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:	Pfizer Inc.
Vaccine(s) Studied:	*Neisseria meningitidis* Group A, B, C, W, and Y Vaccine (MenABCWY) and Trumenba® (*Neisseria meningitidis* Group B)
Protocol Number:	B1971057
Dates of Study:	24 April 2017 to 25 October 2022
Title of this Study:	Clinical Trial to Assess Use of a New Meningitis Vaccine (MenABCWY) in Participants Aged 10 to 25 Years [A Phase 3, Randomized, Active-Controlled, Observer-Blinded Study to Assess the Immunogenicity, Safety, and Tolerability of Bivalent rLP2086 When Administered as a 2-dose Regimen and a First-in-Human Study to Describe the Immunogenicity, Safety, and Tolerability of a Bivalent rLP2086–Containing Pentavalent Vaccine (MenABCWY) in Healthy Subjects ≥10 to <26 Years Of Age]
Date(s) of this Report:	22 May 2023

– Thank You –

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

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

Why was this study done?

What is meningococcal disease?

Neisseria meningitidis (or *N. meningitidis*) is a kind of germ (bacteria). Meningococcus is its other name. There are different types of this germ. For example, meningococcal type A disease is caused by the meningococcus A germ. Meningococcus A, B, C, W, and Y are the most common types.

N. meningitidis can cause infections of the blood, as well as inflammation around the brain and spinal cord. People who get this illness are at risk for death, brain damage, loss of limbs, hearing loss, and other disabilities.

What is a vaccine and an antibody?

A vaccine can help prevent an infection or a disease. It works by helping the body fight off germs.

Antibodies are proteins that fight infections and help prevent diseases. After a person gets a vaccine, the body's response includes making antibodies. This is called an antibody response.

In this study, the vaccines were administered to participants at the start of the study (Vaccination 1) and then 6 months later (Vaccination 2).

Some participants remained in the study after this. These participants were also given a Booster Dose of vaccine approximately 4 years after Vaccination 2. A Booster Dose is an extra injection or shot of the vaccine that is given to boost or increase the body's immune response to the vaccine. The Booster Dose was the same vaccine that they received at the start of the study (Vaccination 1) and 6 months later (Vaccination 2).

What vaccines were tested in this study?

MenABCWY is an injectable study vaccine. It was not approved for use at the time of this study. MenABCWY is composed of 2 other vaccines that are already used for the prevention of meningococcal disease:

- Nimenrix (Nim-en-riks), which is used to prevent disease caused by meningococcus types A, C, W, and Y
- Trumenba (Tru-men-bah), which is used to prevent disease caused by meningococcus type B

MenABCWY would combine vaccines against meningococcus types A, B, C, W, and Y into a single shot.

The researchers also administered the Trumenba vaccine at Vaccination 1 and Vaccination 2. A separate Menveo (Men-v-eo) vaccine was also

administered at Vaccination 1. The Menveo vaccine is a licensed vaccine. It is used to protect against meningococcus types A, C, W, and Y but not type B.

The Trumenba vaccine and the Menveo vaccine were also given as a Booster Dose.

What was the purpose of this study?

This study aimed to collect additional data on the use of the licensed Trumenba vaccine.

The researchers also wanted to find out if the MenABCWY vaccine was safe in healthy adolescents and young adults and if it produced an antibody response against meningococcus.

Researchers wanted to know:

Did participants have antibodies to the vaccines in blood samples taken 1 month after being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and the Booster Dose?

What happened to antibody levels in the blood of participants during the 4 years after receiving the second vaccine dose (Vaccination 2)?

Did participants have any local reactions (redness, swelling, or pain) at the injection site within 7 days of being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose?

Did participants have any systemic events (high temperature or fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, or joint pain), or require any medication for a fever within 7 days of being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose?

Did participants have any medical problems or serious medical problems after being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose?

Did participants have any medical problems that were not serious but required them to visit their doctor or go to a hospital during the study?

Did participants have any new long-term diseases or medical conditions during the study?

What happened during the study?

How was the study done?

