**Supplementary Table 1. Serotype-specific pneumococcal carriage prevalence and density (log10 GE/ml) of all detected pneumococci by cohort in infants aged 1, 4 and 9 months.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **1-month old infants** | | | | **4-month old infants** | | | | **9-month old infants** | | | |
|  | | **PCV13 cohorta** | | **Unvaccinated cohort** | | **PCV13 cohort** | | **Unvaccinated cohort** | | **PCV13 cohort** | | **Unvaccinated cohort** | |
|  | | **(N = 55)**  **n (%)** | **(N = 43)**  **Median density** | **(N = 48)**  **n (%)** | **(N = 38)**  **Median density** | **(N = 55)**  **n (%)** | **(N = 49)**  **Median density** | **(N = 55)**  **n (%)** | **(N = 54)**  **Median density** | **(N = 56)**  **n (%)** | **(N = 53)**  **Median density** | **(N = 51)**  **n (%)** | **(N = 47)**  **Median density** |
| VACCINE TYPES | | | | | | | | | | | | | |
| PCV10 serotypes | | 13 (23.6) | 6.83 | 10 (20.8) | 6.56 | 16 (29.1) | 6.83 | 19 (34.5) | 6.97 | 13 (23.2) | 6.49 | 16 (31.4) | 6.78 |
|  | 1 | - | - | 1 (2.1) | 3.88 | - | - | - | - | 1 (1.8) | 6.36 | - | - |
|  | 4 | 2 (3.6) | 7.67 | 2 (4.2) | 4.99 | - | - | 1 (1.8) | 5.46 | - | - | 1 (2.0) | 6.15 |
|  | 5 | - | - | - | - | - | - | - | - | - | - | 1 (2.0) | 7.28 |
|  | 6B | 1 (1.8) | 5.68 | 2 (4.2) | 6.00 | 3 (5.5) | 6.25 | 5 (9.1) | 6.64 | 4 (7.1) | 6.75 | 5 (9.8) | 6.92 |
|  | 7F | 1 (1.8) | 4.16 | - | - | - | - | - | - | - | - | - | - |
|  | 9V | - | - | - | - | - | - | 1 (1.8) | 6.34 | - | - | - | - |
|  | 14 | 2 (3.6) | 7.89 | 1 (2.1) | 7.34 | 5 (9.1) | 7.22 | 3 (5.5) | 7.22 | 5 (8.9) | 6.21 | 3 (5.9) | 6.77 |
|  | 18C | - | - | 1 (2.1) | 6.79 | 2 (3.6) | 6.70 | 1 (1.8) | 3.40 | - | - | 2 (3.9) | 6.52 |
|  | 19F | 3 (5.5) | 5.84 | - | - | 4 (7.3) | 6.71 | 5 (9.1) | 6.97 | 4 (7.1) | 6.71 | 4 (7.8) | 6.65 |
|  | 23F | 4 (7.3) | 6.71 | 3 (6.3) | 6.69 | 4 (7.3) | 6.83 | 4 (7.3) | 7.52 | 2 (3.6) | 5.74 | 3 (5.9) | 6.87 |
| Additional PCV13 serotypes | | 5 (9.1) | 7.33 | 5 (10.4) | 7.23 | 6 (10.9) | 6.62 | 11 (20.0) | 7.21 | 10 (17.9) | 6.70 | 9 (17.6) | 6.65 |
|  | 3 | 2 (3.6) | 6.84 | 1 (2.1) | 7.26 | - | - | - | - | 1 (1.8) | 6.20 | 1 (2.0) | 4.62 |
|  | 6A | 2 (3.6) | 7.27 | 3 (6.3) | 7.23 | 5 (9.1) | 6.17 | 6 (10.9) | 6.77 | 2 (3.6) | 6.70 | 5 (9.8) | 6.80 |
|  | 19A | 1 (1.8) | 7.59 | 2 (4.2) | 6.74 | 1 (1.8) | 7.20 | 5 (9.1) | 7.65 | 7 (12.5) | 6.76 | 3 (5.9) | 6.65 |
| NON-VACCINE TYPES | | | | | | | | | | | | | |
| Non-PCV13 serotypes | | 21 (38.2) | 6.76 | 28 (58.3) | 6.52 | 39 (70.9) | 6.70 | 34 (61.8) | 6.46 | 40 (71.4) | 6.74 | 34 (66.7) | 6.80 |
