Menactra® is active immunization to prevent invasive meningococcal disease caused by Neisseria meningitidis serogroups A, C, Y and W-135. Menactra is approved for use in individuals 9 months through 55 years of age. Menactra does not prevent N meningitidis serogroup B disease.

**DOSE AND ADMINISTRATION**
A 0.5 mL dose for intramuscular injection.

**Primary Vaccination:**
- Children 9 through 23 months of age: Two doses, three months apart.
- Individuals 2 through 55 years of age: A single dose.

**Booster Vaccination:**
- A single booster dose may be given to individuals 15 through 55 years of age at continued risk for meningococcal disease, if at least 4 years have elapsed since the prior dose.

**ADVERSE REACTIONS**
Common (≥10%) solicited adverse events in individuals 2 through 55 years of age included:
- Injection site pain, redness, and swelling
- Fatigue, malaise, myalgia, arthralgia
- Headache, irritability, drowsiness

**PATIENT COUNSELING INFORMATION**
See 17 PATIENT COUNSELING INFORMATION. Revised: April 2018
Of the 1778 children, 78% of participants (Menactra, N=1056; control group, N=322) were enrolled at United States (US) sites and 22% at a Chilean site. (Menactra, N=200; control group, N=200).

**Individuals 2 Through 55 Years of Age**
The safety of Menactra was evaluated in eight clinical studies that enrolled 10,057 participants aged 2-55 years who received Menactra and 5,266 participants who received Menomune – A/C/Y/W-135. Menomune was approved for use in individuals 9 months to 55 years of age. Menactra does not prevent N meningitidis serogroup B disease.

**2 DOSAGE AND ADMINISTRATION**

**2.1 Preparation for Administration**
Menactra is a clear to slightly turbid solution. Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit. If any of these conditions exist, the vaccine should not be administered. Withdraw the 0.5 mL dose of vaccine from the single-dose vial using a sterile needle and syringe.

**2.2 Dose and Schedule**
Menactra is administered as a 0.5 mL dose by intramuscular injection. Do not administer this product intranovously or subcutaneously.

**Primary Vaccination:**
- In children 9 through 23 months of age, Menactra is given as a 2-dose series three months apart.
- Individuals 2 through 55 years of age, Menactra is given as a single dose.

**Booster Vaccination:**
- A single booster dose may be given to individuals 15 through 55 years of age at continued risk for meningococcal disease, if at least 4 years have elapsed since the prior dose.

**3 DOSAGE FORMS AND STRENGTHS**
Menactra is a solution supplied in 0.5 mL single-dose vials. [See Description (11) for a complete listing of ingredients.]

**4 CONTRAINDICATIONS**
Severe allergic reaction (eg, anaphylaxis) after a previous dose of a meningococcal capsular polysaccharide, diphtheria toxoid- or CRM197-containing vaccine, or to any component of Menactra [see Description (11)].

**5 WARNINGS AND PRECAUTIONS**

**5.1 Guillain-Barré Syndrome**
Persons previously diagnosed with Guillain-Barré syndrome (GBS) may be at increased risk of GBS following receipt of Menactra. The decision to give Menactra should take into account the potential benefits and risks.

GBS has been reported in temporal relationship following administration of Menactra (1) (2). The risk of GBS following Menactra vaccination was evaluated in a post-marketing retrospective cohort study [see Post-Marketing Experience (6.2)].

**5.2 Preventing and Managing Allergic Vaccine Reactions**
Prior to administration, the healthcare provider should review the immunization history for possible vaccine sensitivity and previous vaccination-related adverse reactions to allow an assessment of benefits and risks. Epinephrine and other appropriate agents used for the control of immediate allergic reactions must be immediately available should an acute anaphylactic reaction occur.

**5.3 Altered Immuneocompetence**
- **Reduced Immune Response**
Some individuals with altered immune competence, including some individuals receiving immunosuppressant therapy, may have reduced immune responses to Menactra.
- **Complement Deficiency**
Persons with certain complement deficiencies and persons receiving treatment that inhibits terminal complement activation (for example, eculizumab) are at increased risk for invasive disease caused by N meningitidis, including invasive disease caused by serogroups A, C, Y and W-135, even if they develop antibodies following vaccination with Menactra. [See Clinical Pharmacology (12)].

**5.4 Limitations of Vaccine Effectiveness**
Menactra may not protect all recipients.

**5.5 Syncope**
Syncope (fainting) has been reported following vaccination with Menactra. Procedures should be in place to prevent falling injury and manage syncope reactions.

