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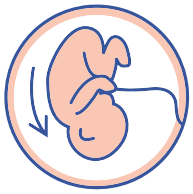

# Evidence on: Breech Version

## How common is the breech position?

Breech position (bottom first) is present in 3% to 4% of term pregnancies. Breech positioning is more common prior to term—25% are breech before 28 weeks, but by 32 weeks only 7% of babies are breech. The vast majority of breech babies in the United States (U.S.) are now born by planned Cesarean (Table 1, page 2). The use of a safe procedure to help turn babies into a head-down position (aka cephalic position) may help to reduce the Cesarean rate (Lannie & Seeds, 2012).

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## What is an external cephalic version?

External = from the outside, cephalic = head first, version = turning

An external cephalic version is when a care provider puts his or her hands on the outside of the mother's belly and turns the baby into a head-down position. This is also called an ECV, version, or "hands to belly" procedure (Lannie & Seeds, 2012).

We compiled some statistics from the Centers for Disease Control (Table 1, page 2). There were 152,183 breech babies in the U.S. during the year 2016, or 3.9% of all babies. Of these, 93% were born by Cesarean. The number of known breech births made up 11% of all Cesareans in 2016.

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# Evidence on: Breech Version

## Table 1: Breech Positioning and Delivery Method in the U.S., 2016

| | Vaginal-Spontaneous | Vaginal-Forceps | Vaginal-Vacuum | Cesarean | Unknown | Total |
|---|---|---|---|---|---|---|
| Breech | 6.5% | 0.2% | 0.1% | 93.2% | 0.0% | 3.9% |
| Non-Breech | 67.8% | 0.6% | 2.7% | 28.9% | 0.0% | 94.2% |
| Position not documented | 39.7% | 0.4% | 1.7% | 55.2% | 3.1% | 1.9% |
| Total | 64.9% | 0.6% | 2.6% | 31.9% | 0.1% | 100% |

*Preliminary 2016 data from personal correspondence on September 13, 2017 with Anne Driscoll, Ph.D., at the Centers for Disease Control and Prevention.

*Note:* These statistics do not tell us how many of these were pre-term births or twin births. Also, the delivery method and positioning were not always listed on the birth certificate. The inaccuracy of birth certificate data is well known. For example, the data show that 199 breech babies were born with vacuum assistance, which is not possible at a breech birth. So this table does not give us a perfect picture of how many singleton babies are in the breech position at birth—but rather it gives us an approximate idea.

## How many pregnant people with breech babies have a version?

We contacted the CDC for the most recent data in the U.S. (Table 2). In 2016, 11,158 people underwent an external cephalic version procedure, or about 0.3% of all people who gave birth. As you can see in the table below, approximately 6,221 (55.8%) of the versions were successful. Of these successful versions, 4,229 (68.0%) of people went on to have spontaneous vaginal births. On the other hand, there were 4,937 (44.2%) failed versions in 2016, and the majority of those people went on to have Cesarean births (4,356 or 88.2%).

## Table 2: Version Success or Failure and Delivery Method in the U.S., 2016

| | Successful version | Failed version |
|---|---|---|
| Total | 6,221 (55.8%) | 4,937 (44.2%) |
| Vaginal-Spontaneous | 4,229 (68.0%) | 545 (11%) |
| Vaginal-Forceps | 89 (1.4%) | 10 (0.2%) |
| Vaginal-Vacuum | 330 (5.3%) | 25 (0.5%) |
| Cesarean | 1,568 (25.2%) | 4,356 (88.2%) |
| Unknown | 5 (0.1%) | 1 (0.0%) |

* Table made for www.evidencebasedbirth.com. Preliminary 2016 data from personal correspondence on September 13, 2017 with Anne Driscoll, Ph.D., at the Centers for Disease Control and Prevention.



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# Evidence on: Breech Version

It is possible that the version is an underused procedure. In an Australian study, only 66% of pregnant people had ever heard of a version, and most of them (87%) had learned about version from books or family/friends—not from care providers. Only 39% of participants said they would choose a version if they had a breech baby, and 22% were undecided. The participants who did not want a version said that they had concerns about effectiveness and safety for the baby (Raynes-Greenow et al., 2004).

