Supplementary

Supplemental Table S1: Period prevalence of diarrhea during the 2 weeks prior to the survey among children under 5 years of age in the 2018 NDHS (N=30,713)

Characteristics		n	Percentage of under 5years old who had diarrhea reported during the 2 weeks before the survey (95% CI)	P-value
Child's age in Months				
	< 6	3250	9.6 (8.6, 10.9)	
	6-11	3149	20.1 (18.5, 21.7)	
	12-23	6059	20.2 (19.1, 21.4)	
	24-35	5834	13.8 (12.8, 14.9)	<0.001
	36-47	6168	8.7 (7.9, 9.5)	
	48-59	6253	6.1 (5.9, 7.4)	
Sex of child				
	Male	15537	12.7 (12.1, 13.3)	
	Female	15176	12.9 (12.3, 13.5)	0.766
Birth order				
	First	5885	11.6 (10.7, 12.6)	
	Second/Third	10504	11.5 (10.8, 12.3)	<0.001
	Fourth/Fifth	7202	12.2 (11.3, 13.1)	
	Sixth and above	7122	16.3 (15.3, 17.3)	
Child lives with whom				
	Respondent	29895	13.0 (12.6, 13.5)	<0.001
	Lives elsewhere	818	3.6 (2.5, 5.4)	
Place of Delivery				
	Non-institutional	18277	15.1 (14.5, 15.7)	<0.001
	Institutional	12436	9.3 (8.8, 9.9)	
Maternal age (in years)				
	< 20	1289	20.1 (17.6, 22.8)	
	20-34	21583	12.8 (12.3, 13.3)	<0.001
	35-49	7844	11.6 (10.8, 12.4)	
Current marital status				
	Never in union	645	10.9 (8.0, 14.6)	
	Married/living with partner	29181	12.8 (12.4, 13.3)	0.585
	Widowed/Divorced/Separated	887	12.4 (10.0, 15.5)	
Maternal educational level				
	No education	13527	16.3 (15.6,17.0)	
	Primary	4776	13.0 (12.0, 14.2)	
	Secondary	9913	9.5 (8.8, 10.2)	<0.001
	Higher	2497	6.3 (5.3, 7.5)	
Mother currently working				
	No	9949	13.3 (12.5, 14.0)	0.250
	Yes	20764	12.6 (12.1, 13.1)	
Place of residence				
	Urban	10851	9.6 (9.0,10.2)	<0.001
	Rural	19862	14.9 (14.3, 15.5)	
Religion of mother				
	Catholic	2744	7.4 (6.5, 8.5)	
	Other Christian	9594	7.3 (6.7, 7.9)	
	Islam	18113	16.1 (15.5, 16.8)	<0.001
	Traditionalist	108	5.8 (2.9,11.4)	
	Other	154	1.8 (0.4,7.0)	
Ethnicity of mother				
	Hausa	9576	15.8 (15.0, 16.6)	
	Fulani	2884	22.4 (20.8, 24.2)	
	Ekoi	144	6.9 (3.5, 13.2)	
	Ibibio	440	7.9 (5.4, 11.4)	
	Igala	288	7.1(4.0, 12.6)	
	Igbo	4200	6.1 (5.3, 6.9)	
	Ijaw/Izion	750	3.6 (2.2, 5.9)	
	Kanuri/Beriberi	746	13.2 (10.8, 16.1)	
	Tiv	723	9.8 (7.6, 12.4)	
	Yoruba	3037	5.7 (4.9, 6.7)	<0.001
	Other	7897	13.4 (12.6, 14.3)	
	Don't know	28	4.9 (0.7, 27.6)	
Sources of drinking water				
	Unimproved	12058	15.1 (14.4, 15.8)	<0.001
	Improved	18655	11.5 (11.0, 12.0)	

