

Supplementary data Table S1a Seroprotection rates at 7 and 13 months of age in infants born vaginally or by Caesarean section

Vaccine antigen	Protective correlate	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age				Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age			
		Vaginal delivery (n=56) % (n); (95% CI)	Caesarean section (n=35) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value	Vaginal delivery (n=192) % (n); (95% CI)	Caesarean section (n=115) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Diphtheria	0.1 IU/mL ¹	94.6 (53); (85.1, 98.8)	100 (35); (90.0, 100)	-5.4 (-14.6, 4.8)	0.28	97.9 (188); (94.8, 99.4)	99.1 (114); (95.3, 100)	-1.2 (-4.5, 2.8)	0.65
Tetanus	0.1 IU/mL ¹	100 (56); (93.6, 100)	100 (35); (90.0, 100)	0 (-6.5, 10)	-	100 (101); (96.4, 100) ²	100 (62); (94.2, 100) ²	0 (-3.7, 5.9) ²	-
PT	25 IU/mL	85.7 (48); (73.8, 93.6)	97.1 (34); (85.1, 100)	-11.4 (-23.4, 1.7)	0.15	29.2 (56); (22.8, 36.1)	31.3 (36); (22.9, 40.6)	-2.1 (-13.0, 8.2)	0.70
Hib	0.15 µg/mL	73.2 (41); (59.7, 84.2)	80 (28); (63.1, 91.6)	-6.8 (-23.6, 12.2)	0.62	84.2 (85); (75.6, 90.7) ²	64.5 (40); (51.3, 76.3) ²	19.6 (6.1, 33.7) ²	0.36 ²
Polio type 1	0.23 IU/mL	100 (56); (93.6, 100)	100 (35); (90.0, 100)	0 (-6.5, 10)	-	100 (192); (98.1, 100)	100 (115); (96.8, 100)	0 (-2.0, 3.2)	-
Polio type 2	0.29 IU/mL	100 (56); (93.6, 100)	100 (35); (90.0, 100)	0 (-6.5, 10)	-	99.5 (191); (97.1, 100)	100 (115); (96.8, 100)	-0.5 (-2.9, 2.7)	1
Polio type 3	0.12 IU/mL	100 (56); (93.6, 100)	100 (35); (90.0, 100)	0 (-6.5, 10)	-	100 (187); (98.1, 100)	100 (115); (96.8, 100)	0 (-2.0, 3.2)	-
Pn 1	0.35 µg/mL	94.6 (53); (85.1, 98.9)	100 (35); (90.0, 100)	-5.4 (-14.6, 4.8)	0.28	95.3 (183); (91.3, 97.8)	91.3 (105); (84.6, 96.8)	4 (-1.5, 11)	0.22
Pn 3	0.35 µg/mL	98.2 (55); (90.4, 100)	100 (35); (90.0, 100)	-1.8 (-9.5, 8.3)	1	68.8 (132); (61.7, 75.2)	71.3 (82); (62.1, 79.4)	-2.6 (-12.8, 8.3)	0.70
Pn 4	0.35 µg/mL	67.9 (38); (54.0, 79.7)	71.4 (25); (53.7, 85.4)	-3.6 (-22.0, 16.5)	0.82	22.9 (44); (17.1, 29.5)	22.6 (22.6); (15.2, 31.3)	-0.3 (-9.8, 9.7)	1
Pn 5	0.35 µg/mL	98.2 (55); (90.4, 100)	97.1 (34); (85.1, 100)	1.1 (-7.0, 13.0)	1	88.5 (170); (83.2, 92.7)	84.3 (97); (76.4, 90.5)	4.2 (-3.4, 12.9)	0.30
Pn 6A	0.35 µg/mL	96.4 (54); (87.7, 99.6)	100 (35); (90.0, 100)	-3.6 (-12.1, 6.6)	0.52	89.1 (171); (83.8, 93.1)	82.6 (95); (74.4, 89.0)	4.2 (-1.4, 15.3)	0.12
Pn 6B	0.35 µg/mL	83.9 (47); (71.7, 92.4)	97.1 (34); (85.1, 100)	-13.2 (-26, 0.1)	0.08	64.6 (124); (57.4, 71.3)	63.5 (73); (54.0, 72.3)	1.11 (-9.8, 12.3)	0.90
Pn 7F	0.35 µg/mL	100 (53); (93.6, 100)	100 (35); (90.0, 100)	0 (-6.5, 10)	-	100 (192); (98.1, 100)	98.3 (113); (98, 100)	1.74 (-0.3, 6.1)	0.14
Pn 9V	0.35 µg/mL	96.4 (54); (87.7, 99.6)	100 (35); (90.0, 100)	-3.6 (-12.1, 6.6)	0.52	78.6 (151); (72.2, 84.2)	71.3 (82); (62.1, 79.4)	7.3 (-2.5, 17.8)	0.17
Pn 14	0.35 µg/mL	91.1 (51); (80.4, 97.0)	91.4 (32); (76.9, 98.2)	-0.4 (-12.4, 14.6)	1	85.4 (164); (79.6, 90.1)	87.8 (101); (80.4, 93.2)	-2.4 (-10.0, 6.0)	0.61
Pn 18C	0.35 µg/mL	92.9 (52); (82.7, 98.0)	100 (35); (90.0, 100)	-7.1 (-17, 3.1)	0.29	78.1 (150); (71.6, 84.8)	74.8 (86); (65.8, 82.4)	3.3 (-6.2, 13.5)	0.57
Pn 19A	0.35 µg/mL	89.3 (50); (78.1, 96.0)	100 (35); (90.0, 100)	-10.7 (-21.5, 3.1)	0.08	50.5 (97); (43.2, 57.8)	48.7 (56); (39.3, 58.2)	1.8 (-9.7, 13.3)	0.81
Pn 19F	0.35 µg/mL	100 (56); (93.6, 100)	100 (35); (90.0, 100)	0 (-6.4, 10)	-	99.0 (190); (96.3, 99.9)	100 (115); (96.8, 100)	-1.0 (-3.7, 2.2)	0.53
Pn 23F	0.35 µg/mL	92.9 (52); (82.7, 98.0)	94.2 (33); (80.8, 99.3)	-1.4 (-12.4, 12.3)	1	61.5 (118); (54.2, 68.4)	60.9 (70); (51.3, 69.8)	0.6 (-10.5, 11.9)	1
						Antibodies to 12-month vaccines measured 13 months of age			
						Vaginal delivery (n=91) % (n); (95% CI)	Caesarean section (n=53) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Measles	0.12 IU/mL					96.7 (88); (90.7, 99.3)	100 (53); (93.3, 100)	-3.3 (-9.2, 3.6)	0.12
Mumps	45 IU/mL					65.9 (60); (55.3, 75.6)	50.9 (27); (36.8, 64.9)	15.0 (-1.6, 31.2)	0.74
Rubella	10 IU/mL					87.9 (80); (79.4, 93.8)	84.9 (45); (72.4, 93.3)	3.0 (-8.1, 16.2)	0.09
MenC	2 µg/mL					100 (91); (96.0, 100)	98.1 (52); (90.0, 100)	1.9 (-2.2, 10.0)	0.49
Hib	0.15 µg/mL					98.9 (90); (94.0, 100)	98.1 (52); (90.0, 100)	0.8 (-4.3, 9.0)	1
Tetanus	0.01 IU/mL					100 (91); (96.0, 100)	100 (53); (93.3, 100)	0 (-4.1, 6.8)	-

¹ 0.01 IU/mL at 13 months of age ² includes only participants who have not had Hib-MenC

CI = confidence interval, Hib = *H. influenzae* type b, MenC = meningococcus C, Pn = pneumococcal serotype, PT = pertussis toxin

Supplementary data Table S1b GMCs and GMRs at 7 and 13 months of age in infants born vaginally or by Caesarean section

Vaccine antigen	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age						Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age					
	Vaginal delivery (n=56) GMC (95% CI)	Caesarean section (n=35) GMC (95% CI)	Unadjusted GMR (95% CI)	Two-sided p-value	Adjusted* GMR (95% CI)	Two-sided p-value	Vaginal delivery (n=192) GMC (95% CI)	Caesarean section (n=115) GMC (95% CI)	Unadjusted GMR (95% CI)	Two-sided p-value	Adjusted** GMR (95% CI)	Two-sided p-value
Diphtheria ¹	0.36 (0.29, 0.45)	0.46 (0.36, 0.57)	0.79 (0.57, 1.10)	0.17	0.89 (0.65, 1.23)	0.49	0.08 (0.07, 0.09)	0.08 (0.06, 0.10)	0.97 (0.77, 1.23)	0.82	1.02 (0.81, 1.27)	0.89
Tetanus ¹	1.12 (0.93, 1.32)	1.11 (0.86, 1.44)	0.99 (0.74, 1.35)	0.99	0.88 (0.65, 1.19)	0.40	0.46 (0.36, 0.58) ³	0.41 (0.31, 0.55) ³	1.12 (0.77, 1.61) ³	0.55 ³	1.07 (0.75, 1.54) ³	0.69 ³
PT ¹	63.11 (50.69, 78.58)	82.87 (64.07, 107.19)	0.76 (0.54, 1.07)	0.11	0.90 (0.64, 1.26)	0.52	17.68 (15.43, 20.25)	16.92 (13.77, 20.78)	1.04 (0.83, 1.32)	0.72	1.10 (0.87, 1.38)	0.42
FHA ¹	58.30 (47.14, 72.10)	73.50 (54.72, 98.71)	0.79 (0.56, 1.13)	0.19	0.87 (0.61, 1.23)	0.41	18.57 (16.37, 21.06)	19.43 (15.93, 23.69)	0.96 (0.77, 1.19)	0.69	1.03 (0.82, 1.28)	0.82
PRN ¹	59.27 (45.42, 77.33)	62.49 (45.56, 85.72)	0.95 (0.63, 1.43)	0.80	1.13 (0.73, 1.75)	0.58	11.48 (9.69, 13.61)	12.78 (10.17, 16.06)	0.90 (0.68, 1.19)	0.45	0.86 (0.66, 1.14)	0.30
Hib ²	0.53 (0.34, 0.81)	0.49 (0.29, 0.82)	1.07 (0.55, 2.11)	0.84	0.90 (0.46, 1.76)	0.75	1.49 (0.97, 2.30)³	0.71 (0.39, 1.30)³	2.10 (1.02, 4.33)³	0.04³	1.89 (1.07, 3.36)³	0.03³
Polio type 1 ¹	34.21 (24.98, 46.84)	35.26 (26.68, 46.61)	0.97 (0.62, 1.52)	0.89	1.09 (0.67, 1.77)	0.73	10.43 (8.91, 12.19)	12.58 (10.14, 15.61)	0.83 (0.64, 1.08)	0.16	0.88 (0.68, 1.16)	0.36
Polio type 2 ¹	64.53 (47.27, 88.09)	60.59 (44.67, 82.19)	1.06 (0.67, 1.68)	0.79	1.20 (0.75, 1.93)	0.45	21.51 (18.12, 25.53)	21.76 (16.86, 28.07)	0.99 (0.74, 1.33)	0.94	1.03 (0.76, 1.39)	0.85
Polio type 3 ¹	22.28 (16.16, 30.72)	20.15 (14.41, 28.17)	1.11 (0.68, 1.79)	0.68	1.12 (0.67, 1.88)	0.66	8.86 (7.40, 10.62)	8.95 (6.94, 11.53)	0.99 (0.73, 1.34)	0.95	0.98 (0.72, 1.33)	0.90
Pn 1 ²	4.06 (2.99, 5.52)	4.91 (3.75, 6.42)	0.83 (0.53, 1.28)	0.39	0.85 (0.56, 1.31)	0.46	1.25 (1.10, 1.43)	1.04 (0.90, 1.19)	1.21 (0.99, 1.48)	0.06	1.23 (1.00, 1.51)	0.05
Pn 3 ²	1.39 (1.14, 1.70)	1.51 (1.25, 1.82)	0.92 (0.69, 1.23)	0.57	0.90 (0.66, 1.23)	0.52	0.56 (0.50, 0.64)	0.50 (0.44, 0.56)	1.14 (0.94, 1.37)	0.18	1.16 (0.96, 1.41)	0.12
Pn 4 ²	0.49 (0.38, 0.62)	0.55 (0.42, 0.72)	0.89 (0.62, 1.28)	0.53	0.86 (0.60, 1.24)	0.42	0.22 (0.20, 0.24)	0.21 (0.18, 0.23)	1.07 (0.91, 1.25)	0.43	1.05 (0.89, 1.23)	0.55
Pn 5 ²	3.01 (2.33, 3.89)	3.41 (2.56, 4.55)	0.88 (0.60, 1.31)	0.53	0.94 (0.63, 1.40)	0.76	0.96 (0.84, 1.10)	0.85 (0.73, 1.00)	1.13 (0.91, 1.40)	0.27	1.17 (0.94, 1.46)	0.15
Pn 6A ²	4.47 (3.48, 5.74)	5.42 (4.23, 6.95)	0.83 (0.57, 1.19)	0.30	0.90 (0.63, 1.30)	0.58	1.04 (0.89, 1.20)	0.95 (0.80, 1.13)	1.09 (0.87, 1.38)	0.46	1.15 (0.91, 1.44)	0.23
Pn 6B ²	1.54 (1.00, 2.37)	2.72 (1.75, 4.22)	0.57 (0.30, 1.07)	0.08	0.59 (0.30, 1.13)	0.11	0.54 (0.46, 0.65)	0.48 (0.39, 0.58)	1.14 (0.87, 1.50)	0.34	1.18 (0.90, 1.56)	0.23
Pn 7F ²	6.16 (4.95, 7.67)	6.08 (4.76, 7.78)	1.01 (0.73, 1.41)	0.94	1.07 (0.77, 1.45)	0.69	1.96 (1.76, 2.18)	1.75 (1.51, 2.03)	1.12 (0.93, 1.34)	0.22	1.17 (0.98, 1.40)	0.09
Pn 9V ²	2.30 (1.79, 2.95)	2.74 (2.18, 3.45)	0.84 (0.58, 1.20)	0.33	0.89 (0.63, 1.25)	0.50	0.61 (0.54, 0.69)	0.58 (0.49, 0.68)	1.07 (0.87, 1.30)	0.54	1.11 (0.90, 1.36)	0.32
Pn 14 ²	2.53 (1.79, 3.57)	2.91 (1.92, 4.39)	0.87 (0.51, 1.49)	0.61	0.96 (0.54, 1.70)	0.90	1.00 (0.86, 1.17)	1.12 (0.94, 1.34)	0.89 (0.71, 1.13)	0.35	0.93 (0.73, 1.19)	0.56
Pn 18C ²	2.68 (2.04, 3.53)	3.40 (2.61, 4.43)	0.79 (0.53, 1.18)	0.24	0.78 (0.51, 1.18)	0.24	0.69 (0.60, 0.78)	0.60 (0.52, 0.69)	1.15 (0.95, 1.40)	0.16	1.22 (1.00, 1.48)	0.05
Pn 19A ²	1.62 (1.25, 2.10)	1.89 (1.38, 2.60)	0.85 (0.57, 1.28)	0.44	0.97 (0.64, 1.48)	0.90	0.47 (0.39, 0.57)	0.45 (0.35, 0.57)	1.06 (0.78, 1.44)	0.69	1.12 (0.82, 1.54)	0.48
Pn 19F ²	11.38 (8.82, 14.68)	11.77 (9.00, 15.41)	0.97 (0.66, 1.41)	0.86	1.06 (0.72, 1.54)	0.78	3.19 (2.74, 3.72)	2.96 (2.43, 3.61)	1.08 (0.84, 1.38)	0.56	1.12 (0.86, 1.44)	0.40
Pn 23F ²	2.10 (1.51, 2.94)	2.77 (2.02, 3.79)	0.76 (0.47, 1.24)	0.27	0.83 (0.51, 1.35)	0.45	0.59 (0.49, 0.70)	0.53 (0.42, 0.67)	1.10 (0.83, 1.47)	0.50	1.05 (0.78, 1.42)	0.72
						Antibodies to 12-month vaccines measured 13 months of age						
							Vaginal delivery (n=91) GMC (95% CI)	Caesarean section (n=53) GMC (95% CI)	Unadjusted GMR (95% CI)	Two-sided p-value	Adjusted* GMR (95% CI)	Two-sided p-value
Measles ¹							3.03 (2.35, 3.92)	3.03 (2.42, 3.79)	1.00 (0.69, 1.45)	1.00	1.03 (0.69, 1.52)	0.90
Mumps ¹							64.97 (48.81, 86.49)	48.11 (34.69, 66.74)	1.35 (0.86, 2.11)	0.19	1.07 (0.72, 1.58)	0.75
Rubella ¹							57.83 (43.24, 77.33)	44.31 (30.18, 65.07)	1.36 (0.84, 2.30)	0.22	1.07 (0.71, 1.60)	0.75
MenC ²							18.66 (15.64, 22.27)	15.94 (12.96, 19.60)	1.17 (0.88, 1.55)	0.26	1.31 (0.99, 1.75)	0.06
Hib ²							15.55 (11.29, 21.41)	15.23 (9.77, 23.73)	1.02 (0.60, 1.74)	0.94	0.97 (0.56, 1.67)	0.90
Tetanus ¹							1.06 (0.82, 1.37)	0.89 (0.65, 1.22)	1.19 (0.79, 1.79)	0.41	1.20 (0.78, 1.85)	0.41

