**Supplementary Information**

**Supplementary Table 1.** Day 30hSBA GMTs in MenC-primed participants stratified by MCC priming vaccine (PPAS)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **MenACYW-TT** | | | | **MCV4-TT** | | | |
|  | **MenC-TT (N=149)** | | **MenC-CRM (N=49)** | | **MenC-TT (N=74)** | | **MenC-CRM (N=25)** | |
| **Serogroup** | **M** | **GMT (95% CI)** | **M** | **GMT (95% CI)** | **M** | **GMT (95% CI)** | **M** | **GMT (95% CI)** |
| **A** | 149 | 43.5 (36.2, 52.2) | 48 | 12.0 (8.2, 17.5) | 74 | 73.7 (56.9, 95.3) | 25 | 42.2 (25.9, 68.8) |
| **C** | 149 | 6026 (4915, 7389) | 47 | 157 (94.9, 261) | 74 | 3945 (2891, 5385) | 25 | 211 (98.7, 451) |
| **W** | 149 | 37.1 (30.7, 44.9) | 47 | 12.6 (8.3, 19.2) | 74 | 24.6 (19.0, 31.9) | 24 | 16.5 (9.6, 28.1) |
| **Y** | 149 | 53.9 (44.8, 64.8) | 48 | 33.4 (23.2, 48.2) | 74 | 32.9 (26.0, 41.6) | 25 | 27.1 (14.3, 51.5) |

CI, confidence interval; M, number of participants with valid serology result for endpoint.

**Supplementary Table 2.** Proportion of MCC-primed participants with hSBA titers achieving seroprotection\* at Day 30 stratified by MCC priming vaccine (PPAS)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **MenACYW-TT** | | | | **MCV4-TT** | | | |
|  | **MenC-TT (N=149)** | | **MenC-CRM (N=49)** | | **MenC-TT (N=74)** | | **MenC-CRM (N=25)** | |
| **Serogroup** | **n/M** | **% (95% CI)** | **n/M** | **% (95% CI)** | **n/M** | **% (95% CI)** | **n/M** | **% (95% CI)** |
| **A** | 144/149 | 96.6 (92.3, 98.9) | 33/48 | 68.8 (53.7, 81.3) | 73/74 | 98.6 (92.7, 100) | 24/25 | 96.0 (79.6, 99.9) |
| **C** | 149/149 | 100 (97.6, 100) | 45/47 | 95.7 (85.5, 99.5) | 74/74 | 100 (95.1, 100) | 23/25 | 92.0 (74.0, 99.0) |
| **W** | 138/149 | 92.6 (87.2, 96.3) | 32/47 | 68.1 (52.9, 80.9) | 65/74 | 87.8 (78.2, 94.3) | 19/24 | 79.2 (57.8, 92.9) |
| **Y** | 143/149 | 96.0 (91.4, 98.5) | 46/48 | 95.8 (85.7, 99.5) | 71/74 | 95.9 (88.6, 99.2) | 20/25 | 80.0 (59.3, 93.2) |

CI, confidence interval; M, number of participants with valid serology result for endpoint; n, number of participants experiencing the endpoint.

\*Seroprotection is defined at hSBA titers ≥1:8

**Supplementary Table 3.** Proportion of meningococcal vaccine-naïve or MCC-primed participants with rSBA titers ≥1:8 and ≥1:128 (rSBA subset)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | | | **MenACYW-TT**  **(n=187)** | | **MCV4-TT**  **(n=151)** | | | |
| **Serogroup** | **Time point** | **rSBA titers** | **n/M** | **%** | | **(95% CI)** | | **n/M** | **%** | **(95% CI)** |
| **A** | Day 0 | ≥1:8 | 31/184 | 16.8 | | (11.7, 23.1) | | 24/151 | 15.9 | (10.5, 22.7) |
|  |  | ≥1:128 | 29/184 | 15.8 | | (10.8, 21.8) | | 24/151 | 15.9 | (10.5, 22.7) |
|  | Day 30 | ≥1:8 | 180/185 | 97.3 | | (93.8, 99.1) | | 150/150 | 100.0 | (97.6, 100.0) |
|  |  | ≥1:128 | 176/185 | 95.1 | | (91.0, 97.8) | | 150/150 | 100.0 | (97.6, 100.0) |
| **C** | Day 0 | ≥1:8 | 39/185 | 21.1 | | (15.4, 27.7) | | 26/150 | 17.3 | (11.6, 24.4) |
|  |  | ≥1:128 | 27/185 | 14.6 | | (9.8, 20.5) | | 15/150 | 10.0 | (5.7, 16.0) |
|  | Day 30 | ≥1:8 | 184/185 | 99.5 | | (97.0, 100.0) | | 148/149 | 99.3 | (96.3, 100.0) |
|  |  | ≥1:128 | 179/185 | 96.8 | | (93.1, 98.8) | | 140/149 | 94.0 | (88.8, 97.2) |
| **W** | Day 0 | ≥1:8 | 7/185 | 3.8 | | (1.5, 7.6) | | 9/151 | 6.0 | (2.8, 11.0) |
|  |  | ≥1:128 | 7/185 | 3.8 | | (1.5, 7.6) | | 8/151 | 5.3 | (2.3, 10.2) |
|  | Day 30 | ≥1:8 | 181/185 | 97.8 | | (94.6, 99.4) | | 149/150 | 99.3 | (96.3, 100.0) |
|  |  | ≥1:128 | 181/185 | 97.8 | | (94.6, 99.4) | | 149/150 | 99.3 | (96.3, 100.0) |
| **Y** | Day 0 | ≥1:8 | 29/186 | 15.6 | | (10.7, 21.6) | | 18/150 | 12.0 | (7.3, 18.3) |
|  |  | ≥1:128 | 26/186 | 14.0 | | (9.3, 19.8) | | 16/150 | 10.7 | (6.2, 16.7) |
|  | Day 30 | ≥1:8 | 183/185 | 98.9 | | (96.1, 99.9) | | 149/150 | 99.3 | (96.3, 100.0) |
|  |  | ≥1:128 | 183/185 | 98.9 | | (96.1, 99.9) | | 148/150 | 98.7 | (95.3, 99.8) |