In 2017, another Australian study looked at over 32,000 people who had singleton breech pregnancies of ≥36 weeks between 2002 and 2012 (Bin et al., 2017). Only 10.5% of the group attempted a version. As many as 67.2% did not attempt a version even though they were considered to be good candidates for the procedure according to Australian practice guidelines. The practice guidelines identified 22.3% of the group as too high risk for the procedure. The authors note that it is not clear whether the low rate of version attempts is related to care providers failing to offer a version or pregnant people declining the procedure.

In a Dutch study, investigators estimated that less than half of people in the Netherlands with a breech baby at term had a version. Approximately 20-30% of them refused a version and decided to have a planned Cesarean instead. It was estimated that anywhere from 4% to 33% of pregnant people are not given the option of a having a version by their care providers (Vlemmix et al., 2010).

It could be that care providers in the U.S. aren't offering versions as readily because health insurance plans (including Medicaid) consider it to be a part of regular, routine prenatal care (Personal correspondence, Johannson, 2017). However, the procedure is anything but routine. An external cephalic version takes time and resources, especially considering the potential need for medications (and in some cases, an epidural), and the need for pre- and post- procedure tests and monitoring for wellbeing.

## Are external cephalic versions effective for reducing the risk of Cesarean?

Many people believe that the U.S. Cesarean rate is higher than necessary and that we should be exploring ways to bring the overall rate down. Since breech babies are almost always born by Cesarean, there is a renewed interest in attempting versions to increase the chance of vaginal birth (ACOG, 2016). Also, versions are cost-effective when compared to a scheduled Cesarean (Tan et al., 2010).

In a Cochrane review, Hofmeyr et al. (2015) combined the results from eight randomized, controlled trials with 1,308 participants who were randomly assigned to either external cephalic version or no treatment. The quality of the studies was mixed. In order to control for quality of the studies, the researchers looked at the results both with and without the poorer quality studies. When they did so, the results stayed the same.

Overall, the researchers found that attempting an external cephalic version at term decreased the relative risk of breech birth by 58% and decreased the relative risk of Cesarean by 43%. There were no differences in any other outcomes, including Apgar scores, neonatal admission, or infant deaths. The studies did not look at maternal satisfaction (Hofmeyr et al., 2015).

It is important to note that five of the eight studies in this review took place between 1981 and 1991, a time when breech vaginal births were more common. Since the publication of the "Term Breech Trial" in 2000, breech vaginal births have become extremely rare, and most breech babies are born by planned Cesarean. Therefore, it is possible that if these studies were replicated today, having an external cephalic version might result in an even larger reduction in the risk of Cesarean.



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# Evidence on: Breech Version

A successful external cephalic version can have important personal benefits for an individual by helping someone avoid major abdominal surgery, and versions can also have population-level benefits by lowering the overall Cesarean rate. If everyone with a breech baby at term attempted a version then about half would be successful. Of those with successful versions, about three quarters would eventually give birth vaginally. This means that more than a third of people with term breech pregnancies could avoid a Cesarean if everyone attempted a version. Given that 3% to 4% of all term pregnancies are breech, the overall Cesarean rate would come down by 1% to 2%. Obviously not all people with breech pregnancies at term are good candidates for the procedure, and some would refuse the procedure, so the real reduction in the Cesarean rate may not be as strong. But it's important to understand that the real benefit in reducing the number of Cesareans from breech pregnancies comes later on in subsequent pregnancies, since most of those would be repeat Cesareans.

## What are the risks of an external cephalic version?

The sample sizes from the previously mentioned Cochrane review were too small to give an accurate picture of rare risks of an external cephalic version. In order to look at risks, we need to look at systematic reviews of observational studies.

In 2008, Grootscholten et al. pooled the results of 84 studies that included 12,955 participants. They only included studies that reported on complications from attempted versions on single babies done after 36 weeks of pregnancy. The average success rate for turning a baby out of the breech position was 58%. The overall complication rate was 6%, and the rate of serious complications (placenta abruption or stillbirth) was 0.24%. There were 12 stillbirths out of the 12,955 cases, and two of these deaths were related to the version. The other deaths were un-related to the external version or unexplained. The unexplained stillbirths were diagnosed 10 to 31 days after the version. Placenta abruption occurred in 0.18% of participants (11 abruptions out of 12,955 versions), and 10 of these abruptions resulted in an emergency Cesarean (Grootscholten et al., 2008).