¹ IU/ml ² µg/ml ³ includes only participants who have not had Hib-MenC

BCG = Bacille Calmette-Guérin, CI = confidence interval, GMC = geometric mean antibody concentration, GMR = geometric mean antibody ratio, FHA = filamentous haemagglutinin, Hib = *H. influenzae* type b, MMR = measles-mumps-rubella, MenC = meningococcus C, Pn = pneumococcal serotype, PRN = pertactin, PT = pertussis toxin

*adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

**adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG and MMR vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

Supplementary data Table S2a Seroprotection rates at 7 and 13 months of age in infants who did or did not receive formula milk before discharge from birth hospital

Vaccine antigen	Protective correlate	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age				Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age			
		No formula milk (n=66) % (n); (95% CI)	Formula milk (n=25) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value	No formula milk (n=223) % (n); (95% CI)	Formula milk (n=84) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Diphtheria	0.1 IU/mL ¹	95.5 (63); (87.3, 99.1)	100 (25); (86.3, 100)	2.3 (-12.5, 9.1)	0.60	97.8 (218); (94.8, 99.3)	100 (84); (95.7, 100)	-2.24 (-5.2, 2.1)	0.68
Tetanus	0.1 IU/mL ¹	100 (66); (94.6, 100)	100 (25); (86.3, 100)	0 (-5.6, 13.4)	-	100 (114); (96.8, 100) ²	100 (49); (92.7, 100) ²	0 (-3.3, 7.3) ²	-
PT	25 IU/mL	87.9 (58); (77.5, 94.6)	96.0 (24); (79.6, 99.9)	-8.1 (-19.2, 8.4)	1	28.7 (64); (22.9, 35.1)	33.3 (28); (23.4, 44.5)	-4.6 (-16.7, 6.5)	0.62
Hib	0.15 µg/mL	74.2 (49); (62.0, 84.2)	80.0 (20); (59.3, 93.2)	-5.8 (-22.2, 15.7)	0.05	76.3 (87); (67.4, 83.8) ²	77.6 (38); (63.4, 88.2) ²	-1.2 (14.2, 14.0) ²	0.36 ²
Polio type 1	0.23 IU/mL	100 (66); (94.6, 100)	100 (25); (86.3, 100)	0 (-5.6, 13.4)	-	100 (223); (98.4, 100)	100 (84); (95.7, 100)	0 (-1.7, 4.3)	-
Polio type 2	0.29 IU/mL	100 (66); (94.6, 100)	100 (25); (86.3, 100)	0 (-5.6, 13.4)	-	100 (223); (98.4, 100)	100 (84); (95.7, 100)	-0.4 (-2.5, 3.9)	0.49
Polio type 3	0.12 IU/mL	100 (66); (94.6, 100)	100 (25); (86.3, 100)	0 (-5.4, 17.0)	-	100 (211); (98.3, 100)	100 (84); (95.7, 100)	0 (-1.7, 4.3)	-
Pn 1	0.35 µg/mL	95.5 (63); (87.3, 99.1)	100 (25); (86.3, 100)	-4.5 (-12.6, 9.1)	1	93.7 (209); (89.7, 96.6)	94.0 (79); (86.7, 98.0)	-0.3 (-5.7, 7.3)	0.35
Pn 3	0.35 µg/mL	98.4 (65); (91.2, 100)	100 (25); (86.3, 100)	-1.5 (-0.9, 12.0)	1	68.6 (153); (62.1, 74.6)	72.6 (61); (61.8, 81.8)	-4.0 (-14.7, 7.9)	0.90
Pn 4	0.35 µg/mL	74.2 (49); (62.0, 84.2)	56.0 (14); (34.9, 76.6)	18.2 (-2.9, 39.9)	0.65	22.9 (51); (17.5, 28.9)	22.6 (19); (14.2, 33.0)	0.3 (-11.0, 10.0)	0.68
Pn 5	0.35 µg/mL	98.5 (65); (91.8, 100)	96.0 (24); (79.6, 99.9)	2.5 (-4.9, 18.3)	0.50	86.5 (193); (81.4, 90.7)	88.1 (74); (79.2, 94.1)	-1.5 (-9.0, 7.9)	0.24
Pn 6A	0.35 µg/mL	96.7 (64); (89.5, 99.6)	100 (25); (86.3, 100)	-3.3 (-10.5, 10.5)	1	86.1 (192); (80.9, 90.4)	88.1 (74); (79.2, 94.1)	-2.0 (-9.5, 7.5)	0.51
Pn 6B	0.35 µg/mL	87.9 (58); (77.5, 94.6)	92.0 (23); (74.0, 99.0)	-4.1 (-16.25, 14.0)	0.10	65.0 (145); (58.4, 71.3)	61.9 (52); (50.7, 72.3)	3.1 (-8.6, 15.4)	0.12
Pn 7F	0.35 µg/mL	100 (66); (94.6, 100)	100 (25); (86.3, 100)	0 (-5.6, 13.4)	-	100 (223); (98.4, 100)	97.6 (82); (91.7, 99.7)	2.4 (-0.7, 8.3)	1
Pn 9V	0.35 µg/mL	96.7 (64); (89.5, 99.6)	100 (25); (86.3, 100)	-3.0 (-10.5, 10.5)	1	77.1 (172); (71.1, 82.5)	72.6 (61); (61.8, 81.8)	4.5 (-5.9, 16.1)	0.18
Pn 14	0.35 µg/mL	90.9 (60); (81.3, 96.6)	92.0 (23); (73.4, 99.0)	-1.1 (-12.5, 16.8)	1	85.2 (190); (79.9, 89.6)	89.3 (75); (80.6, 95.0)	-4.1 (-11.5, 5.2)	0.51
Pn 18C	0.35 µg/mL	95.5 (63); (87.3, 99.1)	96.0 (24); (79.6, 99.9)	-5.5 (-9.5, 15.5)	1	77.1 (172); (71.1, 82.5)	76.2 (64); (65.7, 84.8)	0.9 (-9.0, 12.3)	0.50
Pn 19A	0.35 µg/mL	92.4 (61); (83.2, 97.5)	96.0 (24); (79.6, 99.9)	-3.6 (-18, 8.5)	1	50.7 (113); (43.9, 57.4)	47.6 (40); (36.6, 58.8)	3.1 (-9.4, 15.4)	0.42
Pn 19F	0.35 µg/mL	100 (66); (94.6, 100)	100 (25); (86.3, 100)	0 (-5.4, 17.0)	-	99.1 (221); (96.8, 99.9)	100 (84); (95.7, 100)	-0.9 (-3.2, 3.5)	0.50
Pn 23F	0.35 µg/mL	92.4 (61); (83.2, 97.5)	96.0 (24); (79.6, 99.9)	-3.6 (-13.6, 12.6)	0.68	63.2 (141); (56.6, 69.6)	56.0 (47); (44.7, 66.8)	7.3 (-4.8, 19.6)	0.64
						Antibodies to 12-month vaccines measured 13 months of age			
						No formula milk (n=107) % (n); (95% CI)	Formula milk (n=37) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Measles	0.12 IU/mL					98.1 (105); (93.4, 99.8)	97.3 (36); (85.8, 99.9)	0.8 (-4.4, 12.1)	0.12
Mumps	45 IU/mL					61.7 (66); (51.8, 70.1)	56.8 (21); (39.5, 72.9)	4.9 (-7.1, 27.9)	0.74
Rubella	10 IU/mL					86.9 (93); (79.0, 92.7)	86.5 (32); (71.2, 95.5)	0.4 (-10.7, 15.9)	0.09
MenC	2 µg/mL					99.1 (106); (94.9, 100)	100 (37); (90.5, 100)	-0.9 (-5.1, 8.6)	0.49
Hib	0.15 µg/mL					99.1 (106); (94.9, 100)	97.3 (36); (85.8, 99.9)	1.8 (-2.9, 13.0)	1
Tetanus	0.01 IU/mL					100 (107); (96.6, 100)	100 (37); (90.1, 100)	0 (-3.4, 9.5)	

¹ 0.01 IU/mL at 13 months of age ² includes only participants who have not had Hib-MenC

CI = confidence interval, Hib = *H. influenzae* type b, MenC = meningococcus C, Pn = pneumococcal serotype, PT = pertussis toxin

Supplementary data Table S2b GMCs and GMRs at 7 and 13 months of age in infants who did or did not receive formula milk before discharge from hospital

	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age						Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age					
Vaccine antigen	No formula milk (n=66) GMC (95% CI)	Formula milk (n=25) GMC (95% CI)	Unadjusted GMR (95% CI)	Two-sided p-value	Adjusted* GMR (95% CI)	Two-sided p-value	No formula milk (n=223) GMC (95% CI)	Formula milk (n=84) GMC (95% CI)	Unadjusted GMR (95% CI)	Two-sided p-value	Adjusted** GMR (95% CI)	Two-sided p-value
Diphtheria ¹	0.39 (0.32, 0.47)	0.42 (0.31, 0.56)	0.93 (0.65, 1.34)	0.71	1.12 (0.79, 1.60)	0.52	0.07 (0.06, 0.08)	0.10 (0.08, 0.12)	0.73 (0.56, 0.94)	0.01	0.82 (0.64, 1.04)	0.10
Tetanus ¹	1.09 (0.91, 1.29)	1.17 (0.89, 1.53)	0.93 (0.67, 1.28)	0.64	0.84 (0.60, 1.17)	0.30	0.45 (0.37, 0.55) ³	0.42 (0.29, 0.60) ³	1.07 (0.72, 1.57) ³	0.74 ³	0.93 (0.63, 1.35) ³	0.69 ³
PT ¹	64.16 (52.67, 78.15)	88.47 (64.69, 121.00)	0.73 (0.50, 1.05)	0.09	0.84 (0.58, 1.21)	0.34	16.89 (14.77, 19.33)	18.78 (15.10, 23.36)	0.90 (0.70, 1.16)	0.42	1.00 (0.79, 1.28)	0.98
FHA ¹	56.82 (47.28, 68.28)	86.30 (58.45, 127.42)	0.66 (0.45, 0.96)	0.03	0.73 (0.49, 1.06)	0.10	17.86 (15.81, 20.19)	21.90 (17.51, 27.38)	0.82 (0.64, 1.04)	0.10	0.91 (0.72, 1.15)	0.42
PRN ¹	56.69 (44.42, 72.34)	71.79 (50.14, 102.77)	0.79 (0.50, 1.24)	0.30	0.82 (0.50, 1.33)	0.41	11.38 (9.71, 13.34)	13.61 (8.67, 15.21)	0.84 (0.62, 1.13)	0.25	0.82 (0.61, 1.11)	0.20
Hib ²	0.51 (0.35, 0.75)	0.51 (0.26, 1.00)	1.01 (0.49, 2.11)	0.97	1.05 (0.50, 2.21)	0.90	1.19 (0.78, 1.82) ³	0.98 (0.50, 1.91) ³	1.22 (0.56, 2.65) ³	0.61 ³	1.01 (0.55, 1.88)	0.96 ³
Polio type 1 ¹	34.37 (26.42, 44.71)	35.37 (23.37, 53.20)	0.97 (0.60, 1.59)	0.92	1.05 (0.62, 1.80)	0.85	11.38 (9.74, 13.29)	10.70 (8.63, 13.27)	1.06 (0.80, 1.41)	0.67	1.24 (0.93, 1.65)	0.14
Polio type 2 ¹	67.95 (52.79, 87.48)	51.54 (32.19, 82.52)	1.32 (0.80, 2.16)	0.27	1.43 (0.85, 2.41)	0.18	22.11 (18.68, 26.17)	20.30 (15.46, 26.66)	1.09 (0.79, 1.50)	0.60	1.23 (0.89, 1.70)	0.21
Polio type 3 ¹	23.51 (18.00, 30.71)	16.80 (10.36, 27.24)	1.40 (0.83, 2.35)	0.20	1.40 (0.79, 2.46)	0.24	9.16 (7.67, 10.94)	8.23 (6.33, 10.69)	1.11 (0.80, 1.55)	0.52	1.28 (0.92, 1.78)	0.14
Pn 1 ²	4.33 (3.36, 5.58)	4.47 (2.95, 6.77)	0.97 (0.60, 1.56)	0.90	1.20 (0.75, 1.92)	0.45	1.18 (1.05, 1.33)	1.14 (0.69, 1.35)	1.03 (0.83, 1.29)	0.76	1.03 (0.82, 1.28)	0.80
Pn 3 ²	1.40 (1.20, 1.64)	1.54 (1.11, 2.12)	0.91 (0.66, 1.25)	0.56	0.97 (0.69, 1.36)	0.85	0.52 (0.47, 0.58)	0.58 (0.48, 0.69)	0.91 (0.74, 1.12)	0.37	0.89 (0.72, 1.09)	0.25
Pn 4 ²	0.53 (0.43, 0.66)	0.47 (0.34, 0.65)	1.14 (0.77, 1.69)	0.51	1.22 (0.82, 1.82)	0.33	0.22 (0.20, 0.24)	0.21 (0.18, 0.24)	1.03 (0.87, 1.22)	0.72	1.01 (0.85, 1.20)	0.89
Pn 5 ²	3.01 (2.42, 3.74)	3.59 (2.39, 5.39)	0.84 (0.55, 1.29)	0.42	1.01 (0.65, 1.56)	0.97	0.90 (0.80, 1.02)	0.97 (0.79, 1.18)	0.93 (0.74, 1.18)	0.57	0.97 (0.77, 1.22)	0.79
Pn 6A ²	4.81 (3.90, 5.94)	4.81 (3.32, 6.98)	1.00 (0.67, 1.50)	1.00	1.24 (0.84, 1.85)	0.28	1.00 (0.87, 1.15)	1.00 (0.83, 1.23)	1.00 (0.78, 1.29)	1.00	1.06 (0.83, 1.36)	0.62
Pn 6B ²	1.99 (1.37, 2.89)	1.73 (0.93, 3.22)	1.15 (0.57, 2.33)	0.70	1.62 (0.78, 3.38)	0.19	0.54 (0.46, 0.63)	0.47 (0.38, 0.58)	1.14 (0.85, 1.54)	0.37	1.25 (0.93, 1.63)	0.14
Pn 7F ²	6.39 (5.34, 7.66)	5.49 (3.82, 7.88)	1.16 (0.81, 1.67)	0.40	1.44 (1.02, 2.05)	0.04	1.89 (1.71, 2.09)	1.84 (1.55, 2.19)	1.03 (0.84, 1.25)	0.80	1.06 (0.87, 1.29)	0.56
Pn 9V ²	2.42 (1.97, 2.97)	2.57 (1.80, 3.67)	0.94 (0.63, 1.39)	0.75	1.19 (0.81, 1.74)	0.38	0.58 (0.52, 0.66)	0.64 (0.53, 0.77)	0.91 (0.74, 1.14)	0.44	0.94 (0.76, 1.17)	0.59
Pn 14 ²	2.68 (1.97, 3.63)	2.65 (1.55, 4.53)	1.01 (0.56, 1.82)	0.97	1.14 (0.61, 2.14)	0.68	0.98 (0.85, 1.13)	1.24 (1.03, 1.49)	0.80 (0.62, 1.03)	0.08	0.83 (0.64, 1.08)	0.17
Pn 18C ²	2.98 (2.35, 3.77)	2.84 (1.97, 4.10)	1.05 (0.67, 1.63)	0.84	1.19 (0.75, 1.90)	0.46	0.65 (0.58, 0.72)	0.66 (0.55, 0.79)	0.98 (0.80, 1.21)	0.87	1.03 (0.83, 1.27)	0.82
Pn 19A ²	1.70 (1.37, 2.11)	1.77 (1.12, 2.80)	0.96 (0.62, 1.50)	0.86	1.15 (0.72, 1.84)	0.54	0.48 (0.40, 0.57)	0.43 (0.33, 0.56)	1.10 (0.79, 1.53)	0.58	0.99 (0.71, 1.38)	0.94
Pn 19F ²	11.35 (9.15, 14.08)	12.03 (8.21, 17.62)	0.94 (0.62, 1.43)	0.78	1.18 (0.77, 1.79)	0.44	3.23 (2.78, 3.75)	2.80 (2.31, 3.40)	1.15 (0.88, 1.51)	0.30	1.17 (0.89, 1.54)	0.26
Pn 23F ²	2.24 (1.67, 2.99)	2.63 (1.73, 3.98)	0.85 (0.50, 1.45)	0.55	1.02 (0.59, 1.75)	0.95	0.58 (0.49, 0.68)	0.54 (0.41, 0.70)	1.07 (0.78, 1.46)	0.67	1.06 (0.77, 1.45)	0.72
						Antibodies to 12-month vaccines measured 13 months of age						
							No formula milk (n=107) GMC (95% CI)	Formula milk (n=37) GMC (95% CI)	Unadjusted GMR (95% CI)	Two-sided p-value	Adjusted* GMR (95% CI)	Two-sided p-value
Measles ¹							3.02 (2.43, 3.75)	3.08 (2.23, 4.25)	0.98 (0.65, 1.48)	0.92	0.93 (0.61, 1.43)	0.74
Mumps ¹							61.11 (47.59, 78.46)	50.46 (32.25, 78.95)	1.21 (0.74, 1.99)	0.45	1.02 (0.66, 1.57)	0.94
Rubella ¹							51.32 (40.06, 65.74)	55.79 (31.87, 97.67)	0.92 (0.54, 1.56)	0.76	0.84 (0.54, 1.30)	0.43
MenC ²							17.81 (15.05, 21.08)	17.04 (13.93, 20.83)	1.05 (0.77, 1.42)	0.78	1.12 (0.82, 1.54)	0.47
Hib ²							17.20 (12.92, 22.90)	11.27 (6.36, 19.95)	1.53 (0.85, 2.74)	0.16	1.36 (0.75, 2.45)	0.31
Tetanus ¹							1.02 (0.81, 1.28)	0.92 (0.63, 1.36)	1.10 (0.70, 1.73)	0.67	1.09 (0.68, 1.76)	0.71

