

## Evidence on: Due Dates

What is an estimated due date, and how is it determined? What are the risks of going past your due date? Does induction increase the risk of Cesarean? At which point do the benefits of being electively induced outweigh the risks? Does a person's goals and preferences for their birth matter?

The purpose of this Evidence Based Birth<sup>®</sup> article is to look at the evidence on due dates.

### **How often are pregnant people induced for going past their estimated "due date?"**

Inductions for non-medical reasons have been on the rise in the U.S. Increasingly, more pregnant people are being induced because they have reached their estimated "due date" of 40 weeks.

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**This article was written on April 15, 2015 by [Rebecca Dekker](#), PhD, RN, APRN of [www.evidencebasedbirth.com](http://www.evidencebasedbirth.com). A literature review was conducted in September 1, 2017 and no new major updates were found.**

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According to the 2013 Listening to Mothers III survey, more than four out of ten mothers (41%) in the U.S. said that their care provider tried to induce labor ([Declercq et al., 2014](#)). The researchers asked mothers to select the reasons that they were induced.

Out of everyone who was induced, 44% said that they were induced because their baby was full term and it was close to the due date. Another 18% said that they were induced because the health care provider was concerned that the mother was overdue.

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### Glossary

- **Estimated due date** = Traditionally considered to be 40 weeks and 0 days after the last menstrual period
- **Last menstrual period (LMP)** = First day of the last period
- **Stillbirth** = Death in utero due to any cause after 20 weeks
- **Neonatal death** = Death during the first week of life\*
- **Perinatal death** = Either a stillbirth or a death that occurs in the first week of life after birth
- **Post-dates pregnancy** = A common term that means any pregnancy that goes past the estimated 40-week due date; however, this term is imprecise and not recommended
- **Post-term pregnancy** = Any pregnancy that reaches 42 weeks and 0 days (294 days total) or later
- **Elective induction** = Induction that is not medically indicated
- **Spontaneous labor** = A labor starting on its own without medical intervention

\* Some researchers define neonatal death as a death in the first week of life; others use the first month of life. Most of the research studies reviewed in this article used the definition of first week of life.

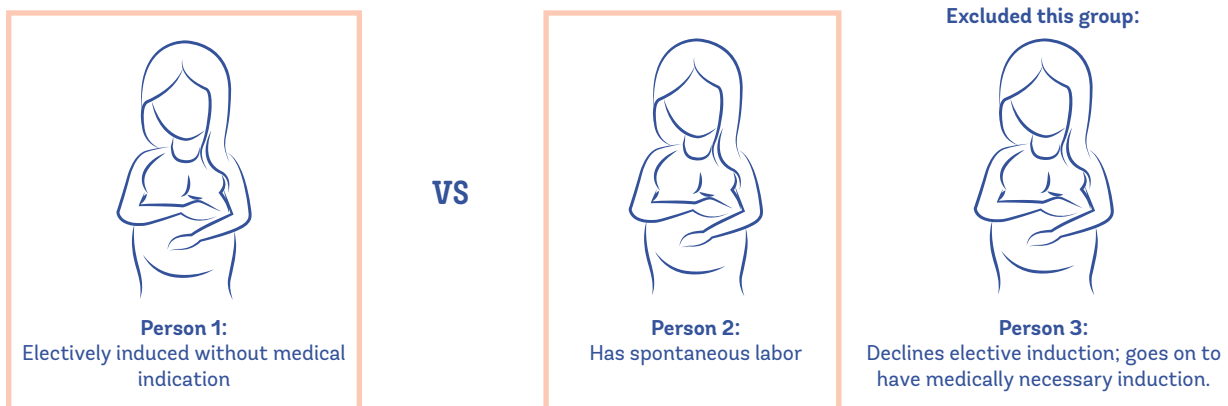
### Why is there so much controversy about elective induction?

For many years, the common belief was that elective (not medically indicated) inductions doubled the Cesarean rate, especially in first-time mothers. Elective inductions might occur for social reasons, like the provider wanting the mother to give birth before he or she goes out of town, or other non-medical reasons like the mother wanting to be done with an uncomfortable pregnancy.

However, in the 2010s, some researchers began to dispute the claim that elective induction doubles the risk of cesarean. They argued that earlier studies—where elective induction showed a doubling in Cesarean rates—were flawed.

In the earlier studies, elective induction was compared only to spontaneous labor: people who were electively induced versus people who went into spontaneous labor. Excluded from these two groups were people who were not *electively* induced, but chose to wait for labor and then ended up having medically indicated inductions later on (and, thus, a higher rate of Cesareans). For an example of this earlier flawed research, see this article by [Yeast et al. 1999](#).

Previous studies compared Cesarean rates of these two groups only:





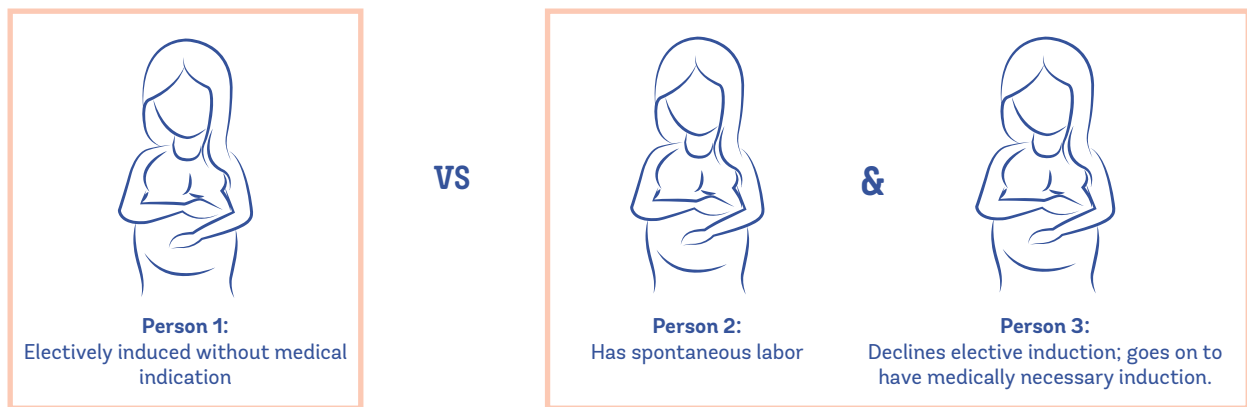
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New researchers pointed out that we need to compare people who have elective inductions with the whole group of those who *choose to wait* for spontaneous labor—whether or not they actually do have spontaneous labor.

This is a subtle difference, but an important one, because not everyone who chooses to wait for labor will actually have a spontaneous labor; some of them will develop complications that lead to an induction and increase their risk for Cesarean. The researchers argued that the comparison group must include them as well.

This graphic shows how you would look at the two groups: the elective induction group versus the entire group of people who were not electively induced—some of whom would, in fact, end up being induced later for medical reasons.

In 2010, researchers say studies should include all groups:



Because of this flaw in the earlier studies, the researchers argued, we can't determine from those older studies if elective induction between 39-41 weeks is better or worse than waiting for labor to start on its own.

### Enter the **ARRIVE** study.

Funded by the U.S. National Institutes of Health, the doctors in charge of the [ARRIVE study](#) ([A Randomized Trial of Induction Versus Expectant Management](#)) recently presented results on 6,000 first-time mothers from across the United States (U.S.). Participants were randomly assigned to elective induction at 39 weeks OR waiting for labor to start on its own (expectant management), up until 41 weeks. The researchers recently reached their recruitment goal of 6,000 people, and presented their initial findings at the annual Society for Maternal-Fetal Medicine (SMFM) conference in February 2018.

According to the [study brochure](#), the goal of the study was “to find out whether coming to the hospital and having your labor started with medicine (induced) at 39 weeks of pregnancy can improve the baby’s health at birth when compared with waiting for labor to start on its own.”

