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 study participants. 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(s) Studied: BNT162b2 RNA-Based COVID-19 Vaccines, Compound Number: PF-07302048

Protocol Number: C4591017

Dates of Study: 15 February 2021 to 22 July 2021

Title of this Study: A Phase 3 Study to Evaluate the Safety, Tolerability, and Immunogenicity of Multiple Production Lots and Dose Levels of BNT162b2 RNA-Based COVID-19 Vaccines Against COVID-19 in Healthy Participants

[Final Report: A Phase 3, Randomized, Observer-Blind Study to Evaluate the Safety, Tolerability, and Immunogenicity of Multiple Production Lots and Dose Levels of the Vaccine Candidate BNT162b2 Against COVID-19 in Healthy Participants 12 Through 50 Years of Age and the Safety, Tolerability, and Immunogenicity of BNT162b2 RNA-Based COVID-19 Vaccine Candidates as a Booster Dose in Healthy Participants 18 Through 50 Years of Age]

Date(s) of this Report: 18 February 2022

– Thank You –

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

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?

A new respiratory disease appeared in Wuhan, China in December 2019 and has since rapidly spread to many other countries around the world. In January 2020, the cause of this disease was found to be a new Coronavirus; and the disease it causes was named COVID-19 (Coronavirus disease 2019). Since then, many companies around the world have quickly started to look for ways to prevent COVID-19 disease.

People can get COVID-19 through contact with another person who has the virus. COVID-19 is mainly a disease of the respiratory system, but it can also affect other organs in the body. COVID-19 can cause a wide range of symptoms, such as fever, cough, shortness of breath, and loss of sense of taste or smell. COVID-19 symptoms can sometimes be severe.

What are BNT162b2 RNA-Based COVID-19 Vaccines?

A vaccine is used to help the body to fight off germs. After a vaccine is injected into a person's body, the body responds by making "antibodies", which are proteins that fight infections and help to prevent disease. This is known as the body's "immune response".

The BNT162b2 investigational vaccine does not contain the whole virus, or the parts of the virus that can cause COVID-19. Instead, BNT162b2 is made up of 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". This spike protein may help the body to produce antibodies to fight against COVID-19.

At the time of this study, BNT162b2 was an investigational vaccine and it was not approved for general use. BNT162b2 has now been approved for use in many countries worldwide. BNT162b2 is given as 2 doses, about 3 weeks apart.

What was the purpose of this study?

The main purpose of this study was to learn about the safety and about the body's immune response to 4 different batches, or "lots", of the BNT162b2 vaccine, given at 2 different doses. Three of the lots of were intended for use in the United States (US lot), and 1 lot was intended for use in the European Union (EU lot). All 4 lots contained the same components and were made in the same way. The researchers needed to compare the investigational vaccines from the different lots and doses to be sure that they worked the same way and were safe to use.

Researchers wanted to know:

Did participants who received vaccines from the 3 US lots have similar immune responses?

Did participants who received a low-dose vaccine have similar immune responses to participants who received a standard-dose vaccine from the same lot?

*Results for this study question will be available at a later date.

Did participants who received vaccines from the EU lot have similar immune responses to participants who received vaccines from the US lots?

*Results for this study question will be available at a later date.

How many participants had pain, redness, or swelling at the injection site within 7 days after vaccination?

How many participants had fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain within 7 days after vaccination?

How many participants had any medical problems within 1 month after their second vaccination?

How many participants had serious medical problems within 1 month after their second vaccination?

The researchers also studied a third ("booster") dose, given about 3 months after Dose 2. The main purpose of this part of the study was to learn about the safety and about the body's immune response to the booster dose.

Researchers wanted to know:

Did participants have an immune response to the booster dose?

*Results for this study question will be available at a later date.

How many participants had pain, redness, or swelling at the injection site within 7 days after the booster dose?

How many participants had fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain within 7 days after the booster dose?

How many participants had any medical problems within 1 month after the booster dose?

How many participants had serious medical problems within 1 month after the booster dose?

What happened during the study?

How was the study done?

Part 1

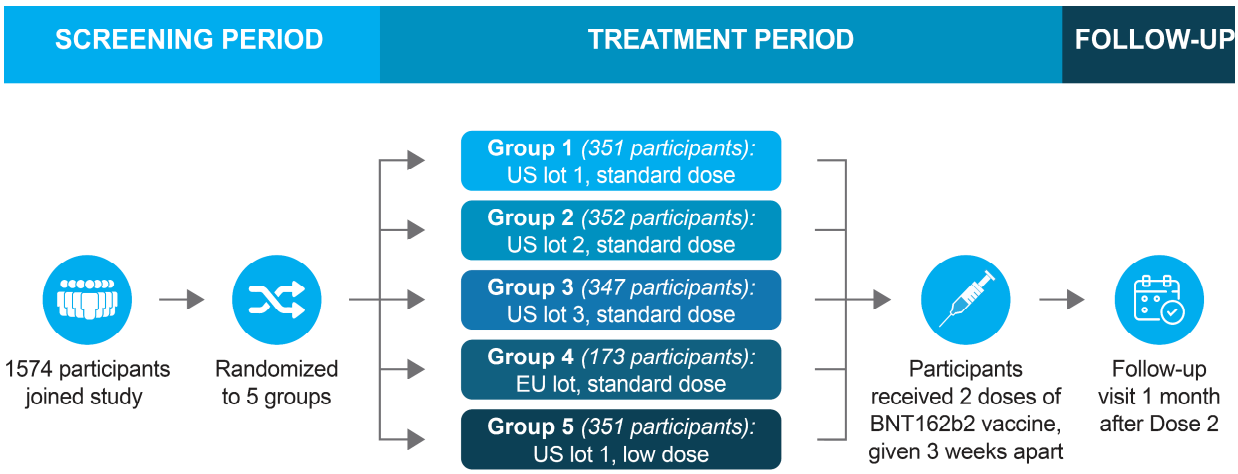
In the first part of the study, researchers studied 5 groups of study participants. Each group received 2 doses of the BNT162b2 vaccine, given about 3 weeks apart:

