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Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Gibson DG, Ochieng B, Kagucia EW, et al. Mobile phone-delivered reminders and incentives to improve childhood immunisation coverage and timeliness in Kenya (M-SIMU): a cluster randomised controlled trial. *Lancet Glob Health* 2017; **5**: e428–38.

Appendix Table S1. Detailed distribution of mobile phone ownership and access at enrollment

| Mobile Phone Access Point | Control (n=360) | SMS Only (n=388) | SMS+75KES (n=446)* | SMS+200KES (n=406)* | Total (n=1600)† | Shared Phone (n=810)† |
|---------------------------|--------------------|---------------------|-----------------------|------------------------|--------------------|--------------------------|
| Owns phone | 182 (51%) | 205 (53%) | 210 (47%) | 193 (48%) | 790 (49%) | |
| Spouse | 106 (29%) | 107 (28%) | 124 (28%) | 119 (29%) | 456 (29%) | 456 (56%) |
| Someone else in household | 27 (8%) | 25 (6%) | 44 (10%) | 31 (8%) | 127 (8%) | 127 (16%) |
| Someone else in compound | 26 (7%) | 22 (6%) | 29 (7%) | 26 (6%) | 103 (6%) | 103 (13%) |
| Neighbor | 12 (3%) | 24 (6%) | 33 (7%) | 30 (7%) | 99 (6%) | 99 (12%) |
| Other | 7 (2%) | 5 (1%) | 5 (1%) | 6 (1%) | 23 (1%) | 23 (2%) |

Data are n (%). SMS=short message service. KES=Kenyan Shilling. *1 missing value. † 2 missing values

Table S2. Demographics of analytic vs non-analytic sample

| | Analytic sample (n=1600) | Verbal report (n=107) | LFU (n=311) | Total Excluded (n=418) | p value* |
|---------------------------------|-----------------------------|--------------------------|----------------|---------------------------|----------|
| Mobile phone access | | | | | |
| Shares phone | 810 (51%) | 63 (59%) | 167 (54%) | 230 (55%) | 0.11 |
| Owns phone | 790 (49%) | 44 (41%) | 144 (46%) | 188 (45%) | |
| Infant's gender | | | | | |
| Female | 800 (50%) | 60 (56%) | 159 (51%) | 219 (52%) | 0.38 |
| Male | 800 (50%) | 47 (44%) | 152 (49%) | 199 (48%) | |
| Socioeconomic status | | | | | |
| Bottom 40% | 629 (39%) | 35 (33%) | 144 (46%) | 179 (43%) | 0.19 |
| Upper 60% | 971 (61%) | 72 (67%) | 167 (54%) | 239 (57%) | |
| Time to clinic | | | | | |
| ≤ 30 minutes | 975 (61%) | 67 (63%) | 199 (64%) | 266 (64%) | 0.31 |
| > 30 minutes | 625 (39%) | 40 (37%) | 112 (36%) | 152 (36%) | |
| Maternal Education | | | | | |
| ≤ 7 years | 411 (26%) | 22 (21%) | 76 (24%) | 98 (23%) | 0.35 |
| > 7 years | 1189 (74%) | 85 (79%) | 235 (76%) | 320 (77%) | |
| Maternal Age[†] | | | | | |
| ≤ 25 years | 825 (52%) | 72 (67%) | 228 (73%) | 300 (72%) | 0.0001 |
| >25 years | 769 (48%) | 35 (33%) | 83 (27%) | 118 (28%) | |
| # Child under 5 in house | | | | | |
| ≤1 child | 558 (35%) | 35 (33%) | 145 (47%) | 180 (43%) | 0.002 |
| >1 child | 1042 (65%) | 72 (67%) | 166 (53%) | 238 (57%) | |
| Region | | | | | |
| Asembo | 335 (21%) | 22 (21%) | 46 (15%) | 68 (16%) | 0.033 |
| Gem | 1265 (79%) | 85 (79%) | 265 (85%) | 350 (84%) | |
| Place of last delivery | | | | | |
| At home | 445 (28%) | 33 (31%) | 82 (26%) | 115 (28%) | 0.90 |
| Health Facility | 1155 (72%) | 74 (69%) | 229 (74%) | 303 (72%) | |

Data are mean (SD) or n (%). Percentages do not add up to 100% in some cases due to rounding. LFU= loss to follow up. SMS=short-message service. LFU includes deceased children and caregivers who out-migrated from the study area. *As compared to analytic sample. †6 missing values in analytic sample.