The [study brochure](#) also says that “During labor induction, the same types of complications that can arise during spontaneous labor can occur.” Unfortunately, this statement is not quite true, because [risks of inductions](#) include hyper-stimulation of the uterus (where the uterus contracts too frequently, decreasing blood flow to the baby), the use of extra interventions such as continuous fetal monitoring and the need for additional pain relief, and a failed induction leading to a Cesarean ([NICE Guidelines, 2008](#)).





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The researchers looked at the benefits and risks of elective induction at 39 weeks—including Cesarean rates, serious infant health problems, hospital costs, and patient satisfaction. Their goal was to find out if having everyone give birth by 39 weeks results in better newborn outcomes than letting people wait for spontaneous labor. They found that there was no difference between groups in their primary outcome—the overall health of newborns. They did find a slight decrease in the Cesarean rate among the 39 week induction group. To listen to our podcast explaining the results, check out EBB episode 10 [here](#).

### Limitations to the ARRIVE study

Since only 10% of people go into labor on their own by 39 weeks ([Smith, 2001](#); [Jukic et al., 2013](#)), what would happen if everyone was electively induced at 39 weeks? The ARRIVE study was not designed to look at the practical implications of inducing everyone at 39 weeks. For example, what might happen to someone who has a serious medical need for an induction, but can't get on the schedule because all of the hospital beds are full of people being electively induced at 39 weeks?

One thing that the ARRIVE study could not tell us is whether or not induction at 39 weeks can decrease the risk of stillbirth or newborn death. They did not find any difference in stillbirth or newborn death between groups, but their study (even with 6,000 people) was too small to tell a difference in such a rare outcome. In earlier research, it took a sample size of at least 7,000 participants to tell whether elective induction at 41-42 weeks decreases the combined risk of stillbirth and newborn death ([Hussain et al., 2011](#); [Gulmezoglu et al., 2012](#)). Since stillbirths and newborn deaths are even rarer at 39 and 40 weeks, the ARRIVE study (with 6,000 participants) was too small to tell if elective induction has an effect on this outcome.

### What does it mean to be “full term?”

For many years, a baby was defined as being born at “term” if it was born between 37 weeks 0 days and 41 weeks 6 days. Anything before that 5-week period was considered “preterm,” and anything after those five weeks was “post-term.”

Over time, though, research began to show that health problems were more common at certain points during this 5-week “term” period. In particular, newborns are more likely to die (although the overall risk was still very low) if they are born before 39 weeks, or after 41 weeks.

The chance of a newborn having problems is lowest if he or she is born between 39 weeks and 0 days and 40 weeks and 6 days ([Spong, 2013](#)).

In 2012, a group of experts came together to define *term pregnancy*. Based on their review of the research evidence, they broke the 5-week term period into separate groups ([Spong, 2013](#)).

- *Early term* babies are born between 37 weeks 0 days and 38 weeks 6 days
- *Full term* babies are born between 39 weeks 0 days and 40 weeks 6 days
- *Late term* babies are born between 41 weeks 0 days and 41 weeks 6 days
- *Post term* babies are born at 42 weeks and 0 days or later

### How do you figure out your estimated due date?

Almost everyone—including doctors, midwives, and online due date calculators—uses Naegele’s rule (listen to the pronunciation [here](#) (<http://bit.ly/2eDYCEO>)) to figure out an *estimated due date* (EDD).

Naegele’s rule assumes that you had a 28-day menstrual cycle, and that you ovulated exactly on the





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14<sup>th</sup> day of your cycle (Note: some health care providers will adjust your due date for longer or shorter menstrual cycles).

To calculate your EDD according to Naegele's rule, you add 7 days to the first day of your last period, and then count forward 9 months (or count backwards 3 months). This is equal to counting forward 280 days from the date of your last period.

For example, if your last menstrual period was on April 4 you would add seven days (April 11) and subtract 3 months = an estimated due date of January 11.

Another way to look at it is to say that your EDD is 40 weeks after the first day of your last period.

In cases where the date of conception is known precisely, such as with [in vitro fertilization](http://bit.ly/2x5qolb) (<http://bit.ly/2x5qolb>) or [fertility tracking](http://bit.ly/2x5dTWz) (<http://bit.ly/2x5dTWz>) where people know their ovulation day, the EDD is calculated by adding 266 days to the date of conception (or subtracting 7 days and adding 9 months). This increases the accuracy of the EDD because it no longer assumes a 28-day cycle with ovulation occurring on Day 14.

### But where did Naegele's rule come from?

In 1744, a professor from the Netherlands named Hermann Boerhaave explained how to calculate an estimated due date. Based on the records of 100 pregnant women, Boerhaave figured out the estimated due date by adding 7 days to the last period, and then adding nine months ([Baskett & Nagele, 2000](#)).

However, Boerhaave never explained whether you should add 7 days to the *first day* of the last period, or to the *last day* of the last period.

In 1812, a professor from Germany named Carl Naegele quoted Professor Boerhaave, and added some of his own thoughts. (This is how Naegele's rule got its name!) However, Naegele, like Boerhaave, did not say when you should start counting—from the beginning of the last period, or the last day of the last period.

His text can be interpreted one of two ways: either you add 7 days to the first day of the last period, or you add 7 days to the last day of the last period.

As the 1800s went on, different doctors interpreted Naegele's rule in different ways. Most added 7 days to the *last day* of the last period.

However, by the 1900s, for some unknown reason, American textbooks adopted a form of Naegele's rule that added 7 days to the *first day* of the last period ([Baskett & Nagele, 2000](#)).

And so this brings us to today, where almost all doctors use a form of Naegele's rule that adds 7 days to the *first day* of your last period, and then counts forward 9 months—a rule that is not based on any current evidence, and may not have even been intended by Naegele.

### What is the most accurate way to tell how far along you are?

Doctors started using ultrasound in the 1970s. Soon after, ultrasound measurement replaced last menstrual period (LMP) as the most reliable way to define gestational age ([Morken et al., 2014](#)).

A large body of evidence shows that ultrasounds done in early pregnancy are more accurate than using LMP to date a pregnancy. In a 2012 Cochrane review, researchers combined the results from 7





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randomized clinical trials that compared routine early ultrasound to a policy of not routinely offering ultrasound.

The researchers found that people who had an early ultrasound to date the pregnancy were less likely to be induced for a post-term pregnancy.

In other words, using the LMP to estimate your due date makes it more likely that you will be mislabeled as “post-term” and experience an unnecessary induction.

In a large observational study that enrolled more than 17,000 pregnant people in Finland, researchers found that ultrasound at any time point between 8 and 16 weeks was more accurate than the LMP. When ultrasound was used instead of a “certain” LMP (in other words, the mother is “certain” about the date she had her last period), the number of “post-term” pregnancies decreased from 10.3% to 2.7% (Taipale & Hiilesmaa, 2001).

### Why is LMP less accurate than using ultrasound?

There are several reasons why the LMP is usually less accurate than an ultrasound (Savitz et al., 2002; Jukic et al., 2013; ACOG, 2014). LMP is less accurate because it can have these problems:

- People can have irregular menstrual cycles, or cycles that are not 28 days
- People may be uncertain about the date of their LMP
- Many people do not ovulate on the 14<sup>th</sup> day of their cycle
- The embryo may take longer to implant in the uterus for some people
- Research indicates that some people are more likely to recall a date that includes the number 5, or even numbers, so they may inaccurately recall that the first day of their LMP has one of these numbers in it

### What is the best time to have an ultrasound to determine gestational age?

In a recent study, researchers grouped ultrasound scans by <7 weeks, 7-10 weeks, 11-14 weeks, 14-19 weeks, and 20-27 weeks (Khambalia et al., 2013).

