

## Maine Statistics

The Maine Drug Data Hub, which describes itself as “a collaboration between several state departments, the Governor’s Office and the University of Maine,” has a Substance Exposed/affected Infant Dashboard: <https://mainedrugdata.org/how-maine-is-serving-children-and-families/>

We found some materials from a 2017 Fetal Alcohol Spectrum Disorders Conference that has some models and statistics on alcohol and drug-affected babies: <https://www.maineddc.org/index.php/resources-publications/fetal-alcohol-spectrum-disorders>

The above conference materials include this Maine CDC presentation that has some Maine statistics: <https://www.maineddc.org/images/PDFs/FASD-pezzullo.pdf>

The Maine CDC Maternal, Fetal & Infant Mortality Review Panel produces an annual report. This isn’t exactly what you’re asking for, but they have some mortality information on drug overdoses specifically. Within each report, you can usually just search for the word “drug” to find the relevant section: [https://legislature.maine.gov/lawlib/lldl/rpts/rj60\\_m2m34.html](https://legislature.maine.gov/lawlib/lldl/rpts/rj60_m2m34.html)

## Neonatal Abstinence Syndrome in Maine

Neonatal Abstinence Syndrome (NAS) occurs when babies are exposed to drugs (usually opioids, but also alcohol or other substances) in utero and experience withdrawal symptoms after birth, like excessive crying, seizures, or poor feeding. Maine has been hit hard by the opioid crisis, reflected in its NAS rates.

- **Historical Data:**

- In 2012, Maine had an NAS rate of 30.4 per 1,000 hospital births, the second-highest in the U.S. (behind Vermont’s 30.5), per CDC data. With about 12,000 births, this translates to roughly 365 NAS cases that year.
- The number of “drug-affected” babies (a broader category including NAS and other substance exposures) rose sharply from 178 in 2006 to 995 in 2015, per Maine CDC. By 2016, it peaked at 1,024.
- In 2017, the figure dropped slightly to 952, or about 8% of births (1 in 12), according to the Maine Children’s Alliance 2019 KIDS COUNT report. Heroin was the most common substance (43% of cases), followed by other opioids and medication-assisted treatment drugs like methadone or buprenorphine.

## Recent Trends:

The decline to 952 in 2017 was the first in over a decade, possibly due to increased treatment access or reduced opioid prescribing. However, experts caution that the opioid epidemic’s grip remains strong, and overdose deaths stayed high (376 in 2016, 185 in the first half of 2017). Data beyond 2017 is less consistently reported, but a 2019 report suggested the rate stabilized or slightly declined as treatment efforts grew.

## Baby Olivia Medical Accuracy

### Context

[Baby Olivia](#) is a medically accurate, animated glimpse of human life from the moment of fertilization. This story details her growth as she progresses from one developmental stage to the next in preparation for her continued life outside of the womb.

*Baby Olivia* was created by Live Action in collaboration with a panel of medical doctors, including experts in embryonic and fetal development — [Dr. David Bolender](#); [Dr. Donna Harrison](#); [Dr. Tara Sander Lee](#); [Dr. Katrina Furth](#); [Michelle Cretella, MD](#); and [Jeffrey Barrows, DO, MA](#) — who each endorsed the project.

The following are the facts stated in the [Baby Olivia](#) video, in chronological order, with specific source links and text supporting each claim. It is important to note that all gestational markers are [calculated](#) relative to fertilization (also called “conception”), not to the last menstrual period (LMP), which is often used elsewhere and which adds approximately two weeks.

Many of the developmental facts shared in *Baby Olivia* are sourced from the [Endowment for Human Development](#), which is “a nonprofit organization dedicated to improving health science education and public health.” Its website [states](#) that it is “committed to [neutrality](#) regarding all controversial bioethical issues,” adding, “Our board of directors, board of advisors, staff, and volunteers includes accomplished educators, researchers, authors, programmers, and clinicians from a variety of scientific and business disciplines who share the common goal of improving lifelong health through prenatal development-based education.” Science educators across the United States have endorsed the organization’s award-winning content, which National Geographic also distributes.