- Group 1 (351 participants): US lot 1, standard dose
- Group 2 (352 participants): US lot 2, standard dose
- Group 3 (347 participants): US lot 3, standard dose
- Group 4 (173 participants): EU lot, standard dose
- Group 5: (351 participants): US lot 1, low dose

This was as an "observer blinded" study, which means that the researchers and the participants did not know which lot or dose they received, but the healthcare workers who prepared and administered the study vaccines did know. Study participants were assigned to each group by chance alone.

Participants were first screened by a doctor to make sure they met the requirements to join the study. This was known as the screening period. Participants were in Part 1 for about 2 months, and were expected to attend 3 visits at the study center during this time. At these visits, participants received study vaccines, had their blood drawn and other lab samples collected, and were monitored for any medical problems.

The figure below shows what happened during Part 1.



Part 2 (Booster Study)

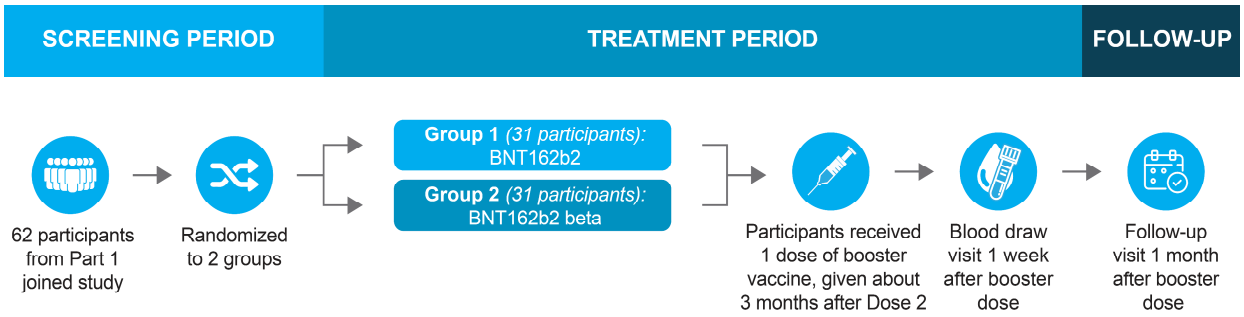
In the booster study, researchers studied 2 groups of study participants who had previously received 2 standard doses of BNT162b2 (US lot) during the first part of the study. Each group received 1 booster dose of either BNT162b2 or BNT162b2 beta, given about 3 months after they received the second dose in the first part of the study. BNT162b2 beta is a slightly modified version of BNT162b2, made to help provide protection against a variant of COVID-19 from South Africa.

- Booster Group 1 (31 participants): BNT162b2
- Booster Group 2 (31 participants): BNT162b2 beta

This was as an "observer blinded" study, which means that the researchers and participants did not know which booster they received, but the healthcare workers who prepared and administered the study vaccines did know. Study participants were assigned to each group by chance alone.

Participants were in the booster study for about 1 month, and were expected to attend 3 visits at the study center during this time. At these visits, participants received study vaccines, had their blood drawn and other lab samples collected, and were monitored for any medical problems.

The figure below shows what happened during the booster study.



Where did this study take place?

The Sponsor ran the first part of the study at 16 locations in the United States, and the booster study at 8 of these 16 locations.

When did this study take place?

It began 15 February 2021 and ended 22 July 2021.

Who participated in this study?

Participants 12 to 50 years of age could join Part 1, and participants 18 to 50 years of age could join the booster study. Study participants:

- Were examined by the study doctor and determined to be appropriate for study participation
- Had never been diagnosed with COVID-19
- Had never received a COVID-19 vaccine outside of this study
- Were not allergic to any of the ingredients in the study vaccines
- Were not pregnant or breast-feeding

- A total of 815 men (52%) participated in Part 1
- A total of 758 women (48%) participated in Part 1

- All participants in Part 1 were 12 to 50 years of age
- A total of 31 men (50%) participated in the booster study
- A total of 31 women (50%) participated in the booster study
- All participants in the booster study were 19 to 50 years of age

A total of 1574 participants joined Part 1, and 1573 participants (more than 99%) received at least 1 study vaccine. 1570 participants (more than 99%) received both doses. 16 participants (1%) left the study early, and 2 participants (less than 1%) did not receive the second dose due to a medical problem or pregnancy, but remained in the study. 1557 participants (99%) completed the study.