The authors found that the most accurate time to perform an ultrasound to determine the gestational age was 11-14 weeks. About 68% of people gave birth  $\pm$ 11 days of their estimated due date as calculated by ultrasound at 11-14 weeks. This was a more accurate result than any of the other ultrasound scans, and more accurate than the LMP.

The accuracy of the ultrasound saw a significant decline starting at about 20 weeks. Using an estimated due date from either the LMP or an ultrasound at 20-27 weeks led to a higher rate of pre- and post-term births.

### Should a due date be changed based on a third trimester ultrasound?

In the Listening to Mothers III study, one in four mothers (26%) reported that their care provider changed their estimated due date based on a late pregnancy ultrasound. For 66% of the mothers, the estimated due date was moved up to an earlier date, while for 34% of the mothers, the date was moved back to a later date (Declercq et al., 2014).

Ultrasounds in the third trimester are less accurate than earlier ultrasounds or the LMP at predicting gestational age. Ultrasounds in the third trimester are not as accurate because they are measuring the





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size of the baby and comparing him or her to a “standard” sized baby. All babies are about the same size early in pregnancy. But if your baby will be larger than average, it will be perceived as “closer to done” when the ultrasound is done, and your due date will be moved up (incorrectly).

The reverse is also true for babies that will be smaller than average at term—their due date might be moved to a later date. This could be risky if the baby is experiencing growth restriction, as growth-restricted babies have a higher risk of stillbirth towards the end of pregnancy. Because of these problems with third trimester ultrasounds, the American College of Obstetricians and Gynecologists states that due dates should only be changed in the third trimester in very rare circumstances (2014).

They suggest that the due date should only be changed after a third trimester pregnancy ultrasound if 1) it is the pregnant person’s first ultrasound, and 2) it is more than 21 days different than the due date suggested by the LMP ([ACOG, 2014](#)).

### How long is a normal pregnancy? Is it really 40 weeks?

In the U.S. and other Western countries, induction is common at or even before 40 weeks, so it is impossible to know exactly what percentage of people today would naturally go into labor and give birth before, on, or after their estimated due date.

In the past, researchers figured out the average length of a normal pregnancy by looking at a large group of pregnant people, and measuring the time from ovulation (or the last menstrual period, or an ultrasound) until the date the person gave birth—and calculating the average. However, this method is wrong and does not give us accurate results.

### Why is this method wrong?

This method does not work because many people are induced when they reach 39, 40, 41, or 42 weeks.

If you *do* include these induced people in your average, then you are including people who gave birth earlier than they would have otherwise, because they were not given time to go into labor on their own.

But this puts researchers in a bind, because if you *exclude* a person who was induced at 42 weeks from your study, then you are ignoring a pregnancy that was induced because it went longer—and by excluding that case, you artificially make the average length of pregnancy too short.

### So how can we deal with this problem?

Researchers today use a method called “survival analysis” or “time to event analysis.” This is a special method that allows you to include *all* of these people in your study, and still get an accurate picture of how long it takes the average person to go into spontaneous labor. There have been two studies that measured the average length of pregnancy using survival analysis:

#### Study finds that estimated due date is 3 to 5 days AFTER 40 weeks

In a very important study published in 2001, [Smith](#) looked at the length of pregnancy in 1,514 healthy women whose estimated due dates, as calculated by the last menstrual period, were perfect matches with estimated due dates from their first trimester ultrasound ([Smith, 2001](#)).

The researchers found that 50% of all women giving birth for the first time gave birth by 40 weeks and 5 days, while 75% gave birth by 41 weeks and 2 days.





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Meanwhile, 50% of all women who had given birth at least once before gave birth by 40 weeks and 3 days, while 75% gave birth by 41 weeks.

This means that for both first-time and experienced mothers in [Smith's study](#), the traditional “estimated due date” of 40 weeks was wrong!

The actual pregnancy was about 5 days longer than the traditional due date (using Naegele's rule) in a first-time mother, and 3 days longer than the traditional due date in a mother who has given birth before.

### Study finds that estimated due date should be closer to 40 weeks and 5 days

In 2013, [Jukic et al.](#) used survival analysis to look at the normal length of a pregnancy. This was a smaller study—there were only 125 healthy women, and they all gave birth between the years 1982 and 1985. However, this was also an important study, because researchers followed the participants even before conception and measured their hormones daily for six months ([Jukic et al., 2013](#)).

This means that the researchers knew the exact days that the participants ovulated, conceived, and even when their pregnancies implanted!

So what was the average length of a pregnancy in this study?

After excluding women who had preterm births or pregnancy-related medical conditions, the final sample of 113 women had a median time from *ovulation to birth* of 268 days (38 weeks, 2 days after ovulation).

The median time from the first day of the *last menstrual period to birth* was 285 days (or 40 weeks, 5 days after the last menstrual period).

The length of pregnancy ranged from 36 weeks and 6 days to one person who gave birth 45 weeks and 6 days after the last menstrual period. The 45 weeks and 6 days sounds really long... but this particular person actually gave birth 40 weeks and 4 days after *ovulation*. Her ovulation did not fit the normal pattern, so we know her LMP due date was not accurate.

The researchers also found that:

- 10% gave birth by 38 weeks and 5 days after the LMP
- 25% gave birth by 39 weeks and 5 days after the LMP
- 50% gave birth by 40 weeks and 5 days after the LMP
- 75% gave birth by 41 weeks and 2 days after the LMP
- 90% gave birth by 44 weeks and zero days after the LMP

Remember though, some of the participants did not ovulate on the 14<sup>th</sup> day of their period (that's why you saw the statistic that 10% still haven't given birth by 44 weeks after the LMP!) So if we look at when people give birth after ovulation, you'll see this pattern:

- 10% gave birth by 36 weeks and 4 days after ovulation
- 25% gave birth by 37 weeks and 3 days after ovulation
- 50% gave birth by 38 weeks and 2 days after ovulation
- 75% gave birth by 39 weeks and 2 days after ovulation
- 90% gave birth by 40 weeks and zero days after ovulation







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Women who had **embryos that took longer to implant were more likely to have longer pregnancies**. Also, women who had a specific sort of hormonal reaction right after getting pregnant (a late rise in progesterone) had a pregnancy that was 12 days shorter, on average.

### So is the traditional “due date” really your due date?

Based on best evidence, there is no such thing as an exact “due date,” and the estimated due date of 40 weeks is not accurate. Instead, it would be more appropriate to say that there is a normal range of time in which most people give birth. About half of all pregnant people will go into labor on their own by 40 weeks and 5 days (for first-time mothers) or 40 weeks and 3 days (for mothers who have given birth before). The other half will not.

### Are there some things that can make your pregnancy longer?

By far, the most important predictor of a longer pregnancy is a family history of long pregnancies—including your own personal history, your mother and sisters’ history, and your male partner’s family history ([Jukic et al., 2013](#); [Oberg et al., 2013](#); [Mogren et al., 1999](#); [Olesen, et al., 1999](#); [Olesen et al., 2003](#)).

In 2013, [Oberg et al.](#) published a large study that looked at more than 475,000 Swedish births, most of which were dated with an ultrasound before 20 weeks. They found that genetics has an incredibly strong influence on your chance of having a birth after 42 weeks:

- If you’ve had a post-term birth before, you have 4.4 times the chance of having another post-term birth with the same partner
- If you’ve had a post-term birth before, and then you switch partners, you have 3.4 times the chance of having another post-term birth with your new partner
- If your sister had a post-term birth, you have 1.8 times the chance of having a post-term birth

Overall, researchers found that half of your chance for having a post-term birth comes from genetics. This includes the baby’s genetic tendency to gestate longer (due to genes the baby inherited from the mother and the father), and the mother’s genetic tendency to carry a pregnancy longer. The Swedish researchers even proposed that you could call some pregnancies “resistant,” because these mothers and/or fetuses have a genetically decreased tendency to start labor.