**6 ADVERSE REACTIONS**
**6.1 Clinical Trials Experience**
Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a vaccine cannot be directly compared to rates in the clinical trials of another vaccine and may not reflect the rates observed in practice.

**Children 9 Through 12 Months of Age**
The safety of Menactra was evaluated in four clinical studies that enrolled 3721 participants who received Menactra at 9 and 12 months of age. At 12 months of age these children also received one or more other recommended vaccines (Meeasles, Mumps and Rubella, and Varicella Virus Vaccine Live (MMRV) or Measles, Mumps, and Rubella Virus Vaccine (MMR) and Varicella Virus Vaccine Live (V) each manufactured by Merck & Co., Inc., Pneumococcal 7-valent Conjugate Vaccine (Diphtheria CRM, Protein) manufactured by Wyeth Pharmaceuticals Inc. (PCV7), Hepatitis A Vaccine manufactured by Merck & Co., Inc. (HepA). A control group of 997 children was enrolled at 12 months of age and received two or more childhood vaccines [MMR or MMR-V, PCV7, HepA] at 12 months of age [see Concomitant Vaccine Administration (14.3)].

**Table 1:** Percentage of US Participants Reporting Solicited Adverse Reactions Within 7 Days Following Vaccine Administration at 9 Months and 12 Months of Age

<table>
<thead>
<tr>
<th>Reaction</th>
<th>Any</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Any</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Any</th>
<th>Grade 2</th>
<th>Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menactra Site</td>
<td>37.4</td>
<td>4.3</td>
<td>0.6</td>
<td>48.5</td>
<td>7.5</td>
<td>1.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PCV7 Site</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>45.6</td>
<td>9.4</td>
<td>1.6</td>
<td>45.7</td>
<td>8.3</td>
<td>0.3</td>
</tr>
<tr>
<td>MMRV Site</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>38.9</td>
<td>7.1</td>
<td>1.0</td>
<td>40.3</td>
<td>5.2</td>
<td>0.0</td>
</tr>
<tr>
<td>HepA Site</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>43.4</td>
<td>8.7</td>
<td>1.4</td>
<td>40.9</td>
<td>4.6</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**Erythema**

| Menactra Site | 30.2 | 2.5 | 0.3 | 30.1 | 1.3 | 0.1 | - | - | - |
| PCV7 Site | - | - | - | 23.4 | 2.6 | 0.2 | 32.6 | 3.0 | 0.7 |
| MMRV Site | - | - | - | 22.5 | 0.9 | 0.3 | 33.2 | 5.9 | 0.0 |
| HepA Site | - | - | - | 25.1 | 1.1 | 0.0 | 26.6 | 0.7 | 0 |

**Swelling**

| Menactra Site | 16.8 | 0.9 | 0.2 | 16.2 | 0.9 | 0.1 | - | - | - |
| PCV7 Site | - | - | - | 19.5 | 1.3 | 0.4 | 18.6 | 1.3 | 0.7 |
| MMRV Site | - | - | - | 12.1 | 0.4 | 0.1 | 14.1 | 0.3 | 0.0 |
| HepA Site | - | - | - | 16.4 | 0.7 | 0.2 | 13.5 | 0.0 | 0.3 |
Table 2: Percentage of US Participants 2 Years Through 10 Years of Age Reporting Solicited Adverse Reactions Within 7 Days Following Vaccine Administration

<table>
<thead>
<tr>
<th>Reaction</th>
<th>Menactra N=1156 - 1157</th>
<th>Menomune – A/C/Y/W-135 N=1027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local/Injection Site</td>
<td>Any</td>
<td>Grade 2</td>
</tr>
<tr>
<td>Pain</td>
<td>45.0</td>
<td>4.9</td>
</tr>
<tr>
<td>Redness</td>
<td>21.8</td>
<td>4.6</td>
</tr>
<tr>
<td>Induration</td>
<td>18.9</td>
<td>3.4</td>
</tr>
<tr>
<td>Swelling</td>
<td>17.4</td>
<td>3.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Systemic</th>
<th>Reaction</th>
<th>Menactra N=1156 - 1157</th>
<th>Menomune – A/C/Y/W-135 N=1027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>12.4</td>
<td>3.0</td>
<td>0.3</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>11.1</td>
<td>2.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Redness</td>
<td>10.8</td>
<td>2.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Anorexia</td>
<td>8.2</td>
<td>1.7</td>
<td>0.4</td>
</tr>
<tr>
<td>Arthralgia</td>
<td>6.8</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Fever</td>
<td>5.2</td>
<td>1.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Rash</td>
<td>3.4</td>
<td>0.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Vomiting</td>
<td>3.0</td>
<td>0.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Seizure</td>
<td>0.0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3: Percentage of Participants 18 Years Through 55 Years of Age Reporting Solicited Adverse Reactions Within 7 Days Following Vaccine Administration With a Single Dose