Other complications included cord prolapse (0.18%), temporary abnormal fetal heart rate patterns (4.7%), vaginal bleeding (0.34%), and water breaking (0.22%). There was one urgent Cesarean for every 286 versions. In summary, researchers found that external cephalic version is safe, but they recommended that a version should take place in a setting where an urgent Cesarean could be performed if necessary.

## Is having a version painful?

The potential pain or discomfort from external cephalic version may be discouraging more people from attempting the procedure. Several studies have asked mothers about their experiences during and after an attempted version. Researchers at a large teaching hospital in the Netherlands conducted a study of 249 people attempting a version (Truijens et al., 2014). Before the version attempt, researchers spent about 30 minutes interviewing participants about symptoms of depression and fear of the version procedure. Immediately after the procedure, a different researcher (who was blind to the earlier interview) assessed each participant's pain perception.

They found that the most important factor influencing pain perception was whether the version was successful at turning the baby or not. To put it another way, people who had successful versions reported significantly less pain than people with failed version attempts. The average version attempt lasted just under four minutes, and ranged from less than a minute to 16 minutes. As would be expected, the people who underwent longer procedures reported more pain. The important takeaway, however, is that the length of the procedure—or any other factor for that matter—didn't totally explain why people with failed version attempts reported more pain. It appears that the negative emotions that follow a



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disappointing outcome independently influence how much pain a person recalls. Data from the pre-version interviews showed that depression and fear also independently influence pain perception. This means that people who have signs of depression or expect the procedure to be painful are more likely to actually find it painful compared to people without signs or depression or fear going into the procedure.

In Australia, researchers interviewed 16 first-time mothers and six experienced mothers who had attempted a version but the version did not successfully turn the baby (Watts et al. 2016). The mothers went on to have either planned Cesareans (45%) or planned vaginal breech births (55%). When asked how they felt about the attempted version, the majority of people replied that the procedure was painful. Some people reported pain that lasted for a while after they were home. Nearly half of the people interviewed (46%) said that they would not attempt a version in a future pregnancy. It's important to remember that the people being interviewed did not have successful versions, and as we saw in the study from the Netherlands, an attempted version's outcome can greatly influence a person's pain perception. The authors concluded that attempting a version should be only one of multiple options that pregnant people with term breech can consider—other options include planned Cesarean or vaginal breech birth.

Some therapies can be used to reduce the discomfort of a version attempt. A study in Spain compared 300 people who received gas (a 50:50 mix of nitrous oxide and oxygen) starting three minutes before attempting a version with 150 people who did not receive gas with the procedure (Burgos et al., 2013). There were no differences in the rate of complications, the Cesarean rate, or the success rate of the version, but people who received gas were 49% less likely to report severe pain from the procedure.

A study in China randomly assigned 72 first-time mothers to intravenous (IV) remifentanil and 72 first-time mothers to a saline IV solution (placebo) during an attempted version (Wang et al., 2017). Remifentanil is a synthetic opioid that is sometimes used to manage pain during labor. They found that the people who received the remifentanil reported less pain immediately after the procedure and more satisfaction when asked 10 minutes after the version. They also found a difference in the success rate of the version between groups—the people who received remifentanil had a success rate of 57% and the placebo group had a success rate of 39%. There were no differences as far as complications. Earlier studies have also found that remifentanil decreases pain during version attempts but findings are conflicting regarding whether it increases the success rate of the version or not.

A recent review found that people who receive epidurals, spinals, or a combination of both report less pain and discomfort than those who do not (1.2% versus 9.3%) (Magro-Malosso et al., 2016). Some researchers think that the reason pain medications have been shown to increase the success rate of the version is because pain medications can help to keep the mother's abdominal muscles relaxed, which may allow the care provider to more easily rotate the baby (Carvalho & Bateman, 2017).

