Clinical Study Results

This summary reports the results of only one study. Researchers must look at the results of many types of studies to understand if a study vaccine works, how it works, and if it is safe to prescribe to patients. The results of this study might be different than the results of other studies that the researchers review.

Sponsor:	BioNTech SE
Sponsor Agent:	Pfizer Inc.
Vaccine Studied:	Comirnaty® (Pfizer-BioNTech RNA-based COVID-19 Vaccine), also known as BNT162b2
Protocol Number:	C4591015
Dates of Study:	16 February 2021 to 15 July 2022
Title of this Study:	A Study of RNA Vaccine (BNT162b2) Against COVID-19 in Healthy Pregnant Participants [A Phase 2/3, Placebo-Controlled, Randomized, Observer-Blind Study to Evaluate the Safety, Tolerability, and Immunogenicity of a SARS-CoV-2 RNA Vaccine Candidate (BNT162b2) Against COVID-19 in Healthy Pregnant Women 18 Years of Age and Older]
Date of this Report:	15 July 2024

– Thank You –

If you or your child participated in this study, Pfizer, the Sponsor Agent, would like to thank you for your participation.

This summary will describe the study results. If you have any questions about the study or the results, please contact the doctor or staff at your study site.

Why was this study done?

What is COVID-19?

Coronavirus disease 2019 (or COVID-19) is caused by a virus called **s**evere **a**cute **r**espiratory **s**yndrome **co**rona**v**irus **2** (SARS-CoV-2).

COVID-19 spreads easily from person to person and can cause mild to severe illness. People with COVID-19 can have fever, chills, cough, loss of taste or smell, or trouble breathing.

Pregnant people may have a higher risk for severe illness from COVID-19 compared to non-pregnant people. Among pregnant people with COVID-19, there may also be a higher risk of pregnancy complications, such as the baby is born too early.

What is BNT162b2 vaccine (BNT)?

BNT162b2 (**BNT**) is also known as Comirnaty®. It is an injectable vaccine that may help the body's immune system to defend against COVID-19.

BNT is the original monovalent COVID-19 vaccine. This vaccine was designed to protect against the **original strain** of the COVID-19 virus. A monovalent vaccine targets 1 strain of virus.

- BNT does not contain a whole virus or any part of the virus that can cause COVID-19.
- BNT is made up of a part of the virus's genetic code, surrounded by fatty particles called lipids. It uses the body's own cells to produce a spike protein, which may help the body produce antibodies to fight against COVID-19.

When a person first gets a vaccine, a protective **immune response** is triggered in the body. This means that the body's immune system is activated to make **antibodies**.

- **Antibodies** are proteins that can fight off infections and help to prevent disease.
- An **immune response** is the body's ability to find and fight off germs that cause disease.

After vaccination, the mother's immune system will make antibodies. Pregnant people naturally pass antibodies to their fetus while still in the womb. These antibodies can then help protect infants from disease after they are born.

Pregnant people vaccinated with BNT may be able to pass COVID-19-fighting antibodies to their fetus using this natural process. These antibodies may help to prevent infections caused by COVID-19 in infants while they are unable to receive a COVID-19 vaccine. Currently, people 6 months of age or older can be allowed to receive a COVID-19 vaccine.

What was the purpose of this study?

The main purposes of this study were:

- To find out if pregnant participants who got BNT vaccine had an immune response against the COVID-19 virus.
- To learn if BNT vaccine is safe for pregnant participants. Researchers checked for any medical problems that pregnant participants may have experienced during the study. Researchers also checked if pregnant participants had **local reactions** and **systemic events**.

Local reactions or systemic events are responses that a person can have to a vaccine.

- **Local reactions** in this study are redness, swelling, or injection site pain.
- **Systemic events** in this study are fever, fatigue, headache, chills, vomiting, diarrhea, muscle pain, or joint pain.

