**APPENDIX**

**Effect of different schedules of ten-valent pneumococcal conjugate vaccine on pneumococcal carriage in Vietnamese infants: results from a randomised controlled trial**

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# **Appendix Table S1: Vaccination schedules and nasopharyngeal swabs in the Vietnam Pneumococcal Project**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time point** |  |  | **2m** | **3m** | **4m** |  | **6m** |  | **9m**\* |  | **12m** |  | **18m** |  | **24m** |
| **NP swabs** |  |  | X |  |  |  | X |  | X |  | X |  | X |  | X |
| **PCV doses** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Group** | **Schedule** | **Vaccine** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **A** | 3+1 | PCV10 | X | X | X |  |  |  | X |  |  |  |  |  |  |
| **B** | 3+0 | PCV10 | X | X | X |  |  |  |  |  |  |  |  |  |  |
| **C** | 2+1 | PCV10 | X |  | X |  |  |  | X |  |  |  |  |  |  |
| **D** | Two-dose | PCV10 | X |  |  |  | X |  |  |  |  |  |  |  |  |
| **E** | 2+1 | PCV13 | X |  | X |  |  |  | X |  |  |  |  |  |  |
| **F** | Controls | PCV10 |  |  |  |  |  |  |  |  |  |  | X |  | X |
| **G** † | Controls | PCV10 |  |  |  |  |  |  |  |  |  |  |  |  | X |

PCV = pneumococcal conjugate vaccine. PCV10 = ten-valent PCV. PCV13 = 13-valent PCV. NP = nasopharyngeal. \* Booster dose of PCV administered at 9 months of age in group A and at 9·5 months of age in groups C and E. † Group G recruited at 18 months of age.

# **Appendix Table S2: Participant demographics at the time of enrolment**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **3+1 schedule**  (Group A, n=152) | **3+0 schedule**  (Group B, n=149) | **2+1 schedule**  (Group C, n=250) | **two-dose schedule**  (Group D, n=202) | **controls 2-18m**  (Group F, n=197) | **controls 18-24m**  (Group G, n=199) | p-value\* |
| Age, m [median (range)] | 2·1 (1·9, 2·5) | 2·1 (1·9, 2·4) | 2·1 (1·9, 2·4) | 2·1 (1·9, 2·4) | 2·1 (1·9, 2·5) | 18·3 (17·4, 20·3) | NA |
| Sex |  |  |  |  |  |  | 0·044 |
| Male | 66 (43·4%) | 73 (49·0%) | 135 (54·0%) | 91 (45·0%) | 100 (50·8%) | 113 (56·8%) |  |
| Female | 86 (56·6%) | 76 (51·0%) | 115 (46·0%) | 111 (55·0%) | 97 (49·2%) | 86 (43·2%) |  |
| District |  |  |  |  |  |  | 0·019 |
| 4 | 68 (44·7%) | 67 (45·0%) | 112 (44·8%) | 90 (44·6%) | 87 (44·2%) | 107 (53·8%) |  |
| 7 | 84 (55·3%) | 82 (55·0%) | 138 (55·2%) | 112 (55·4%) | 110 (55·8%) | 92 (46·2%) |  |
| Birthweight , g† [mean (sd)] | 3234 (424) | 3212 (349) | 3228 (370) | 3234 (410) | 3208 (395) | 3264 (423) | 0·198 |
| Place of delivery† |  |  |  |  |  |  | 0·605 |
| Hospital | 111 (73·0%) | 114 (76·5%) | 196 (78·7%) | 147 (72·8%) | 144 (73·1%) | 152 (76·8%) |  |
| Other | 41 (27·0%) | 35 (23·5%) | 53 (21·3%) | 55 (27·2%) | 53 (26·9%) | 46 (23·2%) |  |
| Type of delivery† |  |  |  |  |  |  | 0·088 |
| Vaginal | 89 (58·9%) | 85 (57·8%) | 160 (65·0%) | 130 (64·4%) | 121 (61·7%) | 104 (53·1%) |  |
| Elective caesarean | 30 (19·9%) | 30 (20·4%) | 43 (17·5%) | 36 (17·8%) | 34 (17·3%) | 44 (22·4%) |  |
| Emergency caesarean | 27 (17·9%) | 30 (20·4%) | 40 (16·3%) | 34 (16·8%) | 41 (20·9%) | 43 (21·9%) |  |
| Other/unknown | 5 (3·3%) | 2 (1·4%) | 3 (1·2%) | 2 (1·0%) | 0 (0·0%) | 5 (2·6%) |  |
| Cigarette smoker in house† |  |  |  |  |  |  | 0·951 |
| No | 57 (37·5%) | 52 (34·9%) | 81 (32·5%) | 74 (36·6%) | 72 (36·5%) | 70 (35·2%) |  |
| Yes | 95 (62·5%) | 97 (65·1%) | 168 (67·5%) | 128 (63·4%) | 125 (63·5%) | 129 (64·8%) |  |