¹IU/ml ²µg/ml ³ includes only participants who have not had Hib-MenC

BCG = Bacille Calmette-Guérin, CI = confidence interval, GMC = geometric mean antibody concentration, GMR = geometric mean antibody ratio, FHA = filamentous haemagglutinin, Hib = *H. influenzae* type b, MMR = measles-mumps-rubella, MenC = meningococcus C, Pn = pneumococcal serotype, PRN = pertactin, PT = pertussis toxin

*adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

**adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG and MMR vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

Supplementary data Table S3a Seroprotection rates at 7 and 13 months of age in infants who were or were not still receiving breast milk at the age of 1 month

Vaccine antigen	Protective correlate	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age				Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age			
		Breast-fed (n=80) % (n); (95% CI)	Not breast-fed (n=11) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value	Breast-fed (n=251) % (n); (95% CI)	Not breast-fed (n=56) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Diphtheria	0.1 IU/mL ¹	96.3 (77); (89.4, 99.2)	100 (11); (71.5, 100)	-3.8 (-10.5, 22.5)	0.60	98.4 (247); (96.0, 99.6)	98.2 (55); (90.4, 100)	0.2 (-2.7, 7.9)	0.68
Tetanus	0.1 IU/mL ¹	100 (80); (95.5, 100)	100 (11); (71.5, 100)	0 (-4.6, 26.1)	-	100 (132); (97.2, 100) ²	100 (31); (88.8, 100) ²	0 (-2.8, 11.1) ²	-
PT	25 IU/mL	88.8 (71); (79.7, 94.7)	100 (11); (71.5, 100)	-11.3 (-20.1, 15.3)	1	30.7 (77); (25.0, 36.8)	26.8 (15); (15.8, 40.3)	3.9 (-10.0, 15.6)	0.62
Hib	0.15 µg/mL	72.3 (58); (61.4, 81.9)	100 (11); (71.5, 100)	-27.5 (-38.2, 0.5)	0.05	79.5 (105); (71.7, 86.0) ²	64.5 (20); (45.4, 80.8) ²	15 (-1.4, 33.9) ²	0.36 ²
Polio type 1	0.23 IU/mL	100 (80); (95.5, 100)	100 (11); (71.5, 100)	0 (-4.6, 26.1)	-	100 (251); (98.5, 100)	100 (56); (93.6, 100)	0 (-1.5, 6.4)	-
Polio type 2	0.29 IU/mL	100 (80); (95.5, 100)	100 (11); (71.5, 100)	0 (-4.6, 26.1)	-	99.6 (250); (97.4, 100)	100 (56); (93.6, 100)	-0.4 (-2.2, 5.0)	0.49
Polio type 3	0.12 IU/mL	100 (80); (95.5, 100)	100 (11); (71.5, 100)	0 (-4.6, 26.1)	-	100 (251); (98.5, 100)	100 (56); (93.6, 100)	0 (-1.5, 6.4)	-
Pn 1	0.35 µg/mL	96.3 (77); (89.4, 99.2)	100 (11); (71.5, 100)	-3.8 (-10.5, 22.5)	1	93.2 (234); (89.4, 96.0)	96.4 (54); (87.7, 99.6)	-3.2 (-8.0, 5.6)	0.35
Pn 3	0.35 µg/mL	98.8 (79); (93.2, 100)	100 (11); (71.5, 100)	-1.3 (-6.8, 24.9)	1	67.3 (169); (61.1, 73.1)	80.4 (45); (67.6, 89.8)	-13.0 (-23.5, 0.3)	0.90
Pn 4	0.35 µg/mL	70.0 (56); (38.8, 79.7)	63.6 (7); (30.8, 89.1)	6.4 (-18.0, 36.6)	0.65	22.7 (57); (17.7, 28.4)	23.2 (13); (13.0, 36.4)	-0.5 (-14.0, 10.3)	0.68
Pn 5	0.35 µg/mL	98.8 (79); (93.2, 100)	90.9 (10); (74.0, 99.9)	-7.8 (-0.8, 36.7)	0.50	86.5 (217); (81.6, 90.4)	89.3 (50); (78.1, 96.0)	-2.8 (-10.4, 8.5)	0.24
Pn 6A	0.35 µg/mL	97.5 (78); (89.8, 99.6)	100 (11); (71.5, 100)	-2.5 (-8.7, 23.7)	1	85.7 (215); (80.7, 89.7)	91.1 (51); (81.0, 95.4)	-5.4 (-12.6, 5.5)	0.51
Pn 6B	0.35 µg/mL	87.5 (70); (78.2, 93.8)	100 (11); (71.5, 100)	-12.5 (-21.6, 14.1)	0.10	64.1 (161); (57.9, 70.1)	64.3 (36); (50.4, 76.7)	-0.1 (-13.1, 14.2)	0.12
Pn 7F	0.35 µg/mL	100 (80); (95.5, 100)	100 (11); (71.5, 100)	0 (-4.6, 26.1)	-	99.2 (249); (97.2, 99.9)	100 (56); (93.6, 100)	-0.8 (-28.6, 5.7)	1
Pn 9V	0.35 µg/mL	97.5 (78); (91.3, 99.7)	100 (11); (71.5, 100)	-2.5 (-8.7, 23.7)	1	76.9 (193); (79.8, 89.8)	71.4 (40); (57.8, 82.7)	5.5 (6.2, 19.3)	0.18
Pn 14	0.35 µg/mL	91.3 (73); (82.8, 96.4)	90.9 (10); (58.7, 99.8)	0.3 (-11.3, 29.7)	1	85.3 (214); (80.3, 89.4)	91.1 (51); (80.4, 97.0)	-5.8 (-13.1, 5.2)	0.51
Pn 18C	0.35 µg/mL	95.0 (76); (87.7, 98.6)	100 (11); (71.5, 100)	-5.0 (-12.2, 21.3)	1	76.9 (193); (71.2, 81.2)	76.8 (43); (63.4, 87)	0.1 (-10.7, 13.6)	0.50
Pn 19A	0.35 µg/mL	92.5 (74); (84.4, 97.2)	100 (11); (71.5, 100)	-7.5 (-15.5, 18.0)	1	48.2 (121); (41.9, 54.6)	57.1 (32); (43.2, 70.3)	-8.9 (-22.6, 5.5)	0.42
Pn 19F	0.35 µg/mL	100 (80); (95.5, 100)	100 (11); (71.5, 100)	0 (-4.6, 26.1)	-	99.2 (249); (97.2, 99.9)	100 (56); (93.6, 100)	-0.8 (-2.9, 5.7)	0.50
Pn 23F	0.35 µg/mL	92.5 (74); (84.4, 97.2)	100 (11); (71.5, 100)	-7.5 (-15.5, 18.0)	0.68	62.2 (156); (55.8, 68.2)	57.1 (32); (43.2, 70.3)	5.0 (-8.7, 19.3)	0.64
						Antibodies to 12-month vaccines measured 13 months of age			
						Breast-fed (n=119) % (n); (95% CI)	Not breast-fed (n=25) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Measles	0.12 IU/mL					97.5 (116); (92.8, 99.5)	100 (25); (86.3, 100)	-2.5 (-7.2, 10.9)	0.12
Mumps	45 IU/mL					61.3 (73); (52.0, 70.1)	56.0 (14); (34.9, 75.6)	5.3 (-14.5, 26.3)	0.74
Rubella	10 IU/mL					86.6 (103); (79.1, 92.1)	88.0 (22); (68.8, 97.5)	-1.45 (-12.5, 17.3)	0.09
MenC	2 µg/mL					99.2 (118); (95.4, 100)	100 (25); (86.3, 100)	-0.8 (-4.6, 24.6)	0.49
Hib	0.15 µg/mL					99.2 (118); (95.4, 100)	96 (24); (79.6, 99.9)	3.2 (-1.6, 18.8)	1
Tetanus	0.01 IU/mL					100 (119); (96.9, 100)	100 (25); (86.3, 100)	0 (-3.1, 13.4)	-

¹ 0.01 IU/mL at 13 months of age ² includes only participants who have not had Hib-MenC

CI = confidence interval, Hib = *H. influenzae* type b, MenC = meningococcus C, Pn = pneumococcal serotype, PT = pertussis toxin

Supplementary data Table S3b GMCs and GMRs at 7 and 13 months of age in infants who were or were not still receiving breast milk at the age of 1 month