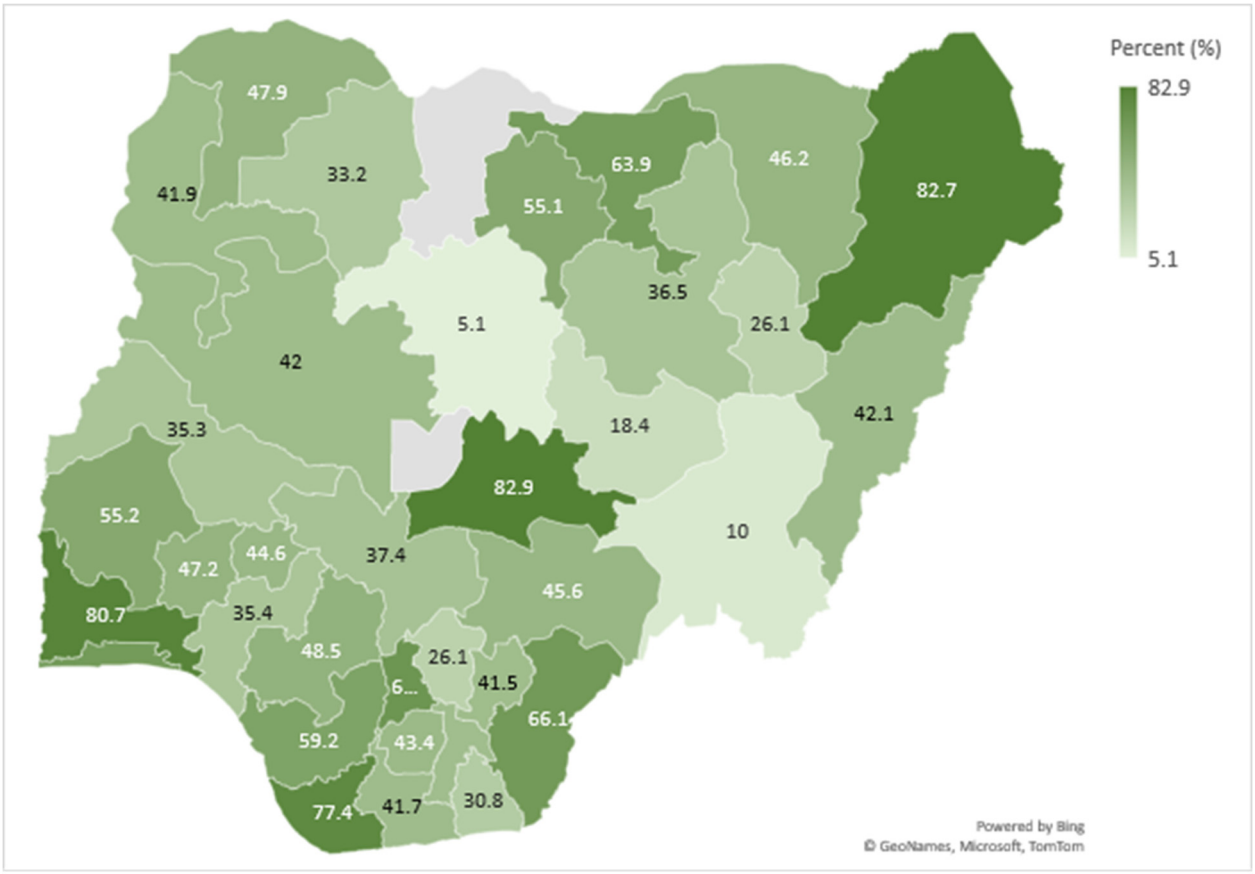
Toilet facility				
	Unimproved	15644	14.3 (13.6, 14.9)	<0.001
	Improved	15069	11.4 (10.8, 12.0)	
Presence of water at hand washing place (n=24304)				
	Water not available	9577	14.8 (14.0, 15.7)	<0.001
	Water available	14727	11.2 (10.7, 11.8)	
Soap or detergent present at hand washing place (n=24304)				
	No	16658	14.5 (13.9, 15.2)	<0.001
	Yes	7646	9.0 (8.3, 9.8)	
Sex of household head				
	Male	27776	13.1 (12.6, 13.5)	0.001
	Female	2937	10.0 (8.8, 11.4)	
Household wealth quintiles				
	Poorest	7081	18.6 (17.6. 19.7)	<0.001
	Poorer	6839	15.4 (14.5, 16.4)	
	Middle	6509	12.2 (11.3, 13.1)	
	Richer	5747	9.7 (8.8, 10.7)	
	Richest	4537	6.2 (5.4, 7.0)	
Region				
	North Central	5403	11.4(10.4,12.4)	<0.001
	North East	6481	24.6 (23.4, 25.9)	
	North West	8934	13.8 (13.0, 14.6)	
	South East	3545	6.1(5.3.7.0)	
	South South	3021	6.1 (5.1, 7.2)	
	South West	3329	5.2 (4.4, 6.1)	
Diarrrhea status 2 weeks before Survey				
	Did not have diarrhea	26757	87.1 (86.7, 87.4)	-
	Had diarrhea	3965	12.9 (12.5, 13.3)	