## When is the best time to have a version?

There are two basic times when you can choose to have a version: before term (34 to 37 weeks) or at term (>37 weeks). In the largest randomized controlled trial to compare before term and at term versions, researchers found that doing a version before term increases the chance that the baby will be head down at birth (59% versus 51%). However, they also found that having an early version does not reduce the risk of having a Cesarean. There was also evidence that doing a version before term may increase the risk of premature birth (Hutton et al., 2011). In a later analysis of the data, the researchers found that lower gestational age was a predictor of success during a version among people who had given birth before, but that a more important predictor of success was if the baby was still floating above the pelvis (had not yet descended into the pelvis) (Hutton et al., 2017).



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# Evidence on: Breech Version

A Cochrane review from 2015 combined five trials to study versions attempted before term. The review was dominated by the large Hutton et al. (2011) trial, so not surprisingly the results are consistent with that trial's results. The Cochrane reviewers concluded that a version done between 34 and 36 weeks does result in more babies that are head-down at the time of birth compared with a version at gestational age ≥ 37 weeks. However, the decrease in breech presentation at birth did not lead to an overall lowering of the Cesarean rate. Based on these findings, the first attempt at a version is usually scheduled at gestational age ≥ 37 weeks (Lim & Lucero, 2017). People should discuss the potential benefits and risks of an early version with their care providers— weighing the greater likelihood of successful version before 37 weeks against the rare complication of birthing a preterm infant.

## Are there any techniques that increase the likelihood of a successful version?

Researchers have studied several techniques that could increase the chance of success with a version. So far, the most helpful technique seems to be using drugs to prevent labor contractions (also known as tocolysis). In a Cochrane review, researchers combined the results of 28 studies with more than 2,700 participants who were randomly assigned to receive version alone or version with an additional technique, such as tocolysis or having an epidural (Cluver et al., 2015). The participants who were randomly assigned to receive tocolytic drugs (drugs to prevent contractions) during the version were 23% less likely to end up with an eventual Cesarean for breech positioning compared to those who did not receive tocolysis. Participants who received tocolysis were also 68% more likely to have babies with head-first positioning at the start of labor.

In the Cochrane review, the participants who were randomly assigned to have an epidural or spinal (in combination with tocolysis) during the version were 39% more likely to have a successful version (Cluver et al., 2015). There were no differences in any of the other outcomes between participants with and without epidurals, such as cephalic presentation at the start of labor or rate of Cesareans, but the number of participants in the study (279 people) may not have been large enough to find an effect. A more recent meta-analysis pooled nine randomized trials (934 people) to look at the affect of epidurals and spinals on outcomes after version (Magro-Malosso et al., 2016). They found that the participants who received an epidural, spinal, or combination spinal-epidural had a higher rate of successful version compared to the participants who received IV analgesia or no treatment (58% versus 43%). The epidural/spinal group also had a higher rate of cephalic presentation at the start of labor (55% versus 40%) and a higher vaginal birth rate (54% versus 45%). The participants in both groups also received tocolysis. There were no differences in the rate of complications between groups. Some care providers recommend against epidurals and spinals for version attempts because it makes for a much longer and more complicated procedure.

One small study found that vibroacoustic stimulation (applying sound to the mother's abdomen) resulted in successful versions in 86% of participants (19 of 22) compared to 8% of participants (one of 12) in the placebo group that only received sound into the nurse's arm (Johnson & Elliott, 1995). The current evidence is too weak to draw conclusions about the effectiveness of this technique. However, it deserves further research in larger studies since it is inexpensive, noninvasive, and has no known side effects.

## Are there any other factors that may influence the success rate of versions?

One of our physician reviewers has found in his experience that there are three important factors for a successful version procedure (Personal correspondence, Morris, 2017):



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# Evidence on: Breech Version

1. A physician who believes in the benefits of the procedure and is skilled at performing it
2. A well-informed patient who is also motivated to avoid a first and therefore subsequent Cesarean
3. A willingness by the physician to abandon the procedure if requires more than the normal amount of manipulation or the baby does not tolerate the procedure

Studies have also looked at factors specific to the individual and the pregnancy that may influence the success rate of versions. The researchers that conducted the randomized trial comparing early versus late versions used the data from that trial (and an earlier pilot trial) to study the factors that influence the success rate of versions (Hutton et al., 2017). Of the 1,253 people who had a version, 742 were first-time mothers and 511 were people who had given birth before. The version was considered to be successful— meaning that the baby immediately turned *and* was still cephalic at the time of birth— in 33% of the first-time mothers and 61% of the experienced mothers. Overall, 11% of the participants attempted more than one version. Note that it is not standard practice in the U.S. to attempt another version on a later day after a failed version attempt (Personal correspondence, Johannson, 2017).