Other factors that may make your pregnancy more likely to go longer include:

- Higher body mass index before you get pregnant ([Halloran et al., 2012](#); [Jukic et al., 2013](#); [Oberg et al., 2013](#))
- Higher weight gain during pregnancy ([Halloran et al., 2012](#))
- Longer time between when you ovulated and when your pregnancy implanted ([Jukic et al., 2013](#))
- Older maternal age ([Oberg et al., 2013](#); [Jukic et al., 2013](#))
- Heavier birth weight of the mother ([Jukic et al., 2013](#))
- Higher education level of the mother ([Oberg et al., 2013](#))
- Being pregnant for the first time ([Oberg et al., 2013](#))
- Being pregnant with a male baby ([Divon et al., 2002](#); [Oberg et al., 2013](#))
- Your mother had a post-term birth ([Mogren et al., 1999](#); [Olesen et al., 1999](#); [Olesen et al., 2003](#))
- The baby is measuring small by ultrasound at 10–24 weeks ([Johnsen et al., 2008](#))
- Experiencing environmental stress towards the end of pregnancy (at 33-36 weeks) ([Margerison-Zilko et al., 2015](#))





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### What are the risks of going past your due date?

The risks of some complications go up as you go past your due date, and there are three recent studies that have shown us what the risks are.

1. In 2003, [Caughey et al.](#) looked at 135,560 people who gave birth at term in California between the years 1995 and 1999 ([Caughey et al., 2003](#)). The participants in this sample all gave birth at Kaiser Permanente hospitals in northern California. The overall use of interventions (Cesareans and inductions) in this sample was not listed.
2. In 2004, [Caughey et al.](#) looked at the records of 45,673 people who gave birth in a single hospital in California from 1992 to 2002 ([Caughey & Musci, 2004](#)). The participants in this study were mostly well-educated. As far as intervention rates go, 18% gave birth by Cesarean and 16% with the help of vacuum or forceps. The rate of inductions was not listed.
3. In 2007, [Caughey et al.](#) studied the medical records of 119,254 people who gave birth after 37 weeks at Kaiser Permanente between the years of 1995 and 1999. This was the same time period and same hospital as his 2003 study, but this time the researchers only looked at low-risk people who had health insurance. The overall Cesarean rate was 13.8%, and 9.3% gave birth with the help of vacuum or forceps. The authors also took whether or not people had inductions into account when they calculated the risks of going past your due date ([Caughey et al., 2007](#)).

Risks for mothers:

- The risk of chorioamnionitis (infection of the membranes) was lowest at 37 weeks (0.16%) and increased every week after that to a high of 6.15% at  $\geq 42$  weeks ([Caughey et al., 2003](#))
- The risk of endomyometritis (infection of the uterus) was lowest at 38 weeks (0.64%) and increased every week after that to a high of 2.2% at  $\geq 42$  weeks ([Caughey & Musci, 2004](#))
- The risk of having a placenta abruption (placenta separates prematurely from the uterus) was lowest at 37 weeks (0.09%), and increased every week to a high of 0.44% at  $\geq 42$  weeks ([Caughey et al., 2003](#))
- The risk of preeclampsia was lowest at 37 weeks (0.4%) and highest at 40 weeks (1.5%), after which the risk did not change ([Caughey et al., 2003](#))
- The risk of postpartum hemorrhage was lowest at 37 weeks (1.1%) and increased almost every week to a high of 5% at 42 weeks ([Caughey et al., 2007](#))
- The risk of a primary Cesarean (in people who have never had a Cesarean before) increased from 14.2% at 39 weeks to a high of 25% at  $\geq 42$  weeks ([Caughey & Musci, 2004](#))
- The risk of having a primary Cesarean for a non-reassuring fetal heart rate was lowest at 37-39 weeks (13.3-14.5%) and reached a high of 27.5% at 42 weeks ([Caughey et al., 2007](#))
- The risk of receiving forceps or vacuum assistance increased from 14.1% at 38 weeks to a high of 18.5% at 41 weeks ([Caughey & Musci, 2004](#))
- The risk of having a 3rd or 4th degree tear was lowest at 37 weeks (3.4%) and increased every week to a high of 9.1% at 42 weeks. However, these numbers are much higher than are typically seen, and are partially related to the high use of vacuum and forceps in this study.

In their 2007 study, [Caughey et al.](#) reported that high use of induction, Cesareans, and vacuum/forceps for people with increasing gestational age may contribute to an increase in maternal risks. However, when the researchers used a statistical method to control for the use of interventions, the risks still increased with gestational age.





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Risks for infants:

- The risk of moderate or thick meconium increased every week starting at 38 weeks, and peaked at  $\geq 42$  weeks (3% at 37 weeks, 5% at 38 weeks, 8% at 39 weeks, 13% at 40 weeks, 17% at 41 weeks, and 18% at  $> 42$  weeks) ([Caughey & Musci, 2004](#))
- Neonatal intensive care unit (NICU) admission rates were lowest at 39 weeks (3.9%) and rose to 5% at 40 weeks and 7.2% at  $\geq 42$  weeks ([Caughey & Musci, 2004](#))
- The risk of the baby being large at birth ( $> 9$  lbs 15 oz or  $> 4500$  grams) rose starting at 38 weeks (0.5%), and doubled every week after that up until 42 weeks (6%) ([Caughey & Musci, 2004](#))
- The odds of having a low 5-minute Apgar score went up starting at 40 weeks and increased each week until  $\geq 42$  weeks (exact numbers not reported; [Caughey & Musci, 2004](#))

Other risks for post-term pregnancy include having low fluid, and something called dysmaturity syndrome (growth restriction plus muscle wasting), which happens in about 10% of babies who go past 42 weeks. For more information about meconium, see this article by Midwife Thinking about [meconium stained waters](#).

### What about the risk of stillbirth?

In this section, we will talk about how the risk of stillbirth increases towards the end of pregnancy.

There are two very important things for you to understand when learning about stillbirth rates in post-term pregnancies.

First, there is a difference between absolute risk and relative risk.

**Absolute risk is the actual risk of something happening to you.** For example, if the absolute risk of having a stillbirth at 41 weeks was 0.4 out of 1,000, then that means that 0.4 mothers out of 1,000 (or 4 out of 10,000) will experience a stillbirth.

**Relative risk is the risk of something happening to you in comparison to somebody else.** If someone said that the risk of having a stillbirth at 42 weeks compared to 41 weeks is 50% higher, then that sounds like a lot. But the actual (or absolute) risk would still be low—0.6 per 1,000 versus 0.4 per 1,000.

Yes—0.6 is 50% higher than 0.4, if you do the math! So, while it is a true statement to say “the risk of stillbirth increases by 50%,” it can be a little misleading if you are not looking at the actual numbers behind it.

The second important thing that you need to understand is that there are different ways of measuring stillbirth rates. Depending on how the rate is calculated, you can end up with different rates.

### How do you measure stillbirth rates?

Up until the 1980s, some researchers thought that the risk of stillbirth past 41-42 weeks was similar to the risk of stillbirth earlier in pregnancy. So, they did not think there was any increase in risk with going past your due date.

However, in 1987, a researcher named Dr. [Yudkin](#) published a paper introducing a new way to measure stillbirth rates. Dr. [Yudkin](#) said that earlier researchers used the wrong math when they calculated stillbirth rates—they used the wrong denominator! ([Yudkin, Wood et al., 1987](#)).





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Before 1987, researchers calculated stillbirth rates like this:

Risk of Stillbirth at Week 41	=	$\frac{\text{\# of Stillbirths at 41 weeks}}{\text{\# of Births at 41 weeks}}$	(Excluded babies still in the womb and born after 41 weeks)
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Here’s why this formula is wrong: We don’t need to know how many stillbirths happen out of every 1,000 births at 41 weeks. Instead, we need to know how many stillbirths happen at 41 weeks compared to all pregnancies and births at 41 weeks. In other words, you have to include the healthy, living babies that have not been born yet in your denominator.