Researchers wanted to know:

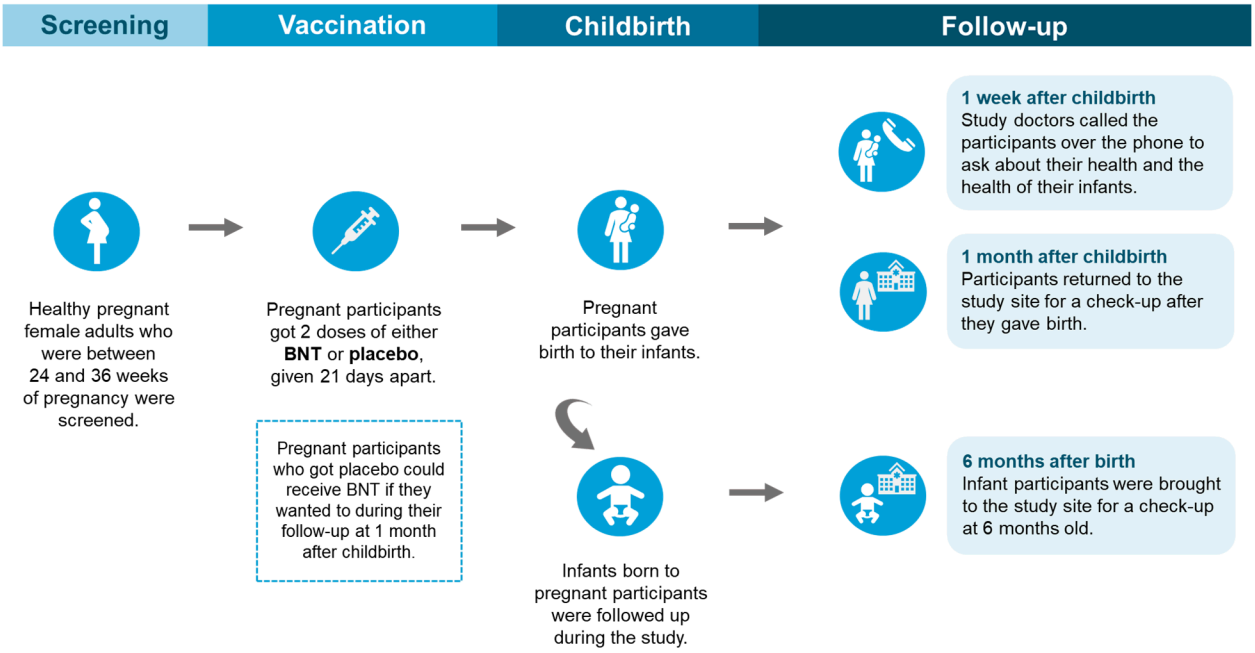
- **Did pregnant participants have immune responses against the COVID-19 virus after getting BNT vaccine?**
- **How many pregnant participants had any local reactions within 7 days after each dose of study vaccine?**
- **How many pregnant participants had any systemic events within 7 days after each dose of study vaccine?**
- **What medical problems did participants have during the study?**
- **What serious medical problems did participants have during the study?**

What happened during the study?

How was the study done?

Figure 1 below shows what happened to pregnant participants and their infants in this study.

Figure 1. How was the study done?



A **placebo** does not have any active ingredients in it.

Researchers used a computer program to assign the pregnant participants to a vaccine group by chance. This means that pregnant participants had an equal chance of getting either BNT or placebo.

Pregnant participants got 2 doses of either BNT or placebo, which were given 21 days apart.

- **BNT group:** Pregnant participants in this group got 2 doses of 30 micrograms (30 mcg) BNT.
- **Placebo group:** Pregnant participants in this group got 2 doses of placebo.

Only the person who prepared the injections knew what study vaccine each pregnant participant was given. This is known as an "observer-blinded" study. This is done to make sure that the study results were not influenced in any way.

- The pregnant participants and researchers did not know who was given BNT vaccine and who was given placebo.
- One month after the participant gave birth, the participant and researchers were told if the participant got BNT or placebo.
- Pregnant participants who got placebo could receive BNT if they wanted to during their follow-up at 1 month after childbirth. These participants also got 2 doses of BNT, given 21 days apart.

Where did this study take place?

The study ran at 41 locations in 5 countries.

- Brazil
- South Africa
- Spain
- United Kingdom
- United States

When did this study take place?

It began on 16 February 2021 and ended on 15 July 2022.

Who participated in this study?

The study included healthy pregnant participants.

- All pregnant participants were between the ages of 18 and 44 years.
- All pregnant participants were between 24 and 36 weeks of pregnancy during Dose 1 of the study vaccine.

A total of 348 pregnant participants participated in the study. Of these:

- 174 pregnant participants were assigned to get BNT
- 174 pregnant participants were assigned to get placebo

The table below shows the number of pregnant participants in each group who took part in this study.