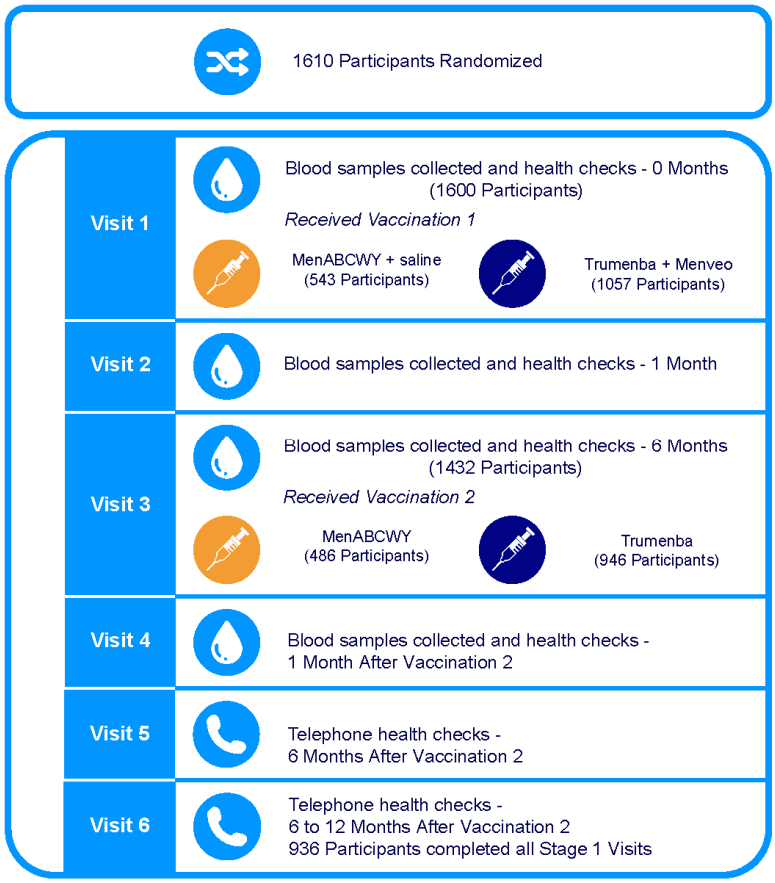
At the start of the study, 10 adult participants were to be assigned to the MenABCWY + saline vaccine group. This was done so that the researchers could find out more about the safety of combining Nimenrix with Trumenba into one vaccine (MenABCWY). The rest of the participants were then assigned to the MenABCWY + saline group or the Trumenba + Menveo vaccine group. Participants were put into these groups by chance

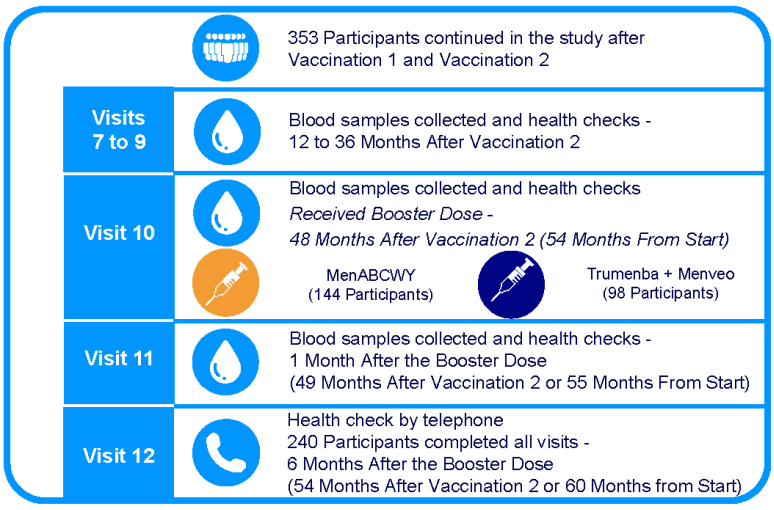
(ie, like flipping a coin to indicate heads or tails).