	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age						Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age					
Vaccine antigen	Breast-fed (n=80) GMC (95% CI)	Not breast-fed (n=11) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value	Breast-fed (n=251) GMC (95% CI)	Not breast-fed (n=56) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted** GMR (95% CI)	Two- sided p- value
Diphtheria ¹	0.38 (0.32, 0.45)	0.53 (0.22, 0.83)	0.73 (0.44, 1.19)	0.20	0.82 (0.52, 1.30)	0.39	0.07 (0.07, 0.08)	0.09 (0.07, 0.13)	0.79 (0.59, 1.06)	0.11	0.8 (0.63, 1.08)	0.17
Tetanus ¹	1.09 (0.94, 1.27)	1.26 (0.74, 2.12)	0.84 (0.58, 1.20)	0.53	0.98 (0.63, 1.52)	0.92	0.44 (0.36, 0.53) ³	0.45 (0.28, 0.72) ³	1.03 (0.66, 1.62) ³	0.89 ³	1.04 (0.68, 1.59) ³	0.86 ³
PT ¹	68.91 (57.34, 82.82)	79.23 (53.47, 117.39)	0.87 (0.54, 1.41)	0.57	0.95 (0.72, 1.25)	0.57	17.48 (15.37, 19.98)	16.97 (13.26, 21.72)	1.03 (0.77, 1.38)	0.84	1.05 (0.80, 1.38)	0.72
FHA ¹	61.37 (51.13, 73.66)	83.90 (48.37, 145.52)	0.72 (0.44, 1.18)	0.19	1.11 (0.85, 1.44)	0.46	18.39 (16.32, 20.72)	21.29 (16.49, 27.50)	0.86 (0.65, 1.14)	0.30	0.90 (0.69, 1.18)	0.46
PRN ¹	62.25 (49.98, 77.54)	49.07 (29.60, 81.36)	1.24 (0.53, 1.21)	0.50	0.89 (0.63, 1.24)	0.48	12.11 (10.44, 14.05)	11.27 (8.00, 15.87)	1.07 (0.76, 1.53)	0.69	1.13 (0.81, 1.58)	0.48
Hib ²	0.46 (0.33, 0.65)	1.10 (0.39, 3.16)	0.55 (0.21, 1.43)	0.21	0.54 (0.27, 1.07)	0.08	1.19 (0.81, 1.76) ³	0.86 (0.35, 2.16) ³	0.72 (0.29, 1.78) ³	0.48 ³	1.85 (0.94, 3.64)	0.08 ³
Polio type 1 ¹	33.78 (26.54, 43.00)	41.30 (25.68, 66.42)	0.79 (0.40, 1.59)	0.51	0.84 (0.61, 1.17)	0.30	11.43 (9.89, 13.22)	10.14 (7.89, 13.03)	1.13 (0.81, 1.57)	0.47	1.18 (0.86, 1.64)	0.30
Polio type 2 ¹	63.97 (50.47, 81.10)	56.22 (27.54, 114.78)	1.10 (0.56, 1.79)	0.78	0.75 (0.52, 1.08)	0.12	22.55 (19.27, 26.40)	17.81 (12.65, 25.08)	1.27 (0.88, 1.83)	0.21	1.33 (0.93, 1.91)	0.12
Polio type 3 ¹	21.63 (16.88, 27.71)	20.09 (9.18, 43.97)	1.00 (0.48, 2.02)	0.99	1.12 (0.87, 1.44)	0.37	9.05 (7.69, 10.64)	8.24 (5.78, 11.74)	1.10 (0.75, 1.61)	0.63	1.11 (0.77, 1.61)	0.58
Pn 1 ²	4.20 (3.32, 5.31)	5.80 (3.55, 9.45)	0.92 (0.50, 1.70)	0.79	1.13 (0.90, 1.42)	0.31	1.14 (1.03, 1.27)	1.29 (1.00, 1.67)	0.88 (0.69, 1.14)	0.33	0.89 (0.70, 1.15)	0.37
Pn 3 ²	1.37 (1.17, 1.59)	2.07 (1.63, 2.63)	0.71 (0.46, 1.09)	0.12	1.09 (0.90, 1.33)	0.36	0.52 (0.47, 0.58)	0.61 (0.50, 0.75)	0.85 (0.68, 1.08)	0.19	0.89 (0.71, 1.12)	0.31
Pn 4 ²	0.50 (0.42, 0.61)	0.61 (0.35, 1.06)	0.97 (0.57, 1.64)	0.90	0.98 (0.75, 1.27)	0.86	0.21 (0.19, 0.23)	0.23 (0.19, 0.28)	0.92 (0.75, 1.11)	0.36	0.91 (0.75, 1.11)	0.36
Pn 5 ²	3.09 (2.52, 3.79)	3.69 (1.96, 6.98)	1.05 (0.59, 1.85)	0.88	0.96 (0.69, 1.34)	0.82	0.92 (0.82, 1.03)	0.92 (0.70, 1.21)	1.00 (0.76, 1.31)	1.00	1.02 (0.79, 1.33)	0.86
Pn 6A ²	4.67 (3.83, 5.69)	6.02 (4.13, 8.76)	0.93 (0.55, 1.55)	0.77	1.24 (0.80, 1.93)	0.33	1.00 (0.89, 1.14)	0.99 (0.75, 1.30)	1.01 (0.76, 1.36)	0.93	1.04 (0.79, 1.37)	0.76
Pn 6B ²	1.79 (1.27, 2.52)	3.16 (1.47, 6.80)	0.72 (0.28, 1.86)	0.49	1.32 (0.58, 2.97)	0.50	0.51 (0.44, 0.59)	0.53 (0.39, 0.72)	0.98 (0.70, 1.37)	0.89	1.04 (0.75, 1.45)	0.82
Pn 7F ²	6.02 (5.06, 7.19)	6.89 (4.29, 11.06)	1.01 (0.63, 1.61)	0.98	1.30 (0.88, 1.93)	0.19	1.85 (1.68, 2.03)	2.02 (1.61, 2.55)	0.91 (0.73, 1.14)	0.42	0.92 (0.74, 1.15)	0.48
Pn 9V ²	2.41 (1.99, 2.91)	2.84 (1.68, 4.81)	1.08 (0.66, 1.78)	0.75	1.29 (0.78, 1.81)	0.42	0.59 (0.53, 0.66)	0.63 (0.48, 0.82)	0.95 (0.73, 1.22)	0.66	0.97 (0.76, 1.24)	0.81
Pn 14 ²	2.76 (2.08, 3.67)	2.07 (1.02, 4.17)	1.47 (0.65, 3.31)	0.35	1.84 (0.92, 3.68)	0.09	1.01 (0.89, 1.15)	1.21 (0.92, 1.58)	0.84 (0.62, 1.13)	0.25	0.83 (0.62, 1.12)	0.23
Pn 18C ²	2.88 (2.32, 3.58)	3.41 (2.18, 5.32)	0.95 (0.52, 1.75)	0.88	1.15 (0.68, 1.94)	0.59	0.65 (0.59, 0.72)	0.66 (0.52, 0.84)	0.98 (0.77, 1.25)	0.88	1.00 (0.79, 1.26)	0.98
Pn 19A ²	1.66 (1.35, 2.05)	2.20 (1.12, 4.32)	0.84 (0.46, 1.53)	0.56	1.04 (0.63, 1.73)	0.87	0.44 (0.38, 0.52)	0.56 (0.39, 0.80)	0.79 (0.54, 1.16)	0.24	0.82 (0.56, 1.19)	0.30
Pn 19F ²	11.10 (9.08, 13.58)	15.15 (9.41, 24.41)	0.85 (0.50, 1.47)	0.57	1.15 (0.72, 1.84)	0.56	2.96 (2.89, 5.07)	3.83 (2.89, 5.07)	0.77 (0.57, 1.06)	0.10	0.78 (0.57, 1.06)	0.11
Pn 23F ²	2.21 (1.71, 2.86)	3.46 (1.82, 6.58)	0.80 (0.40, 1.03)	0.52	1.35 (0.76, 2.40)	0.31	0.55 (0.48, 0.64)	0.62 (0.43, 0.90)	0.89 (0.62, 1.28)	0.53	0.92 (0.64, 1.32)	0.65
						Antibodies to 12-month vaccines measured 13 months of age						
							Breast-fed (n=119) GMC (95% CI)	Not breast-fed (n=25) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value
Measles ¹							2.93 (2.38, 3.62)	3.55 (2.64, 4.78)	0.83 (0.51, 1.33)	0.43	0.91 (0.56, 1.49)	0.71
Mumps ¹							59.29 (46.88, 74.98)	53.14 (29.56, 95.51)	1.12 (0.63, 1.98)	0.71	1.17 (0.72, 1.92)	0.52
Rubella ¹							48.60 (38.06, 62.07)	75.22 (39.04, 144.93)	0.64 (0.35, 1.19)	0.16	0.66 (0.40, 1.08)	0.10
MenC ²							18.24 (15.67, 21.23)	14.89 (11.17, 19.85)	1.22 (0.86, 1.75)	0.26	1.29 (0.90, 1.85)	0.16
Hib ²							17.41 (13.49, 22.48)	8.67 (3.68, 20.45)	2.01 (1.03, 3.92)	0.04	1.85 (0.95, 3.62)	0.07
Tetanus ¹							1.03 (0.83, 1.28)	0.83 (0.51, 1.38)	0.81 (0.48, 1.36)	0.43	1.26 (0.74, 2.16)	0.39

¹ IU/ml ² µg/ml ³ includes only participants who have not had Hib-MenC

BCG = Bacille Calmette-Guérin, CI = confidence interval, GMC = geometric mean antibody concentration, GMR = geometric mean antibody ratio, FHA = filamentous haemagglutinin, Hib = *H. influenzae* type b, MMR = measles-mumps-rubella, MenC = meningococcus C, Pn = pneumococcal serotype, PRN = pertactin, PT = pertussis toxin

*adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

**adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG and MMR vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

Supplementary data Table S4a Seroprotection rates at 7 and 13 months of age in infants who were or were not still receiving breast milk at the age of 6 months

Vaccine antigen	Protective correlate	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age				Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age			
		Breast-fed (n=71) % (n); (95% CI)	Not breast-fed (n=20) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value	Breast-fed (n=219) % (n); (95% CI)	Not breast-fed (n=88) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Diphtheria	0.1 IU/mL ¹	95.8 (68); (88.1, 99.1)	100 (20); (83.2, 100)	-4.2 (-11.8, 12.2)	0.60	98.2 (215); (95.4, 99.5)	98.9 (87); (93.8, 100)	-0.7 (-3.7, 4.4)	0.68
Tetanus	0.1 IU/mL ¹	100 (71); (94.9, 100)	100 (20); (83.2, 100)	0 (-5.2, 16.3)	-	100 (112); (96.8, 100) ²	100 (51); (93.0, 100) ²	0 (-3.3, 7.0) ²	-
PT	25 IU/mL	88.7 (63); (79.0, 95.0)	95.0 (19); (75.1, 99.9)	-6.3 (-17.1, 13.2)	1	32.4 (71); (26.3, 39.1)	23.9 (21); (15.4, 34.1)	8.6 (-2.9, 18.8)	0.62
Hib	0.15 µg/mL	76.1 (54); (64.5, 85.4)	75.0 (15); (50.9, 91.3)	1.1 (-17.2, 24.9)	0.05	76.8 (86); (62.9, 84.2) ²	76.5 (39); (62.5, 87.2) ²	0.3 (12.8, 15.4) ²	0.36 ²
Polio type 1	0.23 IU/mL	100 (71); (94.9, 100)	100 (20); (83.2, 100)	0 (-5.2, 16.3)	-	100 (219); (98.3, 100)	100 (88); (95.6, 100)	0 (-1.8, 4.4)	-
Polio type 2	0.29 IU/mL	100 (71); (94.9, 100)	100 (20); (83.2, 100)	0 (-5.2, 16.3)	-	99.5 (218); (97.5, 100)	100 (88); (95.6, 100)	-0.5 (-2.5, 3.7)	0.49
Polio type 3	0.12 IU/mL	100 (71); (94.9, 100)	100 (20); (83.2, 100)	0 (-5.2, 16.3)	-	100 (219); (98.3, 100)	100 (88); (95.6, 100)	0 (-1.8, 4.4)	-
Pn 1	0.35 µg/mL	95.8 (68); (88.1, 99.1)	100 (20); (83.2, 100)	-4.2 (-11.8, 12.2)	1	94.1 (206); (90.1, 96.8)	93.2 (82); (85.7, 97.5)	0.9 (-4.5, 8.6)	0.35
Pn 3	0.35 µg/mL	98.6 (70); (92.4, 100)	100 (20); (83.2, 100)	-1.4 (-7.6, 14.9)	1	67.6 (148); (60.9, 73.7)	75.0 (66); (64.6, 83.6)	-7.4 (-17.8, 4.2)	0.90
Pn 4	0.35 µg/mL	73.2 (52); (61.4, 83.1)	55.0 (11); (31.5, 76.9)	18.2 (-4.3, 41.5)	0.65	23.3 (51); (17.9, 29.5)	21.6 (19); (13.5, 31.6)	1.7 (-9.2, 11.3)	0.68
Pn 5	0.35 µg/mL	98.6 (70); (92.4, 100)	100 (20); (83.2, 100)	3.6 (-3.6, 22.4)	0.50	86.8 (190); (81.5, 90.9)	87.5 (77); (78.7, 94.6)	-0.7 (-8.3, 8.6)	0.24
Pn 6A	0.35 µg/mL	97.2 (69); (90.2, 99.7)	100 (20); (83.2, 100)	-2.8 (-9.8, 13.6)	1	85.4 (187); (80.0, 89.8)	89.7 (79); (81.5, 95.2)	-4.4 (-11.7, 4.6)	0.51
Pn 6B	0.35 µg/mL	88.7 (63); (79.0, 95.0)	90.0 (18); (68.3, 98.8)	-1.3 (-13.7, 19.8)	0.1	63.5 (139); (56.7, 69.9)	65.9 (58); (55.0, 75.7)	-2.4 (-13.7, 9.7)	0.12
Pn 7F	0.35 µg/mL	100 (71); (94.9, 100)	100 (20); (83.2, 100)	0 (-5.2, 16.3)	-	100 (219); (98.3, 100)	97.7 (86); (92.0, 99.7)	2.3 (-0.5, 7.9)	1
Pn 9V	0.35 µg/mL	97.2 (69); (90.2, 99.7)	100 (20); (83.2, 100)	-2.8 (-9.8, 13.6)	1	78.1 (171); (72.0, 83.4)	70.5 (62); (59.8, 79.7)	7.6 (-2.8, 19.1)	0.18
Pn 14	0.35 µg/mL	91.5 (65); (82.5, 96.8)	90 (18); (68.3, 98.8)	1.5 (-10.2, 22.4)	1	85.3 (180); (79.8, 89.8)	88.3 (68); (79.0, 94.5)	-3 (-10.8, 7.0)	0.57
Pn 18C	0.35 µg/mL	94.4 (67); (86.2, 98.4)	100 (20); (83.2, 100)	-5.6 (-13.7, 10.8)	1	77.6 (170); (71.5, 83.0)	75.0 (66); (64.6, 83.6)	2.6 (-7.3, 13.8)	0.50
Pn 19A	0.35 µg/mL	91.5 (65); (82.5, 96.8)	100 (20); (83.2, 100)	-8.5 (-17.3, 8.1)	1	46.6 (102); (39.9, 53.4)	58.0 (51); (47.0, 68.4)	-11.4 (-23.3, 1.0)	0.42
Pn 19F	0.35 µg/mL	100 (71); (94.9, 100)	100 (20); (83.2, 100)	0 (-5.2, 16.3)	-	99.1 (217); (96.7, 99.9)	100 (88); (95.6, 100)	-0.9 (-3.3, 3.3)	0.50
Pn 23F	0.35 µg/mL	94.4 (67); (86.2, 98.4)	90.0 (18); (68.3, 98.8)	4.4 (-6.6, 25.0)	0.68	62.6 (137); (55.8, 69.0)	58.0 (51); (47.0, 68.4)	4.6 (-7.3, 16.8)	0.64
						Antibodies to 12-month vaccines measured 13 months of age			
						Breast-fed (n=107) % (n); (95% CI)	Not breast-fed (n=37) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Measles	0.12 IU/mL					98.1 (105); (93.4, 99.8)	97.3 (36); (85.8, 99.9)	0.8 (-4.4, 12.1)	0.11
Mumps	45 IU/mL					60.7 (65); (50.8, 70.0)	59.5 (22); (42.1, 75.2)	1.3 (-16.1, 19.8)	0.74
Rubella	10 IU/mL					85.0 (91); (76.9, 91.2)	91.9 (34); (78.1, 98.3)	-6.8 (-16.9, 7.4)	0.09
MenC	2 µg/mL					100 (107); (96.6, 100)	97.3 (36); (85.8, 99.9)	2.7 (-0.8, 13.9)	0.49
Hib	0.15 µg/mL					99.1 (106); (94.9, 100)	97.3 (36); (85.8, 99.9)	1.8 (-2.9, 13.0)	1
Tetanus	0.01 IU/mL					100 (107); (96.6, 100)	100 (37); (90.5, 100)	0 (-3.4, 9.4)	-

¹ 0.01 IU/mL at 13 months of age ² includes only participants who have not had Hib-MenC

CI = confidence interval, Hib = *H. influenzae* type b, MenC = meningococcus C, Pn = pneumococcal serotype, PT = pertussis toxin

Supplementary data Table S4b GMCs and GMRs at 7 and 13 months of age in infants who were or were not still receiving breast milk at the age of 6 months