Supplemental Table S2: Proportion of children under 5 years of age with diarrhea for whom mothers/caregivers reported the child received ORS, zinc and ORS and zinc in the 2018 NDHS (N=3956)

Characteristics		n	Percentage of ORS uptake among under 5 years who had diarrhea 2 weeks before the survey (95% CI)	Percentage of zinc supplement uptake among under 5 years who had diarrhea 2 weeks before the survey (95% CI)	Percent of ORS and zinc supplement uptake among under 5 years who had diarrhea 2 weeks before the survey (95% CI)
Child's age in Months					
	< 6	324	33.0 (27.4, 39.2)	20.3 (15.6, 26.1)	15.4 (11.2, 20.9)
	6-11	641	40.3 (36.0, 44.7)	32.0 (27.8, 36.4)	22.8 (19.3, 26.8)
	12-23	1229	46.8 (43.6, 50.0)	33.7 (30.8, 36.8)	25.9 (23.2, 28.8)
	24-35	800	42.7 (38.8, 46.7)	32.1 (28.5, 35.9)	24.5 (21.2, 28.1)
	36-47	560	39.4 (34.9, 44.1)	29.4 (25.3, 33.8)	21.8 (18.2, 25.9)
	48-59	402	38.2 (32.8, 43.8)	30.6 (25.4, 36.2)	23.3 (18.9, 28.4)
Sex of child					
	Male	2015	41.5 (39.1, 44.0)	30.3 (28.0, 32.6)	21.6 (19.6, 23.8)
	Female	1941	42.2 (39.8, 44.8)	32.0 (29.6, 34.5)	25.4 (23.2, 27.6)
Birth order					
	First	684	39.6 (35.4, 43.9)	27.7 (23.8, 31.9)	20.2 (16.9, 23.9)
	Second/Third	1228	43.8 (40.6, 47.1)	31.6 (28.6, 34.7)	23.7 (21.0, 26.6)
	Fourth/Fifth	883	40.7 (37.1, 44.4)	33.0 (29.5, 36.6)	24.8 (21.7, 28.2)
	Sixth and above	1161	42.1 (38.9, 45.4)	31.3 (28.4, 34.4)	24.2 (21.5, 27.1)
Place of Delivery					
	Non-institutional	2776	37.5 (35.5, 39.6)	28.6 (26.7, 30.6)	21.0 (19.4, 22.8)
	Institutional	1180	52.4 (49.1, 55.7)	37.1 (33.9, 40.4)	29.3 (26.3, 32.6)
Maternal age (in years)					
	< 20	246	32.5 (26.3, 39.5)	25.8 (19.4, 33.4)	16.3 (11.7, 22.3)
	20-34	2805	43.7 (41.6, 45.9)	31.7 (29.8, 33.8)	24.3 (22.5, 26.2)

