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 recommend for infants.

Sponsor: Pfizer Inc.

Vaccine Studied: *Neisseria meningitidis* Group A, B, C, W, and Y Vaccine (called MenABCWY or PF-06886992)

Protocol Number: C3511002

Dates of Study: 26 November 2020 to 15 September 2022

Title of this Study: A Clinical Trial to Assess the Safety, Tolerability, and Immunogenicity of MenABCWY in Healthy Infants

[A Phase 2b Trial to Assess the Safety, Tolerability, and Immunogenicity of MenABCWY in Healthy Infants 2 and 6 Months of Age]

Date(s) of this Report: 15 March 2023

– Thank You –

If your child participated in this study, Pfizer, the Sponsor, 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 child's 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.

Neisseria 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 brain damage, loss of limbs, hearing loss, and other disabilities.

What is a vaccine and an antibody response?

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 an infant gets a vaccine, the body's response includes making antibodies. This is called an antibody response.

What is meningococcal ABCWY vaccine (MenABCWY)?

Meningococcal ABCWY vaccine (men-in-jo-kok-uhl A-B-C-W-Y), or MenABCWY, is an injectable study vaccine. It is an investigational vaccine, which means that it has not been approved for general use. MenABCWY is a combination of 2 other vaccines that are already used for the prevention of meningococcal disease. With MenABCWY, the components of these vaccines are mixed together and given in a single injection.

What vaccines were tested in this study?

4 study vaccines were tested in this study:

- MenABCWY: A study vaccine against meningococcus germs types A, B, C, W, and Y
- Nimenrix (Nim-en-riks): A study vaccine against meningococcus germs types A, C, W, and Y (but not the type B germ)
- Trumenba (Tru-men-bah) full dose and Trumenba half dose: A study vaccine only against meningococcus germ type B
- Bexsero (Beks-ser-oh): A study vaccine only against meningococcus germ type B

What was the purpose of this study?

This study primarily aimed to find out if MenABCWY was safe in healthy infants, and if it produced antibody responses against *N meningitidis*. Before the MenABCWY vaccine was given to infants 2 months of age, it was first given to infants who were about 6 months of age. The researchers wanted to know if MenABCWY was safe in infants 6 months of age before infants 2 months of age were given vaccination in the study.

Among infants who were about 2 months of age when they joined the study, researchers wanted to know:

Did infants who received MenABCWY have antibody responses:

- **Against meningococcus germs types A, C, W, and Y that were similar to those who received Nimenrix?**

- Against meningococcus germ type B that were similar to those who received Bexsero?

Did infants who received Trumenba half dose or Trumenba full dose have an antibody response:

- Against meningococcus germ type B?

Among infants who received MenABCWY and in those who received Bexsero + Nimenrix:

- How many infants had redness, swelling, or tenderness at the MenABCWY or Bexsero injection site (or the skin area where the needle was inserted) after they got study vaccine?
- How many infants had fever, drowsiness, decreased appetite, or irritability after they got the study vaccine?
- How many infants were given fever-reducing medicine (other than the study paracetamol)?
- What medical problems and serious medical problems did infants have during the study?
- How many infants had medical problems that required going to the doctor or a hospital during the study?
- How many infants were diagnosed with a new long-term disease or medical condition during the study?
- How many infants had immediate medical problems after they got the study vaccine?

What happened during the study?

How was the study done?

Researchers tested MenABCWY, Nimenrix, Trumenba, and Bexsero with 9 groups of infants who joined the study. Infants were first assigned to a study group based on their age, after which assignment to a specific study vaccine group was done by chance (ie, like flipping a coin to indicate heads or tails). In addition to the study vaccines, infants were also given other vaccines per the standard childhood immunization schedule. The study started as an open-label study, which means that the researchers and the infants' parents/guardians knew who received which vaccine, and was divided in 2 parts. A third part of the study, intended for researchers and parents/guardians to be blinded to the study vaccine assigned to each infant (ie, not know which study vaccine each infant received) was also planned, but the study was stopped before any infants joined that part.

As with many vaccines, after vaccination, infants may develop fever and other reactions. As part of the study, paracetamol was given to some infants to see if this helped to prevent or reduce occurrence of fever and other reactions after vaccination.

Part 1

Part 1 included 8 groups of infants. The first 2 groups enrolled infants who were about 6 months of age, and these infants received MenABCWY. All other groups enrolled infants who were about 2 months of age. Groups receiving Trumenba + Nimenrix or MenABCWY started enrolling only after researchers reviewed the safety data from previous groups and found the data acceptable.