	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age						Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age					
Vaccine antigen	Breast-fed (n=71) GMC (95% CI)	Not breast-fed (n=20) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value	Breast-fed (n=219) GMC (95% CI)	Not breast-fed (n=88) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted** GMR (95% CI)	Two- sided p- value
Diphtheria ¹	0.40 (0.33, 0.48)	0.39 (0.28, 0.55)	1.02 (0.69, 1.51)	0.90	0.97 (0.67, 1.39)	0.85	0.07 (0.06, 0.08)	0.09 (0.07, 0.11)	0.85 (0.66, 1.10)	0.22	0.90 (0.71, 1.13)	0.37
Tetanus ¹	1.06 (0.91, 1.25)	1.28 (0.89, 1.85)	0.83 (0.58, 1.18)	0.30	0.87 (0.62, 1.23)	0.42	0.43 (0.35, 0.53) ³	0.46 (0.32, 0.65) ³	1.06 (0.72, 1.56) ³	0.76 ³	1.02 (0.71, 1.46) ³	0.92 ³
PT ¹	69.87 (57.48, 84.92)	70.84 (50.47, 99.43)	0.99 (0.66, 1.48)	0.95	0.95 (0.65, 1.39)	0.81	17.98 (15.68, 20.61)	16.00 (12.97, 19.74)	1.12 (0.87, 1.45)	0.36	1.19 (0.94, 1.50)	0.15
FHA ¹	63.55 (52.36, 77.13)	64.40 (43.11, 96.20)	0.99 (0.65, 1.50)	0.95	0.90 (0.61, 1.33)	0.59	18.86 (16.61, 21.43)	18.94 (15.42, 23.27)	1.00 (0.79, 1.26)	0.97	1.06 (0.85, 1.34)	0.60
PRN ¹	62.60 (49.35, 79.42)	53.54 (36.91, 77.67)	1.17 (0.72, 1.90)	0.52	1.13 (0.69, 1.85)	0.62	11.93 (10.16, 14.02)	12.00 (9.26, 15.54)	0.99 (0.74, 1.34)	0.97	1.02 (0.80, 1.42)	0.66 ³
Hib ²	0.50 (0.35, 0.72)	0.56 (0.25, 1.25)	0.89 (0.40, 1.96)	0.76	0.77 (0.36, 1.63)	0.49	1.09 (0.72, 1.67) ³	1.19 (0.61, 2.32) ³	1.09 (0.51, 2.34) ³	0.83 ³	1.31 (0.74, 2.34)	0.36
Polio type 1 ¹	34.05 (26.13, 44.35)	36.68 (25.77, 52.22)	0.93 (0.55, 1.57)	0.78	0.81 (0.47, 1.39)	0.44	11.16 (9.56, 13.02)	11.26 (9.00, 14.08)	0.99 (0.75, 1.31)	0.95	1.06 (0.80, 1.40)	0.68
Polio type 2 ¹	64.74 (49.78, 84.18)	57.14 (37.84, 86.28)	1.13 (0.66, 1.94)	0.64	1.03 (0.60, 1.76)	0.90	22.30 (18.84, 26.38)	19.96 (15.20, 26.22)	1.12 (0.81, 1.53)	0.49	1.21 (0.88, 1.65)	0.24
Polio type 3 ¹	21.44 (16.39, 28.05)	21.42 (13.03, 35.24)	1.00 (0.57, 1.76)	1.00	0.90 (0.50, 1.60)	0.71	9.16 (7.70, 10.88)	8.27 (6.23, 10.98)	1.11 (0.80, 1.53)	0.54	1.15 (0.84, 1.59)	0.38
Pn 1 ²	4.50 (3.53, 5.74)	3.93 (2.45, 6.31)	1.14 (0.68, 1.92)	0.61	1.12 (0.70, 1.81)	0.63	1.15 (1.03, 1.29)	1.21 (1.00, 1.46)	0.96 (0.77, 1.18)	0.68	0.97 (0.78, 1.20)	0.75
Pn 3 ²	1.38 (1.18, 1.62)	1.65 (1.21, 2.26)	0.83 (0.59, 1.17)	0.29	0.81 (0.57, 1.14)	0.21	0.53 (0.48, 0.60)	0.55 (0.47, 0.64)	0.97 (0.79, 1.18)	0.75	1.00 (0.82, 1.22)	0.98
Pn 4 ²	0.52 (0.43, 0.63)	0.50 (0.32, 0.78)	1.03 (0.67, 1.57)	0.89	1.02 (0.68, 1.54)	0.91	0.21 (0.19, 0.23)	0.22 (0.19, 0.25)	0.97 (0.82, 1.15)	0.72	0.97 (0.82, 1.15)	0.75
Pn 5 ²	3.35 (2.74, 4.08)	2.57 (1.51, 4.39)	1.30 (0.82, 2.06)	0.26	1.27 (0.82, 1.98)	0.28	0.93 (0.82, 1.05)	0.90 (0.73, 1.11)	1.03 (0.81, 1.30)	0.80	1.05 (0.84, 1.32)	0.67
Pn 6A ²	4.95 (4.02, 6.09)	4.37 (3.00, 6.37)	1.13 (0.73, 1.75)	0.57	1.13 (0.75, 1.69)	0.56	1.01 (0.88, 1.15)	0.99 (0.81, 1.22)	1.01 (0.79, 1.30)	0.92	1.03 (0.81, 1.30)	0.81
Pn 6B ²	1.93 (1.34, 2.78)	1.87 (0.96, 3.64)	1.03 (0.48, 2.21)	0.94	1.07 (0.50, 2.25)	0.87	0.51 (0.44, 0.60)	0.53 (0.42, 0.66)	0.97 (0.73, 1.30)	0.85	1.02 (0.77, 1.36)	0.87
Pn 7F ²	6.40 (5.34, 7.67)	5.27 (3.59, 7.72)	1.22 (0.82, 1.79)	0.32	1.26 (0.88, 1.81)	0.21	1.90 (1.72, 2.10)	1.83 (1.53, 2.19)	1.04 (0.86, 1.26)	0.69	1.05 (0.87, 1.27)	0.62
Pn 9V ²	2.53 (1.42, 3.51)	2.98 (2.22, 4.00)	1.13 (0.74, 1.73)	0.56	1.14 (0.77, 1.67)	0.52	0.60 (0.54, 0.67)	0.59 (0.48, 0.72)	1.03 (0.83, 1.28)	0.81	1.04 (0.84, 1.28)	0.73
Pn 14 ²	2.98 (2.22, 4.00)	1.79 (1.01, 3.17)	1.67 (0.89, 3.10)	0.11	1.77 (0.95, 3.31)	0.07	1.03 (0.89, 1.18)	1.09 (0.89, 1.34)	0.98 (0.75, 1.28)	0.90	0.92 (0.71, 1.19)	0.54
Pn 18C ²	2.95 (2.34, 3.73)	2.90 (2.03, 4.16)	1.02 (0.63, 1.63)	0.95	1.03 (0.64, 1.66)	0.90	0.66 (0.59, 0.74)	0.63 (0.52, 0.75)	1.06 (0.86, 1.30)	0.59	1.07 (0.87, 1.31)	0.51
Pn 19A ²	1.77 (1.42, 2.21)	1.55 (0.97, 2.48)	1.14 (0.71, 1.84)	0.58	1.06 (0.66, 1.69)	0.82	0.43 (0.36, 0.51)	0.56 (0.43, 0.74)	0.76 (0.55, 1.05)	0.09	0.75 (0.55, 1.04)	0.08
Pn 19F ²	11.87 (9.64, 14.60)	10.41 (6.73, 16.09)	1.14 (0.73, 1.78)	0.56	1.12 (0.73, 1.72)	0.59	2.89 (2.51, 3.32)	3.73 (2.96, 4.71)	0.77 (0.59, 1.01)	0.06	0.76 (0.58, 0.99)	0.04
Pn 23F ²	2.40 (1.84, 3.13)	2.14 (1.23, 3.70)	1.12 (0.63, 1.99)	0.69	1.13 (0.65, 1.95)	0.67	0.57 (0.49, 0.67)	0.55 (0.42, 0.71)	1.06 (0.77, 1.43)	0.75	1.08 (0.80, 1.47)	0.62
						Antibodies to 12-month vaccines measured 13 months of age						
							Breast-fed (n=107) GMC (95% CI)	Not breast-fed (n=37) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value
Measles ¹							3.09 (2.56, 3.74)	2.86 (1.82, 4.49)	1.08 (0.71, 1.64)	0.71	1.15 (0.74, 1.77)	0.53
Mumps ¹							58.53 (45.27, 75.69)	57.14 (37.77, 86.46)	1.02 (0.62, 1.68)	0.92	1.17 (0.76, 1.80)	0.48
Rubella ¹							46.00 (35.22, 60.08)	76.54 (48.77, 120.15)	0.60 (0.36, 1.01)	0.06	0.66 (0.43, 1.03)	0.07
MenC ²							19.32 (16.52, 22.60)	13.46 (10.45, 17.35)	1.44 (1.06, 1.94)	0.02	1.53 (1.12, 2.11)	<0.01
Hib ²							17.25 (13.16, 22.63)	11.17 (5.93, 21.01)	1.55 (0.86, 2.77)	0.14	1.51 (1.11, 2.06)	0.33
Tetanus ¹							1.08 (0.85, 1.36)	0.79 (0.54, 1.16)	1.10 (0.70, 1.73)	0.67	1.40 (0.87, 2.24)	0.16

¹ IU/ml ² µg/ml ³ includes only participants who have not had Hib-MenC

BCG = Bacille Calmette-Guérin, CI = confidence interval, GMC = geometric mean antibody concentration, GMR = geometric mean antibody ratio, FHA = filamentous haemagglutinin, Hib = *H. influenzae* type b, MMR = measles-mumps-rubella, MenC = meningococcus C, Pn = pneumococcal serotype, PRN = pertactin, PT = pertussis toxin

*adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling

**adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG and MMR vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination age at sampling and time between vaccination and sampling

Supplementary data Table S5a Seroprotection rates at 7 and 13 months of age in infants whose mothers did or did not received antibiotics during delivery

Vaccine antigen	Protective correlate	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age				Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age			
		Intrapartum antibiotics (n=21) % (n); (95% CI)	No intrapartum antibiotics (n=70) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value	Intrapartum antibiotics (n=62) % (n); (95% CI)	No intrapartum antibiotics (n=245) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Diphtheria	0.1 IU/mL ¹	100 (21); (83.9, 100)	95.7 (67); (88.0, 99.1)	4.3 (-11.5, 11.9)	0.6	98.4 (61); (91.3, 100)	98.4 (241); (95.9, 99.5)	0 (-7.0, 2.9)	0.68
Tetanus	0.1 IU/mL ¹	100 (21); (83.9, 100)	100 (70); (94.9, 100)	0 (-15.6, 5.3)	-	100 (30); (88.4, 100) ²	100 (133); (97.3, 100) ²	0 (-11.4, 2.8) ²	-
PT	25 IU/mL	90.5 (19); (69.6, 98.8)	90.0 (63); (80.5, 95.9)	0.5 (-19.8, 12.5)	1	32.3 (20); (20.9, 45.3)	29.4 (72); (23.8, 35.6)	2.9 (-9.2, 16.4)	0.62
Hib	0.15 µg/mL	71.4 (15); (47.8, 88.7)	77.1 (54); (65.6, 86.3)	-5.7 (-29.1, 13.2)	0.05	83.3 (25); (65.3; 94.4) ²	75.2 (100); (67.0; 82.3) ²	8.1 (-10.0, 20.9) ²	0.36 ²
Polio type 1	0.23 IU/mL	100 (21); (83.9, 100)	100 (70); (94.9, 100)	0 (-15.6, 5.3)	-	100 (62); (94.2, 100)	100 (245); (98.5, 100)	0 (-11.1, 1.4)	-
Polio type 2	0.29 IU/mL	100 (21); (83.9, 100)	100 (70); (94.9, 100)	0 (-15.6, 5.3)	-	98.4 (61); (91.3, 100)	100 (245); (98.5, 100)	-1.6 (-8.6, 0)	0.49
Polio type 3	0.12 IU/mL	100 (21); (83.9, 100)	100 (70); (94.9, 100)	0 (-15.6, 5.3)	-	100 (62); (94.2, 100)	100 (245); (98.5, 100)	0 (-5.9, 1.5)	-
Pn 1	0.35 µg/mL	100 (21); (83.9, 100)	95.7 (67); (88.0, 99.1)	4.3 (-11.5, 11.9)	1	95.2 (59); (86.5, 99.0)	93.5 (229); (89.6, 96.2)	1.7 (-7.1, 6.8)	0.35
Pn 3	0.35 µg/mL	100 (21); (83.9, 100)	98.6 (69); (92.3, 100)	1.4 (-14.2, 7.7)	1	74.2 (46); (61.5, 84.5)	68.6 (168); (62.4, 74.3)	5.6 (-7.6, 16.9)	0.90
Pn 4	0.35 µg/mL	76.2 (16); (52.8, 91.8)	67.1 (47); (54.8, 77.9)	9.1 (-14.7, 27.4)	0.65	25.8 (16); (15.6, 38.5)	22.0 (54); (17.0, 27.8)	3.8 (-7.2, 16.8)	0.68
Pn 5	0.35 µg/mL	100 (21); (83.9, 100)	97.1 (68); (90.1, 99.7)	2.9 (-12.9, 9.9)	1	91.9 (57); (82.2, 97.3)	85.7 (210); (81.6, 90.1)	6.2 (-3.9, 13.2)	0.24
Pn 6A	0.35 µg/mL	100 (21); (83.9, 100)	97.1 (68); (90.1, 99.7)	2.9 (-12.9, 9.9)	1	90.3 (56); (80.1, 96.4)	85.7 (210); (81.6, 90.1)	4.6 (-5.9, 12.0)	0.51
Pn 6B	0.35 µg/mL	95.2 (20); (76.2, 100)	87.1 (61); (77.0, 93.9)	9.1 (-10.8, 19.3)	0.09	67.7 (42); (54.7, 79.1)	63.3 (155); (56.9, 69.3)	4.5 (-9.2, 16.7)	0.12
Pn 7F	0.35 µg/mL	100 (21); (83.9, 100)	100 (70); (94.9, 100)	0 (-15.6, 5.3)	-	100 (62); (94.2, 100)	99.2 (243); (97.1, 99.9)	0.8 (-5.0, 2.9)	1
Pn 9V	0.35 µg/mL	100 (21); (83.9, 100)	97.1 (68); (90.1, 99.7)	2.9 (-12.9, 9.9)	1	83.9 (52); (72.3, 92.0)	73.9 (181); (69.8, 80.3)	10.0 (-2.1, 19.4)	0.18
Pn 14	0.35 µg/mL	95.2 (20); (76.2, 100)	90.0 (63); (80.5, 95.9)	5.2 (-13.4, 15.8)	1	88.7 (55); (70.2, 96.4)	85.7 (210); (81.6, 90.1)	3.0 (-7.9, 10.7)	0.51
Pn 18C	0.35 µg/mL	100 (21); (83.9, 100)	94.3 (66); (86.9, 98.4)	5.7 (-12.9, 9.9)	1	83.9 (52); (72.3, 92.0)	75.1 (184); (69.2, 80.4)	8.8 (-3.4, 18.2)	0.50
Pn 19A	0.35 µg/mL	100 (21); (83.9, 100)	91.4 (64); (82.3, 96.8)	8.6 (-7.3, 17.5)	1	46.8 (29); (34.0, 59.9)	50.6 (121); (44.2, 57.0)	-3.8 (-17.4, 10.0)	0.42
Pn 19F	0.35 µg/mL	100 (21); (83.9, 100)	100 (70); (94.9, 100)	0 (-15.6, 5.3)	-	98.4 (61); (91.3, 100)	99.6 (244); (97.7, 100)	-1.2 (-8.2, 0.1)	0.50
Pn 23F	0.35 µg/mL	100 (21); (83.9, 100)	91.4 (64); (82.3, 96.8)	8.6 (-7.3, 17.5)	0.68	66.1 (41); (53.0, 77.7)	60.0 (147); (53.6, 66.2)	6.1 (-7.7, 18.5)	0.64
						Antibodies to 12-month vaccines measured 13 months of age			
						Intrapartum antibiotics (n=32) % (n); (95% CI)	No intrapartum antibiotics (n=112) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Measles	0.12 IU/mL					100 (32); (89.1, 100)	97.3 (109); (92.4, 99.4)	2.7 (-8.2, 7.7)	0.12
Mumps	45 IU/mL					84.4 (27); (67.2, 94.7)	87.5 (98); (79.9, 93.0)	-3.1 (-20.2, 8.6)	0.09
Rubella	10 IU/mL					53.1 (17); (34.7, 70.9)	62.5 (70); (52.9, 71.5)	-9.4 (-28.4, 9.3)	0.74
MenC	2 µg/mL					100 (32); (89.1, 100)	99.1 (111); (95.1, 100)	-9.4 (-9.9, 4.9)	0.49
Hib	0.15 µg/mL					100 (32); (89.1, 100)	98.2 (110); (93.7, 99.8)	1.8 (-9.0, 6.3)	1
Tetanus	0.01 IU/mL					100 (32); (89.1, 100)	100 (112); (96.8, 100)	0 (-10.8, 3.3)	-

¹ 0.01 IU/mL at 13 months of age

² includes only participants who have not had Hib-MenC

CI = confidence interval, Hib = *H. influenzae* type b, MenC = meningococcus C, Pn = pneumococcal serotype, PT = pertussis toxin

Supplementary data Table S5b GMCs and GMRs at 7 and 13 months of age in infants whose mothers did or did not received antibiotics during delivery