	BNT	Placebo
Received Dose 1	173 out of 174 pregnant participants (99%)	173 out of 174 pregnant participants (99%)
Received Dose 2	170 out of 174 pregnant participants (98%)	170 out of 174 pregnant participants (98%)
Completed the follow-up 1 month after childbirth	161 out of 174 pregnant participants (93%)	159 out of 174 pregnant participants (91%)
Did not finish the study	7 out of 174 pregnant participants (4%)	12 out of 174 pregnant participants (7%)

Pregnant participants who did not finish the study left because they no longer wanted to continue the study, they no longer met the study requirements, or they could not be contacted for a check-up.

Of the participants who first got placebo, 152 participants got Dose 1 of BNT and 148 participants got Dose 2 of BNT during their follow-up at 1 month after childbirth.

The study also included 335 infants born to pregnant participants during the study. Of these, 291 infant participants finished the study and 44 infant participants did not.

Among those who did not finish the study, the most common reason was that the parents or guardians of the infant participants no longer wanted to continue the study, or they could not be reached for a check-up on their infant's health.

How long did the study last?

Pregnant participants were in the study for up to 10 months. They were in the study for different lengths of time depending on when they gave birth or if they got BNT or placebo at the start of the study. The entire study took 17 months to complete.

In October 2021, the study stopped enrolling pregnant participants earlier than planned. This is because the COVID-19 vaccine was approved for pregnant people. After this, researchers had difficulty finding people who wanted to enroll in a COVID-19 vaccine clinical study.

When the study ended in July 2022, the Sponsor Agent began reviewing the information collected. The Sponsor Agent then created a report of the results. This is a summary of that report.

What were the results of the study?

This section includes the results of pregnant participants who got either BNT or placebo at the start of the study.

Did pregnant participants have immune responses against the COVID-19 virus after getting BNT vaccine?

To answer this question, researchers measured the pregnant participants' antibodies against the COVID-19 virus 1 month after receiving Dose 2 of BNT or placebo.

Pregnant participants who got **BNT** or **placebo** in this study

The antibody levels against the COVID-19 virus were **higher** in **pregnant** participants who got **BNT** than in **pregnant** participants who got **placebo** in this study.

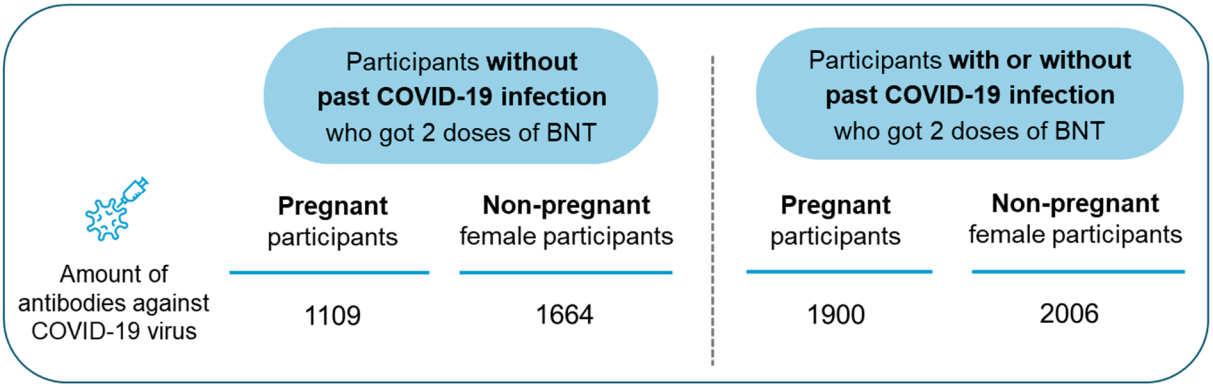
Researchers then compared the antibody levels against the COVID-19 virus between the **pregnant participants** who got 2 doses of 30 mcg BNT in this study and a group of **non-pregnant female participants** from another study.

The group of non-pregnant female participants from another study also received 2 doses of 30 mcg BNT and belonged to the same age group as the pregnant participants in this study.

Researchers looked at the results of participants **without past COVID-19 infection** and those **with or without past COVID-19 infection**.