New formula for calculating calculated stillbirth rates:

Risk of Stillbirth at Week 41	=	$\frac{\text{\# of Stillbirths at 41 weeks}}{\text{\# of Births and Pregnancies at 41 weeks}}$	(Includes babies still in the womb and born after 41 weeks)
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When researchers began using this new formula to figure out stillbirth rates, they found something very surprising—the risk of stillbirth decreased throughout pregnancy, until it reached a low point at 37-38 weeks, after which the risk started to rise again.

This finding—that the risk of stillbirth decreases throughout pregnancy, and then increases sometime after 37-38 weeks—has been found many times by different researchers in different countries. This phenomenon is called the “U-shaped curve” of stillbirth. In other words, there are higher rates of stillbirth earlier in pregnancy, then they go down until around 37-38 weeks, after which they rise again.

Because the risk of stillbirth starts to go up even more at 40, 41, and 42 weeks, some researchers argue that although 40 weeks and 3-5 days may be the physiological length of pregnancy, 40 weeks may be the functional length of a pregnancy.

In other words, the average pregnancy normally lasts about 40 weeks and 5 days, but in some researchers’ *opinion*, because of the increased risk of stillbirth and newborn death; 40 weeks may be as long as a pregnancy should go.

And although the stillbirth rates may seem really low overall, if you happen to be a parent who experiences the 1 in 1,000 event at 42 weeks, then the risk doesn’t seem so low anymore.

## Actual stillbirth rates vs. open-ended stillbirth rates

Even after researchers began using the new way of calculating stillbirth rates, there was still controversy about the best way to calculate this new formula for measuring stillbirth rates.

Different than what Yudkin proposed in 1987, some researchers preferred an “open-ended” stillbirth rate (also known as the “prospective risk of stillbirth”). An open-ended stillbirth rate at 40 weeks would tell us what a pregnant person’s risk of stillbirth was for any time after 40 weeks, if she let the pregnancy continue indefinitely.

Other researchers argued that most people (and doctors!) don’t want to know what the risk of stillbirth would be if a pregnant person chose to let the pregnancy continue on and on! (Hilder et al., 2000). They





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just want to know what the risk would be if they waited one more week until the next appointment, or even a few days.

But the “open-ended” stillbirth rate tells you what your risk of stillbirth at 40 weeks would be if you include babies born not just at 40 weeks, but 41 weeks, 42 weeks, 43 weeks, and on! ([Boulvain et al., 2000](#)).

In the end, you will find that stillbirth rates vary from study to study, depending on whether the researchers report the actual stillbirth rate, or the open-ended stillbirth rate.

### So what is the risk of stillbirth as you go past your due date?

Since the late 1980’s, there have been at least 12 large studies that looked at the risk of stillbirth during each week of pregnancy. Some of the researchers used open-ended stillbirth rates, and some of them used actual stillbirth rates.

All of the researchers found a relative increase in the risk of stillbirth as pregnancy advanced.

To get an accurate picture of stillbirth in people who go past their due date, it would be best to look at studies that took place in more recent times. I’ve chosen 3 of the most recent studies to show you from Norway, Germany, and the U.S. To see all of the other studies, click to view the entire table [here](http://bit.ly/2iY937p) (<http://bit.ly/2iY937p>).

All 3 of these studies used the actual stillbirth rate—not the open-ended stillbirth rate. Two studies used ultrasound to calculate gestational age, and one study used the LMP.

First Author (Year)	Sample	Findings
<a href="#">Morken (2014)</a>	<ul style="list-style-type: none"> <li>Stillbirth rates of 1,855,682 people in Norway who gave birth to single babies at 37-44 gestational weeks between the years 1967 and 2006</li> <li>Ultrasound was introduced in 1986; for this study, due dates were calculated per LMP from 1967 to 1998 and by ultrasound from 1999 to 2006</li> <li>Excluded cases with preeclampsia, diabetes, and congenital problems</li> <li>Data are from the Norwegian birth registry</li> </ul>	<p>When <a href="#">Morken</a>, et al. only looked at stillbirth rates from the years 1999 to 2006 (when ultrasound was used to determine gestational age), they found that <b>the stillbirth rates for infants who were not small for gestational age were:</b></p> <p>37 weeks = 0.14 per 1,000  38 weeks = 0.18 per 1,000  39 weeks = 0.26 per 1,000  40 weeks = 0.52 per 1,000  41 weeks = 0.68 per 1,000  ≥ 42 weeks = 1.17 per 1,000</p> <p>Babies who were small for gestational age had much higher stillbirth rates:</p> <p>37 weeks = 0.81 per 1,000  38 weeks = 1.93 per 1,000  39 weeks = 1.72 per 1,000  40 weeks = 1.82 per 1,000  41 weeks = 3.38 per 1,000  ≥ 42 weeks = 7.00 per 1,000</p>





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<p><a href="#">Weiss (2014)</a></p>	<ul style="list-style-type: none"> <li>• Stillbirth rates of 472,843 low-risk people who were pregnant with a single baby and gave birth in Germany between the years 2004 and 2009</li> <li>• During this time, all hospitals did non-stress tests every 2 days, starting at 40 weeks and 0 days</li> <li>• Excluded premature births (&lt;37 weeks 0 days), babies with congenital problems, and babies that did not have ultrasound dating.</li> </ul>	<p>The stillbirth rates in this study were:</p> <p>37.0-37.6 days = 2.77 per 1,000  38.0-38.6 days = 1.09 per 1,000  39.0-39.6 days = 0.90 per 1,000  40.0-40.6 days = 0.72 per 1,000  41.0-41.6 days = 0.44 per 1,000  42.0-42.6 days = 0.70 per 1,000  &gt;42.6 days = 8.85 per 1,000 (2 babies stillborn out of 226 pregnancies)</p> <p>The authors note that the stillbirth rates they observed at 41 and 42 weeks were much lower than what has been observed in other studies—probably because their study is more recent (2004-2009 vs. 1980s-1990s). They also think that perhaps their fetal monitoring policy could be responsible for the lower stillbirth rates.</p>
<p><a href="#">Rosenstein (2012)</a></p>	<ul style="list-style-type: none"> <li>• Stillbirth rates of 3,820,826 singleton infants who were born between 37 weeks and 42 weeks 6 days in California during the years 1997 to 2006</li> <li>• Excluded infants with genetic or congenital problems, and those born to mothers with diabetes or chronic hypertension.</li> <li>• Last menstrual period (LMP) used to determine due dates</li> <li>• Data came from birth certificates</li> </ul>	<p>The stillbirth rates were:</p> <p>37 weeks = 0.21 per 1,000  38 weeks = 0.27 per 1,000  39 weeks = 0.35 per 1,000  40 weeks = 0.42 per 1,000  41 weeks = 0.61 per 1,000  42 weeks = 1.08 per 1,000</p> <p>The authors also looked at the combined risk of the baby <b>either being stillborn or dying in the first year of life</b> if the mother waited one more week to give birth (combined stillbirth + infant death risk):</p> <p>37 weeks = 1.26 per 1,000  38 weeks = 1.16 per 1,000  39 weeks = 1.29 per 1,000  40 weeks = 1.40 per 1,000  41 weeks = 1.76 per 1,000</p>

Although most researchers have found an increase in stillbirth rates in the late term and post term period, the “absolute” increase in risk is small until about 42 weeks, after which it reaches about 1 out of 1,000.

Based on their data, [Rosenstein et al. \(2012\)](#) calculated that in order to prevent 1 stillbirth or infant death, there would need to be at least 2,442 people electively induced at 39 weeks. They also estimated that 1,476 people would need to be electively induced at 41 weeks in order to prevent one stillbirth or infant death. This is called the “number needed to treat.” In other research that we are going to talk about later on this article, the number needed to treat was much lower.