Hutton et al. (2017) found that the following factors are strongly linked to higher version success rates:

- Having given birth to previous children
- If the baby is not engaged in the pelvis (described as floating or dipping)
- If the care provider can easily feel the baby's head on palpation (related to the baby's position as well as the mother's body fat)

Other factors that increase the likelihood of a version's success to a lesser extent are:

- If the placenta is posterior (on the back side of the uterus) (Hutton et al., 2017)
- If the mother's BMI is less than 32.7 (a pre-pregnancy BMI of 30 is the lower cut-off of obesity set by the World Health Organization) (Hutton et al., 2017)
- If there are normal levels of amniotic fluid (an Amniotic Fluid Index >10) (Lim & Lucero, 2017)
- If the mother's waters are intact (Lim & Lucero, 2017)
- If the mother's uterus is normally shaped (Lim & Lucero, 2017)
- If the mother's abdominal wall muscles are relaxed (Lim & Lucero, 2017)
- Non-frank breech presentation (Lim & Lucero, 2017)

Another way to look at it is that certain factors make a version more likely to fail. People should have an honest discussion with their care provider before deciding to attempt a version. If someone has one or more of these factors then they should know that they have a lower chance of success—not to be discouraged, but to have realistic expectations about the outcome.

This is not a complete list, but some factors that decrease the success rate of a version are (Ehrenberg-Buchner & Van De Ven, 2015):

- First time giving birth
- The baby has already descended into the pelvis (engaged)
- The care provider can not easily feel the baby's head on palpation
- Obesity
- The baby is small for gestational age
- The placenta is on the front, side, or top of the uterus
- The mother's amniotic fluid volume is higher or lower than normal
- The mother's abdominal muscles and/or uterus is firm and tense
- The mother's waters have already broke
- The baby's spine is located towards the back
- Frank breech presentation



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Hutton et al. (2017) also found that gestational age of <37 weeks was linked to successful version in people who had given birth before. However, they recommend that care providers focus on the individual baby's descent rather than use a standard gestational age cut-off, so that a version can be planned before the baby becomes engaged in the pelvis while still doing as much as possible to avoid influencing preterm birth.

## Are there any reasons why someone cannot have a version?

Different guidelines list different reasons why certain people should not have a version. Whenever there is a reason not to do something, that reason is called a "contraindication." In 2012, researchers did a systematic review to determine which contraindications are based on research evidence (Rosman et al., 2012). It's important to be clear that the failure to find research evidence to support a contraindication does not mean that there is evidence showing the factor to be safe. Rather, it means that there is a lack of evidence—we can't say that the factor is contraindicated but we also can't say that it is not.

For the 39 different contraindications listed in international guidelines, the researchers could only find research evidence for six of these. In other words, 33 of the 39 contraindications were based on clinical opinion alone. Of the six contraindications that had research evidence, five of these lacked strong evidence that they were, in fact, contraindications. The research evidence does not support these contraindications for a version: having had a previous Cesarean, fetal growth restriction, suspected big baby, low amniotic fluid, and high amniotic fluid.

The authors concluded that there is good evidence—based on both research and physiology—that people should NOT have a version if they have a history of placenta abruption or if placenta abruption is suspected, if there is a diagnosis of severe pre-eclampsia, or if there are signs of fetal distress. Also, if vaginal birth is considered to be contraindicated then a version would also be contraindicated.