|  | 6C | 1 (1.8) | 6.49 | - | - | 5 (9.1) | 7.27 | 2 (3.6) | 7.02 | 5 (8.9) | 7.28 | 2 (3.9) | 7.10 |
|  | 6C/39-like | - | - | - | - | 1 (1.8) | 6.72 | - | - | - | - | - | - |
|  | 6D | 2 (3.6) | 6.96 | - | - | 1 (1.8) | 5.11 | - | - | 3 (5.4) | 6.63 | 2 (3.9) | 6.03 |
|  | 7C | - | - | - | - | 1 (1.8) | 7.31 | 2 (3.6) | 7.67 | 1 (1.9) | 6.11 | 1 (2.0) | 7.46 |
|  | 8 | 1 (1.8) | 7.47 | - | - | - | - | - | - | - | - | 2 (3.9) | 5.83 |
|  | 9L | 1 (1.8) | 8.41 | - | - | 2 (3.6) | 6.30 | 3 (5.5) | 6.19 | - | - | 4 (7.8) | 7.04 |
|  | 9N | - | - | - | - | - | - | - | - | - | - | - | - |
|  | 10A | 4 (7.3) | 7.10 | 2 (4.2) | 5.61 | 4 (7.3) | 7.00 | - | - | 3 (5.4) | 7.10 | 3 (5.9) | 6.32 |
|  | 10B | - | - | - | - | - | - | - | - | - | - | 1 (2.0) | 6.15 |
|  | 10F | - | - | - | - | - | - | 2 (3.6) | 6.49 | 2 (3.6) | 7.69 | 1 (2.0) | 5.88 |
|  | 11A | - | - | 1 (2.1) | 7.17 | 2 (3.6) | 5.65 | - | - | 2 (3.6) | 6.64 | - | - |
|  | 11B | - | - | - | - | - | - | 1 (1.8) | 5.93 | - | - | - | - |
|  | 11C | - | - | - | - | - | - | 4 (7.3) | 6.61 | - | - | - | - |
|  | 12F | - | - | - | - | - | - | 1 (1.8) | 8.09 | 2 (3.6) | 5.09 | - | - |
|  | 13 | 3 (5.5) | 7.45 | 1 (2.1) | 5.86 | 2 (3.6) | 7.51 | - | - | - | - | 4 (7.8) | 6.95 |
|  | 15A | - | - | - | - | 2 (3.6) | 5.88 | 2 (3.6) | 6.63 | 2 (3.6) | 4.87 | - | - |
|  | 15B/C | 2 (3.6) | 6.85 | 2 (4.2) | 7.11 | 2 (3.6) | 6.02 | 3 (5.5) | 6.97 | 11 (19.6) | 5.95 | 8 (15.7) | 6.70 |
|  | 16F | 2 (3.6) | 5.91 | - | - | 3 (5.5) | 5.71 | 5 (9.1) | 5.93 | - | - | 4 (7.8) | 6.08 |
|  | 17F | - | - | 1 (2.1) | 5.69 | - | - | 1 (1.8) | 7.59 | 3 (5.4) | 7.72 | - | - |
|  | 18A | - | - | - | - | - | - | - | - | 2 (3.6) | 6.35 | - | - |
|  | 19B | 1 (1.8) | 6.88 | 1 (2.1) | 6.18 | 2 (3.6) | 5.68 | - | - | 1 (1.8) | 5.54 | 1 (2.0) | 6.12 |
|  | 20B | 1 (1.8) | 5.63 | 1 (2.1) | 6.41 | 2 (3.6) | 6.11 | - | - | - | - | - | - |
|  | 21 | 2 (3.6) | 6.17 | 2 (4.2) | 6.62 | 4 (7.3) | 6.30 | 1 (1.8) | 6.21 | 5 (8.9) | 8.00 | - | - |
|  | 22A | - | - | 1 (2.1) | 5.00 | 1 (1.8) | 7.43 | 3 (5.5) | 6.74 | 2 (3.6) | 6.20 | 2 (3.9) | 6.87 |
|  | 22F | - | - | 1 (2.1) | 7.45 | 3 (5.5) | 7.41 | 2 (3.6) | 6.66 | 1 (1.8) | 5.43 | - | - |
|  | 23A | - | - | 2 (4.2) | 5.10 | 1 (1.8) | 6.62 | 1 (1.8) | 5.91 | 1 (1.8) | 8.55 | - | - |
|  | 23B | 2 (3.6) | 6.11 | 1 (2.1) | 5.55 | 1 (1.8) | 6.38 | 1 (1.8) | 7.23 | - | - | 1 (2.0) | 7.25 |
|  | 24A | - | - | 1 (2.1) | 7.11 | - | - | - | - | - | - | - | - |
|  | 24F | - | - | 2 (4.2) | 6.08 | 1 (1.8) | 7.02 | 4 (7.3) | 6.02 | - | - | 1 (2.0) | 6.89 |
|  | 25F | - | - | 2 (4.2) | 6.52 | - | - | - | - | 1 (1.8) | 6.42 | - | - |