Certified OB/GYN Kathi Aultman, MD, FACOG, has [said](#): “*Olivia* is a spectacular and medically accurate portrayal of the development of a baby girl within the womb. It is based on information from the Endowment for Human Development, a highly respected scientific source on embryology and fetal development. *Olivia* draws back the curtain on the womb giving us a realistic glimpse of the baby within. As a retired OB/GYN, I wish this had been available for my patients.”

### Line-by-Line Corroboration

**1). “This is the moment that life begins.” (0:19)** This statement refers to fertilization.

The Endowment for Human Development (EHD) [states](#): “Biologically speaking, fertilization (or conception) is the beginning of human development.”

The journal *Nature* stated in its January 2010 issue: “The life cycle of mammals begins when a sperm enters an egg.” The textbook Patten’s *Foundations of Embryology* (6th ed., p. 3) likewise states: “The time of fertilization represents the starting point in the life history, or ontogeny, of the individual.” These quotes and many other similar statements from embryology textbooks can be found in this Live Action News [article](#).

**2). “At fertilization, her gender, ethnicity, hair color, eye color, and countless traits are already determined.” (0:25)**

EHD [states](#): “The zygote... contains 46 unique chromosomes with the entire genetic blueprint of a new individual.”

[Science Daily](#) notes that “[t]he sex of a baby is determined by its chromosome make-up at conception. An embryo with two X chromosomes will produce a girl, while an embryo with an X-Y combination results in a boy.”

[WebMD](#) also states: “At the moment of fertilization, the baby’s genetic makeup is complete, including whether it’s a boy or girl.”

**3). “She begins to implant in the uterus around 1 week after fertilization.” (0:34)**

EHD [states](#): “Implantation is the process whereby the early embryo embeds into the inner wall of the mother’s uterus. Implantation begins about 6 days after fertilization and is complete by about 12 days.”

[UCSF Health](#) also notes: “Once the embryo reaches the blastocyst stage, approximately five to six days after fertilization, it hatches out of its zona pellucida and begins the process of implantation in the uterus.”

**4). “At 3 weeks and 1 day, just 22 days after fertilization, Olivia’s heartbeat can be detected.” (0:48)**

EHD [states](#): “About 3 weeks, one day after fertilization ... the heart first begins to beat[.]”

[Merck Manuals](#) also [stated](#): “The heart and major blood vessels begin to develop earlier—by about day 16. The heart begins to pump fluid through blood vessels by day 20, and the first red blood cells appear the next day.”

In a 2020 [study](#) published in the journal *Fetal Diagnosis and Therapy*, Oxford-affiliated researchers [Cheryl Mei Jun Tan](#) and [Adam James Lewandowski](#) wrote: “By the end of gestational week 3, passive oxygen diffusion becomes insufficient to support metabolism of the developing embryo, and thus the fetal heart becomes vital for oxygen and nutrient distribution. The initiation of the first heart beat via the primitive heart tube begins at gestational day 22, followed by active fetal blood circulation by the end of week 4.”

VeryWell Family similarly [states](#): “A baby’s heart begins to beat around 22 days after conception.”

**5). “The buds of her arms and legs appear by 4 weeks.” (1:04)**

EHD [states](#): “Upper and lower limb buds appear by four weeks.”

[Planned Parenthood](#) similarly notes that “[b]uds for arms and legs develop” during week 5-6 LMP (or week 3-4 post-fertilization).

[Mayo Clinic](#) also notes: “By the end of the sixth week of pregnancy — four weeks after conception — small buds appear that will become arms.”

**6). “She begins to move between 5 and 6 weeks, with both spontaneous and reflexive movements.” (1:11)**

EHD [states](#): “...the embryo begins to move between 5 and 6 weeks. The embryo’s first movements are both spontaneous and reflexive.”

Developmental Medicine & Child Neurology published a [study](#) which stated: “The embryo starts moving by 7.5 week’s gestation [5.5 weeks post-fertilization].”

**7). “At 6 weeks from fertilization, her brain activity can be recorded, and bone formation begins.” (1:17)**

EHD [states](#): “The embryo has brainwaves by 6 weeks, 2 days! ... Individualized brainwaves recorded via electroencephalogram, or EEG, have been reported as early as 6 weeks, 2 days. ... Bone formation begins between 6 and 7 weeks, starting with the clavicle, or collar bone, and the upper and lower jaw.”