	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age						Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age					
Vaccine antigen	Intrapartum antibiotics (n=21) GMC (95% CI)	No intrapartum antibiotics (n=70) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value	Intrapartum antibiotics (n=62) GMC (95% CI)	No intrapartum antibiotics (n=245) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted** GMR (95% CI)	Two- sided p- value
Diphtheria ¹	0.49 (0.36, 0.68)	0.37 (0.31, 0.45)	1.33 (0.91, 1.95)	0.14	1.27 (0.89, 1.82)	0.19	0.08 (0.06, 0.10)	0.08 (0.07, 0.09)	1.33 (0.91, 1.94)	0.14	1.10 (0.85, 1.43)	0.46
Tetanus ¹	1.15 (0.91, 1.46)	1.10 (0.92, 1.31)	1.05 (0.75, 1.49)	0.77	1.16 (0.82, 1.64)	0.40	0.53 (0.22, 0.85) ³	0.42 (0.35, 0.51) ³	1.25 (0.79, 1.98) ³	0.33 ³	1.35 (0.88, 2.07) ³	0.17 ³
PT ¹	78.15 (55.17, 110.72)	67.83 (55.89, 82.32)	1.15 (0.78, 1.71)	0.48	1.06 (0.72, 1.55)	0.76	17.90 (13.83, 23.16)	17.26 (15.19, 19.62)	1.12 (0.76, 1.63)	0.57	1.09 (0.84, 1.42)	0.53
FHA ¹	59.70 (44.06, 80.89)	64.99 (52.86, 79.91)	0.92 (0.61, 1.38)	0.68	0.85 (0.57, 1.25)	0.39	18.16 (14.45, 22.81)	19.08 (16.87, 21.57)	1.25 (0.87, 1.78)	0.22	0.99 (0.76, 1.27)	0.91
PRN ¹	95.00 (70.77, 127.54)	52.83 (41.61, 67.07)	1.80 (1.13, 2.85)	0.01	1.97 (1.23, 3.16)	<0.01	15.08 (11.50, 19.78)	11.27 (9.64, 13.17)	1.49 (0.95, 2.33)	0.09	1.46 (1.06, 2.01)	0.02
Hib ²	0.56 (0.25, 1.25)	0.50 (0.35, 0.72)	1.11 (0.51, 2.42)	0.79	0.90 (0.42, 1.92)	0.78	1.70 (0.71, 4.03) ³	1.02 (0.69, 1.51) ³	1.66 (0.66, 4.13) ³	0.28 ³	1.33 (0.66, 2.66) ³	0.42 ³
Polio type 1 ¹	34.05 (19.51, 59.43)	34.78 (27.42, 44.09)	0.98 (0.58, 1.65)	0.94	0.96 (0.56, 1.67)	0.89	11.39 (8.57, 15.13)	11.14 (9.66, 12.84)	0.80 (0.53, 1.22)	0.30	1.06 (0.78, 1.45)	0.70
Polio type 2 ¹	60.83 (39.31, 94.12)	63.64 (49.02, 82.64)	0.96 (0.56, 1.62)	0.87	0.90 (0.53, 1.54)	0.69	24.54 (17.56, 34.29)	20.91 (17.85, 24.50)	0.71 (0.44, 1.14)	0.16	1.20 (0.85, 1.70)	0.30
Polio type 3 ¹	16.88 (10.70, 26.65)	23.03 (17.54, 30.24)	0.73 (0.42, 1.27)	0.27	0.77 (0.43, 1.38)	0.38	8.27 (5.83, 11.74)	9.06 (7.70, 10.66)	0.78 (0.48, 1.27)	0.31	0.95 (0.66, 1.36)	0.78
Pn 1 ²	5.63 (3.49, 9.08)	4.05 (3.18, 5.15)	1.39 (0.84, 2.30)	0.20	1.26 (0.78, 2.03)	0.34	1.29 (1.04, 1.58)	1.14 (1.02, 1.27)	1.00 (0.73, 1.39)	0.99	1.17 (0.92, 1.49)	0.19
Pn 3 ²	1.55 (1.13, 2.11)	1.40 (1.20, 1.65)	1.10 (0.79, 1.54)	0.57	1.03 (0.73, 1.46)	0.86	0.56 (0.47, 0.68)	0.53 (0.48, 0.59)	0.99 (0.73, 1.33)	0.93	1.08 (0.87, 1.35)	0.48
Pn 4 ²	0.58 (0.43, 0.78)	0.50 (0.40, 0.62)	1.16 (0.76, 1.75)	0.49	1.02 (0.68, 1.54)	0.91	0.22 (0.20, 0.28)	0.21 (0.19, 0.23)	0.90 (0.70, 1.16)	0.43	1.16 (0.96, 1.39)	0.12
Pn 5 ²	3.76 (2.45, 5.78)	3.00 (2.41, 3.72)	1.26 (0.80, 1.97)	0.32	1.16 (0.74, 1.81)	0.50	1.01 (0.83, 1.22)	0.90 (0.80, 1.02)	1.03 (0.73, 1.45)	0.89	1.15 (0.89, 1.48)	0.27
Pn 6A ²	5.84 (4.25, 8.02)	4.54 (3.67, 5.63)	1.28 (0.84, 1.96)	0.24	1.17 (0.78, 1.76)	0.43	1.05 (0.83, 1.32)	0.99 (0.87, 1.13)	0.92 (0.63, 1.33)	0.65	1.09 (0.84, 1.42)	0.53
Pn 6B ²	2.59 (1.56, 4.28)	1.75 (1.19, 2.57)	1.48 (0.70, 3.12)	0.30	1.37 (0.65, 2.90)	0.40	0.54 (0.41, 0.73)	0.51 (0.44, 0.59)	1.03 (0.67, 1.60)	0.87	1.07 (0.78, 1.47)	0.67
Pn 7F ²	6.77 (4.92, 7.20)	5.95 (4.92, 7.20)	1.14 (0.77, 1.67)	0.51	1.05 (0.73, 1.52)	0.78	2.03 (1.72, 2.39)	1.84 (1.66, 2.04)	1.03 (0.77, 1.38)	0.83	1.13 (0.91, 1.39)	0.27
Pn 9V ²	2.96 (2.04, 4.31)	2.32 (1.90, 2.85)	1.27 (0.84, 1.93)	0.25	1.16 (0.79, 1.71)	0.45	0.67 (0.56, 0.80)	0.58 (0.52, 0.65)	1.05 (0.76, 1.45)	0.78	1.18 (0.93, 1.50)	0.17
Pn 14 ²	3.24 (2.05, 5.12)	2.52 (1.84, 3.44)	1.29 (0.69, 2.39)	0.42	1.18 (0.62, 2.23)	0.61	1.12 (0.88, 1.42)	1.03 (0.90, 1.17)	1.08 (0.74, 1.58)	0.68	1.13 (0.85, 1.50)	0.41
Pn 18C ²	3.24 (2.32, 4.51)	2.86 (2.25, 3.62)	1.13 (0.71, 1.81)	0.60	1.03 (0.64, 1.65)	0.91	0.71 (0.59, 0.87)	0.64 (0.57, 0.71)	0.99 (0.72, 1.35)	0.94	1.16 (0.92, 1.45)	0.21
Pn 19A ²	1.82 (1.21, 2.73)	1.69 (1.34, 2.13)	1.08 (0.67, 1.72)	0.76	1.05 (0.66, 1.69)	0.83	0.52 (0.36, 0.75)	0.45 (0.38, 0.53)	0.96 (0.59, 1.57)	0.87	1.24 (0.87, 1.78)	0.24
Pn 19F ²	14.42 (10.19, 20.42)	10.78 (8.67, 13.40)	1.34 (0.87, 2.07)	0.19	1.31 (0.85, 1.99)	0.22	3.48 (2.63, 4.60)	3.02 (2.64, 3.45)	1.03 (0.69, 1.53)	0.90	1.21 (0.90, 1.62)	0.21
Pn 23F ²	2.91 (1.87, 4.53)	2.19 (1.65, 2.90)	1.33 (0.76, 2.33)	0.32	1.24 (0.72, 2.16)	0.43	0.59 (0.44, 0.80)	0.56 (0.48, 0.65)	0.79 (0.50, 1.24)	0.30	1.04 (0.74, 1.47)	0.83
						Antibodies to 12-month vaccines measured 13 months of age						
							Intrapartum antibiotics (n=32) GMC (95% CI)	No intrapartum antibiotics (n=112) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value
Measles ¹							3.66 (2.89, 4.64)	2.87 (2.30, 3.59)	0.69 (0.38, 1.27)	0.23	1.33 (0.86, 2.07)	0.20
Mumps ¹							47.61 (30.54, 74.23)	61.60 (47.99, 79.07)	0.57 (0.27, 1.18)	0.13	0.82 (0.53, 1.27)	0.37
Rubella ¹							42.71 (25.43, 71.73)	55.59 (42.89, 72.05)	0.43 (0.20, 0.92)	0.03	0.75 (0.47, 1.18)	0.21
MenC ²							20.46 (14.89, 28.13)	16.87 (14.54, 19.57)	1.12 (0.64, 1.95)	0.70	1.23 (0.89, 1.70)	0.21
Hib ²							14.73 (8.40, 25.83)	15.63 (11.67, 20.95)	1.03 (0.44, 2.44)	0.95	1.13 (0.62, 2.09)	0.68
Tetanus ¹							1.06 (0.69, 1.62)	0.97 (0.78, 1.22)	1.09 (0.68, 1.75)	0.72	1.16 (0.72, 1.89)	0.54

¹ IU/ml ² µg/ml ³ includes only participants who have not had Hib-MenC

BCG = Bacille Calmette-Guérin, CI = confidence interval, GMC = geometric mean antibody concentration, GMR = geometric mean antibody ratio, FHA = filamentous haemagglutinin, Hib = *H. influenzae* type b, MMR = measles-mumps-rubella, MenC = meningococcus C, Pn = pneumococcal serotype, PRN = pertactin, PT = pertussis toxin

*adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

**adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG and MMR vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

Supplementary data Table S6a Seroprotection rates at 7 and 13 months of age in infants who did or did not received antibiotics before their six-weeks vaccination

Vaccine antigen	Protective correlate	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age				Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age			
		Antibiotics (n=4) % (n); (95% CI)	No antibiotics (n=87) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value	Antibiotics (n=29) % (n); (95% CI)	No antibiotics (n=278) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Diphtheria	0.1 IU/mL ¹	100 (4); (39.8, 100)	96.6 (84); (90.3, 99.3)	3.4 (-46.0, 9.7)	0.60	100 (29); (88.1, 100)	98.2 (273); (95.9, 99.4)	1.8 (-10.0, 4.1)	0.68
Tetanus	0.1 IU/mL ¹	100 (4); (39.8, 100)	100 (87); (95.8, 100)	0 (-49.3, 4.3)	-	100 (16); (79.4, 100) ²	100 (147); (97.5, 100) ²	0 (-19.5, 2.6) ²	-
PT	25 IU/mL	100 (4); (39.8, 100)	89.7 (78); (81.3, 95.2)	10.5 (-39.3, 18.6)	1	31.0 (9); (15.2, 50.8)	29.9 (83); (24.5, 35.6)	1.2 (-13.9, 20.2)	0.62
Hib	0.15 µg/mL	100 (4); (39.8, 100)	74.7 (65); (64.3, 83.4)	25.3 (-24.8, 35.4)	0.05	81.3 (13); (54.4; 96.0) ²	76.2 (112); (68.5, 82.8) ²	5.1 (-20.1, 19.9) ²	0.36 ²
Polio type 1	0.23 IU/mL	100 (4); (39.8, 100)	100 (87); (95.8, 100)	0 (-49.3, 4.3)	-	100 (29); (88.1, 100)	100 (278); (98.7, 100)	0 (-11.7, 1.4)	-
Polio type 2	0.29 IU/mL	100 (4); (39.8, 100)	100 (87); (95.8, 100)	0 (-49.3, 4.3)	-	100 (29); (88.1, 100)	99.6 (277); (98.0, 100)	0.4 (-11.74, 2.0)	0.49
Polio type 3	0.12 IU/mL	100 (4); (39.8, 100)	100 (87); (95.8, 100)	0 (-49.3, 4.3)	-	100 (29); (88.1, 100)	100 (278); (98.7, 100)	0 (-11.7, 1.4)	-
Pn 1	0.35 µg/mL	100 (4); (39.8, 100)	96.6 (84); (90.3, 99.3)	3.4 (-46.0, 9.7)	1	93.1 (27); (77.2, 99.2)	93.9 (261); (90.4, 96.4)	-0.8 (-16.0, 5.5)	0.35
Pn 3	0.35 µg/mL	100 (4); (39.8, 100)	98.9 (86); (93.8, 100)	1.1 (-48.2, 6.3)	1	79.3 (23); (58.9, 90.4)	68.7 (191); (62.9, 74.1)	10.6 (-7.9, 23.1)	0.90
Pn 4	0.35 µg/mL	75.0 (3); (19.4, 99.4)	69.0 (60); (58.1, 78.5)	6.0 (-40.4, 30.1)	0.65	17.2 (5); (5.5, 33.7)	23.4 (65); (18.5, 28.8)	-6.1 (-17.4, 11.8)	0.68
Pn 5	0.35 µg/mL	100 (4); (39.8, 100)	97.7 (85); (91.9, 99.7)	2.3 (-47.1, 8.0)	1	93.1 (27); (77.2, 99.2)	86.3 (240); (81.7, 90.1)	6.8 (-8.7, 13.9)	0.24
Pn 6A	0.35 µg/mL	100 (4); (39.8, 100)	97.7 (85); (91.9, 99.7)	2.3 (-47.1, 8.0)	1	82.8 (24); (64.2, 94.2)	87.1 (242); (82.5, 90.8)	-4.3 (-22.0, 6.5)	0.51
Pn 6B	0.35 µg/mL	75.0 (3); (19.4, 99.4)	89.7 (78); (81.3, 95.2)	-14.7 (-60.3, 7.7)	0.10	65.5 (19); (45.7, 82.1)	64.0 (178); (58.1, 69.7)	1.5 (-17.6, 17.3)	0.12
Pn 7F	0.35 µg/mL	100 (4); (39.8, 100)	100 (87); (95.8, 100)	0 (-49.3, 4.3)	-	100 (29); (88.1, 100)	99.3 (276); (97.4, 99.9)	0.7 (-11.0, 2.6)	1
Pn 9V	0.35 µg/mL	100 (4); (39.8, 100)	97.7 (85); (91.9, 99.7)	2.3 (-47.1, 8.0)	1	82.8 (24); (64.2, 94.2)	75.2 (209); (69.7, 80.1)	7.6 (-10.4, 18.9)	0.18
Pn 14	0.35 µg/mL	100 (4); (39.8, 100)	90.8 (79); (82.7, 95.9)	9.2 (-40.4, 17.2)	1	86.2 (25); (68.3, 96.1)	86.3 (240); (81.7, 90.1)	-0.1 (-17.3, 9.5)	0.51
Pn 18C	0.35 µg/mL	75.0 (3); (19.4, 99.4)	96.6 (84); (90.3, 99.3)	-21.6 (-66.9, 0.3)	0.28	72.4 (21); (52.8, 87.3)	77.3 (215); (72.0, 82.1)	-4.9 (-23.7, 9.2)	0.66
Pn 19A	0.35 µg/mL	75.0 (3); (19.4, 99.4)	94.3 (82); (87.1, 98.1)	-19.3 (-64.7, 2.4)	0.24	51.7 (15); (32.5, 70.6)	49.6 (138); (43.6, 55.7)	2.0 (-16.3, 20.1)	0.42
Pn 19F	0.35 µg/mL	100 (4); (39.8, 100)	100 (87); (95.8, 100)	0 (-49.3, 4.3)	-	100 (29); (88.1, 100)	99.3 (276); (97.4, 99.9)	0.7 (-11, 2.6)	0.50
Pn 23F	0.35 µg/mL	100 (4); (39.8, 100)	93.1 (81); (85.6, 97.4)	6.9 (-42.6, 14.3)	0.68	51.7 (15); (32.5, 70.6)	62.2 (173); (56.2, 68.0)	-10.5 (-28.8, 7.5)	0.64
						Antibodies to 12-month vaccines measured 13 months of age			
						Antibiotics (n=13) % (n); (95% CI)	No antibiotics (n=131) % (n); (95% CI)	Difference % (95% CI)	Two-sided p-value
Measles	0.12 IU/mL					100 (13); (75.3, 100)	97.7 (128); (93.5, 99.5)	2.3 (-20.7, 6.5)	0.12
Mumps	45 IU/mL					46.2 (6); (19.2, 74.9)	61.8 (81); (52.9, 70.2)	-15.7 (-40.4, 10.7)	0.74
Rubella	10 IU/mL					76.9 (10); (46.2, 95.0)	87.8 (115); (80.9, 92.9)	-10.9 (-81.8, 8.5)	0.09
MenC	2 µg/mL					100 (13); (75.3, 100)	98.5 (129); (94.6, 99.8)	0.8 (-21.4, 5.4)	0.49
Hib	0.15 µg/mL					100 (13); (75.3, 100)	98.5 (128); (94.5, 99.8)	1.5 (-20.2, 5.5)	1
Tetanus	0.01 IU/mL					100 (13); (75.3, 100)	100 (131); (97.2, 100)	0 (-22.9, 2.9)	-