Part 2

Part 2 included 1 group of infants who were about 2 months of age when they joined the study. The researchers reviewed the safety results from the infants in Part 1, prior to giving study vaccine to infants in Part 2.

Table 1 below shows the groups and study vaccines that were planned to be administered to infants during Parts 1 and 2 of the study.

Table 1. Study groups and study vaccines

	Study Group	Type of Meningococcal Vaccine Given	Study Paracetamol Given	Safety Review by Sponsor	Direction of Study Progression
Infants about 6 months of age*	1	MenABCWY	Yes	✓	↓
	2	MenABCWY	No		
Infants about 2 months of age	3	Trumenba half dose and Nimenrix	Yes	✓	
	4	Trumenba half dose and Nimenrix	No		
	5	Trumenba full dose and Nimenrix	Yes	✓	
	7	MenABCWY	Yes	✓	
	11	MenABCWY	Yes, when needed	✓	
	8	Bexsero and Nimenrix	Yes		Groups 8 and 10 were enrolled at the same time or after the enrollment of Groups 4-5.
	10	Bexsero and Nimenrix	No		

NOTE: Infants in Study Groups with the same shading joined the study at the same time.

* The MenABCWY vaccine was first given in infants who were about 6 months of age. The researchers wanted to know if MenABCWY was safe in infants 6 months of age before infants 2 months of age were given vaccination in the study.

Where did this study take place?

The study occurred at 32 locations in Germany, Greece, and Spain.

When did this study take place?

The study began 26 November 2020. Each infant was planned to be in the study for about 16 months if they started the study at 2 months of age, and 12 months if they started the study at 6 months of age. On 17 March 2022, the Sponsor decided to discontinue the study based on careful review of safety results available at that time and the recommendation of an external Safety Monitoring Committee. More specifically, 2 infants required hospital care to investigate the fever that occurred shortly after vaccination. The infants that were in the study when the Sponsor made this decision were followed for safety for 6 months after their last vaccination. After this decision, the study doctors assessed the health needs of the infants and recommended non-study meningococcal vaccines to be given to these infants. The last study visit was on 15 September 2022. Overall, the study was conducted for about 2 years. The Sponsor then created a report of the results. Below is a summary of that report.

Who participated in this study?

The study included infants who were assessed as healthy by study doctors, and who were about 2 months or 6 months of age when the study started.

- There were 165 (51%) boys and 160 (49%) girls.

Of the 326 infants who started the study, 325 infants received at least 1 dose of study vaccine.

- Overall, 115 infants finished the study.
- 211 infants did not finish the study as planned; the most common reason was that the Sponsor stopped the study early.

What were the results of the study?

Because the study was stopped early, most of the infants did not complete the study and the researchers were not able to collect all of the information that they had planned. For instance, 41% of infants in Group 3 (Trumenba half dose + Nimenrix) and all infants in Group 11 (MenABCWY) did not receive their second vaccination. Infants in Groups 7 and 11 (MenABCWY) did not receive their booster dose (third vaccination), and blood samples were not collected following the booster dose for infants in Groups 4 (Trumenba half dose + Nimenrix) and 5 (Trumenba full dose + Nimenrix).

For the results that they were able to collect, the researchers measured the amount of antibodies against *N meningitidis* in the infants' blood samples. They looked at the amount of antibodies found in infants who received MenABCWY and in those who received Nimenrix + Trumenba or Bexsero. Results shown focus mainly on infants 2 months of age because the study primarily aimed to find out if MenABCWY was safe in healthy infants 2 months of age, and if it produced antibody responses against *N meningitidis*. This is a summary of just some of the main results of this study.

Did infants 2 months of age who received MenABCWY have antibody responses against meningococcus germs types A, C, W, and Y that were similar to those who received Nimenrix?

The researchers compared the amount of antibodies found in infants who received MenABCWY and in infants who received Bexsero + Nimenrix, 1 month after the second vaccination. Researchers saw a rise in antibodies against meningococcus germs types A, C, W, and Y among all the infants (100%) in these groups. They found out that the infants who received MenABCWY had similar antibody responses against *N meningitidis* to infants who received Bexsero + Nimenrix. Because the infants who received MenABCWY did not receive booster doses, the

researchers could not compare their post-booster results to the infants who received Bexsero + Nimenrix.

Did infants 2 months of age who received MenABCWY have antibody responses against meningococcus germs type B that were similar to those who received Bexsero?

