neurologic impairment.[98] And the true figures could be

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[95] *See* Ahmad et al., *supra* note 27, at 1–2; *see also* App. 82a.

[96] Johns Hopkins All Children's Hosp., *A Week-by-Week Pregnancy Calendar: Week 22*, available at https://www.hopkinsallchildrens.org/Patients-Families/Health-Library/HealthDocNew/Week-22?id=13484 [https://perma.cc/7VR8-2LFX] (last visited July 28, 2021).

[97] Matthew A. Rysavy et al., *Between-Hospital Variation in Treatment and Outcomes in Extremely Preterm Infants*, 372 New Eng. J. Med. 1801, 1804 (2015); Katrin Mehler et al., *Survival Among Infants Born at 22 or 23 Weeks' Gestation Following Active Prenatal and Postnatal Care*, 170 J. Am. Med. Ass'n Pediatrics 671, 675 (2016).

[98] *See, e.g.*, Noelle Younge et al., *Survival and Neurodevelopmental Outcomes Among Periviable Infants*, 376 New Eng. J. Med. 617, 622, 627 (2017) (describing study showing "an increase in the rate of survival without neurodevelopmental impairment from 2000 through 2011"); Antti Holsti et al., *Two-Thirds of Adolescents who Received Active Perinatal Care After*

much higher, for imposing particular values on "viability" "create[s] facts": "A policy that limits treatment for infants born at 24 weeks' gestation will lead to [comparatively] low survival rates for those infants. Those [comparatively] low survival rates will seem to justify and validate the policy, even if the true causal relationship runs in the other direction."[99] Medical advances suggest that viability will continue to occur at even younger ages as time goes on.[100]

At twenty-three weeks, the child's skin tone changes color as his or her capillaries form and blood fills them under the skin.[101] At twenty-four weeks, the baby's face is nearly fully formed, with eyelashes, eyebrows, and hair clearly visible. The child is accumulating a large amount of muscle mass and baby fat during this period.[102]

Unborn Child Yawning at Twenty-Four Weeks[103]

Extremely Preterm Birth Had Mild or No Disabilities, 105 Acta Paediatrica 1288, 1296 (2016) (similar).

[99] John D. Lantos & William Meadow, *Variation in the Treatment of Infants Born at the Borderline of Viability*, 123 Pediatrics 1588, 1589 (2009).

[100] *See* App. 82a–83a.

[101] Cleveland Clinic, *supra* note 87.

[102] *Ibid.*

[103] Pionetelli, *supra* note 43, at 34.

At twenty-five weeks, the lungs have developed surfactant, a substance that helps the lungs to expand after birth.[104] Blood vessels form in the lungs.[105] The child's nostrils also function by this point, allowing him or her to practice exhaling before birth.

Around twenty-six weeks, the child's eyes open, and he or she can fully see what is going on around him or her.[106] Brain wave activity increases throughout this period. At twenty-seven weeks, the child weighs about two pounds, double the child's weight a month earlier.

At twenty-eight weeks, the child experiences rapid eye movement during sleep, possibly showing that the he or she is dreaming.[107] The child also blinks routinely during this period, developing another skill for after birth.

Only after all this development—which was largely unknown to the Court in 1973—could an unborn child be protected under *Roe*, which thought that no "biological justification[]" existed to protect life beforehand. 410 U.S. at 163.

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[104] Timothy E. Weaver et al., *Surfactant During Lung Development*, *in Fetal & Neonatal Lung Development* 141, 151 (Alan H. Jobe et al. eds., 2016).

[105] Timothy D. Le Cras & Marlene Rabinovitch, *Pulmonary Vascular Development*, *in Fetal & Neonatal Lung Development* 34, 36 (Alan H. Jobe et al. eds., 2016).

[106] Johns Hopkins All Children's Hosp., *A Week-by-Week Pregnancy Calendar: Week 26*, available at https://www.hopkinsallchildrens.org/Patients-Families/Health-Library/HealthDocNew/Week-26?id=13484 [https://perma.cc/A8QG-XBPA] (last visited July 28, 2021).