CI, confidence interval; n, number of participants with specified endpoint; M, number of participants with available data for the endpoint

**Supplementary Table 4.** Safety overview comparing occurrence of solicited and unsolicited events after vaccines injections in meningococcal vaccine-naïve and MCC-primed toddlers (SafAS)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **MenACYW-TT** | | | | **MCV4-TT** | | | |
|  | | **Naïve (N=303)** | | **MCC primed (N=203)** | | **Naïve (N=306)** | | **MCC primed (N=102)** | |
| **Participants experiencing at least one:** | **Maximum intensity (grade)** | **n/N** | **% (95% CI)** | **n/N** | **% (95% CI)** | **n/N** | **% (95% CI)** | **n/N** | **% (95% CI)** |
| **Within 30 minutes after vaccine injection** | | | | | | | |  |  |
| Immediate unsolicited AE | Any | 0/303 | 0.0 (0.0, 1.2) | 0/203 | 0.0 (0.0, 1.8) | 0/306 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |
| Immediate unsolicited AR | Any | 0/303 | 0.0 (0.0, 1.2) | 0/203 | 0.0 (0.0, 1.8) | 0/306 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |
| **Within 7 days after vaccination** | | | | | | | |  |  |
| **Solicited injection site reaction** | Any | 178/303 | 58.7 (53.0, 64.3) | 83/203 | 40.9 (34.1, 48.0) | 180/305 | 59.0 (53.3, 64.6) | 34/102 | 33.3 (24.3, 43.4) |
|  | Grade 3 | 15/303 | 5.0 (2.8, 8.0) | 5/203 | 2.5 (0.8, 5.7) | 11/305 | 3.6 (1.8, 6.4) | 1/102 | 1.0 (0.0, 5.3) |
| Tenderness | Any | 122/303 | 40.3 (34.7, 46.0) | 55/203 | 27.1 (21.1, 33.8) | 113/305 | 37 (31.6, 42.7) | 20/102 | 19.6 (12.4, 28.6) |
|  | Grade 3 | 1/303 | 0.3 (0.0, 1.8) | 1/203 | 0.5 (0.0, 2.7) | 4/305 | 1.3 (0.4, 3.3) | 1/102 | 1.0 (0.0, 5.3) |
| Erythema | Any | 122/303 | 40.3 (34.7, 46.0) | 52/203 | 25.6 (19.8, 32.2) | 115/305 | 37.7 (32.2, 43.4) | 21/102 | 20.6 (13.2, 29.7) |
|  | Grade 3 | 13/303 | 4.3 (2.3, 7.2) | 4/203 | 2.0 (0.5, 5.0) | 7/305 | 2.3 (0.9, 4.7) | 0/102 | 0.0 (0.0, 3.6) |
| Swelling | Any | 63/303 | 20.8 (16.4, 25.8) | 35/203 | 17.2 (12.3, 23.2) | 52/305 | 17.0 (13.0, 21.7) | 9/102 | 8.8 (4.1, 16.1) |
|  | Grade 3 | 6/303 | 2.0 (0.7, 4.3) | 3/203 | 1.5 (0.3, 4.3) | 2/305 | 0.7 (0.1, 2.3) | 0/102 | 0.0 (0.0, 3.6) |
| **Solicited systemic reaction** | Any | 198/303 | 65.3 (59.7, 70.7) | 120/203 | 59.1 (52.0, 65.9) | 186/305 | 61.0 (55.3, 66.5) | 51/102 | 50.0 (39.9, 60.1) |
|  | Grade 3 | 14/303 | 4.6 (2.5, 7.6) | 9/203 | 4.4 (2.0, 8.2) | 14/305 | 4.6 (2.5, 7.6) | 1/102 | 1.0 (0.0, 5.3) |
| Fever | Any | 29/303 | 9.6 (6.5, 13.5) | 23/203 | 11.3 (7.3, 16.5) | 38/304 | 12.5 (9.0, 16.8) | 11/101 | 10.9 (5.6, 18.7) |