**8). “She can bring her hands together at 7 ½ weeks. Separate fingers and toes emerge. She can also begin to hiccup.” (1:27)**

EHD [states](#): “Also by 7½ weeks, the hands can be brought together[.]” In a table under the heading “A Summary of Hand and Foot Development” on the same page, the text “Fingers separate; Hands and feet come together” appears in a box designated “7 ½ weeks.” On another [page](#), EHD states: “Also by 7 weeks ... hiccups begin.”

[Mayo Clinic](#) also states that “eight weeks after conception ... your baby’s toes and fingers lose their webbing and become longer.”

According to a [study](#) published in Developmental Medicine & Child Neurology, “a number of movement patterns including general movements, isolated limb and head movements, hiccup, and breathing movements, appear” at 9.5-10.5 weeks’ gestation (or 7.5-8.5 weeks post-fertilization).

**9). “At the beginning of the 9<sup>th</sup> week, Olivia will have grown from a single cell into nearly 1 billion cells, and she is now called a fetus. She will suck her thumb and swallow, grasp an object, touch her face, sigh, and stretch.” (1:41)**

EHD [states](#): “8 weeks marks the end of the embryonic period. During this time, the human embryo has grown from a single cell into nearly 1 billion cells[.]” On another [page](#), EHD states: “By 9 weeks thumb sucking begins and the fetus may swallow amniotic fluid. The fetus can also grasp an object, move the head forward and back, open and close the jaw, move the tongue, sigh, and stretch.”

[Planned Parenthood](#) notes: “The embryo develops into a fetus after 10 weeks” LMP (or 8 weeks post-fertilization).

**10). “At 11 weeks, she is playing in the womb, moving her body and exploring her environment.” (1:57)**

EHD [states](#) that, by week 8, “Slowly or rapidly, singularly or repetitively, spontaneously or reflexively, the embryo continues to practice the movements begun earlier and to move in new ways.” In a photo caption on another [page](#), EHD states: “Arms and legs - already very active in the 12-week fetus – continue growing for a long time to come.”

**11). “Her taste bud cells have matured by week 12, but are still scattered throughout her mouth.” (2:03)**

EHD [states](#): “Between 11 and 12 weeks ... [t]he taste bud cells that appeared by 7 weeks have matured into discrete taste buds, but are still scattered throughout the mouth.”

[Psychological Science](#) has reported that “[i]n human fetuses, taste buds develop anatomically at 8 weeks’ gestation [6 weeks post-fertilization] and can detect tastants from 14 weeks’ gestation [12 weeks post-fertilization].”

**12). “Her mother will first sense Olivia’s movement between 14 and 18 weeks — an event called quickening.” (2:10)**

EHD [states](#): “[A] pregnant woman first senses fetal movement between 14 and 18 weeks. Traditionally, this event has been called quickening.”

The American College of Obstetricians and Gynecologists’ book *Your Pregnancy and Childbirth* (7th ed., p.96) notes: “Some women, especially those who have had a baby before, feel quickening as early as 16 weeks of pregnancy.”

**13). “Beginning at 18 weeks, ultrasounds show speaking movements in her voice box.” (2:19)**

EHD [states](#): “Beginning at 18 weeks, ultrasound scans show a distinct type of motion in the fetal voice box, or larynx, similar to movements made during speaking.”

**14). “Around 20 weeks, with a lot of help, babies have survived outside the womb.” (2:27)**

The [Washington Post](#) relates the story of Richard Hutchinson, whose mother was “21 weeks and two days pregnant” using the LMP method of gestational calculation (equivalent to just over 19 weeks post-fertilization) when she gave birth to him.

[Curtis Means](#) was born at 21 weeks and 1 day (19 weeks and 1 day post-fertilization). He holds the current [record](#) for the youngest preemie to survive outside the womb.

Other [research](#) affirms the increasing survival rate of preemies born at 22 weeks LMP.