Data are n (%) unless specified. \* p-values compare combined data from Groups A, B, C, D, and F, with data from Group G, and are based on chi-squared test (for comparisons of proportions), ANOVA (for comparisons of means), or quantile regression with bootstrapped standard errors (for comparisons of medians). NA = not applicable, as participants were intentionally recruited at different ages. † Birthweight data missing for 11 participants (Group B=1, C=3, D=3, F=1, G=3); Place of delivery data missing for 2 participants (C=1, G=1); Type of delivery data missing for 11 participants (A=1, B=2, C=4, F=1, G=3); Cigarette smoker data missing for 1 participant (C=1).

# **Appendix Table S3: Pneumococcal carriage prevalence by time point and vaccination group, % (95% CI)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **3+1 schedule**  **(Group A)** | **3+0 schedule**  **(Group B)** | **2+1 schedule**  **(Group C)** | **Two-dose schedule**  **(Group D)** | **Controls\*** |
| **Any pneumococcal serotype carriage** |  |  |  |  |  |
| 2m | 2·0 (0·4-5·7) | 2·7 (0·7-6·7) | 3·6 (1·7-6·7) | 5·4 (2·7-9·5) | 1·5 (0·3-4·4) |
| 6m | 6·2 (2·9-11·4) | 8·6 (4·5-14·6) | 11·9 (8·1-16·7) | 18·4 (13·3-24·5) | 10·9 (6·9-16·2) |
| 9m | 10·3 (5·9-16·5) | 14·6 (9·2-21·6) | 14·2 (10·1-19·3) | 16·3 (11·4-22·3) | 16·3 (11·4-22·4) |
| 12m | 15.6 (10.0-22.7) | 18·0 (11·9-25·6) | 18·2 (13·4-23·8) | 28·4 (22·1-35·2) | 24·5 (18·5-31·3) |
| 18m | 17·2 (11·2-24·6) | 16·5 (10·4-24·4) | 15·4 (10·9-20·8) | 18·5 (13·3-24·8) | 23·9 (19·6-28·6) |
| 24m | 18·6 (12·3-26·4) | 21·1 (14·0-29·7) | 21·0 (15·6-27·2) | 16·5 (11·3-22·8) | 21·2 (15·3-28·1) |
| **VT carriage** |  |  |  |  |  |
| 2m | 0·0 (0·0-2·4) | 1·3 (0·2-4·8) | 1·2 (0·2-3·5) | 3·0 (1·1-6·4) | 0·0 (0·0-1·9) |
| 6m | 2·1 (0·4-5·9) | 3·6 (1·2-8·2) | 4·9 (2·6-8·5) | 7·0 (3·9-11·4) | 5·7 (2·9-10·0) |
| 9m | 3·4 (1·1-7·9) | 8·0 (4·1-13·9) | 2·9 (1·2-5·9) | 5·1 (2·5-9·2) | 7·4 (4·1-12·1) |