|  | Grade 3 | 4/303 | 1.3 (0.4, 3.3) | 1/203 | 0.5 (0.0, 2.7) | 3/304 | 1.0 (0.2, 2.9) | 0/101 | 0.0 (0.0, 3.6) |
| Vomiting | Any | 21/303 | 6.9 (4.3, 10.4) | 19/203 | 9.4 (5.7, 14.2) | 13/305 | 4.3 (2.3, 7.2) | 7/102 | 6.9 (2.8, 13.6) |
|  | Grade 3 | 0/303 | 0.0 (0.0, 1.2) | 1/203 | 0.5 (0.0, 2.7) | 0/305 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |
| Abnormal crying | Any | 106/303 | 35.0 (29.6, 40.6) | 48/203 | 23.6 (18.0, 30.1) | 110/305 | 36.1 (30.7, 41.7) | 23/102 | 22.5 (14.9, 31.9) |
|  | Grade 3 | 6/303 | 2.0 (0.7, 4.3) | 1/203 | 0.5 (0.0, 2.7) | 7/305 | 2.3 (0.9, 4.7) | 0/102 | 0.0 (0.0, 3.6) |
| Drowsiness | Any | 64/303 | 21.1 (16.7, 26.2) | 51/203 | 25.1 (19.3, 31.7) | 55/305 | 18.0 (13.9, 22.8) | 19/102 | 18.6 (11.6, 27.6) |
|  | Grade 3 | 1/303 | 0.3 (0.0, 1.8) | 3/203 | 1.5 (0.3, 4.3) | 0/305 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |
| Appetite loss | Any | 90/303 | 29.7 (24.6. 35.2) | 56/203 | 27.6 (21.6, 34.3) | 93/305 | 30.5 (25.4, 36.0) | 28/102 | 27.5 (19.1, 37.2) |
|  | Grade 3 | 2/203 | 0.7 (0.1, 2.4) | 4/203 | 2.0 (0.5, 5.0) | 2/305 | 0.7 (0.1, 2.3) | 0/102 | 0.0 (0.0, 3.6) |
| Irritability | Any | 144/303 | 47.5 (41.8, 53.3) | 76/203 | 37.4 (30.8, 44.5) | 127/305 | 41.6 (36.0, 47.4) | 36/102 | 35.3 (26.1, 45.4) |
|  | Grade 3 | 3/303 | 1.0 (0.2, 2.9) | 3/203 | 1.5 (0.3, 4.3) | 5/305 | 1.6 (0.5, 3.8) | 1/102 | 1.0 (0.0, 5.3) |
| **Within 30 days after vaccination** | | | | | | | | | |
| **Unsolicited AE** | Any | 164/303 | 54.1 (48.3, 59.8) | 106/203 | 52.2 (45.1, 59.3) | 157/306 | 51.3 (45.6, 57.0) | 47/102 | 46.1 (36.2, 56.2) |
| **Unsolicited AR** | Any | 15/303 | 5.0 (2.8, 8.0) | 1/203 | 0.5 (0.0, 2.7) | 12/306 | 3.9 (2.0, 6.7) | 2/102 | 2.0 (0.2, 6.9) |
| **AE leading to study discontinuation** | Any | 0/303 | 0.0 (0.0, 1.2) | 0/203 | 0.0 (0.0, 1.8) | 0/306 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |
| **During the study** |  |  |  |  |  |  |  |  |  |
| **SAE** | Any | 2/303 | 0.7 (0.1, 2.4) | 2/203 | 1.0 (0.1, 3.5) | 1/306 | 0.3 (0.0, 1.8) | 2/102 | 2.0 (0.2, 6.9) |
| AESI | Any | 1/303 | 0.3 (0.0, 1.8) | 1/203 | 0.5 (0.0, 2.7) | 0/306 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |
| **Death** | Any | 0/303 | 0 (0.0, 1.2) | 0/203 | 0 (0.0, 1.8) | 0/306 | 0.0 (0.0, 1.2) | 0/102 | 0.0 (0.0, 3.6) |

AE, adverse event. AESI, adverse event of special interest. AR, adverse reaction. CI, confidence interval. n, number of participants who reported an AE. N, number of participants in the safety analysis set.