### Does anything increase the risk of stillbirth in an individual who is past 41 or 42 weeks?

Researchers have found several factors are related to a higher risk of stillbirth:





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Post-term babies who are small for gestational age (body weight <10<sup>th</sup> percentile) have a 6-7 times higher chance of stillbirth and newborn death than post-term babies who are not small for gestational age.

Also, small for gestational age babies are often growth restricted at the 18-week ultrasound. So, the gestational age for these babies is often under-estimated.

This means that babies who are small for gestational age may be more post-term than we realize they are—increasing their risk while also leaving us unaware of their true gestational age ([Morken et al., 2014](#)).

Other factors that do not necessarily *cause* stillbirth but may *increase the risk* of stillbirth, in general, include:

- Being African American ([Ananth et al., 2009](#); [Stillbirth Collaborative, 2011](#))
- Being pregnant with your first baby ([Huang et al., 2000](#); [Smith, 2001](#); [Stillbirth Collaborative, 2011](#); [Flenady et al., 2011](#))
- Fewer than four prenatal visits or no prenatal care ([Huang et al., 2000](#); [Flenady et al., 2011](#))
- Low socioeconomic status ([Huang et al., 2000](#); [Flenady et al., 2011](#))
- Being overweight or obese ([Huang et al., 2000](#); [Stillbirth Collaborative, 2011](#); [Flenady et al., 2011](#))
- Smoking ([Morken et al., 2014](#); [Flenady et al., 2011](#))
- Pre-existing diabetes ([Stillbirth Collaborative, 2011](#); [Flenady et al., 2011](#))
- Pre-existing hypertension ([Flenady et al., 2011](#))
- Older maternal age (≥40 years) ([Stillbirth Collaborative, 2011](#))
- Not living with a partner ([Stillbirth Collaborative, 2011](#))
- History of previous stillbirth ([Stillbirth Collaborative, 2011](#))
- Being pregnant with multiples ([Stillbirth Collaborative, 2011](#))

Of course, parents can still experience the stillbirth of a child even when none of these risk factors are present. As many as a third of all stillbirths that take place before labor have no known cause ([Warland & Mitchell, 2014](#)).

To read more about theories of unexplained stillbirth, read this article [here](http://bit.ly/2vI2Q5C) (<http://bit.ly/2vI2Q5C>).

### Induction versus Waiting for Labor

When someone gets closer or past their due date, they will often face the question about whether to induce labor or wait for labor to start on its own.

Inducing labor is also known as “active management.”

Waiting for labor to start on its own, with fetal testing to monitor the baby’s status, is called “expectant management.”

Many researchers have tried to compare the risks and benefits of induction versus expectant management for pregnant people who get close to or go past their due dates.

### Cautions about the Evidence

Before we begin discussing the evidence, it is important to note that there are some major drawbacks to the evidence that we have so far on induction versus waiting for labor to start:





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1. Many of the clinical trials were carried out in countries or time periods with low Cesarean rates. Some research results may not apply to hospitals with high Cesarean rates. Does your hospital have high rates of “failed inductions,” and strict time limits on the length of labor? If so, then this evidence may not apply to you, because induction may be more risky (more likely to lead to a Cesarean) in your specific hospital!
2. In these studies, participants were randomly assigned to induction or to waiting for labor to start on its own. However, crossover rates were high. For example, in the [Hannah PostTerm](#) trial (the biggest study about induction for post-dates), about a third of people who were assigned to the “expectant management group” were actually induced, while about a third of people who were in the induction group went into labor spontaneously.

Most researchers only report the Cesarean rates of the two study groups (those who were assigned to expectant management and active management), but it’s also important for us to look at the Cesarean rates in people who were *actually* induced or who *actually* went into spontaneous labor.

3. In most studies, people in the expectant management group had many fetal tests, some of which may have showed possible signs of distress, and some of which were false positives ([Minticoglou & Hall, 2002](#)). This could have led to higher rates of Cesarean section for fetal distress during labor in the expectant management group, especially among those people in the expectant management group who were induced for fetal indications (Woods et al., 2013).

Another researcher said, “It may be that the results of our review reflect doctors’ discomfort with delayed delivery in high-risk people that, once they are in labor, manifests as more frequent Cesarean sections: an example of research confirming the biases of the health care community” (Woods et al., 2013, pg. 682).

4. The induction protocols varied from study to study, and even within studies themselves. For example, in the most influential study of all—the [Hannah PostTerm](#) study—people in the induction group first received drugs to ripen the cervix, and then drugs to induce labor.

Meanwhile, people in the expectant management group who ended up being induced did NOT have cervical ripening. This put the expectant management group at a disadvantage because many of them had inductions without cervical ripening treatment—increasing their risk for a Cesarean.

### Meta-analyses

A meta-analysis is when researchers take multiple studies and combine all the data together into one big “meta” study.

There have been at least six meta-analyses in which researchers compared people who were electively induced to those who waited for labor to start on its own. However, only four of these meta-analyses specifically looked at induction for post-dates, as opposed to induction for any reason ([Sanchez-Ramos et al., 2003](#); [Wennerholm et al., 2009](#); [Hussain et al., 2011](#); [Gulmezoglu et al., 2012](#)).

Each meta-analysis’s results are slightly different, depending on which studies the researchers included in their analysis.

It’s important to note that the [Hannah PostTerm](#) trial was the biggest randomized trial included in all of these meta-analyses, and the driving factor behind most of the meta-analysis findings ([Hannah et al., 1992](#)).

Meta-analyses are only as good as the trials that are put into them. Unfortunately, *all* of the trials that







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were put into these meta-analyses were of fair or poor quality, with *most* of them being poor quality. As one meta-analysis author said:

“The weaknesses of our conclusions are closely linked with the weaknesses of the individual trials” ([Wennerholm et al., 2009, pg. 14](#)).

Thus, we have to be cautious with how much weight we give to this evidence and the conclusions it yields.

### So what did they find in the meta-analyses?

Three out of three meta-analyses that looked at Cesarean rates found that there was a slightly lower Cesarean rate in people who are assigned to labor induction at 41 or 42 weeks, compared to those who are assigned to expectant management. People in the induction groups also had lower rates of Cesarean for non-reassuring fetal heart rates during labor.

The decrease in Cesarean rates was almost exclusively due to the [Hannah](#) PostTerm trial. In other words, the [Hannah](#) study dominated the meta-analysis findings.

Two of the four meta-analyses found that there was a lower risk of perinatal death in the induction group compared to the expectant management group.

Overall, there were 13 perinatal deaths in the expectant management group (3 of these were due to congenital abnormalities) and 1 death in the induction group—out of about 7,400 women.

The researchers calculated that there would need to be 328 to 410 elective inductions at 41 weeks to prevent 1 perinatal death.

### Two other Meta-analyses that have been in the news

In 2013, two separate groups of researchers made headlines when their meta-analyses came out, showing that elective induction in general (not just induction at 41 or 42 weeks) decreases the Cesarean rate ([Mishanina et al., 2014](#); [Wood et al., 2014](#)).

These meta-analyses suffered from the same weaknesses as the meta-analyses above—including a reliance on the [Hannah](#) study results (both the [Hannah](#) PostTerm study and the [Hannah PROM](#) study), inclusion of studies with many different types of induction (including sex, membrane stripping, etc.) and many indications for induction (such as premature rupture of membranes).

In other words, these meta-analyses lumped a ton of very different types of trials into one big data-analysis. This blurs the detailed information that is important for interpreting trial results.