|  | 28A | - | - | 1 (2.1) | 6.22 | 1 (1.8) | 6.20 | - | - | 1 (1.8) | 7.70 | 2 (3.9) | 5.98 |
|  | 29 | - | - | - | - | 1 (1.8) | 6.40 | 1 (1.8) | 5.75 | 2 (3.6) | 6.25 | - | - |
|  | 31 | 1 (1.8) | 6.45 | 1 (2.1) | 5.57 | - | - | - | - | - | - | - | - |
|  | 33A | - | - | - | - | 1 (1.8) | 5.67 | - | - | - | - | 1 (2.0) | 7.00 |
|  | 33B | 1 (1.8) | 6.59 | 1 (2.1) | 5.28 | 1 (1.8) | 7.55 | 2 (3.6) | 6.21 | - | - | 2 (3.9) | 4.80 |
|  | 33C | - | - | - | - | - | - | - | - | 1 (1.8) | 3.37 | - | - |
|  | 34 | 1 (1.8) | 7.38 | 3 (6.3) | 8.09 | 1 (1.8) | 6.11 | 2 (3.6) | 6.26 | 2 (3.6) | 6.28 | 1 (2.0) | 7.76 |
|  | 35A | - | - | 1 (2.1) | 8.05 | - | - | - | - | 1 (1.8) | 7.09 | - | - |
|  | 35B | 2 (3.6) | 6.66 | 1 (2.1) | 6.97 | 2 (3.6) | 6.67 | 2 (3.6) | 6.65 | 4 (7.1) | 6.83 | 3 (5.9) | 6.69 |
|  | 35F | - | - | 1 (2.1) | 8.80 | 1 (1.8) | 4.61 | - | - | 1 (1.8) | 8.10 | - | - |
|  | 36 | - | - | - | - | 1 (1.8) | 4.75 | - | - | - | - | - | - |
|  | 37 | 1 (1.8) | 7.46 | - | - | 2 (3.6) | 6.70 | - | - | 1 (1.8) | 5.62 | - | - |
|  | 38/NT2 | - | - | - | - | 1 (1.8) | 6.22 | 1 (1.8) | 7.01 | - | - | - | - |
|  | 39 | - | - | - | - | - | - | - | - | 1 (1.8) | 6.20 | - | - |
|  | 43 | - | - | - | - | 1 (1.8) | 6.67 | - | - | - | - | - | - |
|  | 45 | - | - | - | - | 1 (1.8) | 5.90 | - | - | - | - | - | - |
|  | 46 | 1 (1.8) | 7.20 | 1 (2.1) | 7.56 | - | - | - | - | - | - | 1 (2.0) | 6.73 |
| Non-encapsulated pneumococci | | 9 (16.4) | 6.18 | 7 (14.6) | 6.85 | 12 (21.8) | 6.42 | 9 (16.4) | 7.09 | 6 (10.7) | 6.03 | 8 (15.7) | 5.57 |
|  | NT2 | 8 (14.5) | 6.40 | 5 (10.4) | 7.00 | 11 (20.0) | 6.54 | 8 (14.5) | 7.09 | 6 (10.7) | 6.03 | 6 (11.8) | 5.57 |
|  | NT4a | - | - | 1 (2.1) | 6.85 | - | - | - | - | - | - | - | - |
|  | NT4b | - | - | - | - | - | - | - | - | - | - | 1 (2.0) | 4.30 |
|  | NT2/NT3b | 1 (1.8) | 6.18 | 1 (2.1) | 6.18 | 1 (1.8) | 5.89 | 1 (1.8) | 6.05 | - | - | 1 (2.0) | 6.10 |

PCV13, 13-valent pneumococcal conjugate vaccine; aPCV13 cohort received 3 doses of PCV13 at 1, 2 and 3 months of age, 1-month nasopharyngeal swabs were collected prior to first dose of vaccine. Samples that were pneumococcal positive with unknown serotype (*lytA* positive, culture negative samples were not able to proceed to microarray) were excluded from analyses of serotype-specific pneumococcal carriage prevalence. Analyses of overall pneumococcal density were restricted to samples that were positive for pneumococcal carriage, and analyses of serotype-specific pneumococcal density were restricted to samples that were pneumococcal positive by microarray.