Again, it is important to note that although there may be little research evidence to back up some contraindications, many factors haven't been well studied, and some care providers may use their expert opinion to recommend against a version in certain circumstances. A care provider may anticipate a difficult version, a low likelihood of success, or perhaps that the benefits do not outweigh the risks. For example, a care provider may not want to perform a version on someone with very low amniotic fluid because that increases the difficulty of the procedure. Other care providers might not want to perform a version if the baby has the umbilical cord wrapped around the neck. Although there is no solid research on these topics, the care provider may base his or her clinical opinion on previous experience or the mechanism (means) by which the factor could affect the version procedure—and find it to be too difficult, or that the risks of the procedure outweigh the benefits.

The American College of Obstetricians and Gynecologists (ACOG) recommends that:

"Because the risk of an adverse event occurring as a result of external cephalic version is small and the cesarean delivery rate is significantly lower among women who have undergone successful external cephalic version, all women who are near term with breech presentations should be offered an external cephalic version attempt if there are no contraindications."

Since the data have yet to establish clear contraindications, they recommend that care providers should consider each patient individually as a potential candidate for version. The expert medical opinion is that care providers should assess contractions and fetal well-being before and after the attempt at version and that version should only be attempted in settings where Cesareans are immediately available.



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# Evidence on: Breech Version

## Can someone with a previous Cesarean have a version?

The 2017 Australian study of over 32,000 people with breech pregnancies found that a previous Cesarean was the most common reason that people were told they were too high risk to attempt a version (Bin et al., 2017). However, as we've stated, there is little research evidence that a previous Cesarean should be considered a contraindication for a version (Rosman et al., 2012). In fact, the available evidence suggests that the risks of a version and the chance that it will be successful are similar between people who have had a Cesarean and those who have not.

Researchers in Spain enrolled 70 participants with one previous Cesarean who were attempting a version ≥37 weeks of pregnancy (Burgos et al., 2014). The researchers compared their outcomes to 387 experienced mothers without a previous Cesarean who were also attempting a version. They found that the version was just as likely to be successful at turning the baby in mothers with a previous Cesarean compared to mothers without a previous Cesarean (67% versus 66%). The participants with a previous Cesarean did not experience any cases of uterine rupture or other complications from the version. However, they did have a lower vaginal birth rate (53% versus 75%) compared to the participants without a previous Cesarean.

An Israeli review and retrospective study (looking back in time) included 42 people with one previous Cesarean who attempted a version (Sela et al., 2009). The version successfully turned the baby for 74% of participants. Of those with successful versions, 84% went on to give birth vaginally. There were no bad health outcomes for any mothers or infants in the study. The researchers then added their data to data from other studies so that they could look at version attempts in 166 people with one previous Cesarean. On average, 76.5% of the versions were successful in causing the baby to turn. The authors of the review concluded that this success rate is similar to the published success rates for version in the normal population.

Researchers in Canada reviewed 1,425 version attempts between 1987 and 2001 (Abenhaim et al., 2009). Of those, 36 (2.5%) of the versions were attempted on people with a previous Cesarean. They found that people with a previous Cesarean had a success rate similar to those without (50.0% versus 51.6%). There were no reports of bad health outcomes.

So far, the research is promising that people with a previous Cesarean birth can benefit from attempting a version. ACOG's official stance is that people who have had previous Cesareans are not any less likely to have a successful version, but they should be counseled that the risk of uterine rupture with version has not been well studied (ACOG, 2017).

## In summary, the evidence shows that:

- Attempting one or more external cephalic versions will result in a baby who is head-down at the time of birth in 33% of first-time mothers and 61% of people who have given birth before
- The procedure is painful for many people, but it's less painful if the procedure is successful, and there are medications that can be used to decrease the pain
- Tocolytic drugs that prevent labor contractions have been shown to improve the success of versions
- Benefits include a significant decrease in the risk of Cesarean and a decrease in breech positioning at birth
- The most common risk is a temporary change in the infant's heart rate (4.7%); serious complications are rare (0.24%)



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## Other resources:

- Guidelines on version from the American College of Obstetricians and Gynecologists (http://bit.ly/2ycRoOW)
- Guidelines on version from the Royal College of Obstetricians and Gynecologists (United Kingdom) (http://bit.ly/2xvTNRd)
- Guidelines on version from the American Academy of Family Physicians (http://bit.ly/2xvcbd1)

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