The researchers compared the amount of antibodies against meningococcus germs type B found in infants who received MenABCWY and in infants who received Bexsero + Nimenrix 1 month after the second vaccination. Researchers saw a rise in antibodies against meningococcus germs type B that was generally higher among infants who received MenABCWY compared to infants who received Bexsero + Nimenrix. Because the infants from Group 7 (MenABCWY) did not receive booster doses, the researchers could not compare their post-booster results to the infants who received Bexsero + Nimenrix.

Did infants 2 months of age who received half or full dose of Trumenba have an antibody response against meningococcus germs type B?

The researchers looked at the amount of antibodies found in infants who received Trumenba half dose + Nimenrix and infants who received Trumenba full dose + Nimenrix, 1 month after the second vaccination. The researchers found out that the infants who received half or full dose of Trumenba had antibody responses against meningococcus germs type B. A similar proportion of infants from these groups had a rise in antibodies. Because the infants from the Trumenba full dose + Nimenrix group did not have blood draws following their booster dose, these post-booster results were not available.

The infants' parents/guardians kept a diary to record how infants were doing within 7 days after the first and second vaccination. The MenABCWY vaccine was first

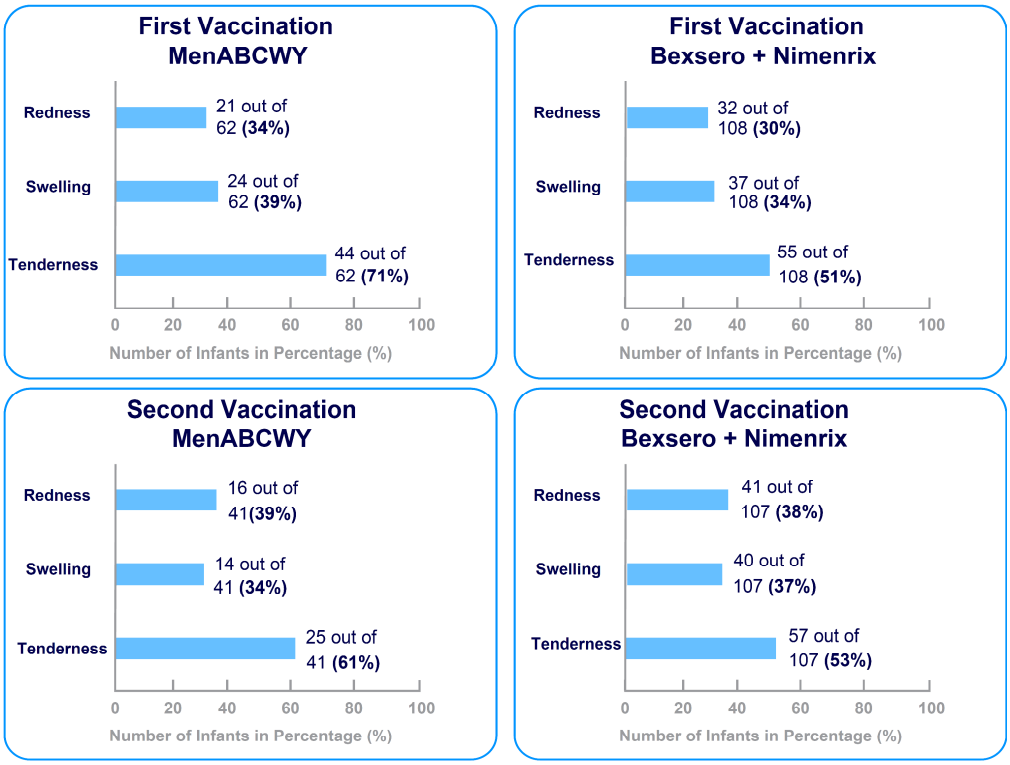
given in infants who were about 6 months of age and the researchers looked at the fever and other symptoms within 7 days of the first vaccination as well as any medical problems. The researchers saw that it was safe to continue with the study and give the MenABCWY vaccine in infants 2 months of age. This is a summary of some of the main results in infants 2 months of age when researchers looked at the records of 62 infants who received MenABCWY, and 109 infants who received Bexsero + Nimenrix.

Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many had redness, swelling, or tenderness at the MenABCWY or Bexsero injection site (or the skin area where the needle was inserted) after they got study vaccine?

A total of 51 out of 62 (82%) infants who received MenABCWY and 91 out of 109 (83%) infants who received Bexsero + Nimenrix had at least one of the following: redness, swelling, or tenderness at the MenABCWY or Bexsero injection site, respectively, within 7 days of any study vaccination.

The charts below in **Figure 1** show that tenderness at the injection site was the most common reaction after the first and second vaccination.