Table S3. SMS reminders sent per protocol by study arm

| | SMS (n=388) | SMS+75KES (n=446) | SMS+200KES (n=406) | Total (n=1240) |
|----------------------|-------------------|----------------------|-----------------------|-------------------|
| Per Protocol* | | | | |
| Pentavalent1 | 306 (78.9%) | 367 (82.3%) | 341 (84.0%) | 1014 (81.8%) |
| Pentavalent2 | 284 (73.2%) | 341 (76.5%) | 317 (78.1%) | 942 (76.0%) |
| Pentavalent3 | 309 (79.6%) | 366 (82.0%) | 338 (83.3%) | 1013 (81.7%) |
| Measles | 386 (99.5%) | 442 (99.1%) | 403 (99.3%) | 1231 (99.3%) |
| Total | 1285/1552 (82.8%) | 1516/1784 (85.0%) | 1399/1624 (86.1%) | 4200/4960 (84.7%) |
| Sent any SMS† | | | | |
| Pentavalent1 | 362 (93.3%) | 415 (93.1%) | 380 (93.6%) | 1157 (93.3%) |
| Pentavalent2 | 366 (94.3%) | 423 (94.8%) | 388 (95.6%) | 1177 (94.9%) |
| Pentavalent3 | 381 (98.2%) | 442 (98.9%) | 401 (98.8%) | 1223 (98.6%) |
| Measles | 387 (99.7%) | 446 (100%) | 406 (100%) | 1239 (99.9%) |
| Total | 1496/1552 (96.4%) | 1726/1784 (96.7%) | 1575/1624 (96.9%) | 4797/4960 (96.7%) |
| Sent no SMS‡ | | | | |
| Pentavalent1 | 26 (6.7%) | 31 (7.0%) | 26 (6.4%) | 83 (6.7%) |
| Pentavalent2 | 22 (5.7%) | 23 (5.2%) | 18 (4.4%) | 63 (5.1%) |
| Pentavalent3 | 7 (1.8%) | 5 (1.1%) | 5 (1.2%) | 17 (1.4%) |
| Measles | 1 (0.3%) | 0 (0%) | 0 (0%) | 1 (0.1%) |
| Total | 56/1552 (3.6%) | 59/1784 (3.3%) | 49/1624 (3.0%) | 164/4960 (3.3%) |

Data are n (%) for 1240 children with immunisation data recorded on maternal and child health booklet at 12 months and in the intervention arms. SMS=short message service. KES=Kenyan Shilling. *Per protocol is defined as being sent the appropriate number of SMS reminders per vaccine. †Sent any SMS is defined as a caregiver who was sent reminders per protocol or sent at least one SMS. ‡Sent no SMS is defined as caregivers who were not sent a single SMS reminder for that vaccine.

Table S4. Per protocol analysis of SMS reminders on vaccination coverage at 12 months of age