<table>
<thead>
<tr>
<th>Reaction</th>
<th>Menactra N=1371</th>
<th>Menomune – A/C/Y/W-135 N=1159</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local/Injection Site</td>
<td>Any</td>
<td>Grade 2</td>
</tr>
<tr>
<td>Pain</td>
<td>53.9</td>
<td>11.3</td>
</tr>
<tr>
<td>Induration</td>
<td>17.1</td>
<td>3.4</td>
</tr>
<tr>
<td>Redness</td>
<td>20.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Swelling</td>
<td>15.9</td>
<td>3.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Systemic</th>
<th>Reaction</th>
<th>Menactra N=1371</th>
<th>Menomune – A/C/Y/W-135 N=1159</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>41.4</td>
<td>10.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Fatigue</td>
<td>34.7</td>
<td>8.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Malaise</td>
<td>23.6</td>
<td>6.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Arthralgia</td>
<td>19.6</td>
<td>4.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>16.0</td>
<td>2.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Anorexia</td>
<td>11.8</td>
<td>2.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Chill</td>
<td>7.9</td>
<td>2.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Vomiting</td>
<td>2.3</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Fever</td>
<td>5.0</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Rash</td>
<td>1.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Seizure</td>
<td>0.0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
B and C, respectively. For all study groups, the most frequently reported systemic reaction following the administration of Menactra alone or with the respective concomitant vaccines was myalgia: 24.2%, 37.3% and 26.7% of participants in Groups A, B and C, respectively. Fever >39.5°C occurred at <1.0% in all groups. [See Concomitant Vaccine Administration (14.3).]

### Solicited Injection Site and Systemic Reactions when Given with Tetanus and Diphtheria Toxoid Adsorbed Vaccine

In a clinical study, rates of local and systemic reactions after Menactra and Tetanus and Diphtheria Toxoid Adsorbed (Td) vaccine manufactured by Sanofi Pasteur Inc. were compared [see Drug Interactions (7), and Concomitant Vaccine Administration (14.3) for study description]. Injection site pain was reported more frequently after Td vaccination than after Menactra vaccination (71% versus 53%). The overall rate of systemic adverse events was higher when Menactra and Td vaccines were given concomitantly than when Menactra was administered 28 days after Td vaccine (59% versus 36%). In both groups, the most common reactions were headache (Menactra + Td vaccine, 36%; Td vaccine + Placebo, 34%; Menactra alone, 22%) and fatigue (Menactra + Td vaccine, 32%; Td vaccine + Placebo, 29%; Menactra alone, 17%). Fever >40.0°C occurred at <0.5% in all groups.

### Solicited Injection Site and Systemic Reactions when Given with Typhoid Vi Polysaccharide Vaccine

In a clinical study, rates of local and systemic reactions after Menactra and Typhim Vi® [Typhoid Vi Polysaccharide Vaccine] (Typhoid), produced by Sanofi Pasteur SA were compared [see Drug Interactions (7), and Concomitant Vaccine Administration (14.3) for a description of the concomitantly administered vaccine, study design and number of participants. More participants experienced pain after Typhoid vaccination than after Menactra vaccination (Typhoid + Placebo, 76% versus Menactra + Typhoid, 47%). The majority (70%-77%) of injection site solicited reactions for both groups at either injection site were reported as Grade 1 and resolved within 3 days post-vaccination. In both groups, the most common systemic reaction was headache (Menactra + Typhoid, 41%; Typhoid + Placebo, 42%; Menactra alone, 33%) and fatigue (Menactra + Typhoid, 38%; Typhoid + Placebo, 35%; Menactra alone, 27%). Fever >40.0°C and seizures were not reported in either group.

### 6.2 Post-Marketing Experience

In addition to reports in clinical trials, worldwide voluntary adverse events reports received since market introduction of Menactra are listed below. This list includes serious events and/or events which were included based on severity, frequency of reporting or a plausible causal connection to Menactra. Because these events were reported voluntarily from a population of uncertain size, it is not possible to reliably estimate their frequency or establish a causal relationship to vaccination.