| 12m | 6.4 (3.0-11.8) | 7·5 (3·7-13·4) | 5·6 (3·0-9·4) | 12·4 (8·1-17·8) | 10·6 (6·6-16·0) |
| 18m | 7·5 (3·6-13·3) | 8·3 (4·0-14·7) | 5·4 (2·8-9·3) | 8·5 (4·9-13·4) | 14·1 (10·7-18·1) |
| 24m | 7·0 (3·2-12·8) | 4·4 (1·4-9·9) | 6·8 (3·8-11·2) | 8·0 (4·4-13·0) | 12·4 (7·8-18·3) |
| **Non-VT carriage** |  |  |  |  |  |
| 2m | 2·0 (0·4-5·7) | 1·3 (0·2-4·8) | 2·8 (1·1-5·7) | 2·5 (0·8-5·7) | 1·5 (0·3-4·4) |
| 6m | 4·1 (1·5-8·7) | 5·0 (2·0-10·1) | 7·4 (4·4-11·5) | 11·9 (7·8-17·2) | 5·2 (2·5-9·3) |
| 9m | 6·9 (3·4-12·3) | 6·6 (3·0-12·1) | 11·3 (7·6-16·0) | 11·2 (7·2-16·5) | 8·9 (5·3-13·9) |
| 12m | 9·9 (5·5-16·1) | 10·5 (5·9-17·0) | 13·0 (8·9-18·0) | 16·0 (11·1-21·9) | 14·4 (9·7-20·2) |
| 18m | 9·7 (5·3-16·0) | 9·9 (5·2-16·7) | 10·0 (6·3-14·7) | 10·6 (6·6-15·9) | 10·6 (7·6-14·2) |
| 24m | 13·2 (7·9-20·3) | 17·5 (11·1-25·8) | 14·6 (10·1-20·2) | 8·5 (4·8-13·7) | 10·6 (6·4-16·2) |
| **Serotype 6A/19A carriage** |  |  |  |  |  |
| 2m | 0·7 (0·0-3·6) | 0·0 (0·0-2·4) | 0·8 (0·1-2·9) | 0·5 (0·0-2·7) | 0·0 (0·0-1·9) |
| 6m | 2·7 (0·8-6·9) | 1·4 (0·2-5·1) | 3·3 (1·4-6·4) | 7·0 (3·9-11·4) | 3·1 (1·1-6·6) |
| 9m | 3·4 (1·1-7·9) | 2·2 (0·5-6·3) | 5·9 (3·2-9·6) | 5·6 (2·8-9·8) | 4·2 (1·8-8·1) |
| 12m | 2·8 (0·8-7·1) | 5·3 (2·1-10·5) | 6·1 (3·4-10·0) | 6·7 (3·6-11·2) | 7·4 (4·1-12·2) |
| 18m | 5·2 (2·1-10·5) | 4·1 (1·4-9·4) | 2·7 (1·0-5·8) | 4·8 (2·2-8·8) | 5·4 (3·4-8·3) |
| 24m | 5·4 (2·2-10·9) | 5·3 (2·0-11·1) | 9·8 (6·1-14·7) | 4·0 (1·6-8·0) | 6·5 (3·3-11·3) |

\* Control data sourced from Group F (2-12 months), Groups F and G combined (18 months), or Group G (24 months). Carriage determined by culture and latex agglutination/Quellung testing (2-12 months) and by DNA microarray (18-24 months). Samples that could not be serotyped are excluded. VT = vaccine type (PCV10 serotypes 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, and 23F).