Also, you might want to note that in the [Mishanina](#) meta-analysis, the use of oxytocin for induction did not decrease the risk of Cesarean, and neither did breaking the waters and oxytocin combined. Cervical ripening as a method of induction decreased the risk of Cesarean, while solely inducing uterine contractions did not. When the results were broken down by *parity* (whether someone had given birth before), neither first-time mothers nor those who had given birth before had a decreased risk of Cesarean with induction. Why the different findings when they broke it down by parity? This is probably because the sample size was too small to look at the results when they broke it down into separate groups.





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### The Famous Hannah “Post-Term” study

We’ve mentioned it before, but the most important study that has ever been done on inducing for post-dates is the [Hannah et al. 1992](#) Post-Term study. This study was published in the New England Journal of Medicine.

Because it was such a large study, the Post-Term study controls most of the findings in all of the meta-analyses listed above.

#### So, let’s look at what happened in this study

Between the years of 1985 to 1990, a group of researchers enrolled 3,407 low-risk pregnant people from six different hospitals in Canada into the [Hannah](#) Post-Term study.

People could be included if they had a live, single fetus, and were excluded if they were  $\geq 44$  weeks, were already 3 or more centimeters dilated, had a previous Cesarean, had pre-labor rupture of membranes, or had a medical reason for induction. The study took place in the six Canadian hospitals between the years 1985 and 1990.

At around 41 weeks, participants were randomly assigned to either induction of labor or fetal monitoring (expectant management).

In the induction group:

- Labor was induced within four days of entering the study (usually about 4 days after 41 weeks)
- If the cervix was not ripe ( $< 3$  cm dilated and  $< 50\%$  effaced), and if the fetal heart rate was normal, participants were given prostaglandin E2 gel to ripen the cervix.
- A maximum of 3 doses of gel were given every 6 hours. If this did not induce labor or if the gel was not used, participants were given IV oxytocin, had their waters broken, or both. They could not receive oxytocin until at least 12 hours after the last prostaglandin gel dose.

In the monitored (expectant management) group:

- Participants were taught how to do kick counts every day and had nonstress tests 3 times per week.
- The amniotic fluid level was checked by ultrasound 2-3 times per week.
- Labor was induced if the nonstress test was nonreactive or showed decelerations, if there was low amniotic fluid (deepest pocket  $< 3$  cm), if complications developed, or if the mother did not go into labor on her own by 44 weeks.
- If doctors decided that the baby needed to be born, mothers did not receive cervical ripening—instead, they either had their water broken and/or IV oxytocin, or had a Cesarean without labor.

### What did researchers find in the Hannah Post-Term study?

There was quite a bit of crossover between groups. In the induction group, 66% of people were induced, and 34% went into labor on their own before the induction. In the monitoring group, 33% were induced and 67% went into labor on their own.

The findings on Cesarean rates differ, depending on what numbers you look at.

You can look at the two original groups—the people randomly assigned to induction and those assigned to fetal monitoring—regardless of the crossover that eventually happened between the groups.





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Or you can look at the breakdown of what actually happened to the people in the two groups. In other words, what happened to the people who were actually induced or actually went into spontaneous labor?

## What happened in the original, randomly assigned groups?

If you look at what happened in the two original groups (random assignment to induction and monitoring groups), the overall Cesarean rate was lower in the induction group (21.2% vs. 24.5%), even after taking into account whether this was the mother’s first baby, her age, cervical dilation at the time of study entry, and race.

Group: All Mothers



Randomly assigned to **Induction**

Cesarean Rate: 21.2%

Group: All Mothers



Randomly assigned to **Expectant Management**

Cesarean Rate: 24.5%

There was also a lower rate of Cesareans for fetal distress in the induction group vs. the monitoring group (5.7% vs. 8.3%).

## But what happened to people who were actually induced or actually went into labor on their own?

So, if you break down those two groups—the induction and fetal monitoring groups—and look at what happened to the people who were actually induced, or who actually went into spontaneous labor, this is what you will see ([Hannah et al., 1996](#)):

Group: All Mothers



Randomly assigned to **Induction**

Actually had Induced Labor  
Cesarean rate: 29.5%

Actually had Spontaneous Labor  
Cesarean rate: 25.7%

Group: All Mothers



Randomly assigned to **Expectant Management**

Actually had Induced Labor  
Cesarean rate: 42.0%

Actually had Spontaneous Labor  
Cesarean rate: 25.7%

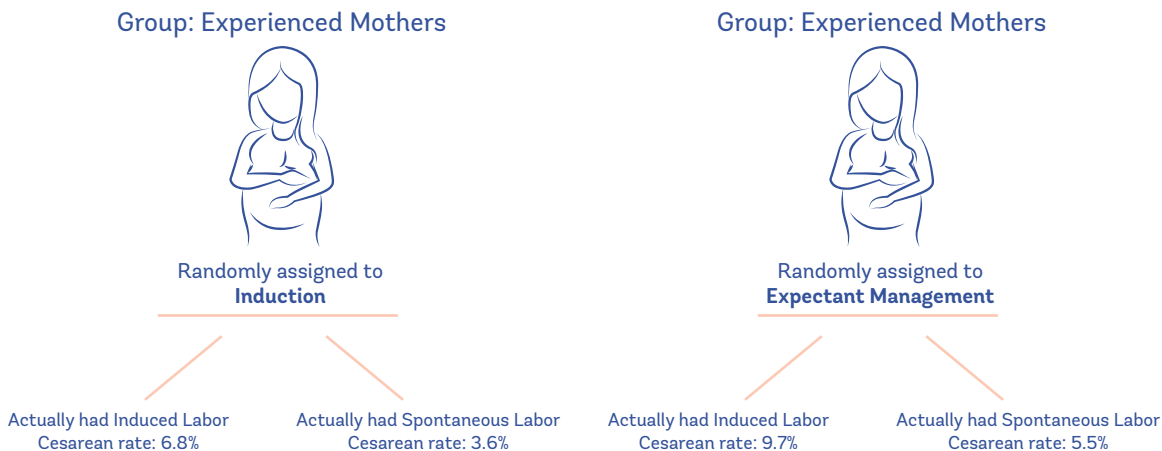
So we see two very interesting things here: people who went into spontaneous labor, regardless of which group they were originally assigned, had a Cesarean rate of only 25.7%. But if people in the monitoring group had an induction, their Cesarean rate was much higher than all of the other groups—42%!





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The same pattern holds true when you look at experienced mothers (people who had given birth before):



### So what do these numbers mean?

Important details from the [Hannah](#) Post-Term study were hidden by the crossover that happened between groups. The reported main findings were that a policy of fetal monitoring and expectant management increases the Cesarean rate.

But a closer look at the findings reveals that only the people who were expectantly managed but then had an induction had a really high Cesarean rate. People who were expectantly managed and went into labor spontaneously did NOT have higher Cesarean rates. One possible explanation for the high Cesarean rate seen in the people who were assigned to expectant management but then ended up getting an induction is that the people in this group may have been at higher risk for Cesarean to begin with, since a medical complication could have led to the induction. The people that were assigned to expectant management and never developed a complication requiring induction were the lower risk people, the ones less likely to give birth by Cesarean. Another factor that could have contributed to the high Cesarean rate in this group is the issue that we discussed previously—that doctors might have been quicker to call for a Cesarean when assisting the labors of people with medical inductions who had post-term pregnancies.

So if someone is considering expectant management after 41 weeks, one of the benefits is that if they go into labor on their own, they will have a relatively low risk of Cesarean. But one of the risks is that longer pregnancies mean more opportunities for potential complications to show up and if an induction becomes necessary, the risk of a Cesarean with that induction is nearly doubled, from 25.7% to 42%.

### What about people who are planning a VBAC?

Many people who are planning a VBAC are told they must go into labor by 39 weeks (or 40 or 41 weeks) or they will be required to have a repeat Cesarean or induction.