- **Blood and Lymphatic System Disorders**
  - Lymphadenopathy

- **Immune System Disorders**
  - Hypersensitivity reactions such as anaphylaxis/anaphylactic reaction, wheezing, difficulty breathing, upper airway swelling, urticaria, erythema, pruritus, hypotension

- **Musculoskeletal and Connective Tissue Disorders**
  - Myalgia

- **General Disorders and Administrative Site Conditions**
  - Large injection site reactions, extensive swelling of the injected limb (may be associated with erythema, warmth, tenderness or pain at the injection site).

### Post-marketing Safety Study

The risk of GBS following receipt of Menactra was evaluated in a US retrospective cohort study using healthcare claims data from 9,578,688 individuals 11 through 18 years of age, of whom 1,433,906 (15%) received Menactra. Of 72 medical chart-confirmed GBS cases, none had received Menactra within 42 days prior to symptom onset. An additional 129 potential cases of GBS were included based on severity, frequency of reporting or a plausible causal connection to Menactra. Post-marketing Safety Study

### 8.1 Pregnancy

**Pregnancy Exposure Registry**

There is a pregnancy exposure registry that monitors pregnancy outcomes in women exposed to Menactra during pregnancy. To enroll in or obtain information about the registry, call Sanofi Pasteur at 1-800-822-2463.

**Risk Summary**

All pregnancies have a risk of birth defect, loss, or other adverse outcomes. In the US general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2% to 4% and 15% to 20%, respectively. There are no adequate and well-controlled studies of Menactra administration in pregnant women in the US. Available data suggest that rates of major birth defects and miscarriage in women who received Menactra 30 days prior to pregnancy or during pregnancy are consistent with estimated background rates.

A developmental toxicity study was performed in female mice given 0.1 mL (in divided doses) of Menactra prior to mating and during gestation (a single human dose is 0.5 mL). The study revealed no evidence of harm to the fetus due to Menactra [see Animal Data (8.1f)].

**Data**

**Pregnancy Data**

A pregnancy registry spanning 11 years (2005-2016) included 222 reports of exposure to Menactra from 30 days before to at any time during pregnancy. Of these reports, 87 had known pregnancy outcomes available and were enrolled in the pregnancy registry prior to the outcomes being known. Outcomes among these prospectively followed pregnancies included 2 major birth defects and 6 miscarriages.

### Animal Data

A developmental toxicity study was performed in female mice. The animals were administered 0.1 mL of Menactra (in divided doses) at each of the following time points: 14 days prior to mating, and on Days 6 and 18 of gestation (a single human dose is 0.5 mL). There were no vaccine-related fetal malformations or variations, and no adverse effects on pre-weaning development observed in the study.

### 8.2 Lactation

**Risk Summary**

The developmental and health benefits of breastfeeding should be considered along with the mother’s clinical need for Menactra and any potential adverse effects on the breastfed child from Menactra. Data are not available to assess the effects of Menactra on the breastfed infant or on milk production/excretion.

### 8.4 Pediatric Use

Menactra is not approved for use in infants under 9 months of age. Available data show that infants administered three doses of Menactra (at 2, 4, and 6 months of age) had diminished immune responses to each meningococcal vaccine serogroup compared to older children given two doses. The majority (70%-77%) of injection site reactions for both groups at either injection site were reported as Grade 1 and resolved within 3 days post-vaccination. In both groups, the most common systemic reaction was headache (Menactra + Typhoid, 41%; Typhoid + Placebo, 42%; Menactra alone, 33%) and fatigue (Menactra + Typhoid, 38%; Typhoid + Placebo, 35%; Menactra alone, 27%). Fever >40.0°C and seizures were not reported in either group.

### 8.5 Geriatric Use

**Risk Summary**

Safety and effectiveness of Menactra in adults older than 55 years of age have not been established.