# **Appendix Table S4: Serotype-specific carriage prevalence over time**

**a) PCV10 and cross-reactive serotypes**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **3+1 schedule**  **(Group A)** | **3+0 schedule**  **(Group B)** | | **2+1 schedule**  **(Group C)** | | **Two-dose schedule**  **(Group D)** | | **Controls\*** |
| **PCV10 serotypes** |  |  | |  | |  | |  |
| **6B** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0.4 (1/250) | | 1.5 (3/202) | | 0 |
| 6m | 1.4 (2/146) | 1.4 (2/139) | | 1.2 (3/243) | | 2.5 (5/201) | | 2.6 (5/193) |
| 9m | 1.4 (2/145) | 2.2 (3/137) | | 1.3 (3/239) | | 3.6 (7/196) | | 3.2 (6/190) |
| 12m | 2.8 (4/141) | 0.8 (1/133) | | 2.6 (6/231) | | 5.2 (10/194) | | 4.3 (8/188) |
| 18m | 0.7 (1/134) | 1.7 (2/121) | | 0.9 (2/221) | | 1.6 (3/189) | | 4.1 (15/368) |
| 24m | 3.1 (4/129) | 1.8 (2/114) | | 1.5 (3/205) | | 1.1 (2/176) | | 5.3 (9/170) |
| **23F** |  |  | |  | |  | |  |
| 2m | 0 | 1.3 (2/149) | | 0.4 (1/250) | | 0.5 (1/202) | | 0 |
| 6m | 0 | 1.4 (2/139) | | 3.3 (8/243) | | 2.5 (5/201) | | 0.5 (1/193) |
| 9m | 0 | 4.4 (6/137) | | 1.3 (3/239) | | 0.5 (1/196) | | 0.5 (1/190) |
| 12m | 1.4 (2/141) | 3.0 (4/133) | | 2.2 (5/231) | | 4.6 (9/194) | | 1.6 (3/188) |
| 18m | 1.5 (2/134) | 3.3 (4/121) | | 2.7 (6/221) | | 4.8 (9/189) | | 4.3 (16/368) |
| 24m | 1.6 (2/129) | 0 | | 3.4 (7/205) | | 2.3 (4/176) | | 3.5 (6/170) |
| **19F** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0 | | 1.0 (2/202) | | 0 |
| 6m | 0.7 (1/146) | 0.7 (1/139) | | 0.4 (1/243) | | 1.0 (2/201) | | 2.1 (4/193) |
| 9m | 2.1 (3/145) | 1.5 (2/137) | | 0.4 (1/239) | | 1.0 (2/196) | | 3.2 (6/190) |
| 12m | 2.1 (3/141) | 3.0 (4/133) | | 0.9 (2/231) | | 2.6 (5/194) | | 3.7 (7/188) |
| 18m | 3.7 (5/134) | 3.3 (4/121) | | 1.8 (4/221) | | 0.5 (1/189) | | 4.6 (17/368) |
| 24m | 1.6 (2/129) | 2.6 (3/114) | | 1.5 (3/205) | | 3.4 (6/176) | | 2.9 (5/170) |
| **14** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0.4 (1/250) | | 0 | | 0 |
| 6m | 0 | 0 | | 0 | | 1.0 (2/201) | | 0.5 (1/193) |
| 9m | 0 | 0 | | 0 | | 0 | | 0 |
| 12m | 0 | 0 | | 0 | | 1.0 (2/194) | | 0.5 (1/188) |
| 18m | 1.5 (2/134) | 0 | | 0 | | 1.6 (3/189) | | 1.9 (7/368) |
| 24m | 0.8 (1/129) | 0 | | 0 | | 0 | | 2.4 (4/170) |
| **Other PCV10 serotypes** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0 | | 0 | | 0 |
| 6m | 0 | 0 | | 0 | | 0 | | 0.5 (1/193) |
| 9m | 0 | 0 | | 0 | | 0 | | 0.5 (1/190) |
| 12m | 0 | 0.8 (1/133) | | 0 | | 0.5 (1/194) | | 0.5 (1/188) |
| 18m | 0 | 0 | | 0.5 (1/221) | | 0 | | 0 |
| 24m | 0 | 0.9 (1/114) | | 1.0 (2/205) | | 1.1 (2/176) | | 0 |
| **Cross-reactive serotypes** | | |  | |  | |  |  |
| **6A** |  |  | |  | |  | |  |
| 2m | 0.7 (1/151) | 0 | | 0 | | 0.5 (1/202) | | 0 |
| 6m | 2.1 (3/146) | 0.7 (1/139) | | 1.6 (4/243) | | 5.0 (10/201) | | 1.6 (3/193) |
| 9m | 3.4 (5/145) | 0 | | 3.3 (8/239) | | 4.1 (8/196) | | 3.2 (6/190) |
| 12m | 2.8 (4/141) | 0.8 (1/133) | | 3.0 (7/231) | | 3.6 (7/194) | | 5.9 (11/188) |
| 18m | 4.5 (6/134) | 0 | | 1.8 (4/221) | | 2.1 (4/189) | | 4.1 (15/368) |
| 24m | 3.9 (5/129) | 2.6 (3/114) | | 6.8 (14/205) | | 2.8 (5/176) | | 3.5 (6/170) |
| **19A** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0.8 (2/250) | | 0 | | 0 |
| 6m | 0.7 (1/146) | 0.7 (1/139) | | 1.6 (4/243) | | 2.0 (4/201) | | 1.6 (3/193) |
| 9m | 0 | 2.2 (3/137) | | 2.5 (6/239) | | 1.5 (3/196) | | 1.1 (2/190) |
| 12m | 0 | 4.5 (6/133) | | 3.0 (7/231) | | 3.1 (6/194) | | 1.6 (3/188) |
| 18m | 0.7 (1/134) | 4.1 (5/121) | | 0.9 (2/221) | | 2.6 (5/189) | | 1.4 (5/368) |
| 24m | 1.6 (2/129) | 2.6 (3/114) | | 2.4 (5/205) | | 1.1 (2/176) | | 2.9 (5/170) |