At the start of the study, participants received the first vaccine dose (Vaccination 1) and then approximately 6 months later the second vaccine dose was administered (Vaccination 2). Participants were monitored and checked for 12 to 18 months. Participants could then continue in the study, providing blood samples for antibody testing yearly and receiving a Booster Dose 4 years after Vaccination 2. The researchers wanted to see how long participants would have antibodies against meningococcus after the second vaccination and how they would respond to the Booster Dose.

Figure 1 below shows when the study vaccines were given to participants in the study.

Figure 1: Study Design





This first part of the study when participants were given the first vaccine dose (Vaccination 1) and the second vaccine dose (Vaccination 2) was observer-blinded. This means the doctors and researchers did not know who was given which vaccine. This was why some participants were given an injection of saline. The rest of the study was open-label. This means that the researchers and participants knew who received which vaccine.

Researchers compared the results of study participants given the MenABCWY vaccine + saline to participants given the Trumenba and Menveo vaccines.

Where did this study take place?

The Sponsor ran this study at 68 locations in 3 countries in Europe (Czech Republic, Finland, and Poland) and the United States. Of these locations, 39 sites included participants who were given the Booster Dose.

When did this study take place?

It began 24 April 2017 and ended 25 October 2022.

Who participated in this study?

The study included participants who were healthy and had never had a meningococcal vaccine or had only received a single dose of a vaccine similar to Nimenrix or Menveo.

- A total of 682 men and boys participated
- A total of 918 women and girls participated
- All participants were 10 to 25 years old at the start of the study

Of the 1610 participants who started the study, 1600 participants received the first vaccine dose (Vaccination 1) and 10 participants left the study before being vaccinated. There were 1432 participants who received the second vaccine dose (Vaccination 2), and 936 participants who completed Visit 6 (6 to 12 months) after being given this second vaccine dose (Vaccination 2). There were 353 participants who agreed to continue in the study after being given the first and second vaccinations. Of the participants who continued in the study, 242 participants received the Booster Dose, and 240 completed the study.

Of the participants who left the study after being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or after the Booster Dose, most left because they were lost to follow-up or they did not want to continue in the study. Lost to follow-up means the study site was not able to contact the participant.

Participants left before the study was over by their choice or a doctor decided it was best for a participant to stop being in the study.

How long did the study last?

If study participants received only the first vaccine dose (Vaccination 1) and the second vaccine dose (Vaccination 2), they were in the study for up to

1½ years. If participants remained in the study and were given the Booster Dose, they were in the study for another 4 years. The entire study took 5½ years to complete.

When the study ended in October 2022, the Sponsor began reviewing the information collected. The Sponsor then created a final report of the results. This is a summary of that final report, which includes data from the complete study.

What were the results of the study?

Researchers wanted to know if participants made antibodies against meningococcal germs after the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and the Booster Dose. To do this, the researchers collected blood samples from participants during the study. They then measured the amount of antibody in these blood samples.

Researchers also wanted to know about the overall safety of the vaccines during the study. To do this, the researchers asked participants to keep a diary and record any symptoms they may have had for 7 days after each vaccination. This included details of how they were feeling and if there were any local reactions or systemic events.

A local reaction is something that happens around the skin area where the needle was inserted when giving the vaccine. This includes redness, swelling, and pain at the injection site. A systemic event is a reaction that is felt in the body was a whole. This can include things like fever, tiredness, headache, chills, vomiting, diarrhea, muscle pain, and joint pain.

The researchers also wanted to know if the participants had any medical problems during the study. Medical problems are discussed in the next section of this document.

Did participants have antibodies to the vaccines in blood samples taken 1 month after being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and the Booster Dose?

The researchers compared the amount of antibody against meningococcus germs in blood samples from participants in the MenABCWY vaccine + saline group and in the Trumenba + Menveo vaccine group.

Researchers saw a rise in antibodies against meningococcus types A, B, C, W, and Y in blood samples from participants taken 1 month after the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and the Booster Dose for both groups.

The researchers found participants previously vaccinated with a vaccine like Nimenrix or Menveo had higher levels of antibodies against meningococcus types A, C, W, and Y than participants who had not previously been given these vaccines.

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

What happened to antibody levels in the blood of participants during the 4 years that followed them being given the second vaccine dose (Vaccination 2)?