Pregnant participants who got **BNT** in this study and **non-pregnant female participants** who got **BNT** in another study

- **Pregnant** participants had **strong immune responses** against the COVID-19 virus after getting 2 doses of **BNT** in this study, regardless of **whether or not they had past COVID-19 infection**.
- The antibody levels against the COVID-19 virus were **lower** in **pregnant** participants when compared to those of **non-pregnant** female participants from another study. The figure below shows these results – those **without past COVID-19 infection** (Left Panel) and those **with or without past COVID-19 infection** (Right Panel).



  - Among those **without past COVID-19 infection**, the antibodies of **pregnant** participants were **0.67 times** that of the **non-pregnant** female participants from another study.
  - Among those **with or without past COVID-19 infection**, the antibodies of **pregnant** participants were **0.95 times** that of the **non-pregnant** female participants from another study.

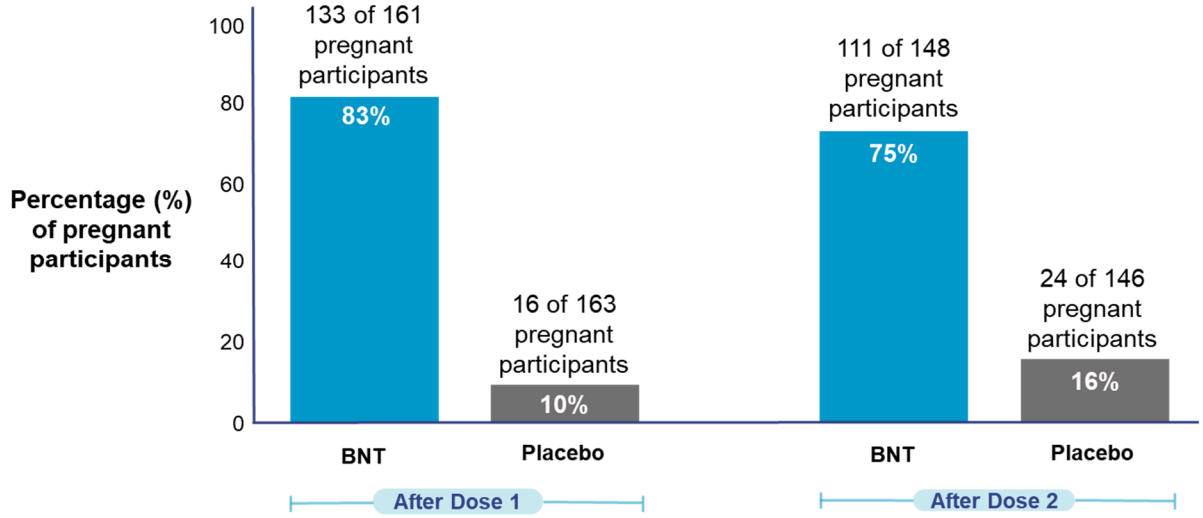
This does not mean that everyone in this study had these results. This is a summary of just some of the main results of this study. Other studies may have different results.

In this study, researchers had also wanted to know if BNT vaccine works to prevent COVID-19 in pregnant participants. But, researchers were not able to collect enough information because of the small number of study participants.

How many pregnant participants had any local reactions within 7 days after each dose of study vaccine?

Figure 2 below shows the answer to this question.

Figure 2. How many pregnant participants had any local reactions within 7 days after each dose of BNT or placebo?