### 11 DESCRIPTION

Menactra is a sterile, intramuscularly administered vaccine that contains N meningitidis serogroup A, C, Y and W-135 capsular polysaccharide antigens individually conjugated to diphtheria toxoid protein. N meningitidis A, C, Y and W-135 strains are cultured on Mueller Hinton agar (3) and grown in Watson Scherp (4) media containing casamino acid. The polysaccharides are extracted from the N meningitidis cells and purified by centrifugation, detergent precipitation, alcohol precipitation, solvent extraction and dialfiltration. To prepare the polysaccharides for conjugation, they are depolymerized, derivatized, and purified by dialfiltration. Diphtheria toxin is derived from Corynebacterium diphtheriae grown in modified culture medium containing hydrolyzed casein (5) and is detoxified using formaldehyde. The diphtheria toxoid protein is purified by ammonium sulfate fractionation and dialfiltration. The derivatized polysaccharides are covalently linked to diphtheria toxoid and purified by serial dialfiltration. The four meningococcal components, present as individual serogroup-specific glycoconjugates, compose the final formulated vaccine. No preservative or adjuvant is added during manufacture. Each 0.5 mL dose may contain residual amounts of formaldehyde of less than 2.66 mcg (0.000532%), by calculation. Potency of Menactra is determined by quantifying the amount of each polysaccharide antigen that is conjugated to diphtheria toxoid protein and the amount of unconjugated polysaccharide present.

Menactra is manufactured as a sterile, clear to slightly turbid liquid. Each 0.5 mL dose of vaccine is formulated in sodium phosphate buffered isotonic sodium chloride solution to contain 4 mcg each of meningococcal A, C, Y and W-135 polysaccharides conjugated to approximately 48 mcg of diphtheria toxoid protein carrier. The vial stopper is not made with natural rubber latex.
13 NON-CLINICAL TOXICOLOGY
13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility
Menactra has not been evaluated for carcinogenic or mutagenic potential, or for impairment of male fertility. A developmental animal toxicity study showed that Menactra had no effects on female fertility in mice [see Pregnancy (8.1)].

14 CLINICAL STUDIES
14.1 Efficacy
The serum bactericidal assay (SBA) used to test sera contained an exogenous complement source that was either human (SBA-H) or baby rabbit (SBA-BR).

The response to vaccination following two doses of vaccine administered to children 9 and 12 months of age and following one dose of vaccine administered to children 2 through 10 years of age was evaluated by the proportion of participants having an SBA-H antibody titer of ≥1:8 or ≥4-fold increase, for each serogroup. In individuals 11 through 55 years of age, the response to vaccination with a single dose of vaccine was evaluated by the proportion of participants with a 4-fold or greater increase in bacteriologic antibody to each serogroup as measured by SBA-BR. For individuals 2 through 55 years of age, vaccine efficacy after a single dose was inferred from the demonstration of immunologic equivalence to a US-licensed meningococcal polysaccharide vaccine, Menomune – A/C/Y/W-135 vaccine as assessed by SBA.

14.2 Immunogenicity
Children 9 through 12 Months of Age
In a randomized, US, multi-center trial, children received Menactra at 9 months and 12 months of age. The first Menactra dose was administered alone, followed by a second Menactra dose given alone (N=404), or with MMRV (N=302), or with PCV7 (N=422). For all participants, sera were obtained approximately 30 days after last vaccination. There were no substantive differences in demographic characteristics between the vaccine groups. The median age range for administration of the first dose of Menactra was 278-279 days of age.

Table 5: Bacterial Antibody Responses to 30 Days Following a Second Dose of Menactra Administered Alone or Concomitantly Administered with MMRV or PCV7 at 12 Months of Age

![Table 5](#)

Table 6: Comparison of Bactericidal Antibody Responses to Menactra and Menomune – A/C/Y/W-135 28 Days After Vaccination for a Subset of Participants 2 through 5 Years of Age and 4 through 10 Years of Age

![Table 6](#)

Table 7: Comparison of Bactericidal Antibody Responses to Menactra and Menomune – A/C/Y/W-135 28 Days After Vaccination for Participants 11 through 18 Years of Age and 18 through 55 Years of Age

![Table 7](#)
In participants with undetectable pre-vaccination titers (ie, SBA-BR titers <1:8 at Day 0), seroconversion rates (defined as the proportions of participants achieving ≥4-fold rise in SBA-BR titers by Day 28) were similar between the Menactra and Menomune – A/C/Y/W-135 recipients. Menactra recipients achieved seroconversion rates of: 100%, Serogroup A (n=158/158); 99%, Serogroup C (n=343/345); 91%, Serogroup Y (n=253/279); 97%, Serogroup W-135 (n=303/373). The seroconversion rates for Menomune – A/C/Y/W-135 recipients were: 99%, Serogroup A (n=143/144); 98%, Serogroup C (n=297/304); 97%, Serogroup Y (n=221/228); 99%, Serogroup W-135 (n=325/328).