Researchers saw that antibodies against meningococcus types A, C, W, and Y remained relatively high during the 4 years following the second vaccine dose (Vaccination 2).

For meningococcus type B, antibodies dropped within a year after being given the second vaccine dose (Vaccination 2), but were still above the level seen before participants were given the first vaccine dose (Vaccination 1). They remained above this level through 4 years after being given the second vaccine dose (Vaccination 2).

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

How many participants had local reactions at the injection site within 7 days of being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose?

The researchers looked at diary entries from the participants in the study to see how many participants had local reactions at the injection site within 7 days of being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose.

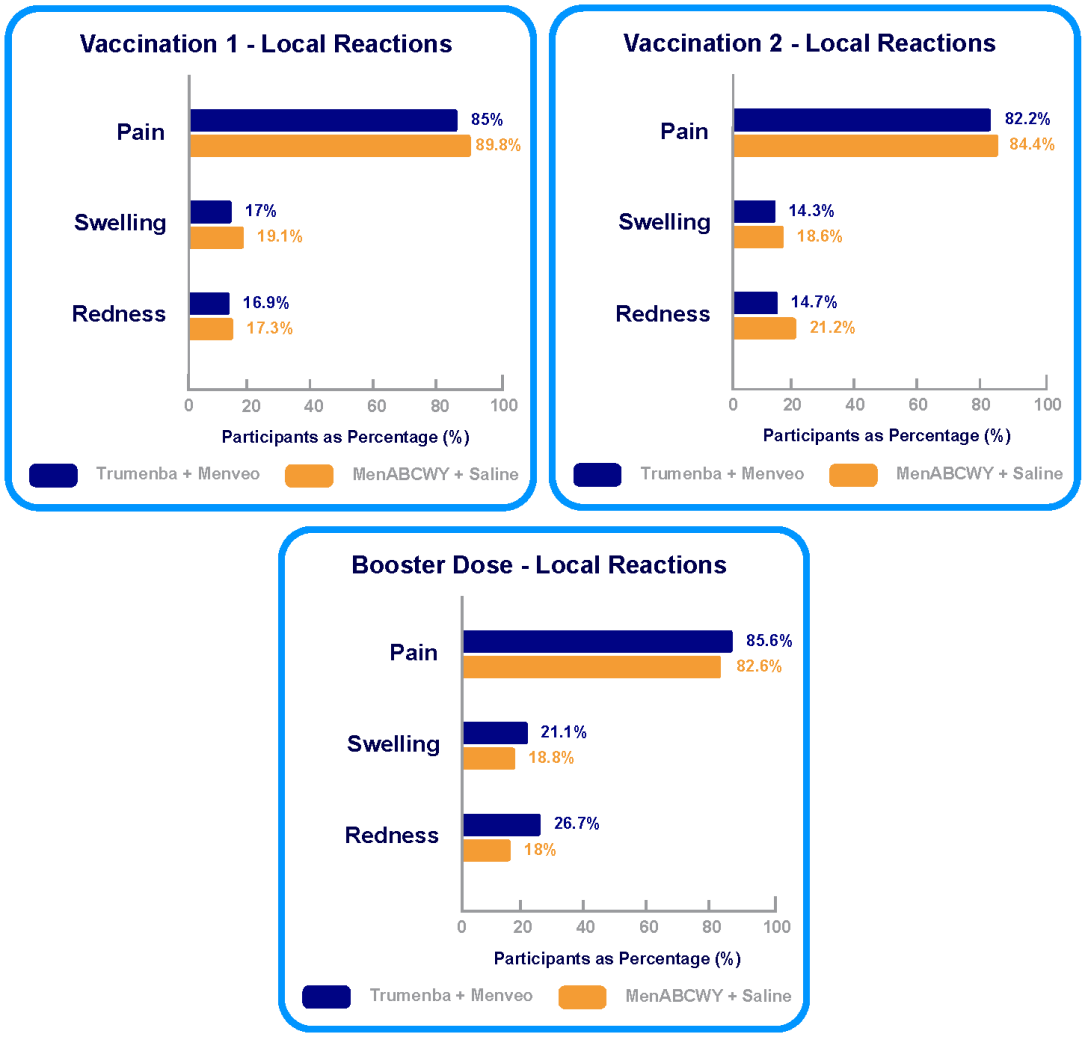
A total of 511 out of 542 (94.3%) participants in the MenABCWY vaccine + saline group and 962 out of 1050 (91.6%) participants in the Trumenba + Menveo vaccine group had a local reaction at the site where they were given the MenABCWY or Trumenba vaccines.