¹ 0.01 IU/mL at 13 months of age

² includes only participants who have not had Hib-MenC

CI = confidence interval, Hib = *H. influenzae* type b, MenC = meningococcus C, Pn = pneumococcal serotype, PT = pertussis toxin

Supplementary data Table S6b GMCs and GMRs at 7 and 13 months of age in infants who did or did not received antibiotics before their six-weeks vaccination

	Antibodies to primary course of vaccines ending at 6 months of age measured at 7 months of age						Antibodies to primary course of vaccines ending at 6 months of age measured at 13 months of age					
Vaccine antigen	Antibiotics (n=4) GMC (95% CI)	No antibiotics (n=87) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value	Antibiotics (n=29) GMC (95% CI)	No antibiotics (n=278) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted** GMR (95% CI)	Two- sided p- value
Diphtheria ¹	0.17 (0.07, 2.55)	0.40 (0.34, 0.47)	1.04 (0.47, 2.29)	0.92	0.91 (0.44, 1.89)	0.80	0.10 (0.07, 0.16)	0.08 (0.07, 0.08)	1.36 (0.92, 2.01)	0.12	1.30 (0.91, 1.86)	0.15
Tetanus ¹	1.44 (0.84, 2.46)	1.10 (0.94, 1.27)	1.31 (0.65, 2.66)	0.45	1.34 (0.67, 2.70)	0.40	0.42 (0.20, 0.87) ³	0.44 (0.37, 0.53) ³	0.96 (0.53, 1.74) ³	0.88 ³	1.06 (0.60, 1.85) ³	0.85 ³
PT ¹	82.19 (17.30, 390.41)	69.57 (58.71, 82.44)	1.18 (0.52, 2.67)	0.69	1.20 (0.56, 2.57)	0.63	18.99 (12.76, 28.26)	17.23 (15.29, 19.42)	1.10 (0.74, 1.63)	0.63	1.03 (0.72, 1.48)	0.87
FHA ¹	74.62 (14.35, 388.01)	63.27 (53.15, 75.32)	1.18 (0.51, 2.73)	0.70	1.15 (0.52, 2.51)	0.73	23.54 (16.90, 32.79)	18.46 (16.47, 20.69)	1.28 (0.88, 1.84)	0.19	1.18 (0.83, 1.68)	0.35
PRN ¹	80.66 (10.03, 648.31)	59.69 (48.75, 73.09)	1.35 (0.51, 3.60)	0.54	1.33 (0.49, 3.58)	0.57	16.22 (10.20, 25.77)	11.58 (10.04, 13.35)	1.40 (0.88, 2.23)	0.15	1.37 (0.88, 2.14)	0.16
Hib ²	1.14 (0.17, 7.71)	0.49 (0.35, 0.69)	2.31 (0.47, 11.38)	0.30	1.86 (0.35, 1.26)	0.42	0.97 (0.28, 3.34) ³	1.14 (0.78, 1.66) ³	0.85 (0.26, 2.08) ³	0.79 ³	0.96 (0.39, 2.37) ³	0.93 ³
Polio type 1 ¹	31.38 (1.99, 495.32)	34.77 (27.98, 43.19)	0.90 (0.31, 2.62)	0.85	0.83 (0.28, 2.49)	0.74	8.57 (5.54, 13.27)	11.59 (10.07, 13.13)	0.75 (0.48, 1.15)	0.18	0.72 (0.47, 1.10)	0.12
Polio type 2 ¹	43.69 (1.68, 1134.3)	64.05 (51.63, 79.47)	0.68 (0.23, 2.00)	0.48	0.76 (0.26, 2.24)	0.62	14.61 (9.74, 21.93)	22.50 (19.34, 26.18)	0.65 (0.40, 1.06)	0.08	0.63 (0.39, 1.01)	0.06
Polio type 3 ¹	15.87 (1.23, 204.86)	21.73 (17.20, 27.46)	0.73 (0.22, 2.27)	0.58	0.75 (0.23, 2.40)	0.62	6.68 (4.33, 10.32)	9.16 (7.84, 10.71)	0.73 (0.44, 1.20)	0.31	0.76 (0.47, 1.24)	0.27
Pn 1 ²	6.93 (1.41, 33.92)	4.28 (3.44, 5.32)	1.62 (0.57, 4.57)	0.36	1.32 (0.51, 3.47)	0.56	1.16 (0.78, 1.72)	1.17 (1.06, 1.29)	0.99 (0.71, 1.38)	0.95	0.99 (0.71, 1.38)	0.97
Pn 3 ²	1.65 (0.30, 9.00)	1.42 (1.24, 1.64)	1.16 (0.58, 2.30)	0.67	1.06 (0.53, 2.14)	0.87	0.54 (0.39, 0.75)	0.54 (0.49, 0.59)	1.00 (0.74, 1.37)	0.99	1.01 (0.74, 1.37)	0.95
Pn 4 ²	0.66 (0.21, 2.06)	0.51 (0.43, 0.61)	1.29 (0.55, 3.03)	0.56	1.19 (0.52, 2.71)	0.68	0.20 (0.15, 0.25)	0.22 (0.20, 0.23)	0.91 (0.70, 1.18)	0.48	0.93 (0.71, 1.19)	0.53
Pn 5 ²	6.62 (1.81, 24.21)	3.05 (2.52, 3.70)	2.17 (0.87, 5.44)	0.10	1.75 (0.72, 4.25)	0.21	0.93 (0.65, 1.33)	0.92 (0.82, 1.03)	1.01 (0.71, 1.44)	0.96	0.98 (0.69, 1.39)	0.90
Pn 6A ²	4.16 (0.77, 22.60)	4.85 (4.04, 5.82)	0.86 (0.36, 2.07)	0.73	0.73 (0.32, 1.65)	0.44	0.90 (0.58, 1.40)	1.01 (0.90, 1.14)	0.89 (0.61, 1.30)	0.55	0.85 (0.59, 1.23)	0.39
Pn 6B ²	2.19 (0.03, 163.57)	1.90 (1.39, 2.60)	1.15 (0.25, 5.39)	0.86	0.93 (2.04, 4.19)	0.92	0.52 (0.31, 0.88)	0.52 (0.45, 0.59)	1.01 (0.64, 1.58)	0.97	0.97 (0.62, 1.50)	0.88
Pn 7F ²	8.85 (2.69, 29.18)	6.03 (5.11, 7.11)	1.47 (0.67, 3.23)	0.34	1.36 (0.65, 2.84)	0.40	1.89 (1.33, 2.69)	1.88 (1.72, 2.05)	1.01 (0.75, 1.36)	0.95	0.97 (0.73, 1.30)	0.85
Pn 9V ²	3.50 (1.18, 10.40)	2.42 (2.02, 2.90)	1.45 (0.61, 3.42)	0.39	1.17 (0.53, 2.56)	0.69	0.63 (0.46, 0.85)	0.60 (0.54, 0.66)	1.05 (0.75, 1.47)	0.77	1.03 (0.74, 1.44)	0.84
Pn 14 ²	3.71 (0.42, 32.35)	2.63 (2.01, 3.43)	1.41 (0.39, 5.04)	0.59	1.28 (0.35, 4.64)	0.70	1.11 (0.66, 1.88)	1.04 (0.93, 1.17)	1.07 (0.72, 1.58)	0.75	1.05 (0.71, 1.56)	0.79
Pn 18C ²	2.87 (0.29, 28.05)	2.94 (2.42, 3.58)	0.98 (0.38, 2.55)	0.96	0.87 (0.34, 2.28)	0.78	0.64 (0.44, 0.92)	0.65 (0.59, 0.72)	0.97 (0.71, 1.35)	0.88	0.95 (0.69, 1.30)	0.74
Pn 19A ²	4.01 (0.27, 58.78)	1.65 (1.37, 2.00)	2.43 (0.94, 6.28)	0.07	2.04 (0.80, 5.22)	0.14	0.45 (0.28, 0.72)	0.45 (0.40, 0.54)	0.96 (0.58, 1.59)	0.88	0.98 (0.59, 1.60)	0.92
Pn 19F ²	20.83 (2.54, 171.12)	11.22 (9.34, 13.48)	1.86 (0.76, 4.54)	0.17	1.60 (0.68, 3.76)	0.28	3.11 (2.01, 4.81)	3.11 (2.74, 3.52)	1.00 (0.66, 1.51)	1.00	0.98 (0.65, 1.48)	0.94
Pn 23F ²	6.71 (0.80, 56.00)	2.23 (1.76, 2.82)	3.02 (0.97, 9.37)	0.06	2.40 (0.81, 7.13)	0.11	0.44 (0.26, 0.73)	0.58 (0.50, 0.67)	0.75 (0.46, 1.21)	0.24	0.72 (0.45, 1.16)	0.18
						Antibodies to 12-month vaccines measured 13 months of age						
							Antibiotics (n=13) GMC (95% CI)	No antibiotics (n=131) GMC (95% CI)	Unadjusted GMR (95% CI)	Two- sided p- value	Adjusted* GMR (95% CI)	Two- sided p- value
Measles ¹							2.00 (1.08, 3.72)	3.16 (2.61, 3.82)	0.63 (0.34, 1.18)	0.15	0.65 (0.34, 1.26)	0.20
Mumps ¹							36.46 (18.28, 72.72)	60.93 (48.48, 76.58)	0.60 (0.28, 1.27)	0.18	1.28 (0.66, 2.48)	0.47
Rubella ¹							21.73 (11.24, 42.02)	57.22 (44.95, 72.84)	0.38 (0.17, 0.84)	0.02	0.73 (0.37, 1.44)	0.36
MenC ²							20.17 (13.26, 30.68)	17.37 (15.06, 20.05)	1.16 (0.73, 1.86)	0.53	0.98 (0.61, 1.60)	0.95
Hib ²							14.33 (4.53, 45.34)	15.54 (11.94, 20.24)	0.92 (0.38, 2.26)	0.86	0.95 (0.38, 2.38)	0.92
Tetanus ¹							1.40 (0.62, 3.15)	0.96 (0.78, 1.18)	1.46 (0.74, 2.89)	0.28	1.30 (0.63, 2.69)	0.48

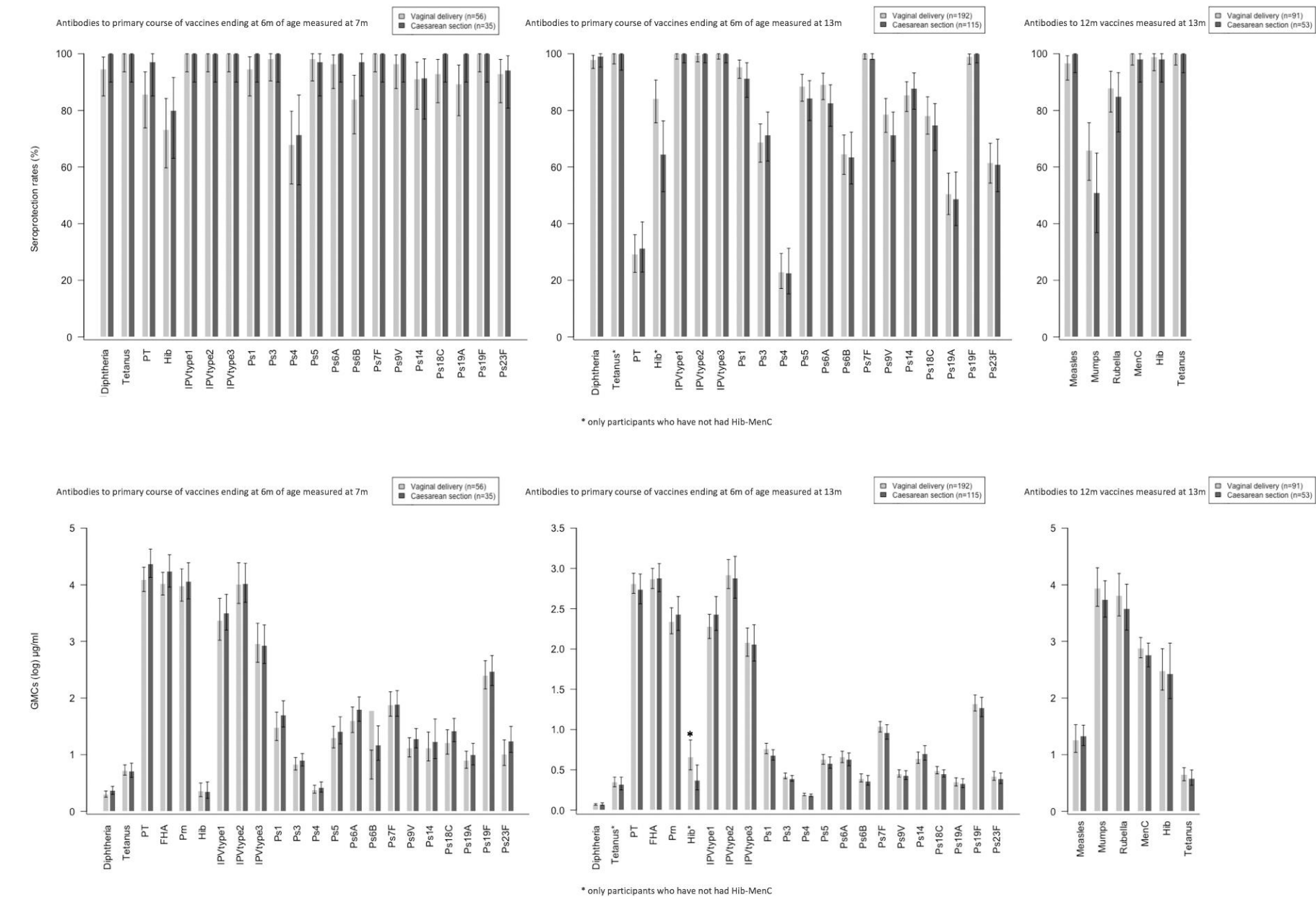
¹ IU/ml ² µg/ml ³ includes only participants who have not had Hib-MenC

BCG = Bacille Calmette-Guérin, CI = confidence interval, GMC = geometric mean antibody concentration, GMR = geometric mean antibody ratio, FHA = filamentous haemagglutinin, Hib = *H. influenzae* type b, MMR = measles-mumps-rubella, MenC = meningococcus C, Pn = pneumococcal serotype, PRN = pertactin, PT = pertussis toxin