Data are prevalence, expressed as a percentage, (n/N). \* Control data sourced from Group F (2-12 months), Groups F and G combined (18 months), or Group G (24 months). Carriage determined by culture and latex agglutination/Quellung testing (2-12 months) and by DNA microarray (18-24 months). Samples that could not be serotyped are excluded. The **11 Other PCV10 serotypes** comprise: **5 x serotype 9V** (1 at 18m [C], 4 at 24m [B=1, C=1, D=2]), **3 x serotype 4** (1 at 9m [Controls], 1 at 12m [Controls], 1 at 24m [C]), **2 x serotype 18C** (1 at 6m [Controls], 1 at 12m [D]), and **1 x serotype 1** (12m [B]).

**b) PCV10 and cross-reactive serotypes**

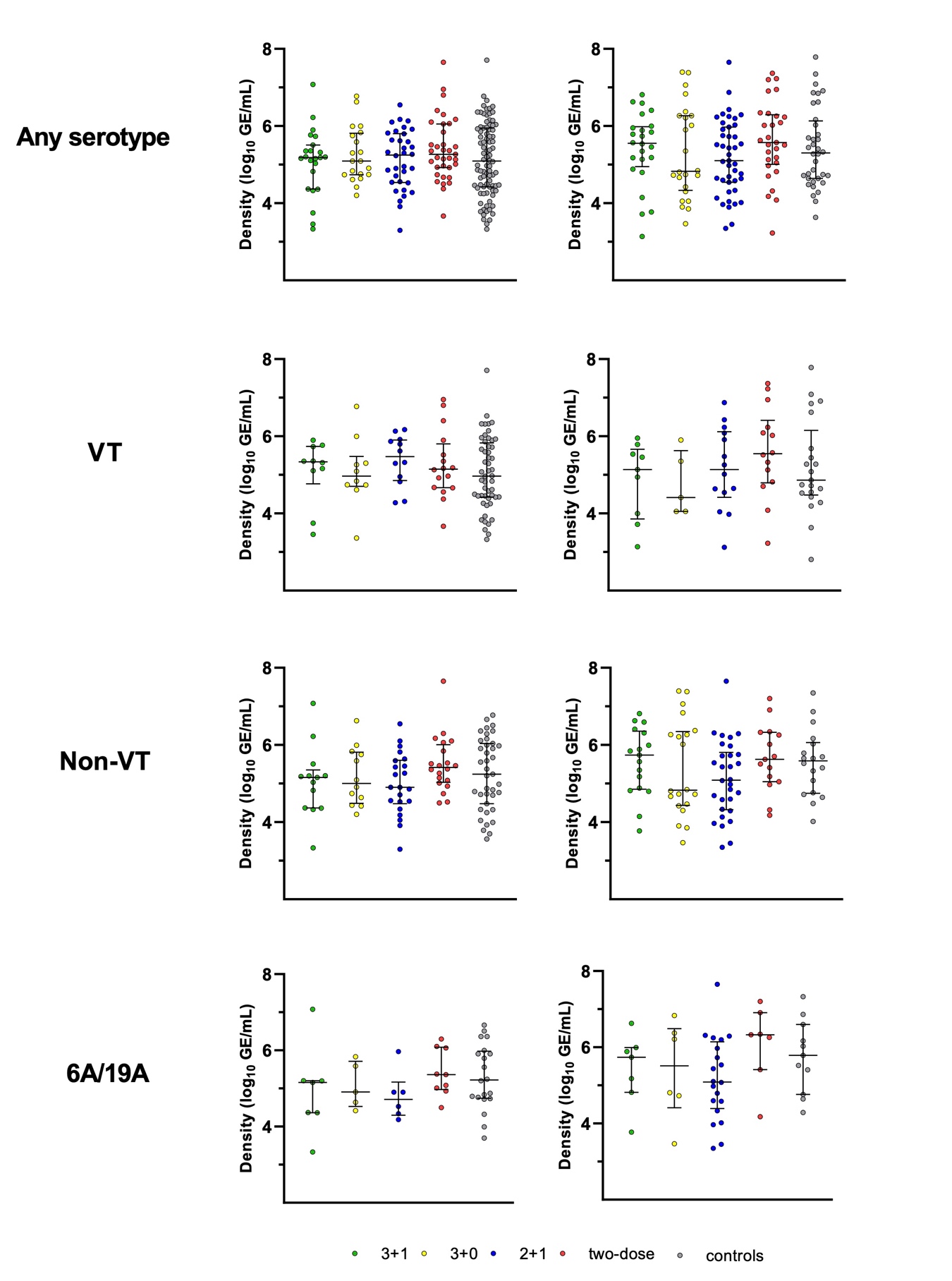
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **3+1 schedule**  **(Group A)** | **3+0 schedule**  **(Group B)** | | **2+1 schedule**  **(Group C)** | | **Two-dose schedule**  **(Group D)** | | **Controls\*** |
| **Non-vaccine serotypes** |  |  | |  | |  | |  |
| **15A** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0.8 (2/250) | | 0 | | 0.5 (1/197) |
| 6m | 0 | 0 | | 0.4 (1/243) | | 0.5 (1/201) | | 0.5 (1/193) |
| 9m | 0.7 (1/145) | 2.2 (3/137) | | 1.3 (3/239) | | 1.0 (2/196) | | 1.6 (3/190) |
| 12m | 2.8 (4/141) | 0.8 (1/133) | | 2.2 (5/231) | | 1.0 (2/194) | | 1.1 (2/188) |
| 18m | 2.2 (3/134) | 3.3 (4/121) | | 1.8 (4/221) | | 3.2 (6/189) | | 1.6 (6/368) |
| 24m | 0.8 (1/129) | 2.6 (3/114) | | 1.5 (3/205) | | 1.1 (2/176) | | 1.2 (2/170) |
| **23A** |  |  | |  | |  | |  |
| 2m | 0 | 0.7 (1/149) | | 0.4 (1/250) | | 0 | | 0 |
| 6m | 0 | 0.7 (1/139) | | 0.8 (2/243) | | 0.5 (1/201) | | 1.0 (2/193) |
| 9m | 0 | 1.5 (2/137) | | 0 | | 1.0 (2/196) | | 2.1 (4/190) |
| 12m | 0 | 0.8 (1/133) | | 0 | | 1.5 (3/194) | | 1.1 (2/188) |
| 18m | 1.5 (2/134) | 0 | | 0.9 (2/221) | | 1.1 (2/189) | | 1.1 (4/368) |