35-49	905	38.8 (35.3, 42.5)	30.8 (27.5, 34.3)	23.0 (20.0, 26.2)
Current marital status				
Never in union	59	41.4 (26.4, 58.2)	17.6 (9.0, 31.6)	12.2(5.1, 26.2)
Married/living with partner	3799	41.8 (40.0, 43.6)	31.4 (29.7, 33.1)	23.7 (22.2, 25.3)
Widowed/Divorced/Separated	98	44.3 (32.8, 56.4)	29.9 (20.0, 42.1)	20.8 (12.8, 32.0)
Maternal educational level				
No education	2248	38.9 (36.6, 41.2)	28.7 (26.6, 30.9)	22.1 (20.2, 24.2)
Primary	614	44.9 (40.4, 49.4)	28.9 (25.1, 33.1)	22.4 (18.9, 26.3)
Secondary	931	44.3 (40.6, 48.1)	35.8 (32.1, 39.6)	24.8 (21.7, 28.3) 37.6
Higher	163	58.6 (49.9, 66.8)	45.6 (37.1, 54.3)	(29.5, 46.3)
Mother currently working				
No	1353	36.0 (33.1, 39.0)	28.7 (26.0, 31.6)	20.0 (17.6, 22.6)
Yes	2603	44.8 (42.6, 47.0)	32.3 (30.3, 34.4)	25.2 (23.4, 27.2)
Place of residence				
Urban	1098	51.6(48.2, 55.0)	37.8 (34.5, 41.1)	30.2 (27.2, 33.4)
Rural	2858	37.8 (35.8. 39.9)	28.3 (26.4, 30.3)	20.6 (19.0, 22.4)
Religion of mother				
Catholic	215	43.5 (36.5, 50.6)	26.4 (20.7, 33.1)	19.5 (14.4, 25.6)
Other Christian	722	41.6 (37.5, 45.9)	28.3 (24.6, 32.4)	18.9 (15.7, 22.5)
Islam	3009	41.9 (39.9, 43.9)	32.0 (30.1, 34.0)	24.7 (22.9, 26.5)
Traditionalist	8	30.7 (8.2, 68.7)	15.7 (02, 60.4)	15.7 (2.2, 60.4)
Other	2	45.1 (4.9, 92.9)	-	45.1 (4.9, 92.9)
Ethnicity of mother				
Hausa	1511	44.6 (41.8, 47.4)		
Fulani	675	29.8(25.9, 34.0)	37.8 (35.1, 40.5)	28.6 (26.2, 31.2)
Ekoi	10	66.6 (34.2, 88.4)	20.9 (17.6, 24.5)	14.5 (11.8, 17.8)
Ibibio	32	37.2 (20.1, 58.3)	52.4 (21.5, 81.6)	42.8 (16.5, 74.0)
Igala	17	55.7 (27.4, 80.7)	34.0 (17.4, 55.7)	26.8 (11.6, 50.5)
Igbo	276	50.4 (43.9, 57.0)	38.5 (14.2, 70.4)	33.8 (10.9, 68.1)
Ijaw/Izion	19	54.0 (30.0, 76.3)	29.8 (24.0, 36.2)	23.7 (18.6, 29.8)
Kanuri/Beriberi	113	55.8 (45.6, 65.5)	63.6 (37.6, 83.5)	45.1 (23.4, 68.7)
Tiv	68	47.4 (34.9, 60.2)	28.7 (19.5, 40.1)	26.1 (17.1, 37.7)
Yoruba	186	47.8 (39.6, 56.1)	25.1 (15.6, 37.8)	16.5 (9.0, 28.4)
Other	1048	38.0 (34.6, 41.6)	30.3 (22.9, 38.8)	23.6 (17.1, 31.7)
			25.0 (22.0, 28.2)	18.3 (157, 21.1)
Sources of drinking water				
Unimproved	1814	33.9 (31.4, 36.5)	25.2 (22.9, 27.7)	17.9 (16.0, 20.1)
Improved	2142	44.7 (45.3, 50.2)	35.4 (33.1, 37.8)	27.5 (25.4, 29.7)
Sex of household head				
Male	3685	41.8 40.0, 43.6)	31.6 (29.9, 33.4)	23.8 (22.2, 25.4)
Female	271	43.1 (36.3, 50.2)	24.6 (19.1, 31.0)	19.4 (14.5, 25.5)
Household wealth quintiles				
Poorest	1303	35.2 (32.2, 38.2)	25.9 (23.2, 28.7)	19.7 (17.3, 22.3)
Poorer	1031	38.0 (34.6, 41.4)	25.2 (22.2, 28.4)	19.3 (16.7, 22.3)
Middle	776	43.1 (39.2, 47.1)	36.1 (32.2, 40.1)	25.5 (22.2, 29.1)
Richer	552	48.6 (43.8, 53.5)	38.7 (34.1, 43.6)	28.5 (24.4, 33.0)
Richest	294	65.3 (59.0, 71.2)	45.2 (38.8, 51.7)	37.9 (31.4, 44.0)

Region					
	North Central				
	North East	540	40.8(36.2, 45.5)	22.9 (19.3, 27.1)	17.9 (14.6, 21.8)
	North West	554	38.2 (35.3, 41.1)	22.0 (19.5, 24.6)	19,9 (15.6, 20.4)
		1580	43.4(40.4,46.4)	41.9 (38.9, 44.9)	30.0 (27.3, 32.8)
	South East	1234	44.9 (38.2, 51.8)	27.5, (21.8, 34.1)	22.9 (17.6, 29.3)
		232	44.6 (36.3, 53.1)	32.7 (25.4, 41.1)	22.6 (16.5, 30.1)
	South South	162	52.9 (44.7, 60.9)	35.1 (27.5, 43.6)	27.5 (20.6, 35.8)
	South West				