There were 110 out of 133 (82.7%) participants in the MenABCWY vaccine + saline group and 77 out of 90 (85.6%) in the Trumenba + Menveo vaccine group who had a local reaction at the site where they were given the Booster Dose.

The percentages of participants with redness, swelling, or pain at the injection site after each vaccination are shown in Figure 2. Pain at the injection site was the most commonly reported local reaction in both groups.

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

Figure 2: How many participants had local reactions at the injection site within 7 days of Vaccination 1, Vaccination 2, or the Booster Dose?



How many participants had systemic events within 7 days of being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose?

The researchers looked at diary entries from the participants in the study to see how many had systemic events within 7 days of being given the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), or the Booster Dose.

A total of 437 out of 542 (80.6%) participants in the MenABCWY vaccine + saline group and 841 out of 1050 (80.1%) in the Trumenba + Menveo vaccine group had a systemic event within 7 days of being given the first vaccine dose (Vaccination 1) or the second vaccine dose (Vaccination 2).

There were 96 out of 136 (70.6%) participants in the dose MenABCWY vaccine + saline group and 71 out of 95 (74.7%) in the Trumenba + Menveo vaccine group who had a systemic event within 7 days of the Booster Dose.

The percentages of participants systemic events after each vaccination are shown in Figure 3. Tiredness and headache were the most commonly reported systemic events in both groups.

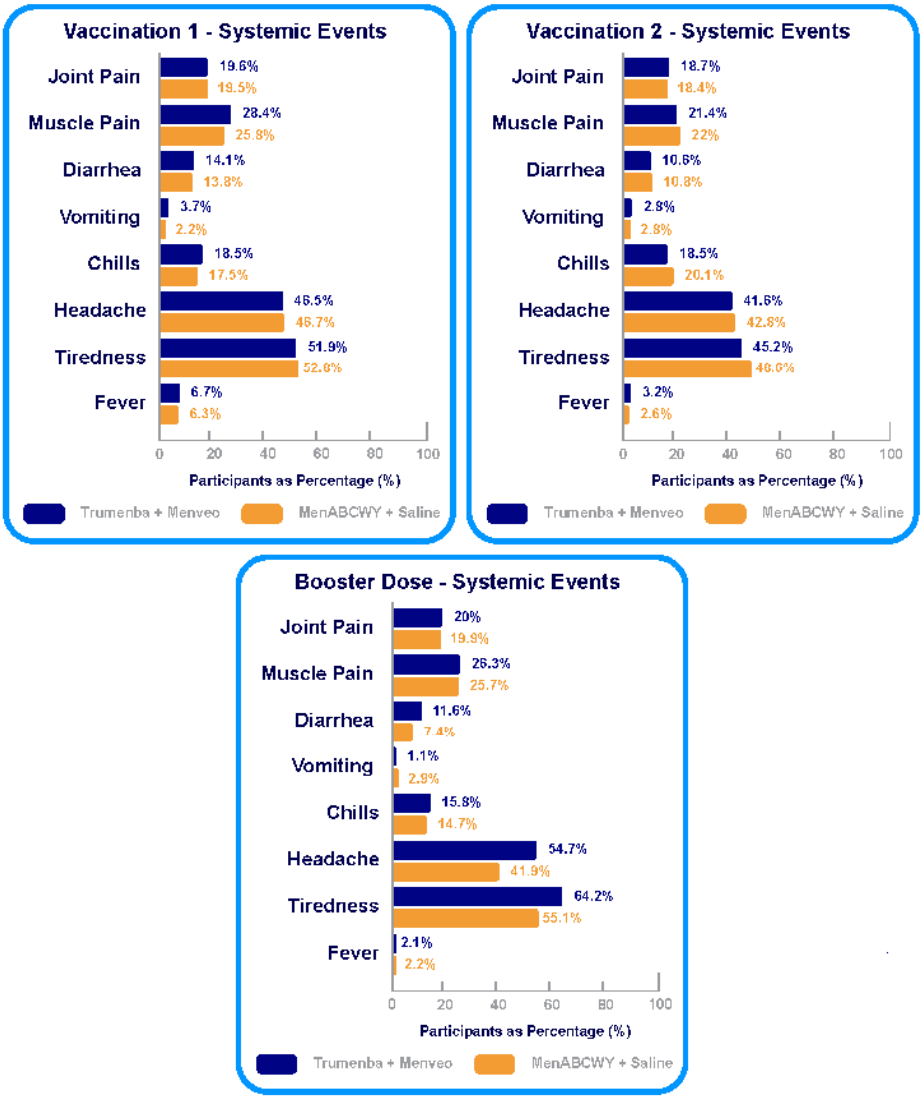
There were 139 out of 542 (25.6%) participants in the MenABCWY vaccine + saline group and 270 out of 1050 (25.7%) participants in the Trumenba + Menveo vaccine group who required medication to treat pain or a fever within 7 days of being given the first vaccine dose (Vaccination 1) or the second vaccine dose (Vaccination 2).

