

Supplementary Table 1: Distribution of participants included and those not included in the study

| Sociodemographic characteristics | Participants included n = 1341 (100%) | Participants not included n = 263 (100%) |
|-------------------------------------------|--------------------------------------------------|-----------------------------------------------------|
| Sex | | |
| Male | 669 (49.9 %) | 151 (53.2 %) |
| Female | 672 (50.1 %) | 133 (46.8 %) |
| Age category at sampling | | |
| 6 weeks to 11 months | 463 (34.5 %) | 91 (32.4 %) |
| 12 to 23 months | 478 (35.7 %) | 111 (39.1 %) |
| 24 to 59 months | 400 (29.8 %) | 82 (28.9 %) |
| Distance to nearest health facility (kms) | | |
| 0 – 2 | 574 (42.8 %) | 127 (48.3 %) |
| 2 – 4 | 584 (43.6 %) | 119 (45.2 %) |
| 4 - 6 | 183 (13.7 %) | 17 (6.5 %) |

Supplementary Table 2: Proportion of participants vaccinated by 12 months of age by year of age-eligibility for vaccination

| Year of age-eligibility for vaccination | Proportion of participants vaccinated by 12 months of age | |
|------------------------------------------------|------------------------------------------------------------------|-----------------------------|
| | Pentavalent-3 n (95% CI) | MCV-1 n (95% CI) |
| 2016 | 74.6 % (61.6, 81.4 %) | - |
| 2017 | 74.8 % (67.4, 81.4 %) | 68.1 % (59.7, 75.7 %) |
| 2018 | 86.0 % (78.5, 91.6 %) | 78.2 % (70.5, 84.7 %) |
| 2019 | 90.6 % (86.7, 93.6 %) | 84.6 % (76.8, 90.6 %) |
| 2020 | 91.0 % (88.1, 93.5 %) | 85.2 % (81.6, 88.3 %) |

Supplementary Table 3: Association between time-period of age-eligibility for vaccination and vaccination by 12 months of age with Pentavalent-3

| | Vaccination per person years | Vaccination Rate | Crude vaccination hazard ratio | 95% CI | ¹ Adjusted hazard ratio | 95% CI | ² LRT P value |
|-------------------------------------------|------------------------------------|---------------------|--------------------------------------|-------------------|------------------------------------------|-------------------|--------------------------|
| Time-period of age-eligibility | | | | | | | |
| Pre-COVID | 604/202.5 | 2.98 | 1 | | 1 | | 0.0430 |
| COVID-19 Year 1 | 420/130.9 | 3.21 | 1.11 | 0.98, 1.26 | 1.11 | 0.98, 1.26 | |
| COVID-19 Year 2 | 103/30.3 | 3.40 | 1.40 | 1.14, 1.73 | 1.41 | 1.14, 1.75 | |
| Primary caregiver | | | | | | | |
| Mother | 1098/353.0 | 3.11 | 1 | | 1 | | 0.3910 |
| Not mother | 29/10.54 | 2.75 | 0.76 | 0.52, 1.09 | 0.85 | 0.58, 1.25 | |
| Primary caregiver's age group | | | | | | | |
| 15 – 25 years | 382/121.6 | 3.14 | 1 | | 1 | | 0.7927 |
| 26 – 35 years | 543/175.7 | 3.09 | 0.98 | 0.86, 1.12 | 0.98 | 0.84, 1.15 | |
| 36 years and above | 202/66.2 | 3.05 | 0.89 | 0.75, 1.06 | 0.93 | 0.75, 1.16 | |
| Primary caregiver's education level | | | | | | | |
| None | 70/24.0 | 2.92 | 1 | | 1 | | 0.0115 |
| Primary | 860/280.4 | 3.07 | 1.30 | 1.02, 1.66 | 1.33 | 1.04, 1.71 | |
| Secondary and above | 197/59.2 | 3.32 | 1.64 | 1.25, 2.16 | 1.55 | 1.15, 2.07 | |
| Birth order | | | | | | | |
| First child | 271/86.4 | 3.13 | 1 | | 1 | | 0.7639 |
| Second child | 263/85.0 | 3.10 | 0.98 | 0.83, 1.16 | 0.99 | 0.83, 1.18 | |
| Third child | 178/59.1 | 3.01 | 0.90 | 0.74, 1.08 | 0.91 | 0.74, 1.11 | |
| Fourth child or higher | 415/133.1 | 3.12 | 0.91 | 0.78, 1.06 | 0.96 | 0.81, 1.20 | |
| Distance to nearest health facility (kms) | | | | | | | |
| 0 – 2 | 484/154.9 | 3.12 | 1 | | 1 | | 0.7505 |
| 2 – 4 | 494/159.3 | 3.10 | 0.94 | 0.83, 1.06 | 0.97 | 0.85, 1.11 | |
| 4 – 8 | 149/49.3 | 3.02 | 0.89 | 0.74, 1.07 | 0.93 | 0.77, 1.12 | |
| Socio-economic status | | | | | | | |
| Poorest | 223/69.7 | 3.20 | 1 | | 1 | | 0.0839 |
| Quintile 2 | 249/79.0 | 3.15 | 0.83 | 0.69, 0.99 | 0.85 | 0.71, 1.02 | |
| Quintile 3 | 215/69.5 | 3.09 | 0.82 | 0.68, 0.99 | 0.87 | 0.71, 1.06 | |
| Quintile 4 | 248/79.5 | 3.12 | 0.82 | 0.68, 0.98 | 0.83 | 0.69, 1.01 | |
| Richest | 192/65.9 | 2.91 | 0.73 | 0.60, 0.89 | 0.75 | 0.61, 0.91 | |

