AMNIOTIC FLUID EMBOLISM (AFE) is a sudden and unexpected life-threatening birth complication that can affect both mother and baby. Although poorly understood, it is thought to be the result of an allergic-like reaction to the amniotic fluid that enters the mother’s bloodstream, a normal part of the birth process. It most often occurs during labor or shortly after delivery.

AFE is a complex medical condition that can be very difficult to understand, most especially if you have been personally affected or are currently facing an AFE crisis.

This is a comprehensive list of frequently asked questions to help you become more familiar with AFE.
Although the exact mechanism of how an amniotic fluid embolism (AFE) occurs is not well understood. It is believed to occur when a mother suffers an allergic-like (immune) response to amniotic fluid and fetal material that enters her bloodstream during labor or shortly after delivery. It is important to note that the entrance of amniotic fluid and fetal material into the bloodstream is a normal part of the birth process and in most women, it does not cause this serious reaction.

Most often an AFE involves two very serious and life-threatening complications. These include heart and lung failure (cardiorespiratory collapse) and severe bleeding (disseminated intravascular coagulopathy or DIC). Together, they are exceptionally challenging to treat and require immediate and aggressive medical care.

Heart and lung failure causes breathing problems, irregular heartbeat, seizures, and can lead to cardiac arrest - when the heart stops beating. When the heart stops beating it is no longer able to send oxygenated blood to the body. Lack of oxygen to the body can cause organ failure and brain damage.

Treatment of heart and lung failure includes oxygenating the body by placing a breathing tube (intubation), cardiopulmonary resuscitation (CPR), and medications to help manage blood pressure and help the heart beat regularly.

Bleeding is a normal process of birth. However, in women who experience an AFE, the blood's normal balance (hemostasis) is interrupted by a complicated process causing sudden and excessive bleeding (hemorrhage). This can lead to a condition known as disseminated intravascular coagulopathy (DIC). DIC causes the over-development of blood clots throughout the bloodstream. This increased clotting quickly depletes the body's platelets and clotting factors that are needed to control bleeding. Excessive bleeding and clotting may lead to more serious complications including stroke, organ failure, and ultimately heart failure.

Treatment of hemorrhage and DIC includes blood transfusions, surgical procedures, and medications to help control bleeding and replenish the body's blood volume.

Advances in critical care medicine offer more complex interventions, although not all hospitals have access to these types of treatments.
WHAT ARE THE SIGNS AND SYMPTOMS OF AN AMNIOTIC FLUID EMBOLISM?

Early signs and symptoms of amniotic fluid embolism develop suddenly and may include:

- Increased anxiety
- An impending sense of doom
- Fetal distress
- Agitation
- Confusion
- Nausea or vomiting
- Chills
- Skin discoloration
- Shortness of breath
- Abnormal vital signs

These may lead to more serious complications including:

- Loss of consciousness
- Seizure
- Heart and lung failure
- Cardiac arrest
- Excessive and uncontrolled bleeding
- Disseminated intravascular coagulation (DIC)
- Stroke
- Acute respiratory distress syndrome
- Brain damage
- Death

WHAT CAUSES AN AFE?

The exact cause (etiology) of an amniotic fluid embolism is poorly understood.

Recent research suggests that it is most likely caused by an overreaction of a mother’s immune system to substances from the mother and/or baby (amniotic fluid, fetal cells, maternal/fetal antigens) that enter her bloodstream (circulation) during birth, medical procedures, or trauma. It is important to note that these substances often enter the mother’s circulation during birth, but most women do not suffer the same reaction.

Older theories suggested it was simply the entrance of amniotic fluid into a mother’s bloodstream that caused the reaction. However, research now shows many women are exposed to amniotic fluid in their bloodstream and do not have this same reaction. Another disproven theory was that the amniotic fluid and/or fetal cells obstructed or blocked airflow in the lungs.

Further research is needed to investigate the cause of AFE.

Learn more about our research initiatives.
Amniotic fluid embolisms are rare and a but are a leading cause of maternal death globally.

It can occur during both vaginal and cesarean births. It can occur during any pregnancy. It may occur in the first pregnancy or in subsequent pregnancies after successful previous births.

Although considered to be rare, amniotic fluid embolism can also occur during a D&E (a surgical procedure to fetus, placenta and other tissue), amniocentesis, or trauma (car accident, fall, etc.).

**WHAT ARE THE RISK FACTORS FOR AN AFE?**

Risk factors for an amniotic fluid embolism are extremely difficult to determine. Occurrences of AFE are infrequent and unpredictable making it extremely difficult to study.