### Immunogenicity in Adolescents and Adults Following Booster Vaccination

For a description of the study design and number of participants, [see Clinical Trials Experience, Booster Vaccination Study (6.1)]. Prior to revaccination, the percentage of participants (n=781) with an SBA-H titer ≥1:8 was 64.5%, 44.2%, 38.7%, and 65.8% for Serogroups A, C, Y, and W-135, respectively. Among the subset of trial participants (n=112) for whom SBA-H responses at Day 6 were assessed, 86.6%, 91.1%, 94.6%, and 92.0% achieved a ≥4-fold rise in SBA-H titer for Serogroups A, C, Y, and W-135, respectively. The proportions of participants (n=781) who achieved a ≥4-fold rise in SBA-H titer by Day 28 were 95.0%, 95.3%, 97.1%, and 96% for Serogroups A, C, Y, and W-135, respectively. The proportions of participants who achieved an SBA-H titer ≥1:8 by Day 28 were >99% for each serogroup.

### 14.3 Concomitant Vaccine Administration

**MMVR (or MMR + V) or PCV7**

In a US, active-controlled trial, 1179 children received Menactra at 9 months and 12 months of age. At 12 months of age these children received Menactra concomitantly with MMVR (N=516), or MMR + V (N=48), or PCV7 (N=230). Another group of 12-month old children received MMVR + PCV7 (N=485). Sera were obtained approximately 30 days after the last vaccinations. Measles, mumps, rubella and varicella antibody responses among children who received Menactra and MMVR (or MMR and V) were comparable to corresponding antibody responses among children who received MMVR and PCV7.

When Menactra was given concomitantly with PCV7, the non-inferiority criteria for comparisons of pneumococcal IgG GMCs (upper limit of the two-sided 95% CI of the GMC ratio ≤2) were not met for 3 of 7 serotypes (4, 6B, 18C). In a subset of participants with available sera, pneumococcal opsonophagocytic assay GMT data were consistent with IgG GMC data.

**Td Vaccine**

In a double-blind, randomized, controlled trial, 1021 participants aged 11 through 17 years received Td vaccine and Menactra concomitantly (N=593), or Td vaccine followed one month later by Menactra (N=512). Sera were obtained approximately 28 days after each respective vaccination. The proportions of participants with a ≥4-fold or greater increase in SBA-BR titer for meningococcal Serogroups C, Y, and W-135 were higher when Menactra was given concomitantly with Td vaccine (86%-99%) than when Menactra was given one month following Td vaccine (85%-91%). Anti-tetanus and anti-diphtheria antibody responses were similar in both study groups.

**Typhim Vi**

In a double-blind, randomized, controlled trial, 945 participants aged 18 through 55 years received Typhim Vi and Menactra concomitantly (N=469), or Typhim Vi followed one month later by Menactra (N=476). Sera were obtained approximately 28 days after each respective vaccination. The antibody responses to Menactra and to Typhim Vi components were similar in both study groups.

**DAPTACEL and IPV**

In a randomized, parallel group, US multi-center clinical trial conducted in children 4 through 6 years of age, Menactra was administered as follows: 30 days after concomitant DTaP [DAPTACEL®, Sanofi Pasteur Limited] + IPV [IPOL®; Sanofi Pasteur SA] [Group A]; concomitantly with DAPTACEL followed 30 days later by IPV [Group B]; concomitantly with IPV followed 30 days later by DAPTACEL [Group C]. Sera were obtained approximately 30 days after each respective vaccination. [See Clinical Trials Experience (6.1)].

When Menactra was administered 30 days after DAPTACEL (and IPV) [Group A], significantly lower SBA-H GMTs to all 4 meningococcal serogroups were observed compared to Menactra (and IPV) administered 30 days prior to DAPTACEL [Group C]. When Menactra was administered concomitantly with DAPTACEL [Group B], SBA-H GMTs to meningococcal serogroups A, C, and W-135 were non-inferior to those observed in Menactra (and IPV) [Group C]. The non-inferiority criterion was marginally missed for meningococcal serogroup Y. The non-inferiority of SBA-H GMTs following concomitant administration of Menactra and DAPTACEL compared to those after concomitant Menactra and IPV was concluded if the upper limit of the 2-sided 95% CI of (GMTGroup A/GMTGroup C) computed separately for each of the serogroups was <2.

The respective SBA-H GMTs and proportion (%) of Group A, B, and C study participants achieving an SBA-H titer of ≥1:8 are displayed in Table 8.