**15). “At 27 weeks, her eyes are responding to light. She can recognize her parents’ voices, and will even recognize lullabies and stories.” (2:34)**

EHD [states](#): “The pupils dilate and constrict in response to light as early as 27 weeks.” On another [page](#), it states: “By 20 weeks [the cochlea] reaches adult size within the fully developed inner ear. From now on, the fetus will respond to a growing medley of sounds.” On a third [page](#), EHD states: “The fetus hears numerous sounds before birth, with the mother’s voice and heartbeat dominating other sounds. Studies show that after months of listening to the mother’s voice, the newborn prefers her voice to any other. The newborn also prefers female voices to male voices and familiar lullabies heard before birth to new lullabies after birth. Newborns can distinguish prose passages heard during the last 6 weeks of pregnancy from new passages, providing additional evidence of in utero memory formation and learning.”

[Mayo Clinic](#) similarly states: “By the end of the 25th week of pregnancy — 23 weeks after conception — your baby might be able to respond to your voice with movement.”

[BabyCenter](#) notes that “after 23 weeks, your little one will be able to make out your voice and other sounds from outside the womb.”

**16). “Olivia has gone on an amazing journey during these last 9 months. She will soon signal to her mother that it is time for delivery[.]” (2:45)**

EHD [states](#): “The fetus initiates labor resulting in the transition from fetus to newborn.” A photo caption on the same page reads: “The fetus, not the mother, determines when labor begins and chooses the birthing position (head first vs. feet first).”

[Planned Parenthood](#) states that a woman “will probably give birth around” week 39-40 LMP (or week 37-38 post-fertilization).

#### **Relevant definitions:**

[Explore](#): “to feel something with your hands or another part of the body”

# explore *verb*

B1

OPAL W

OPAL S

/ɪk'splɔː(r)/

/ɪk'splɔːr/

+ Verb Forms

- 1 B1 [intransitive, transitive] to travel to or around an area or a country in order to learn about it

- *As soon as we arrived on the island we were eager to explore.*
- **explore something** *They explored the land to the south of the Murray River.*
- *The city is best explored on foot.*
- *Westerners did not set out to **explore the world** until the fifteenth century.*
- **explore something for something** *Bears will sometimes explore urban areas for food.*
- **explore for something** *companies exploring for (= searching for) oil*

+ Wordfinder

+ Wordfinder

+ Extra Examples

TOPICS **Holidays** B1, **Hobbies** B1

+ Oxford Collocations Dictionary

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- 2 B2 [transitive] **explore something** to examine a subject or a possibility completely or carefully in order to find out more about it

SYNONYM **analyse**

- *to **explore a theme/an issue***
- *We will **explore these ideas** in more detail in chapter 7.*
- *to **explore the possibilities/options***
- *The firm will explore possible joint development projects.*
- *A team was brought in to **explore ways** to create the most profit for shareholders.*
- *He intends to **explore the relationship** between economic class and career choice.*
- *a series of programmes in which she **explores the world** of ballet*

+ Language Bank **about**

+ Extra Examples

+ Oxford Collocations Dictionary

- 3 [transitive] **explore something (with something)** to feel something with your hands or another part of the body

- *She explored the sand with her toes.*

[Play](#): “to move aimlessly about ... to move or operate in a lively, irregular, or intermittent manner ... to move or function freely within prescribed limits”

# play 2 of 2 verb

played; playing; plays

*intransitive verb*

1 a : to engage in sport or recreation : **FROLIC**

b : to have sexual relations

*especially* : to have promiscuous or illicit sexual relations → usually used in the phrase *play around*

c (1) : to move aimlessly about : **TRIFLE**

(2) : to toy or fiddle around with something

| *played with her food*

(3) : to deal or behave frivolously or mockingly : **JEST**

(4) : to deal in a light, speculative, or sportive manner

(5) : to make use of double meaning or of the similarity of sound of two words for stylistic or humorous effect

2 a : to take advantage

| *playing on fears*

b (1) : **FLUTTER, FRISK**

(2) : to move or operate in a lively, irregular, or intermittent manner

c : to move or function freely within prescribed limits

[Sigh](#): UCLA Health states the following about sighing:

“Heaving an unconscious sigh is a life-sustaining reflex that helps preserve lung function....

Sighing is vital to lung function, and, thus to life, [Jack] Feldman [professor of neurobiology at the [David Geffen School of Medicine at UCLA](#) and a member of the [UCLA Brain Research Institute](#)] emphasized.