There were 20 out of 136 (14.7%) participants in the MenABCWY vaccine + saline group and 14 out of 95 (14.7%) in the Trumenba +

Menveo vaccine group who required medication to treat pain or a fever within 7 days of being given within 7 days of the Booster Dose.

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

Figure 3: How many participants had systemic events within 7 days of Vaccination 1, Vaccination 2, or the Booster Dose?



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.

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 treatment or by another medicine the participant was taking. Sometimes the cause of a medical problem is unknown. By comparing medical problems across many treatment groups in many studies, doctors try to understand what effects a study medication might have on a participant.

After the first vaccine dose (Vaccination 1) and the second vaccine dose (Vaccination 2), there were 124 out of 543 participants (22.8%) in the MenABCWY vaccine + saline group and 255 out of 1057 participants (24.1%) in the Trumenba + Menveo vaccine group who had at least 1 medical problem within 1 month of the vaccination. The most common medical problems – those reported by more 4% participants – are described in Table 1. A total of 6 participants left the study because of medical problems in this part of the study (3 participants in each group).

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

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 more than 4% of participants are listed.
- The **2nd** column tells how many of the 543 participants in the MenABCWY vaccine + saline group reported each medical problem. Next to this number is the percentage of the 543 participants in the MenABCWY vaccine + saline group who reported the medical problem.
- The **3rd** column tells how many of the 1057 participants in the Trumenba + Menveo vaccine group reported each medical problem. Next to this number is the percentage of the 1057 participants in the Trumenba + Menveo vaccine group who reported the medical problem.
- Using these instructions, you can see that 21 out of the 543 participants (3.9%) in the MenABCWY vaccine + saline group reported the common cold. A total of 51 out of the 1057 participants (4.8%) in the Trumenba + Menveo vaccine group reported the common cold.

These instructions can also be used to help understand Table 2.

Table 1. Commonly reported medical problems by study participants within 1 month of vaccination 1 or vaccination 2		
Medical Problem	**MenABCWY Vaccine + Saline (543 Participants)**	**Trumenba + Menveo Vaccines (1057 Participants)**
Common cold (upper respiratory tract infection)	21 out of 543 participants (3.9%)	51 out of 1057 participants (4.8%)
Infection of the nose and throat (nasopharyngitis)	24 out of 543 participants (4.4%)	38 out of 1057 participants (3.6%)

Within 1 month of the Booster Dose, there were 17 out of 144 participants (11.8%) in the MenABCWY vaccine + saline group and 14 out of 96 participants (14.6%) in the Trumenba + Menveo vaccine group who had at least 1 medical problem. Most medical problems were reported by 1 or 2 participants apart from coronavirus disease 2019 (COVID-19) and a positive SARS-CoV-2 test as the Booster Dose was given during the global COVID-19 pandemic. These medical problems are described in Table 2.