Figure 1. How many infants had redness, swelling, or tenderness at the MenABCWY or Bexsero injection site within 7 days of the first and second vaccination?

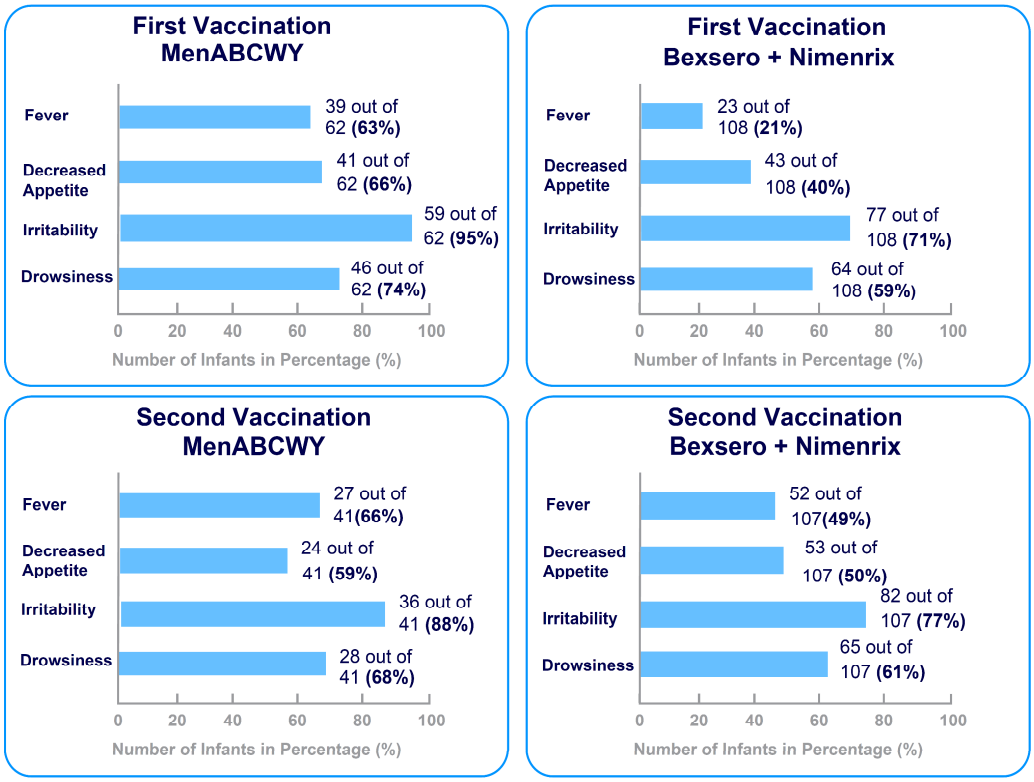


Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many had fever, decreased appetite, irritability, or drowsiness after they got the study vaccine?

All 62 (100%) infants who received MenABCWY and 104 out of 109 (95%) infants who received Bexsero + Nimenrix had at least one of the following: fever, decreased appetite, irritability, or drowsiness within 7 days of any study vaccination.

The charts below in **Figure 2** show that irritability was the most common symptom after the first and second vaccination.

Figure 2. How many infants had fever, decreased appetite, irritability, or drowsiness within 7 days of the first and second vaccination?



Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many were given fever-reducing medicine (other than the study paracetamol)?

33 out of 62 (53%) infants who received MenABCWY and 87 out of 109 (80%) infants who received Bexsero + Nimenrix were given fever-reducing medicine (other than the study paracetamol) after study vaccination.

What medical problems did the infants have during the study?

The researchers recorded any medical problems the infants had during the study. The infants could have had medical problems for reasons not related to the study (for example, caused by an underlying disease or by chance). Medical problems could also have been caused by a study vaccine or by another medicine the infant was taking. Sometimes the cause of a medical problem is unknown. By comparing medical problems across many groups of study participants in many studies, researchers try to understand what side effects a study vaccine might have on an infant. This is a summary of some of the main results in infants of about 2 months of age.

Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, what medical problems did they have during the study?

37 out of 62 (60%) infants who received MenABCWY had a medical problem, and 60 out of 110 (55%) infants who received Bexsero + Nimenrix had a medical problem. 9 out of 62 (15%) infants who received MenABCWY and 11 out of 110 (10%) infants who received Bexsero + Nimenrix had medical problems that were considered by the study doctors to be related to the study vaccines; the other medical problems that happened during the study were not considered to be related to the study vaccines. Decreased appetite, drowsiness, pain in leg, and irritability were the most common medical problems considered by the study doctors to be related to the study vaccines.