[107] *See, e.g.*, Hikohiro Okawa et al., *Eye Movement Activity in Normal Human Fetuses Between 24 and 39 Weeks of Gestation*, 12 PLOS One, July 2017, e0178722, at 1, 10.

III. The Court's abortion jurisprudence should account for these advances in scientific knowledge.

To account for the medical advances and scientific breakthroughs in fetal development that were unknown in 1973 or even in 1992, the Court's abortion jurisprudence must change. "In constitutional adjudication as elsewhere in life, changed circumstances may impose new obligations," and the Court has a "constitutional duty" to reexamine its jurisprudence given the now-repudiated "factual underpinnings of *Roe*'s central holding." *Casey*, 505 U.S. at 864.

Starting with *Roe*, this Court's abortion jurisprudence has repeatedly pledged allegiance to scientific fact. *Roe* based its viability rule on the evidence available "at this point in the development of man's knowledge." 410 U.S. at 159. The Court tied this rule to "biological reasons," focusing on the views of "the medical and scientific communities" and leaving the constitutional line "flexible for anticipated advancements." *Colautti v. Franklin*, 439 U.S. 379, 386–87 (1979). And the Court said that the State's interest in unborn life must be "measure[d]" "in 'the light of present medical knowledge,'" *Danforth*, 428 U.S. at 61 (quoting *Roe*, 410 U.S. at 163), allowing States to exercise "legislative judgment" based on "advancing medical knowledge." *Doe*, 410 U.S. at 190 (first quote); *Roe*, 410 U.S. at 116 (second quote).

Even defenders of *Roe* considered it "obvious" that the States have a "dramatic[]" interest in protecting unborn life as the child develops the capacity to "feel pain," "experience pleasure," and "react to [his or her] surroundings." *Thornburgh v. Am. Coll. of*

Obstetricians & Gynecologists, 476 U.S. 747, 778 (1986) (Stevens, J., concurring). They acknowledged that the States' interest "increases . . . dramatically" as the child's "capacity to feel pain . . . increases day by day" and that the interest becomes "compelling" "as the fetus evolves into its postnatal form." *Webster v. Reprod. Health Servs.*, 492 U.S. 490, 552–53 (1989) (Blackmun, J., concurring in part and dissenting in part). The Court in *Roe* simply did not think that the pre-viability fetus was "biological[ly]" developed enough to warrant protection. 410 U.S. at 163.

"But history did not end in" 1973. *Shelby County*, 570 U.S. at 552. "Nearly 50 years later, things have changed dramatically," and today's medical knowledge "tell[s] an entirely different story." *Id.* at 547, 556. Scientific advancements over the past fifty years have rendered the factual underpinnings of *Roe* obsolete. And the thirty years of technological improvements and medical breakthroughs since *Casey* have revolutionized our understanding of early fetal development.

We now know that the unborn child is a living human being, rapidly developing from the moment of conception and capable of feeling pain long before viability. Even in the pre-viability period, the child's heart beats, the child can express himself or herself through smiling and other actions, and the child can respond to the environment outside the womb. In short, as basic embryology textbooks now teach, life begins at fertilization—a fact that surprises no one in the medical profession.[108] Absent reconsideration of *Roe* and *Casey*, the Court's abortion jurisprudence will

[108] Moore & Persaud, *supra* note 18, at 28.

no longer align with what we know about the early development of the unborn child.