| Vaccine | Control (n=360) | SMS (n=388)* | p value† | SMS+75KES (n=446)* | p value† | SMS+200KES (n=406)* | p value† |
|----------------------|--------------------|-------------------------------------|-------------|-------------------------------------|-------------|-------------------------------------|-------------|
| Per protocol‡ | | | | | | | |
| Penta1 | 359/360 (99.7%) | 305/306 (99.7%) 1.00 (0.99–1.01) | 0.89 | 365/367 (99.5%) 1.00 (0.99–1.01) | 0.57 | 341/341 (100.0%) N.A.† | N.A.‡ |
| Penta2 | 356/360 (98.9%) | 281/284 (98.9%) 1.00 (0.98–1.02) | 0.93 | 337/341 (98.8%) 1.00 (0.98–1.01) | 0.82 | 317/317 (100.0%) N.A.† | N.A.‡ |
| Penta3 | 353/360 (98.1%) | 300/309 (97.1%) 0.99 (0.96–1.01) | 0.38 | 359/366 (98.1%) 1.00 (0.98–1.02) | 0.94 | 336/338 (99.4%) 1.01 (1.00–1.03) | 0.15 |
| Measles | 302/360 (83.9%) | 336/386 (87.1%) 1.04 (0.97–1.11) | 0.28 | 384/442 (86.9%) 1.03 (0.96–1.10) | 0.37 | 363/403 (90.1%) 1.07 (1.01–1.14) | 0.028 |
| Sent any SMS§ | | | | | | | |
| Penta1 | 359/360 (99.7%) | 361/362 (99.7%) 1.00 (0.99–1.01) | 0.98 | 413/415 (99.5%) 1.00 (0.99–1.01) | 0.63 | 379/379 (100.0%) N.A.† | N.A.‡ |
| Penta2 | 356/360 (98.9%) | 361/366 (98.6%) 1.00 (0.98–1.02) | 0.71 | 419/423 (99.1%) 1.00 (0.99–1.02) | 0.90 | 386/388 (99.5%) 1.01 (0.99–1.02) | 0.45 |
| Penta3 | 353/360 (98.1%) | 368/381 (96.6%) 0.98 (0.96–1.01) | 0.19 | 434/441 (98.4%) 1.00 (0.98–1.02) | 0.83 | 396/401 (98.8%) 1.01 (0.99–1.02) | 0.59 |
| Measles | 302/360 (83.9%) | 337/387 (87.1%) 1.04 (0.97–1.11) | 0.28 | 388/446 (87.0%) 1.03 (0.97–1.10) | 0.36 | 365/406 (89.9%) 1.07 (1.01–1.14) | 0.034 |