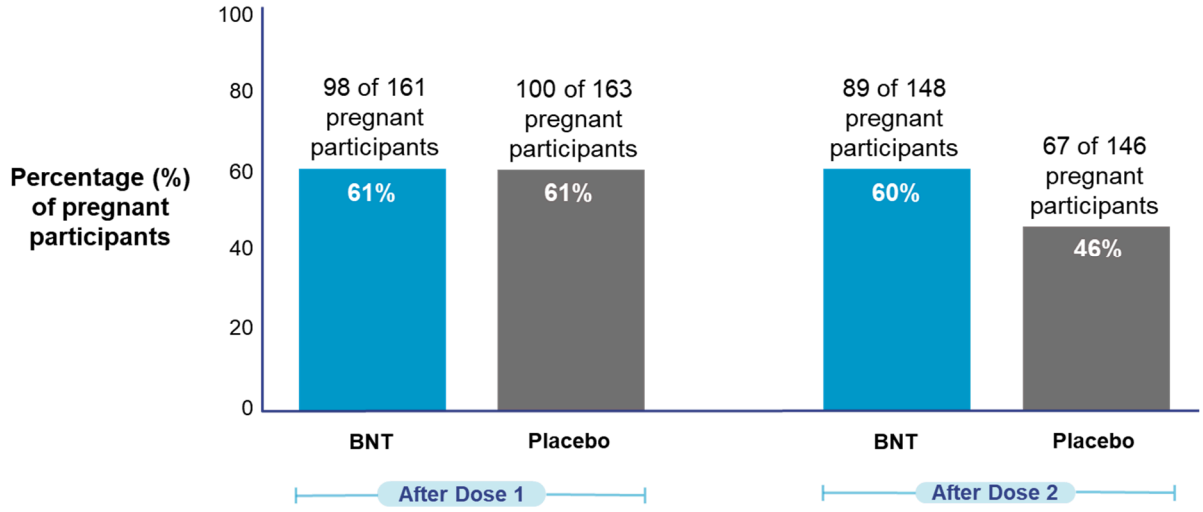


Most local reactions were mild or moderate in severity and lasted 1 to 2 days. In both groups, the most common local reaction was injection site pain.

How many pregnant participants had any systemic events within 7 days after each dose of study vaccine?

Figure 3 below shows the answer to this question.

Figure 3. How many pregnant participants had any systemic events within 7 days after each dose of BNT or placebo?



Most systemic events were mild or moderate in severity and lasted about 1 to 5 days. In both groups, the most common systemic events were fatigue and headache.

What medical problems did participants have during the study?

The researchers recorded any medical problems the participants had during the study. Participants could have had medical problems for reasons not related to the study (for example, caused by an underlying disease or by chance). Or, medical problems could also have been caused by a study vaccine or by another medicine the participant was taking. Sometimes the cause of a medical problem is unknown. By comparing medical problems across many vaccine groups in many studies, doctors try to understand what effects a study vaccine might have on a participant.

Overall, no pregnant participant left the study early because of a medical problem they had during the study.

One infant participant born to a participant given BNT and 1 infant participant born to a participant given placebo left the study early because of a medical problem they had during the study. None of these medical problems experienced by infant participants were considered related to the study vaccine given to their mothers.

Pregnant participants

How many pregnant participants had a medical problem at any time from Dose 1 through 1 month after Dose 2 of BNT or placebo?

A similar number of pregnant participants given BNT and those given placebo had at least 1 medical problem at any time from Dose 1 through 1 month after Dose 2 of BNT or placebo. The figure below shows these results.

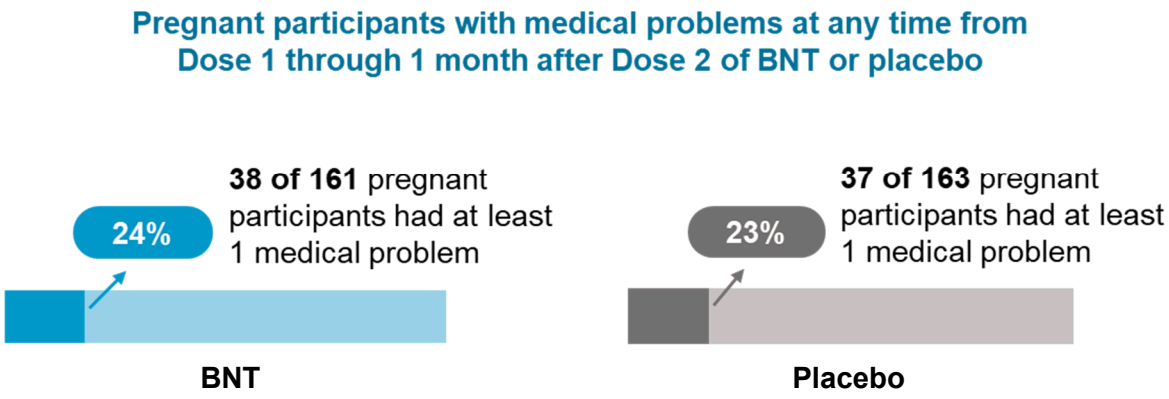


Table 1 lists the most common medical problems the pregnant participants had from Dose 1 through 1 month after Dose 2 of BNT or placebo. These medical problems are the ones reported in 4 or more pregnant participants overall.