1 out of 110 (1%) infants who received Bexsero + Nimenrix was taken out of the study (withdrawn) by their parents/guardians because of medical problems. This

infant was 2 months of age and had irritability and fever after study vaccination. The study doctors thought these medical problems could be related to the study vaccines, and the caregivers decided not to continue in the study. 0 out of 62 (0%) infants 2 months of age who received MenABCWY were withdrawn from the study because of medical problems.

Table 2 below describes the most common medical problems during the vaccination phase of the study – those reported in at least 5% of infants in either group receiving MenABCWY or Bexsero + Nimenrix.

Below are instructions on how to read Table 2.

Instructions for Understanding Table 2.

- The **1st** column of Table 2 lists the most common medical problems reported during the vaccination phase of the study (time from the first study vaccination through 1 month after the second vaccination). It lists all medical problems reported in at least 5% of infants in either study group.
- The **2nd** column tells how many of the 62 infants who received MenABCWY had a medical problem listed in each line of column 1. Next to this number is the percentage of infants who had the medical problem.
- The **3rd** column tells how many of the 110 infants who received Bexsero + Nimenrix had a medical problem listed in each line of column 1. Next to this number is the percentage of infants who had the medical problem.
- Using these instructions, you can see that 9 out of 62 infants (15%) who received MenABCWY had COVID-19 during the period described in bullet 1 above. None of the 110 (0%) infants who received Bexsero + Nimenrix had COVID-19.

Table 2. Most common medical problems reported in study infants (at least 5% of infants in either group)		
Medical Problem	**MenABCWY**	**Bexsero + Nimenrix**
COVID-19	9 out of 62 infants (15%)	0 out of 110 infants (0%)
Infection of the nose, throat, and upper airways	7 out of 62 infants (11%)	13 out of 110 infants (12%)
Irritability	6 out of 62 infants (10%)	3 out of 110 infants (3%)
Viral infection in the small airways of the lung	4 out of 62 infants (6%)	2 out of 110 infants (2%)

Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many had medical problems that required going to the doctor or a hospital during the study?

28 out of 62 (45%) infants who received MenABCWY and 42 out of 110 (38%) infants who received Bexsero + Nimenrix had a medical problem that required going to the doctor or a hospital.

Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many were diagnosed with a new long-term disease or medical condition during the study?

1 out of 62 (2%) infants who received MenABCWY was diagnosed with a new long-term disease or medical condition during the study. This infant had epilepsy (seizure disorder). 2 out of 110 (2%) infants who received Bexsero + Nimenrix were diagnosed with a new long-term disease or medical condition during the study: 1 infant had problems with defects of the heart that were present from birth and the other infant had eczema. These new long-term diseases or medical conditions were not considered by the study doctors to be related to the study vaccines.

Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many had an immediate medical problem after they got the study vaccine?

None of the infants had immediate medical problems after they got the study vaccine.

Did the infants have any serious medical problems?

A medical problem is considered "serious" when it is life-threatening, needs hospital care, or causes lasting problems. The nature of serious medical problems arising in the study are included in section below.

During the study, 1 infant who received full dose of Trumenba and Nimenrix and 1 infant who received MenABCWY developed fever shortly after their first vaccination at the age of 2 months. These infants needed hospital care and investigations including a spinal tap (examination of the liquid that surrounds the spinal cord after it is extracted with a small needle) in order to investigate the cause of the fever. Both of the infants fully recovered. Following these cases, on 17 March 2022, the Sponsor decided to discontinue the study based on careful review of safety results available at that time and the recommendation of an external Safety Monitoring Committee.

Among infants 2 months of age who received MenABCWY and in those who received Bexsero + Nimenrix, how many had a serious medical problem during the study?

6 out of 62 (10%) infants who received MenABCWY had a serious medical problem, and 7 out of 110 (6%) infants who received Bexsero + Nimenrix had a serious medical problem. None of the serious medical problems were considered by the study doctors to be related to the study vaccines.

1 infant who received MenABCWY died during the study at the age of about 5 months, 22 days after they received the second vaccination. This infant died as a result of Sudden Infant Death Syndrome (SIDS). This death was not considered to be related to the study vaccines by the study doctors and the Sponsor.

Where can I learn more about this study?

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

For more details on your study please visit:

www.clinicaltrials.gov	Use the study identifier **NCT04645966**
www.clinicaltrialsregister.eu	Use the study identifier **2020-000948-60**

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

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