| 24m | 0 | 2.6 (3/114) | | 0.5 (1/205) | | 1.1 (2/176) | | 2.4 (4/170) |
| **11A** |  |  | |  | |  | |  |
| 2m | 1.3 (2/151) | 0 | | 0.8 (2/250) | | 0 | | 0 |
| 6m | 1.4 (2/146) | 0.7 (1/139) | | 1.2 (3/243) | | 0 | | 0 |
| 9m | 1.4 (2/145) | 0 | | 1.7 (4/239) | | 1.0 (2/196) | | 0 |
| 12m | 1.4 (2/141) | 2.3 (3/133) | | 1.7 (4/231) | | 0.5 (1/194) | | 0.5 (1/188) |
| 18m | 0 | 0.8 (1/121) | | 0.9 (2/221) | | 0 | | 0.3 (1/368) |
| 24m | 3.1 (4/129) | 2.6 (3/114) | | 0 | | 0 | | 0 |
| **15B/C** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0 | | 1.0 (2/202) | | 0 |
| 6m | 0 | 0 | | 0 | | 2.0 (4/201) | | 0 |
| 9m | 0.7 (1/145) | 0 | | 0.4 (1/239) | | 1.0 (2/196) | | 0 |
| 12m | 0.7 (1/141) | 0 | | 0.4 (1/231) | | 2.1 (4/194) | | 2.1 (4/188) |
| 18m | 0 | 1.7 (2/121) | | 2.3 (5/221) | | 0 | | 0.5 (2/368) |
| 24m | 2.3 (3/129) | 0 | | 2.4 (5/205) | | 0.6 (1/176) | | 1.2 (2/170) |
| **34** |  |  | |  | |  | |  |
| 2m | 0 | 0 | | 0.4 (1/250) | | 0 | | 0.5 (1/197) |
| 6m | 0 | 0 | | 0.4 (1/243) | | 0.5 (1/201) | | 1.0 (2/193) |
| 9m | 0.7 (1/145) | 1.5 (2/137) | | 0 | | 1.0 (2/196) | | 2.6 (5/190) |
| 12m | 0 | 2.3 (3/133) | | 0.9 (2/231) | | 0.5 (1/194) | | 3.2 (6/188) |
| 18m | 0 | 0.8 (1/121) | | 0.9 (2/221) | | 2.1 (4/189) | | 1.9 (7/368) |
| 24m | 2.3 (3/129) | 0.9 (1/114) | | 0.5 (1/205) | | 0 | | 2.9 (5/170) |
| **Other non-vaccine serotypes** | | |  | |  | |  |  |
| 2m | 0 | 0.7 (1/149) | | 0 | | 0.5 (1/202) | | 1.0 (2/197) |
| 6m | 0 | 2.2 (3/139) | | 1.6 (4/243) | | 1.5 (3/201) | | 0 |
| 9m | 0.7 (1/145) | 0 | | 1.3 (3/239) | | 1.5 (3/196) | | 0 |
| 12m | 2.1 (3/141) | 1.5 (2/133) | | 1.7 (4/231) | | 3.1 (6/194) | | 1.6 (3/188) |
| 18m | 0.7 (1/134) | 0 | | 0.9 (2/221) | | 0.5 (1/189) | | 0.5 (2/368) |
| 24m | 2.3 (3/129) | 0.9 (1/114) | | 0.5 (1/205) | | 1.1 (2/176) | | 0.6 (1/170) |