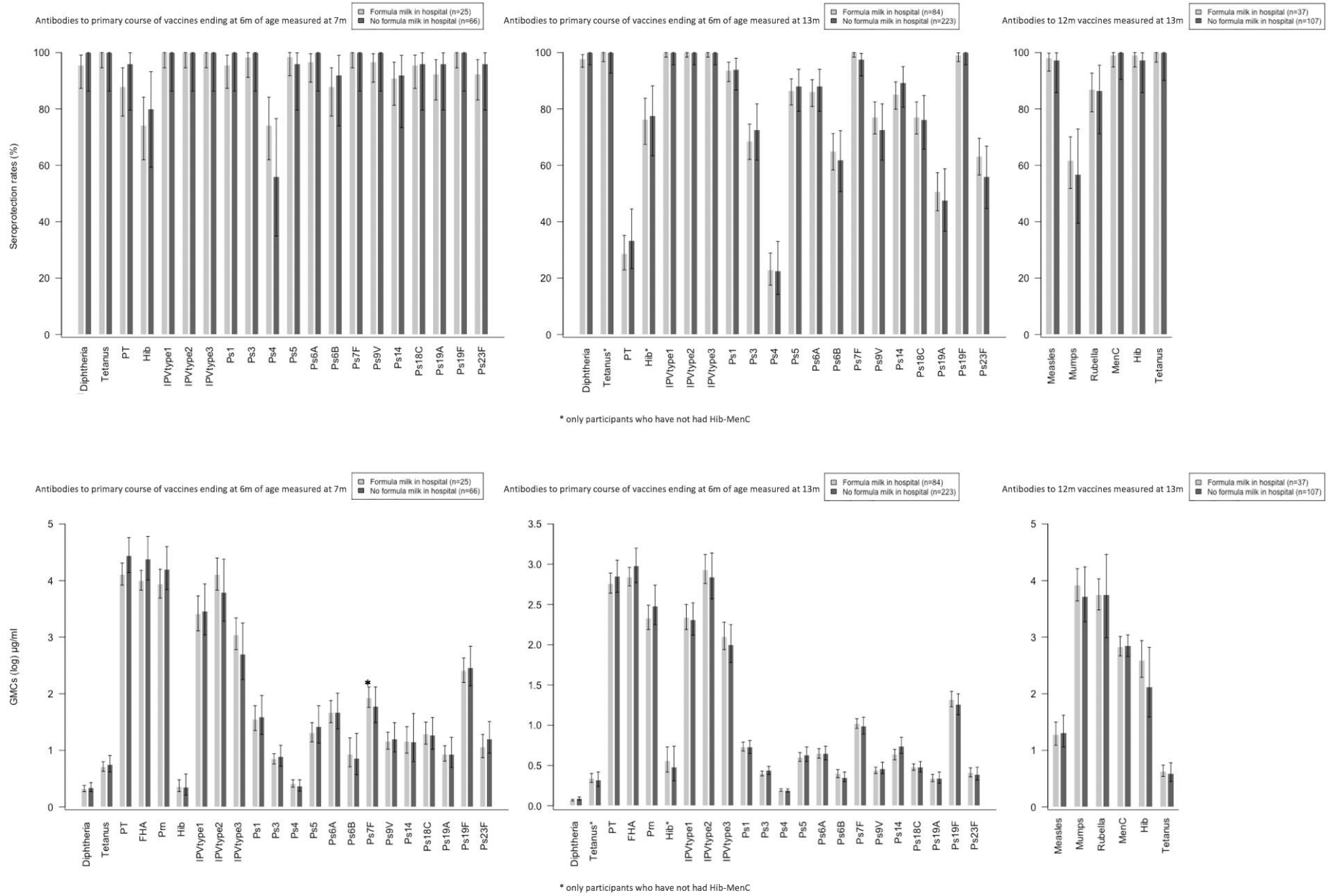
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**adjusted for maternal dTpa (diphtheria-tetanus-acellular pertussis) and trivalent influenza vaccine during pregnancy, gestational age, sex, BCG and MMR vaccination status, age at first DTPa-HepB-IPV-Hib / PCV13 vaccination, age at sampling and time between vaccination and sampling using multiple linear regression

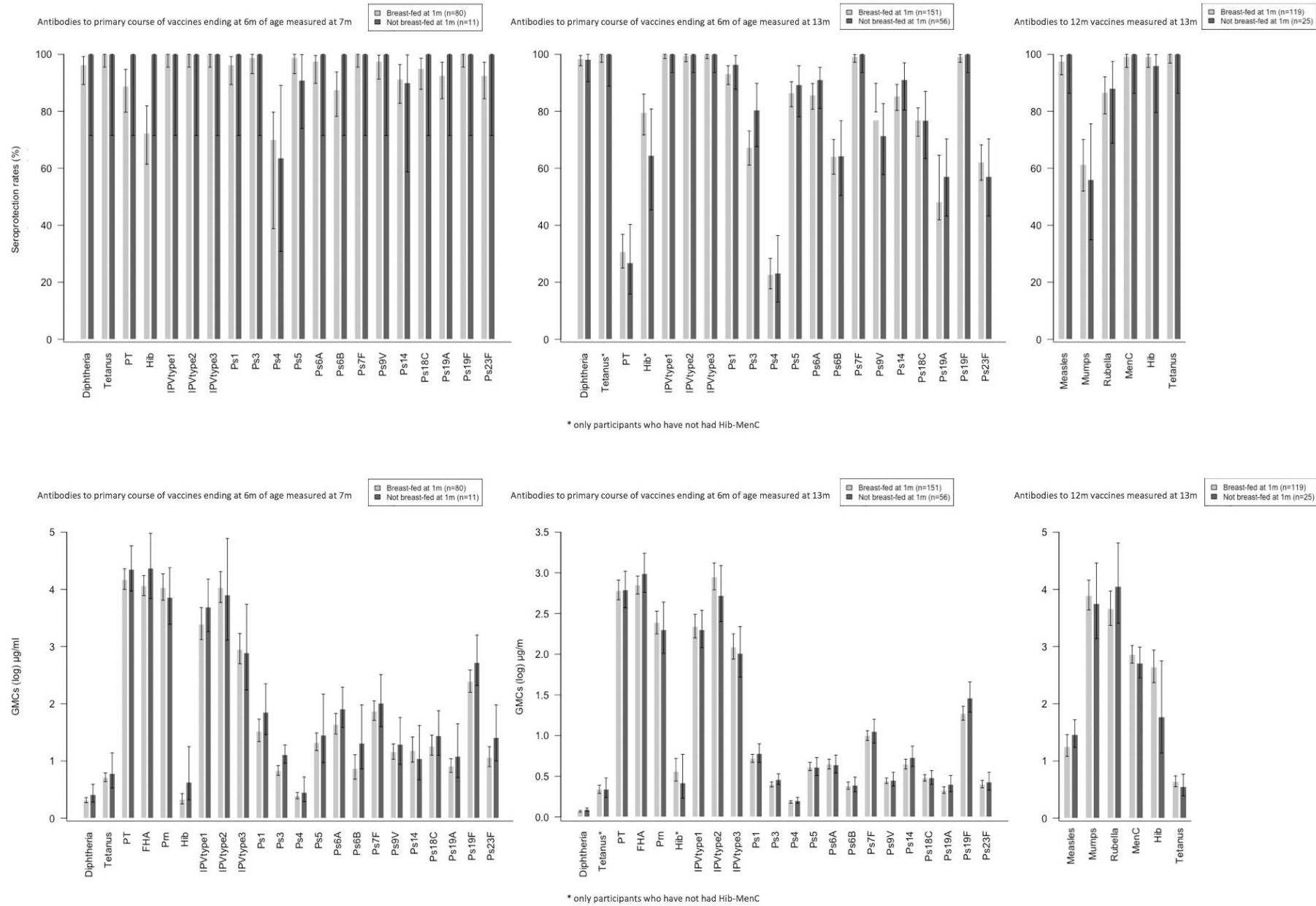
Supplementary Figure S1 Seroprotection rates and GMCs in infants born vaginally or by Caesarean section



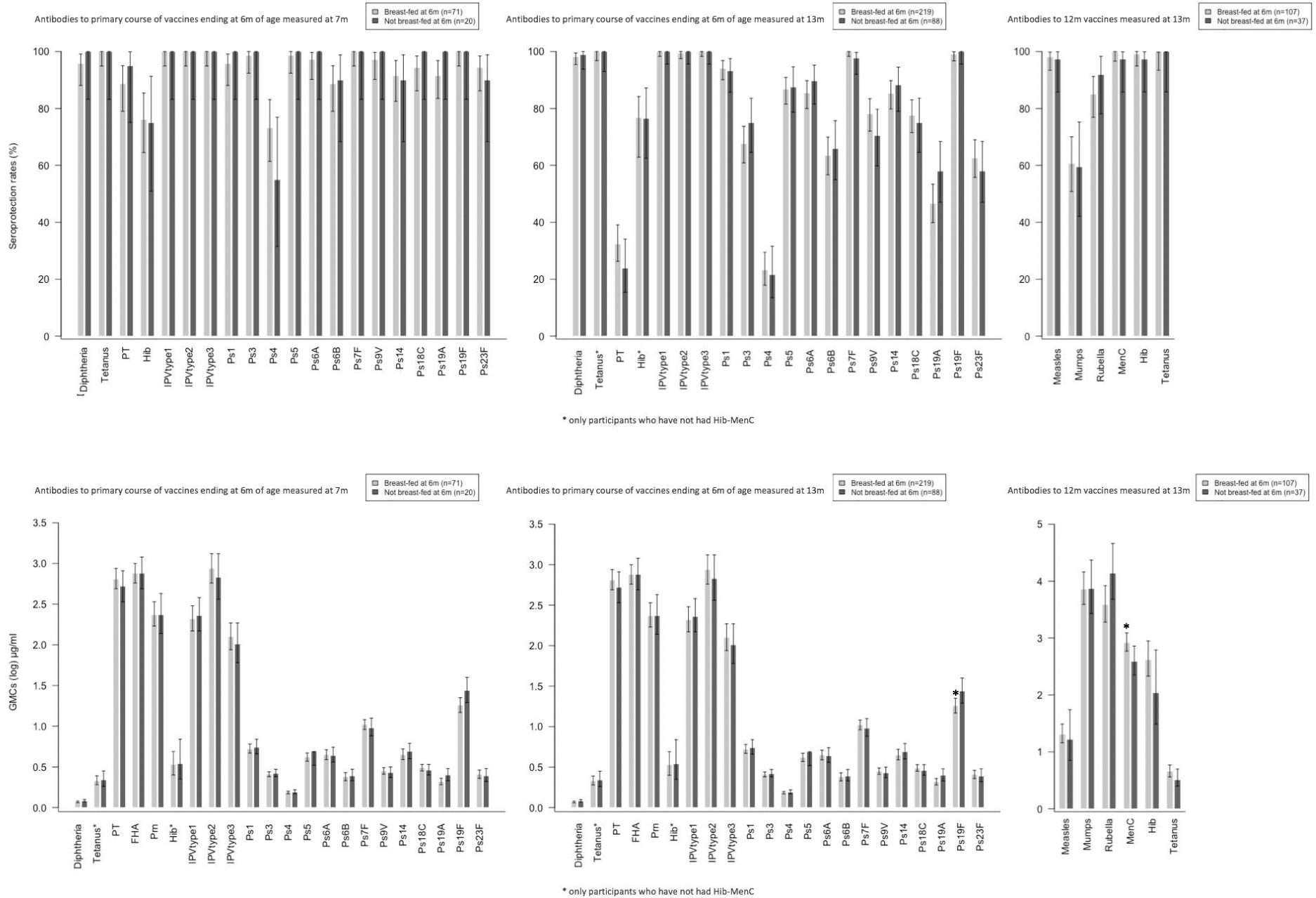
Supplementary Figure S2 Seroprotection rates and GMCs infants who did or did not receive formula milk before discharge from birth



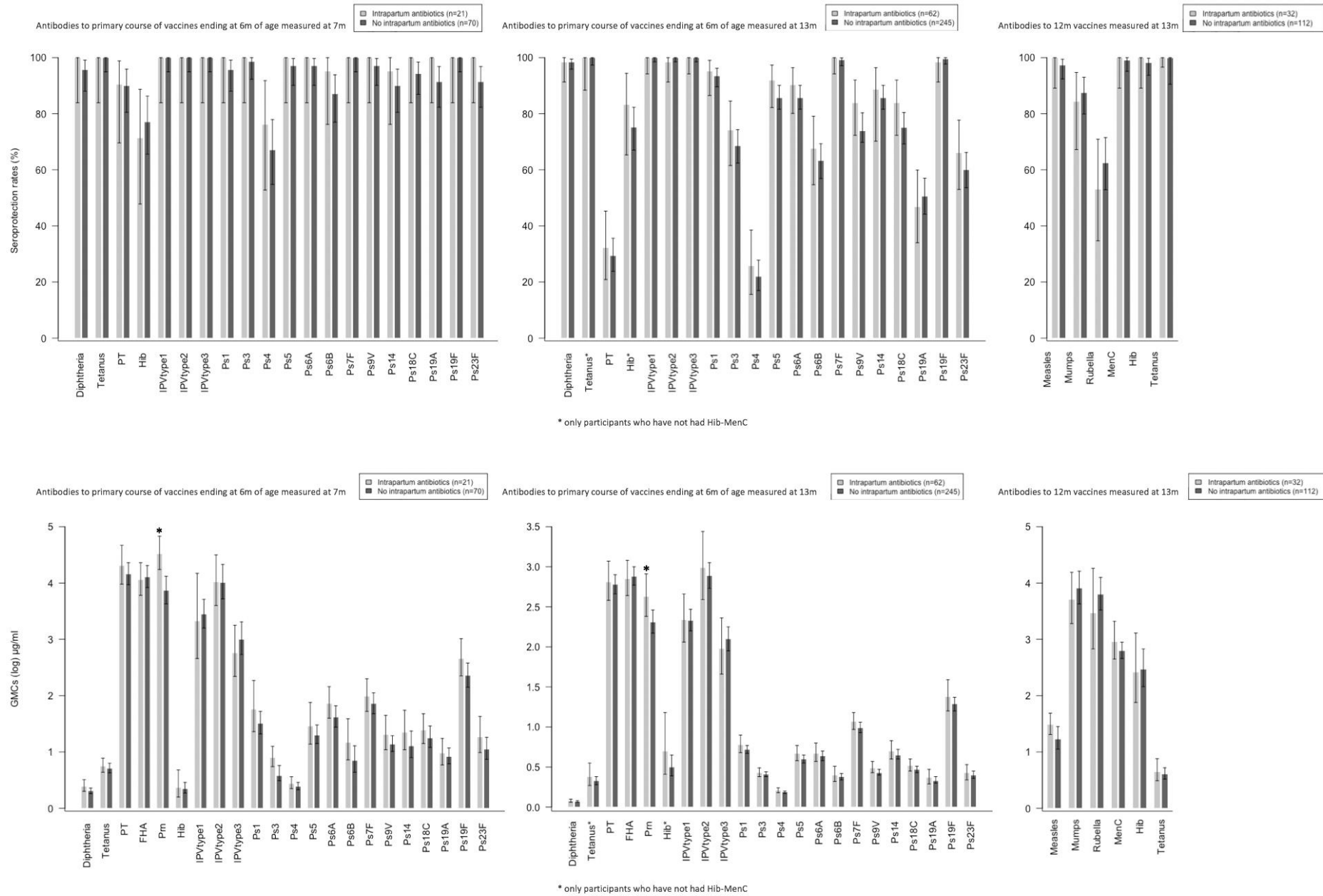
Supplementary Figure S3 Seroprotection rates and GMCs in infants who were or were not still breastfed at 1 month of age



Supplementary Figure S4 Seroprotection rates and GMCs in infants who were or were not still breastfed at 6 month of age



Supplementary Figure S5 Seroprotection rates and GMCs in infants whose mothers did or did not receive antibiotics during delivery



Supplementary Figure S6 Seroprotection rates and GMCs in infants who did or did not receive antibiotics before their six-weeks vaccination