Table 2. Commonly reported medical problems by study participants within 1 month after the booster dose		
Medical Problem	**MenABCWY Vaccine + Saline (144 Participants)**	**Trumenba + Menveo Vaccines (96 Participants)**
COVID-19	5 out of 144 participants (3.5%)	3 out of 96 participants (3.1%)
Positive SARS-CoV-2 test	3 out of 144 participants (2.1%)	2 out of 96 participants (2.1%)

COVID-19: coronavirus disease 2019.

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.

After the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and up to 6 months after Vaccination 2, serious medical problems were reported for:

- 10 out of 543 participants (1.8%) in the MenABCWY vaccine + saline group
- 14 out of 1057 participants (1.3%) in the Trumenba + Menveo vaccine group

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

Within 1 month of the Booster Dose, serious medical problems were reported for:

- 0 out of 144 participants in the MenABCWY vaccine + saline group
- 1 out of 96 participants (1.0%) in the Trumenba + Menveo vaccine group

During the booster follow-up phase (from 30 days after the Booster Dose through 6 months after this vaccination), serious medical problems were reported for:

- 2 out of 144 participants (1.4%) in the MenABCWY vaccine + saline group
- 0 out of 94 participants in the Trumenba + Menveo vaccine group

None of the serious medical problems were thought related to the study vaccines.

There was 1 participant in the MenABCWY vaccine group died during the study. This death was due to a motor vehicle accident that happened more than 3 months after Vaccination 2. No other participants died during the study.

How many participants had medical problems that were not serious but required them to visit their doctor or go to a hospital during the study?

Researchers wanted to know how many participants had a medical problem that was not serious but required them to see a doctor or visit a hospital during the study.

After the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and up to 6 months after Vaccination 2, medical problems that were not serious but required a participant to see a doctor or visit a hospital were reported for:

- 179 out of 543 participants (33.0%) in the MenABCWY vaccine + saline group
- 356 out of 1057 participants (33.7%) in the Trumenba + Menveo vaccine group

Note: In the Trumenba + Menveo group, during the first vaccination (Vaccination 1) and the Booster Dose, participants were given Menveo and Trumenba, and only Trumenba was given at Vaccination 2.

Within 1 month of the Booster Dose, medical problems that meant a participant had to go and see a doctor or visit a hospital were reported for:

- 8 out of 144 participants (5.6%) in the MenABCWY vaccine + saline group
- 6 out of 96 participants (6.3%) in the Trumenba + Menveo vaccine group

During the booster follow-up phase, medical problems that required going to a doctor or a hospital were reported for

- 7 out of 144 participants (4.9%) in the MenABCWY vaccine + saline group
- 9 out of 94 participants (9.6%) in the Trumenba + Menveo vaccine group

How participants many were diagnosed with a new long-term disease or medical condition during the study?

Researchers wanted to know how many participants were diagnosed with a new long-term disease or medical condition during the study.

After the first vaccine dose (Vaccination 1), the second vaccine dose (Vaccination 2), and up to 6 months after Vaccination 2, new long-term diseases or medical conditions were reported for:

- 3 out of 543 participants (less than 1%) in the MenABCWY vaccine + saline group
- 10 out of 1057 participants (less than 1%) in the Trumenba + Menveo vaccine group

Within 1 month of the Booster Dose, there were no new long-term diseases or medical conditions reported in either vaccine group.

During the booster follow-up phase, new long-term diseases or medical conditions were reported for:

- 2 out of 94 participants (1.4%) in the MenABCWY vaccine + saline group
- 0 participants in the Trumenba + Menveo vaccine group

None of the new long-term diseases or medical conditions were considered related to the vaccines.

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 **B1971057**

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

www.clinicaltrials.gov	Use the study identifier **NCT03135834**
www.clinicaltrialsregister.eu	Use the study identifier **2016-004421-17**
www.pfizer.com/research/research_clinical_trials/trial_results	Use the protocol number **B1971057**

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