Data are prevalence, expressed as a percentage, (n/N). \* Control data sourced from Group F (2-12 months), Groups F and G combined (18 months), or Group G (24 months). Carriage determined by culture and latex agglutination/Quellung testing (2-12 months) and by DNA microarray (18-24 months). Samples that could not be serotyped are excluded. The **53 Other non-vaccine serotypes** comprise: **9 x serotype 3** (1 at 6m [B], 2 at 9m [D=2], 4 at 12m [C=3, D=1], 2 at 18m [D=1, Controls=1]), **8 x serotype 35B** (3 at 6m [C=1, D=2], 2 at 12m [D], 1 at 18m [C], 2 at 24m [D=1, Controls=1]), **6 x serotype 7C** (1 at 2m [B], 2 at 12m [B=1, Controls=1], 1 at 18m [A], 2 at 24m [A=1, B=1]), **5 x serotype 13** (1 at 2m [B], 2 at 6m [B=1, C=1], 2 at 18m [C=1, Controls=1]), **4 x serotype 19C** (1 at 2m [Controls], 3 at 12m [A=1, C=1, D=1]), **3 x serotype 6C** (1 at 9m [A], 1 at 12m [A], 1 at 24m [A]), **2 x serotypes 8** (2 at 12m [A=1, Controls=1]) and **9A** (1 at 6m [D], 1 at 9m [D]), and **1 x serotypes 15F** (12m [D]), **16F** (9m [C]), **17F** (12m [Controls]), **19** (9m [C]), **19B** (2m [Controls]), **20** (9m [C]), **23B** (12m [B]), **28F** (2m [D]), **35A** (24m [A]), **35F** (6m [C]), **37** (6m [C]), **38** (24m [C]), **42** (24m [D]), and **45** (12m [D]). PCV = pneumococcal conjugate vaccine. PCV10 = ten-valent PCV.