Below are instructions on how to read Table 1.

Instructions for Understanding Table 1.

- The **1st** column of Table 1 lists medical problems that were commonly reported during the study. All medical problems reported by 4 or more pregnant participants overall are listed.
- The **2nd** column tells how many of the 161 pregnant participants given BNT reported each medical problem. Next to this number is the percentage of the 161 pregnant participants given BNT who reported the medical problem.
- The **3rd** column tells how many of the 163 pregnant participants given placebo reported each medical problem. Next to this number is the percentage of the 163 pregnant participants given placebo who reported the medical problem.
- Using these instructions, for example, you can see that 4 out of the 161 pregnant participants (3%) given BNT reported urinary tract infection (UTI). A total of 1 out of the 163 pregnant participants (1%) given placebo reported UTI.

These instructions may also be used to read Table 2.

Table 1. Commonly reported medical problems at any time from Dose 1 through 1 month after Dose 2 of BNT or placebo – Pregnant participants

Medical Problem	BNT	Placebo
UTI	4 out of 161 participants (3%)	1 out of 163 participants (1%)
Stomach pain	2 out of 161 participants (1%)	3 out of 163 participants (2%)
Slow or reduced body movement of the fetus (fetal hypokinesia)	2 out of 161 participants (1%)	3 out of 163 participants (2%)
High blood pressure with signs of damage to internal organs during pregnancy (pre-eclampsia)	3 out of 161 participants (2%)	1 out of 163 participants (1%)
Headache	2 out of 161 participants (1%)	2 out of 163 participants (1%)

Of the pregnant participants who first got placebo then later got BNT in the study:

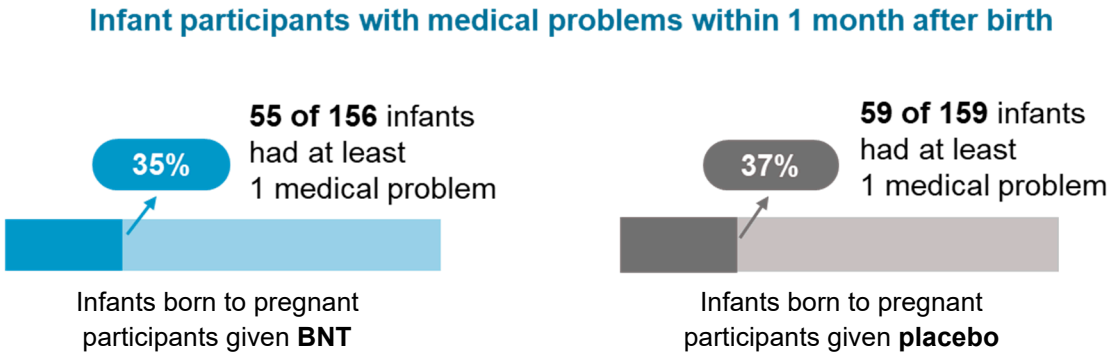
A total of 32 out of 144 participants (22%) had at least 1 medical problem at any time from Dose 1 through 1 month after Dose 2 of BNT. The most common medical problems reported by 5 or more participants were as follows:

- Injection site pain in 13 out of 144 participants (9%).
- Headache in 7 out of 144 participants (5%).
- Fever in 5 out of 144 participants (4%).

Infant participants

How many infant participants had a medical problem within 1 month after birth?

A similar number of infants born to pregnant participants given BNT and those born to pregnant participants given placebo had at least 1 medical problem within 1 month after birth. The figure below shows these results.



In both the BNT and placebo groups, the most common medical problem experienced by infant participants was yellowing of the skin and whites of the eyes (jaundice in newborn babies). This medical problem was not considered related to the study vaccine given to their mothers.

Did study participants have any serious medical problems?

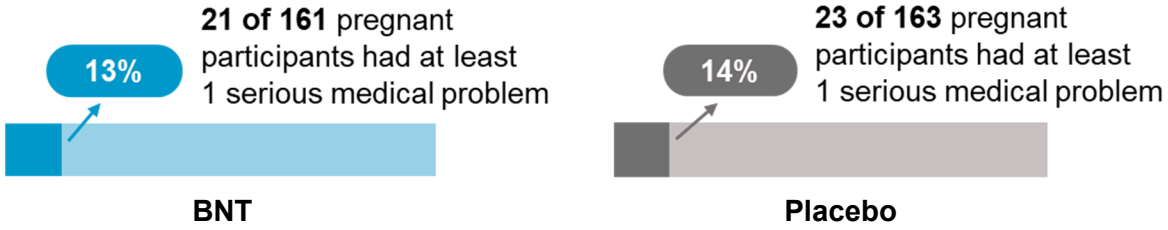
A medical problem is considered "serious" when it is life-threatening, needs hospital care, or causes lasting problems.