Research has shown that only about 10% of people who reach term will give birth by 39 weeks ([Smith, 2001](#); [Jukic et al., 2013](#)). So, if a hospital or physician mandates repeat Cesareans for people who have not gone into labor by 39 weeks, this means that 90% of people planning a VBAC with that hospital or physician will not be able to have a spontaneous VBAC. Also, some hospitals and providers will not provide inductions with VBACs, which means some people who reach the required deadline will only have one option—repeat Cesarean.





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There is actually no evidence supporting a hard-stop “must-give-birth-by-39-weeks” rule for people planning a VBAC.

In 2015, researchers looked at 12,676 people who were electively induced at 39 weeks for a VBAC, or had expectant management for a VBAC ([Palatnik & Grobman, 2015](#)).

Elective induction at 39 weeks was associated with a higher chance of VBAC compared to expectant management (73.8% vs. 60-62%), but there was also a higher rate of uterine rupture in the elective induction group (1.4% vs. 0.4-0.6%).

For people who chose not to be induced, the risk of uterine rupture was fairly steady at 39 weeks (0.5% uterine rupture rate), to 40 weeks (0.6%), to 41 weeks (0.4%).

For more information on two older studies that have looked at rupture rates after 39-40 weeks, see this article at [VBAC Facts](#) (<http://bit.ly/2gDOAST>).

### **Is it safe for someone to wait for labor to begin on its own, if that is what they prefer? How long is it safe to wait?**

As people get closer to 41 weeks, it is appropriate for them and their care provider to discuss the benefits and risks of elective induction and expectant management.

Most research articles and guidelines say that because there are benefits and risks to both options, the pregnant person’s values, goals, and preferences should play a part in the decision-making process.

Ultimately, after receiving accurate, evidence-based information and guidance from their health care provider, pregnant people have the right to decide whether they prefer to induce labor, or wait for spontaneous labor with appropriate fetal monitoring.

### **Are there any benefits to going past your due date?**

One of the major benefits of going past your due date and awaiting the spontaneous start of labor is the hormonal benefit of experiencing spontaneous labor. In her book *Hormonal Physiology of Childbearing* (free full text available [here](#) (<http://bit.ly/14NyRHE>)), Dr. Sarah [Buckley](#) reviewed the research on the hormonal benefits of spontaneous labor.

Based on the available evidence, Dr. [Buckley](#) concluded that:

*“Overall, consistent and coherent evidence from physiologic understandings and human and animal studies finds that that the innate, hormonal physiology of mothers and babies—when promoted, supported, and protected—has significant benefits for both in childbearing, and likely into the future, by optimizing labor and birth, newborn transitions, breastfeeding, maternal adaptations, and maternal-infant attachment” (Executive Summary, page 9)*

Another benefit of going past your due date and experiencing spontaneous labor is that you can avoid the potential risks of a medical induction, which may include experiencing a failed induction (possibly leading to a Cesarean), uterine tachysystole (uterine contractions that are too close together and may decrease blood flow to the baby), and adverse effects of other interventions that often occur with an induction, such as epidural anesthesia and continuous fetal monitoring ([NICE Guidelines, 2008](#)).

Although anecdotally it has been said that later term and post-term babies have an easier time with breastfeeding, I was not able to find any research on that subject.





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### How should people and their care providers talk about the risk of stillbirth?

It can be difficult for health care providers and expectant parents to discuss the risk of stillbirth. Research on health care decision-making suggests that one of the best ways to frame the risk of stillbirth is to use the following techniques (Perneger & Agoritsas, 2011; Fagerlin et al. 2011).

1. Present risks in actual or “absolute” numbers (as opposed to relative risk)
2. Talk about both potential gains and losses
3. Offer a visual if possible
4. Focus on the absolute difference between two risks

So, in a real life situation, this might look like:

“At 41 weeks, out of 10,000 pregnant people, about 6 will have a stillbirth. This means 9,994 won’t have a stillbirth.

In comparison, at 42 weeks, out of 10,000 pregnant people, about 10 will have a stillbirth. This means 9,990 won’t have a stillbirth. Here is a picture to give you an idea of what this means.”

“So this means that an extra 4 people out of 10,000 might avoid a stillbirth by being induced at 41 weeks. For the other 9,994 people, it won’t make any difference.”

Then circle/highlight the additional 4 to show the difference.

### What do the guidelines say?

- In an extensive evidence review from the U.S. Agency for Healthcare Research and Quality, researchers found that elective induction at 41 weeks decreases the risk of Cesarean and meconium aspiration syndrome, but they’re not sure how this evidence translates into real-life settings. To read the free full text of this e-book, click [here](http://bit.ly/2eHpvaU) (<http://bit.ly/2eHpvaU>). (Caughey et al., 2009)
- The Ontario Midwives Association has a really comprehensive, easy-to-understand set of guidelines. To download the free PDF, click [here](http://bit.ly/2bvs1Oj) (<http://bit.ly/2bvs1Oj>).
- To download the Society of Obstetricians and Gynaecologists of Canada guidelines (Canada), click [here](http://bit.ly/2eZSMdT) (<http://bit.ly/2eZSMdT>).
- In 2014, ACOG released their [latest recommendations](#) on post-term pregnancy. Although their guidelines are not freely available to the public, ACOG recommends that induction of labor should take place between 42 weeks 0 days and 42 weeks 6 days, and that induction at 41 weeks can also be considered. If a person planning a VBAC goes post-term, this does not mean they have to have a repeat Cesarean.

### What’s the bottom line?

The whole topic of due dates and induction for due dates can be very confusing. There is a lot of information to digest. We feel that the most important points can be summarized like this:

#### Due dates:

- The traditional way of calculating the estimated due date (40 weeks after the last menstrual period) is not evidence-based. Instead, it is more accurate to give people a range of time that they will probably give birth:





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- About half of first-time mothers will give birth by 40 weeks and 5 days after the LMP, with the other half giving birth after that time point
- About half of mothers who have given birth before will give birth by 40 weeks and 3 days after the LMP, with the other half giving birth after that
- An ultrasound before 20 weeks is usually more accurate than using the last menstrual period, and the accuracy of an ultrasound is highest if it is done between 11 and 14 weeks.

### Risks of going past 41 or 42 weeks:

- There is a rise in the relative risk of stillbirth starting at about 39 weeks, depending on which study you are looking at. However, the overall risk starts to rise more quickly at 42 weeks. At 42 weeks, the risk of stillbirth rises to about 1 in 1,000 in babies who are not growth-restricted. The risk may be higher in people who have additional risk factors for stillbirth, such as first time mothers.
- People who experience post-term pregnancy (past 42 weeks) are more likely to experience infections and Cesareans, and their infants are more likely to experience meconium aspiration syndrome, NICU admissions, and low Apgar scores.

### Induction:

- There is no clear right or wrong path with regard to induction at 41 or 42 weeks.
- Analyses on the largest trial on elective inductions at 41-42 weeks found that the lowest Cesarean rates happen in people who go into labor on their own. The next-lowest Cesarean rates happen in people who are electively induced. The highest Cesarean rates happen in people who choose to wait for spontaneous labor but end up having an induction later on.
- Elective induction at 41 or 42 weeks may decrease the risk of stillbirth or newborn death. It is thought that there would need to be at least 328-410 inductions at 41 weeks in order to prevent one stillbirth or newborn death.
- People should talk with their care providers about the pros and cons of waiting for spontaneous labor or induction at 41 and 42 weeks. This conversation should take into account the mother's preferences, goals, values, personal birth history, chances of a successful induction (how "ripe" the cervix is, also known as the "Bishop score"), and alternatives.

## Final Thoughts

It's important to note that none of the research evidence looked closely at birthing people's experiences or preferences. These non-medical factors are very real when it comes to individual decision-making. For example, it may be very important to a healthy first-time mother who very much wants an unmedicated birth to have a spontaneous labor, while it may be very important to a mother who has experienced miscarriages or stillbirth in the past to lower the absolute risk of stillbirth by any means necessary. All of these experiences and preferences are valid.

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