Supplemental Figure S1: Percentage of children with diarrhea during the 2 weeks prior to the survey that were reported to have received oral rehydration solution (ORS) by state in the 2018 NDHS

Supplemental Table S3: Univariable regression models to estimate the likelihood of uptake of Zinc and ORS by under 5 children, maternal and household characteristics during episode of childhood diarrhea in the NDHS 2018

Characteristics	**N**	**Zinc**		**ORS**		**Zinc & ORS**	
		Univariable relative risk 95% CI	**p-value**	**Univariable relative risk 95% CI**	**p-value**	**Univariable relative risk 95% CI**	**p-value**
Child's age in Months							
< 6	324	Reference		Reference		Reference	
6-11	641	1.66 (1.23. 2.23)	0.001	1.38 (1.09, 1.75)	0.007	1.62 (1.15, 2.28)	0.006
	1229	1.82(1.38, 2.41)	<0.001	1.52 (1.22,1.90)	<0.001	1.83 (1.33, 2.52)	<0.001
12-23	800	1.71 (1.28, 2.28)	0.0061	1.38 (1.10, 1.74)	0.006	1.69 (1.21, 2.35)	0.002
	560	1.60 (1.18, 2.17)	0.002	1.27 (1.00, 1.62)	0.051	1.55 (1.09, 2.20)	0.015
24-35	402	1.63 (1.18, 2.23)	0.003	1.29 (1.00, 1.66)	0.056	1.65 (1.15, 2.38)	0.007
36-47							

48-59							
Sex of child							
Male	2015	Reference		Reference		Reference	
Female	1941	1.00 (0.89, 1.13)	0.941	1.0 (0.91, 1.10)	0.988	1.11 (0.97, 1.27)	0.116
Birth order							
First	684	Reference		Reference	0.199	Reference	
Second/Third	1228	1.09 (0.91, 1.31)	0.321	1.10(0.95, 1.28)	0.515	1.13 (0.92, 1.49)	0.250
Fourth/Fifth	883	1.21 (1.00, 1.46)	0.049	1.05 (0.90, 1.24)	0.570	1.26 (1.02, 1.57)	0.036
Sixth and above	1161	1.12 (0.94, 1.34)	0.211	1.05 (0.90, 1.22)		1.16 (0.94, 1.43)	0.168
Place of Delivery							
Non-institutional	2776	Reference		Reference		Reference	
Institutional	1180	1.28 (1.14, 1.45)	<0.001	1.35 (1.22, 1.50)	<0.001	1.27 (1.111.47)	0.001
Maternal age (in years)							
< 20	246	Reference		Reference		Reference	
20-34	2805	1.36 (1.03, 1.79)	0.029	1.26 (1.01, 1.59)	0.043	1.54 (1.10, 2.16)	0.011
35-49	905	1.31 (0.98, 1.76)	0.068	1.15 (0.90, 1.47)	0.255	1.46 (1.02, 2.08)	0.038
Current marital status							
Never in union	59	Reference		Reference		Reference	
Married/living with partner	3799	1.57 (0.87, 2.85)	0.136	1.24 (0.79, 1.95)	0.353	1.85 (0.88, 3.90)	0.104
Widowed/Divorced/Separated	98	1.48 (0.73, 2.98)	0.275	1.17 (0.67, 2.04)	0.573	1.63 (0.69, 3.89)	0.267
Maternal educational level							
No education	2248	Reference		Reference		Reference	
Primary	614	1.00 (0.84, 1.18)	0.967	1.11 (0.96, 1.28)	0.146	(0.82, 1.21)	0.948
Secondary	931	1.21 (1.06, 1,.39)	0.005	1.16 (1.03, 1.30)	0.017	1.09 (0.93, 1.29)	0.279
Higher	163	1.54 (1.20, 1.98)	0.001	1.51 (1.22, 1.86)	<0.001	1.62 (1.22, 2.14)	0.001
Mother currently working							
No	1353	Reference		Reference		Reference	
Yes	2603	1.12 (0.99, 1.27)	0.066	1.21 (1.09,1.35)	<0.001	1.29 (1.11. 1.49)	0.001
Place of residence							
Urban	1098	Reference		Reference		Reference	
Rural	2858	0.72 (0.64, 0.82)	<0.001	0.75 (0.68, 0.84)	<0.001	0.69 (0.60, 0.80)	<0.001
Religion							
Catholic	215	Reference		Reference		Reference	
Other Christian	722	0.99 (0.74, 1.34)	0.971	0.93 (0.74, 1.18)	0.562	0.87 (0.61, 1.24)	0.444
Islam	3009	1.15 (0.88, 1.51)	0.296	0.94 (0.76, 1.16)	0.548	1.18 (0.87, 1.61)	0.292
Traditionalist	8	0.48 (0.07, 3.47)	0.467	0.59 (0.15, 2.40)	0.461	0.64 (0.09, 4.65)	0.659
Other	2	3.84 (0.94,15.73)	0.062	1.18 (0.16, 8.48)	0.868	2.56 (0.35, 18.59)	0.353