Pregnant participants

How many pregnant participants had a serious medical problem at any time from Dose 1 of BNT or placebo through 1 month after giving birth?

A similar number of pregnant participants given BNT and those given placebo had at least 1 serious medical problem at any time from Dose 1 through 1 month after giving birth. The figure below shows these results.

Pregnant participants with serious medical problems at any time from Dose 1 of BNT or placebo through 1 month after giving birth



None of the serious medical problems were considered related to the study vaccine given to pregnant participants.

Table 2 lists the most common serious medical problems the pregnant participants had from Dose 1 of BNT or placebo through 1 month after giving birth. These serious medical problems are the ones reported in 4 or more pregnant participants overall.

Table 2. Commonly reported serious medical problems from Dose 1 of BNT or placebo through 1 month after giving birth – Pregnant participants

Serious Medical Problem	BNT	Placebo
High blood pressure with signs of damage to internal organs during pregnancy (pre-eclampsia)	4 out of 161 participants (3%)	2 out of 163 participants (1%)
Signs of distress in the fetus during pregnancy or childbirth (fetal distress syndrome)	3 out of 161 participants (2%)	2 out of 163 participants (1%)
Mismatch between the size of the fetus' head and the size of the mother's pelvis (cephalo-pelvic disproportion)	1 out of 161 participants (1%)	3 out of 163 participants (2%)

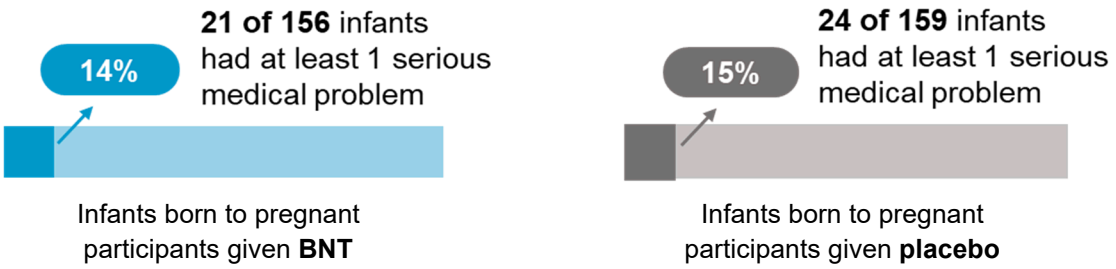
Of the pregnant participants who first got placebo then later got BNT in the study:

No serious medical problem was reported at any time from Dose 1 through 1 month after Dose 2 of BNT.

Infant participants

How many infant participants had a serious medical problem within 6 months after birth?

A similar number of infants born to pregnant participants given BNT and those born to pregnant participants given placebo had at least 1 serious medical problem within 6 months after birth. The figure below shows these results.



None of the serious medical problems experienced by infant participants were considered related to the study vaccine given to their mothers.

In both the BNT and placebo groups, the most common serious medical problem experienced by infant participants was yellowing of the skin and whites of the eyes (jaundice in newborn babies).

Pregnant participants and their infants

- No pregnant participant died during the study.
- A total of 2 infant participants died during the study.
    - One (1) infant was born to a participant given BNT and the other was born to a participant given placebo.
    - None of the deaths were considered related to the study vaccine given to the infants' mothers.

Where can I learn more about this study?

If you have questions about the results of your study, please speak with the doctor or staff at your study site.

For more details on your study protocol, please visit:

www.pfizer.com/research/research_clinical_trials/trial_results	Use the protocol number **C4591015**

The full scientific report of this study is available online at:

www.clinicaltrials.gov	Use the study identifier **NCT04754594**

Please remember that researchers look at the results of many studies to find out which vaccines can work and are safe for patients.

Again, if you or your child participated in this study, **thank you** for volunteering. We do research to try to find the best ways to help patients, and you helped us to do that!