‘A sigh is a deep breath, but not a voluntary deep breath,’ he said. ‘It starts out as a normal breath, but before you exhale, you take a second breath on top of it.’

On average, a person sighs every five minutes, which translates into 12 sighs per hour.



The purpose of sighing is to inflate the alveoli, the half-billion, tiny, delicate, balloon-like sacs in the lungs where oxygen enters and carbon dioxide leaves the bloodstream. Sometimes individual sacs collapse, though.

‘When alveoli collapse, they compromise the ability of the lung to exchange oxygen and carbon dioxide,’ Feldman said. ‘The only way to pop them open again is to sigh... If you don’t sigh, your lungs will fail over time.’”

*“You must remember this: a kiss is just a kiss, a sigh is just a sigh.”*

Contrary to the words immortalized by the piano singer in “Casablanca,” a sigh is far more than a sigh. Heaving an unconscious sigh is a life-sustaining reflex that helps preserve lung function.

Now a new study by researchers at UCLA and Stanford has pinpointed two tiny clusters of neurons in the brain stem that are responsible for transforming normal breaths into sighs. Published in the Feb. 8 advance online edition of *Nature*, the discovery may one day allow physicians to treat patients who cannot breathe deeply on their own — or who suffer from disorders in which frequent sighing becomes debilitating.

“Sighing appears to be regulated by the fewest number of neurons we have seen linked to a fundamental human behavior,” explained [Jack Feldman](#), a professor of neurobiology at the [David Geffen School of Medicine at UCLA](#) and a member of the [UCLA Brain Research Institute](#). “One of the holy grails in neuroscience is figuring out how the brain controls behavior. Our finding gives us insights into mechanisms that may underlie much more complex behaviors.”

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“When alveoli collapse, they compromise the ability of the lung to exchange oxygen and carbon dioxide,” Feldman said. “The only way to pop them open again is to sigh, which brings in twice the volume of a normal breath. If you don’t sigh, your lungs will fail over time.”

## FAQ

*Q: What is Baby Olivia?*

A: Baby Olivia is a medically accurate, animated glimpse of human life from the moment of fertilization. This story details her growth as she progresses from one developmental stage to the next in preparation for her continued life outside of the womb.

*Q: What is the Baby Olivia Act?*

A: The Baby Olivia Act is state legislation that requires local schools provide education on human growth and development, including but not limited to a high-definition ultrasound video and a medically accurate animated video showing the process of fertilization and every significant stage of human development inside the uterus, noting significant markers in cell growth and organ development for every significant marker of pregnancy until birth.

*Q: Who created Baby Olivia?*

A: *Baby Olivia* was created by a panel of medical doctors, including experts in embryonic and fetal development — [Dr. David Bolender](#); [Dr. Donna Harrison](#); [Dr. Tara Sander Lee](#); [Dr. Katrina Furth](#); [Michelle Cretella, MD](#); and [Jeffrey Barrows, DO, MA](#) — who each endorsed the project.

*Q: Is Baby Olivia Medically Accurate?*

A: Yes, in addition to the partnership and review by experts in the field, detailed sources for every word said in the video are available.

*Q: Why is a state legislature mandating this? Why isn't this happening at the county or school district level?*

A: States have a crucial role to play in education policy. What children learn in state-funded schools is affected by all levels of government, federal, state and local as well as parents and non-governmental organizations. For example, in the state of California, the statewide [Health Education Curriculum Framework](#) was developed in collaboration with Planned Parenthood. The Baby Olivia Act allows state lawmakers to act on their compelling interest to ensure students in their state have access to the facts about human development.

*Q: What does this resource cost to use?*

A non-exclusive license to use the resource for educational purposes in perpetuity and at no cost has been granted.

*Q: Is the Baby Olivia Act about restricting abortion? Does the video describe sex?*

A: This bill is about teaching children the basic facts about human development in an approachable way. Children deserve unvarnished, authentic truth. The resource does not talk about sex or mandate specific teaching on the procreative act. The resource starts when a new human being comes into existence, the moment of fertilization. The resource does not say the word abortion, or describe abortion in a positive or negative way.