¹ Adjusted for all a priori risk factors listed in the table

² Likelihood Ratio Test p value

Supplementary Table 4: Association between time-period of age-eligibility for vaccination and vaccination by 12 months of age with MCV-1

| | Vaccination per person years | Vaccination Rate | Crude vaccination hazard ratio | 95% CI | ¹ Adjusted hazard ratio | 95% CI | ² LRT P value |
|-------------------------------------------|------------------------------------|---------------------|--------------------------------------|-------------------|------------------------------------------|-------------------|--------------------------|
| Time-period of age-eligibility | | | | | | | |
| Pre-COVID | 277/251.0 | 1.10 | 1 | | 1 | | 0.0029 |
| COVID-19 Year 1 | 360/307.7 | 1.17 | 1.05 | 0.91, 1.24 | 1.06 | 0.90, 1.24 | |
| COVID-19 Year 2 | 177/141.8 | 1.25 | 1.39 | 1.15, 1.68 | 1.39 | 1.15, 1.68 | |
| Primary caregiver | | | | | | | |
| Mother | 795/682.4 | 1.17 | 1 | | | | 0.5071 |
| Not mother | 19/18.1 | 1.05 | 0.81 | 0.51, 1.28 | 0.93 | 0.58, 1.50 | |
| Primary caregiver's age group | | | | | | | |
| 15 – 25 years | 266/224.8 | 1.18 | 1 | | | | 0.0033 |
| 26 – 35 years | 406/343.6 | 1.18 | 1.05 | 0.90, 1.23 | 1.11 | 0.92, 1.33 | |
| 36 years and above | 142/132.1 | 1.08 | 0.77 | 0.63, 0.94 | 0.83 | 0.64, 1.07 | |
| Primary caregiver's education level | | | | | | | |
| None | 51/45.5 | 1.12 | 1 | | | | 0.8670 |
| Primary | 628/541.8 | 1.16 | 1.11 | 0.83, 1.47 | 1.04 | 0.77, 1.40 | |
| Secondary and above | 135/113.2 | 1.19 | 1.27 | 0.92, 1.75 | 1.09 | 0.77, 1.54 | |
| Birth order | | | | | | | |
| First child | 206/171.8 | 1.20 | 1 | | | | 0.3535 |
| Second child | 190/162.7 | 1.17 | 0.89 | 0.73, 1.09 | 0.89 | 0.73, 1.10 | |
| Third child | 128/111.8 | 1.15 | 0.85 | 0.68, 1.06 | 0.84 | 0.66, 1.06 | |
| Fourth child or higher | 290/254.3 | 1.14 | 0.80 | 0.67, 0.96 | 0.85 | 0.68, 1.07 | |
| Distance to nearest health facility (kms) | | | | | | | |
| 0 – 2 | 345/293.4 | 1.18 | 1 | | | | 0.3323 |
| 2 – 4 | 365/316.5 | 1.15 | 0.92 | 0.79, 1.06 | 0.94 | 0.81, 1.10 | |
| 4 – 8 | 104/90.6 | 1.15 | 0.84 | 0.68, 1.05 | 0.87 | 0.69, 1.09 | |
| Socio-economic status | | | | | | | |
| Poorest | 164/138.1 | 1.19 | 1 | | | | 0.5581 |
| Quintile 2 | 174/154.1 | 1.13 | 0.85 | 0.96, 1.05 | 0.86 | 0.69, 1.07 | |
| Quintile 3 | 155/134.3 | 1.15 | 0.84 | 0.68, 1.05 | 0.86 | 0.68, 1.08 | |
| Quintile 4 | 182/154.5 | 1.18 | 0.87 | 0.71, 1.08 | 0.88 | 0.70, 1.09 | |
| Richest | 139/119.4 | 1.16 | 0.86 | 0.69, 1.08 | 0.88 | 0.69, 1.12 | |

¹ Adjusted for all a priori risk factors listed in the table

² Likelihood Ratio Test p value