# **Appendix Figure S1: Pneumococcal density at A) 18 months of age, and B) 24 months of age.**

**B) 24 months**

**A) 18 months**



Scatter plots of density of carriage of any pneumococcal serotype, VT serotypes, non-VT serotypes, and serotypes 6A or 19A (log10 genome equivalents per ml), among pneumococcal carriers at 18 and 24 months of age. Circles indicate data points, and solid bars indicate the median and interquartile range. VT = vaccine type (PCV10 serotypes 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, and 23F). Control group data come from: Groups F and G combined (18 months); or Group G (24 months).

# **Appendix Table S5: Comparative effect of a three-dose or two-dose primary series on VT carriage during the interval between the primary series and the booster doses**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **VT carriage prevalence, % (95% CI)** | |  | **Prevalence ratio (95% CI)** | **p-value** |
|  | 3-dose primary series (Groups A and B combined) | 2-dose primary series (Group C) |  |  |  |
| 6 months | 2·8 (1·2-5·5) | 4·9 (2·6-8·5) |  | 0·57 (0·24-1·37) | 0·254 |
| 9 months | 5·7 (3·3-9·1) | 2·9 (1·2-5·9) |  | 1·94 (0·81-4·63) | 0·140 |

p-values based on Fisher’s Exact test (two-sided). VT = vaccine type (PCV10 serotypes 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, and 23F).

# **Appendix Table S6: Effect of a booster-dose on VT carriage at 12, 18, and 24 months of age**

Comparison of a 3+1 and 3+0 schedule, and comparison of combined data from the 3+1 and 2+1 schedules with a 3+0 schedule

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **VT carriage prevalence, % (95% CI)** | | |  | **3+1 vs 3+0** | |  | **3+1/2+1 vs 3+0** | |
|  | **3+1 schedule**  (Group A) | **3+1/2+1 schedule**  (Groups A and C combined) | **3+0 schedule**  (Group B) |  | **Prevalence ratio**  **(95% CI)** | **p-value** |  | **Prevalence ratio**  **(95% CI)** | **p-value** |
| 12 months | 6·3 (2·9-11·7) | 5·9 (3·7-8·8) | 7·5 (3·7-13·4) |  | 0·84 (0·35-2·01) | 0·813 |  | 0·78 (0·38-1·61) | 0·535 |
| 18 months | 7·5 (3·6-13·3) | 6·2 (3·9-9·2) | 8·3 (4·0-14·7) |  | 0·90 (0·39-2·09) | 0·820 |  | 0·75 (0·37-1·54) | 0·409 |
| 24 months | 7·0 (3·2-12·8) | 6·9 (4·4-10·2) | 4·4 (1·4-9·9) |  | 1·59 (0·55-4·61) | 0·423 |  | 1·57 (0·61-4·03) | 0·501 |

p-values based on Fisher’s Exact test (two-sided). VT = vaccine type (PCV10 serotypes 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, and 23F).