**Supplementary Table 2. Comparing** **antimicrobial resistance genes detected by microarray in nasopharyngeal samples from PCV13-vaccinated and unvaccinated infants aged 1, 4 and 9 months.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **1-month old infants** | | | **4-month old infants** | | | **9-month old infants** | | |
| **AMR gene** | **Encodes resistance to** | **PCV13 cohorta**  **(N = 43)**  **n (%)** | **Unvaccinated cohort**  **(N = 38)**  **n (%)** | ***p***  **valueb** | **PCV13 cohort**  **(N = 49)**  **n (%)** | **Unvaccinated cohort**  **(N = 54)**  **n (%)** | ***p* value** | **PCV13 cohort**  **(N = 53)**  **n (%)** | **Unvaccinated cohort**  **(N = 47)**  **n (%)** | ***p***  **value** |
| *tetM* | Tetracycline | 7 (16.3) | 4 (10.5) | 0.528 | 8 (16.3) | 8 (14.8) | 1.000 | 6 (11.3) | 2 (4.3) | 0.276 |
| *tetK* | Tetracycline | 7 (16.3) | 6 (15.8) | 0.952 | - | 1 (1.9) | 1.000 | - | - |  |
| *tetO* | Tetracycline | - | - |  | - | - |  | - | - |  |
| *tetL* | Tetracycline | - | - |  | - | - |  | - | - |  |
| *cat* | Chloramphenicol | 4 (9.3) | 2 (5.3) | 0.679 | - | 2 (3.7) | 0.496 | 4 (7.5) | 1 (2.1) | 0.367 |
| *mefA* | Macrolides | - | 3 (7.9) | 0.099 | - | 1 (1.9) | 1.000 | 2 (3.8) | 2 (4.3) | 1.000 |
| *aphA3* | Kanamycin | 1 (2.3) | 1 (2.6) | 1.000 | - | - |  | - | - |  |
| *sat4* | Streptothricin | 1 (2.3) | 1 (2.6) | 1.000 | - | - |  | - | - |  |
| *ermB* | Erythromycin | - | - |  | - | - |  | 1 (1.9) | 1 (2.1) | 1.000 |
| *ermC* | Erythromycin | 5 (11.6) | 6 (15.8) | 0.585 | 1 (2.0) | 1 (1.9) | 1.000 | - | - |  |
| Any AMR gene | | 13 (30.2) | 11 (28.9) | 0.899 | 9 (18.4) | 9 (16.7) | 0.820 | 6 (11.3) | 6 (12.8) | 0.824 |
| ≥3 AMR genes | | 3 (7.0) | 4 (10.5) | 0.701 | - | 1 (1.9) | 1.000 | 2 (3.8) | - | 0.497 |

PCV13, 13-valent pneumococcal conjugate vaccine; aPCV13 cohort received 3 doses of PCV13 at 1, 2 and 3 months of age, 1-month nasopharyngeal swab collected prior to first dose of vaccine; bPearson chi-square test, or Fisher’s exact test where cell count <5, used to compare unvaccinated and PCV13 cohorts. Analyses of AMR genes were restricted to samples that were pneumococcal positive by microarray.