Ethnicity							
Hausa	1511	Reference		Reference		Reference	
Fulani	675	0.54 (0.45, 0.65)	<0.001	0.60 (0.51, 0.71)	<0.001	0.47 (0.37, 0.59)	<0.001
Ekoi	10	1.60 (0.72, 3.59)	0.249	1.33 (0.60, 2.98)	0.481	1.74 (0.72. 4.20)	0.218
Ibibio	32	0.67 (0.33, 1.34)	0.258	0.63 (0.32, 1.21)	0.163	0.54 (0.22, 1.31)	0.176
Igala	17	0.79 (0.33, 1.90)	0.593	1.18 (0.61, 2.27)	0.625	0.82 (0.31, 2.19)	0.691
Igbo	276	0.75 (0.59, 0.95)	0.016	1.08 (0.90,1.30)	0.413	0.78 (0.60, 1.02)	0.070
Ijaw/Izon	19	1.83 (1.06, 3.17)	0.031	1.29 (0.71, 2.34)	0.405	1.83 (0.98, 3.43)	0.058
Kanuri/beriberi	113	0.57 (0.38, 0.85)	<0.007	1.02 (0.77, 1.36)	0.869	0.62 (0.39, 0.96)	0.034
Tiv	68	0.59 (0.35, 0.99)	0.044	0.92 (0.63, 1.34)	0.650	0.51 (0.27, 0.96)	0.036
Yoruba	186	0.69 (0.51, 0.93)	0.014	0.99 (0.79, 1.25)	0.952	0.69 (0.50. 0.97)	0.032
Other	1048	0.65 (0.56, 0.75)	<0.001	0.80 (0.71, 0.91)	0.001	0.61 (0.51, 0.73)	<0.001
Sources of drinking water							
Unimproved	1814	Reference		Reference		Reference	
Improved	2142	1.50 (1.34, 1.70)	<0.001	1.51 (1.36, 1.67)	<0.001	1.63 (1.42, 1.88)	<0.001
Sex of household head							
Male	3685	Reference		Reference		Reference	
Female	271	0.84 (0.66, 1.08)	0.167	0.96 (0.79, 1.18)	0.713	0.84 (0.63, 1.11)	0.223
Wealth quintiles							
Poorest	1303	Reference		Reference		Reference	
Poorer	1031	0.99 (0.83, 1.17)	0.880	1.10 (0.95, 1.26)	0.194	0.97 (0.80, 1.17)	0.734
Middle	776	1.43 (1.21, 1.68)	<0.001	1.32 (1.14, 1.52)	<0.001	1.36 (1.13, 1.65)	0.002
Richer	552	1.66 (1.39, 1.97)	<0.001	1.45 (1.24, 1.69)	<0.001	1.56 (1.28, 1.92)	<0.001
Richest	294	1.90 (1.55, 2.33)	<0.001	1.95 (1.65, 2.23)	<0.001	1.97 (1.56, 2.48)	<0.001
Region							
North Central	540	Reference		Reference		Reference	
North East	554	0.85 (0.69, 1.05)	0.127	0.82 (0.70, 0.96)	0.016	0.85 (0.67, 1.08)	0.181
North West	1580	1.87 (1.54, 2.27)	<0.001	1.16 (0.99,1.36)	0.062	1.79 (1.43, 2.23)	<0.001
South East	1234	1.16 (0.85, 1.57)	0.347	1.13 (0.90, 1.43)	0.291	1.22 (0.87, 1.71)	0.256
South South	232	1.55 (1.14, 2.11)	0.006	1.14 (0.87, 1.49)	0.333	1.47 (1.02, 2.10)	0.038
South West	162	1.29 (0.95, 1.76)	0.103	1.25 (0.98, 1.59)	0.067	1.28 (0.90, 1.83)	0.171