Some studies report that AFE may be associated with advanced maternal age, multiple gestation, assisted fertility, placental abnormalities, eclampsia, polyhydramnios, cervical lacerations, uterine rupture, cesarean section, and other operative assisted deliveries.

Currently, there are no known risk factors that would alter the course of standard obstetric practice.

**WHEN CAN AN AFE OCCUR?**

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**HOW OFTEN DOES AN AFE OCCUR?**

Amniotic fluid embolism is rare and a leading cause of maternal death globally.

The statistics around the incidence of amniotic fluid embolism vary because the diagnosis of this syndrome remains one of exclusion and lacks a specific laboratory or imaging test, thus meaning that a diagnosis of amniotic fluid embolism is made after all other reasonable explanations have been ruled out.

Therefore, the incidence of amniotic fluid embolism may be both over-reported and under-reported. Recent publications based on administrative data (data that has not had cases individually reviewed for accuracy) suggests that the estimated incidence of amniotic fluid embolism is 2.5 for every 100,000 births or 1 in 40,000 in the United States and 1 in 53,800 of the approximately in Europe.

For perspective, there are approximately 4 million deliveries in the United States meaning approximately 100 women may suffer an amniotic fluid embolism. There are approximately 700,000 deliveries in the UK each year, meaning approximately 13 women may experience an amniotic fluid embolism.
Survivability of an amniotic fluid embolism is dependent upon several factors and is therefore very difficult to provide an accurate rate. These factors include:

- Variability of each women's immune response
- Delivery location (home, birth center, hospital)
- Type of hospital and level of services (critical care, NICU, OB on staff 24/7, blood bank, ECMO capabilities)
- Timing of the event (before or after delivery)
- Immediacy of recognition and aggressive treatment
- Pre-existing health issues or presence of other maternal health conditions (i.e. hypertension, placental abruption, accreta spectrum disorders, etc.)

Published rates from studies are inconsistent and differ depending on how and when the data were collected. Published rates of survivability range from 20-60%.

Although survivability has increased over the last 20 years with advances in critical care and obstetric medicine, it cannot be emphasized enough that an amniotic fluid embolism is extremely difficult to treat and considered one of the most fatal birth complications in the world.

Variations of survival are also dependent on the above listed factors. Some women may make a rapid recovery, while others may suffer a stroke, severe hypoxic brain injury, compartment syndrome, acute respiratory distress syndrome, organ failure, loss of a limb, or other complications commonly found in critically ill patients.

The AFE Foundation does an amazing job with their outreach and support of those touched by amniotic fluid embolism. They are guided by a true passion to help provide valuable resources and information regarding this devastating complication during childbirth.

-Michelle M.
Infants who are delivered prior to any symptoms are most often healthy and unlikely to suffer any long-term health challenges related to an amniotic fluid embolism.

Infants who are delivered after a mother begins to exhibit symptoms may be delivered emergently (emergency c-section, forceps, or vacuum) and may have reduced Apgar scores. They are at risk for decreased oxygenation and will require immediate and aggressive critical care interventions.

Infants will almost always be admitted to the neonatal intensive care unit (NICU) which may be for treatment or observation. The survivability of infants is largely dependent on their oxygenation levels at delivery and their response to medical interventions to minimize damage to the brain.

Infants should be monitored for 2-3 years to ensure they meet developmental milestones.

Although having been recognized since the 1920s, amniotic fluid embolism remains poorly understood. Without a clear idea of what causes an amniotic fluid embolism and no ability to predict a woman’s susceptibility means there is no way to prevent it from occurring.

However, we know a woman’s greatest chance of survival is to deliver at a hospital with the ability to provide rapid and aggressive treatment. Increasing awareness among the medical community allows for more prompt recognition and treatment, leading to improved outcomes for mothers and infants.

Additionally, research is crucial to aid in our understanding of this enigmatic complication. Research is needed to identify causes, preventative measures, and effective treatments. The Foundation is working hard to advance research, promote education, and elevate awareness. To contribute to the AFE Foundation’s efforts, please consider making a donation or getting involved.

AFE’s have a tremendous impact on all who are affected by it—patients, spouses, family members, friends, health care providers. Please visit our website for specific guides and resources. Also, consider joining one of our many support groups.

- GRIEVING FAMILIES
- GRIEVING FRIENDS
- AFE WIDOWERS
- AFE SURVIVORS
- AFE SURVIVORS WITH INFANT LOSS
- AFE SURVIVORS WITH SIGNIFICANT BRAIN INJURY
- FAMILY MEMBERS, FRIENDS, AND HEALTHCARE PROVIDERS