Likewise, a failure to reconsider *Roe* and *Casey* would prevent state and federal law from adapting to current scientific knowledge. The "traditional rule" is "that state and federal legislatures have wide discretion to pass legislation in areas where there is medical and scientific uncertainty." *June Medical*, 140 S. Ct. at 2136 (Roberts, C.J., concurring in the judgment) (cleaned up). As shown, *Roe* and its progeny rest on a factual foundation that has since been proven wrong. At a minimum, sufficient uncertainty exists about that foundation that the Court should return to its traditional rule of deference to "legislative product[s]" that "reflect[] . . . advancing medical knowledge and techniques." *Roe*, 410 U.S. at 116. Mississippi's law, which protects unborn children who can experience pain, is an example of a reasonable response to advances in scientific knowledge—a response that warrants deference by the federal judiciary.

Finally, reconsideration of *Roe* and its progeny is required "[t]o avoid an arbitrary discretion in the courts." The Federalist No. 78, at 539 (A. Hamilton) (J. Cooke ed. 1961). "[A]rbitrary criteria" like viability "for who is the subject of rights undermine[] the basic principles of human justice."[109] Under the viability rule, "equality of treatment is impossible to achieve; predictability is destroyed; judicial arbitrariness is facilitated." *June Medical*, 140 S. Ct. at 2135–36 (Roberts, C.J., concurring in the judgment) (ellipses

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[109] Maureen L. Condic, *When Does Human Life Begin? The Scientific Evidence and Terminology Revisited*, 8 U. St. Thomas J.L. & Pub. Pol'y 44, 73 (2013).

omitted) (quoting Antonin Scalia, *The Rule of Law as a Law of Rules*, 56 U. Chi. L. Rev. 1175, 1182 (1989)).

That is because the viability rule "tie[s] a state's interest in unborn children to developments in obstetrics, not to developments in the unborn." *Stenehjem*, 795 F.3d at 774. For instance, the viability rule discriminates against children who happen to be born in areas with less sophisticated medical technology.[110] Justice Blackmun's fear that viability was as "arbitrary" as "any other selected point"[111] was perhaps understandable considering the limited knowledge in 1973. And it might be one thing to accept an arbitrary rule like viability if there was "no line . . . which is more workable." *Casey*, 505 U.S. at 870. But given the state of scientific evidence, we now know that States have a compelling interest beginning well before viability in protecting unborn life, that other rules are far more workable and equitable than viability, and that only those rules—as established by States—can protect unborn children who have developed all the features of humanity.

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[110] Compounding the problems with viability is the scientific fact that estimating gestational age by ultrasound later in the pregnancy has a significantly higher margin of error. *See* Am. Coll. of Obstetricians & Gynecologists et al., *Committee Opinion Number 700: Methods for Estimating the Due Date* 3 (May 2017), available at https://www.acog.org/-/media/project/acog/acogorg/clinical/files/committee-opinion/articles/2017/05/methods-for-estimating-the-due-date.pdf [https://perma.cc/8T5C-9NVC] (last visited July 28, 2021) (explaining that between twenty-two and twenty-seven weeks, ultrasound dating may be inaccurate by up to two weeks in either direction).

[111] Greenhouse, *supra* note 3, at 95 (quoting Justice Blackmun).

CONCLUSION

A 1963 Planned Parenthood pamphlet for expectant mothers said that abortion "kills the life of a baby after it has begun."[112] In *Roe*, this Court may not have had the scientific evidence to know how true that statement was. Perhaps the Court "is not to be reproached . . . for a past judgmental determination made in the light of then-existing medical knowledge." *Doe*, 410 U.S. at 190. But scientific evidence now establishes that "a fetus is a living organism while within the womb." *Gonzales*, 550 U.S. at 147. States have a vital interest in protecting the "life of the unborn." *Id.* at 158. This Court should therefore return to the States "the right to readjust [their] views and emphases in the light of the advanced knowledge" available today—just as Mississippi has done. *Doe*, 410 U.S. at 191. The judgment below should be reversed.

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[112] Brief for Women for the Unborn as *Amicus Curiae* Supporting Appellee at 10 (quoting Planned Parenthood, *"Plan Yc" Children for Health and Happiness* (1963)), *Roe*, 410 U.S. 113 (No. 70-18), 1971 WL 134284.