A total of 62 participants joined the booster study and received the booster vaccine. All 62 participants (100%) completed the booster study.

How long did the study last?

Study participants were in Part 1 for about 2 months and the booster study for an additional 1 month. The entire study took about 5 months to complete.

When the study ended in July 2021, the Sponsor began reviewing the information collected. The Sponsor then created a first report of the results. This is a summary of that report.

What were the results of Part 1 of the study?

Did participants who received vaccines from the 3 US lots have similar immune responses?

The researchers measured the amount of antibodies in participants' blood 1 month after the second dose of BNT162b2. The researchers found that antibody levels in participants from Groups 1, 2, and 3 (standard-dose BNT162b2 Lots 1, 2, and 3) were within a range considered to be comparable to each other. Therefore, the

participants who received vaccines from the 3 US lots had similar immune responses. Based on these results, the researchers have decided that the results are not likely the result of chance.

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.

Did participants who received a low-dose vaccine have similar immune responses to participants who received a standard-dose vaccine from the same lot?

Results for this study question are still being reviewed, and will be available at a later date.

Did participants who received vaccines from the EU lot have similar immune responses to participants who received vaccines from the US lots?

Results for this study question are still being reviewed, and will be available at a later date.

What were the results of the booster study?

Did participants have an immune response to the booster dose?

Results for this study question are still being reviewed, and will be available at a later date.

What medical problems did participants have during Part 1 of 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.

How many participants had pain, redness, or swelling at the injection site within 7 days after vaccination?

A total of 1412 out of 1573 participants (90%) had redness, swelling, or pain at the injection site within 7 days after receiving either dose of BNT162b2. These were mostly mild to moderate, and were already known to be side effects of BNT162b2. The percentage of participants with redness, swelling, or pain at the injection site was similar across each vaccine group, and similar after Dose 1 and Dose 2. Pain at the injection site was the most common of these medical problems.

How many participants had fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain within 7 days after vaccination?

A total of 1397 out of 1573 participants (89%) had fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain within 7 days after receiving either dose of BNT162b2. These were mostly mild to moderate, and were already known to be side effects of BNT162b2. The percentage of participants with these medical problems was similar across each vaccine group, and these medical problems were more common after Dose 2 than Dose 1. Tiredness, headache, and muscle pain were the most common of these medical problems.

How many participants had any medical problems within 1 month after vaccination?

A total of 100 out of 1573 participants (6%) had at least 1 medical problem. Skin rash and swollen lymph nodes were the most common medical problem, occurring in 7 out of 1573 participants (less than 1%) each. No medical problem happened in at least 1% of participants. One participant (less than 1%) from Group 5 left the study because of medical problems that were considered to be related to BNT162b2 (skin inflammation and swelling under the skin), and 1 participant (less than 1%) from Group 3 left the study due to pregnancy.

What medical problems did participants have during the booster study?

How many participants had pain, redness, or swelling at the injection site within 7 days after the booster dose?

A total of 57 out of 62 participants (92%) had redness, swelling, or pain at the injection site within 7 days after receiving the booster. These were mostly mild to moderate, and were already known to be side effects of BNT162b2 and BNT162b2 beta. The percentage of participants with pain, redness, or swelling at the injection site was similar in both booster vaccine groups. Pain at the injection site was the most common of these medical problems, and occurred more frequently after the booster dose than after the 2nd dose.

How many participants had fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain within 7 days after the booster dose?

A total of 54 out of 62 participants (87%) had fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain within 7 days after receiving the booster. These were mostly mild to moderate, and were already known to be side effects of

BNT162b2 and BNT162b2 beta. The percentage of participants with these medical problems was similar in both vaccine groups. These medical problems occurred at a similar rate after Dose 2 and the booster dose. Tiredness, headache, and muscle pain were the most common of these medical problems.

How many participants had any medical problems within 1 month after the booster dose?

A total of 3 out of 62 participants (5%) had at least 1 medical problem within 1 month after the booster dose. These medical problems included neck pain, abnormal growth of cells in the abdomen, and swollen lymph nodes. Swollen lymph nodes was considered to be related to the booster. No participants left the booster study because of medical problems.

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.

How many participants had serious medical problems within 1 month after vaccination?

During the first part of the study, 2 out of 1573 participants (less than 1%) had a serious medical problem within 1 month after vaccination: 1 participant from Group 4 had a long-lasting migraine headache, and 1 participant from Group 3 received BNT162b2 while pregnant and had a miscarriage 30 days later. The study doctor did not consider these medical problems to be related to BNT162b2.

How many participants had serious medical problems within 1 month after the booster dose?

No participants had serious medical problems during the booster study.

No participants died during the first part of the study or the booster study.

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.clinicaltrials.gov Use the study identifier **NCT04713553**

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

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