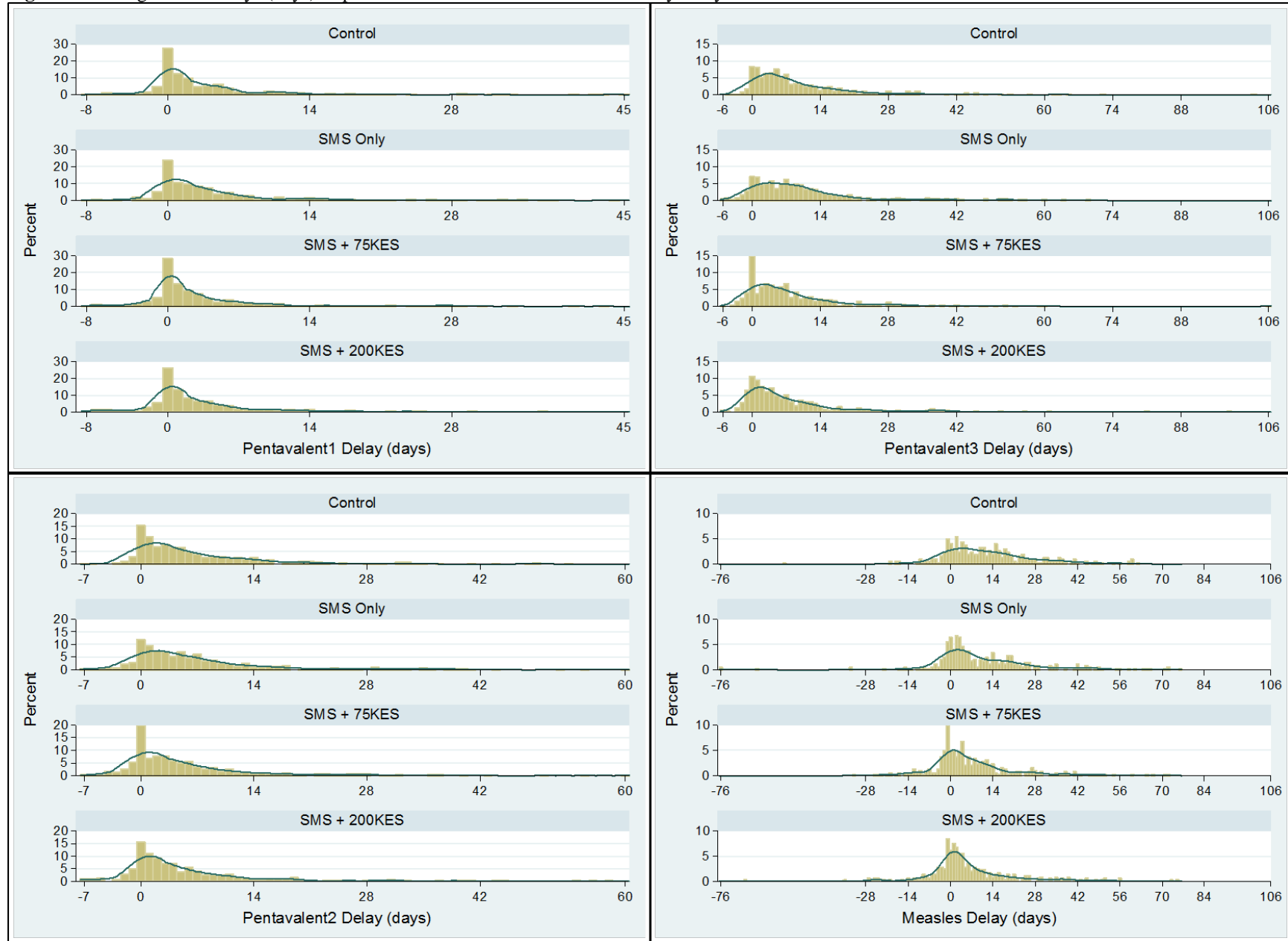
Data are n (%) and RR (95% CI) for children with immunisation data recorded on maternal and child health booklet at 12 months. SMS=short message service. KES=Kenyan Shilling. *Risk Ratios and 95% CI were adjusted to account for correlation within clusters †As compared to control arm. ‡Study arm perfectly predicts outcome. ‡Per protocol SMS reminders defined as being sent the appropriate number of reminders per vaccine. §Sent any SMS is defined as a caregiver who was sent reminders per protocol or sent at least one SMS.

Table S5. Distribution in delays (days) for FIC and vaccines within FIC

| | Recommended age | Control | SMS Only | SMS + 75KES | SMS +200KES |
|------------------------|------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Primary Outcome | | | | | |
| FIC* | 9 months (274 d) | 10 (2, 20) 12.5 (19.2) | 6 (5, 19) 9.4 (23.6) | 4 (-1, 12) 6.7 (18.0) | 3 (-1, 11) 6.4 (19.4) |
| Days delayed | | | | | |
| BCG | Birth (0 d) | 11 (4, 19) 16.3 (21.8) | 11 (5, 17) 16.5 (29.1) | 12 (5, 20) 16.9 (26.0) | 10 (4, 18) 13.7 (17.1) |
| Pentavalent1 | 6 weeks (42 d) | 1 (0, 5) 4.7 (11.3) | 2 (0, 6) 5.8 (18.2) | 1 (0, 4) 4.0 (16.9) | 1 (0, 5) 3.8 (9.6) |
| Pentavalent2 | 10 weeks (70 d) | 4 (1, 10) 8.5 (18.5) | 5 (1, 10) 9.1 (21.1) | 3 (0, 8) 6.4 (16.7) | 3 (0, 7) 6.9 (15.4) |
| Pentavalent3 | 14 weeks (98 d) | 6 (2, 14) 11.7 (19.9) | 7 (2, 14) 12.7 (23.4) | 5 (1, 12) 9.8 (17.7) | 4 (1, 11) 8.7 (18.3) |
| Measles | 9 months (274 d) | 10 (2, 20) 12.7 (19.2) | 6 (0, 19) 9.6 (23.9) | 4 (-1, 12) 6.7 (18.0) | 3 (-1, 11) 6.3 (19.3) |

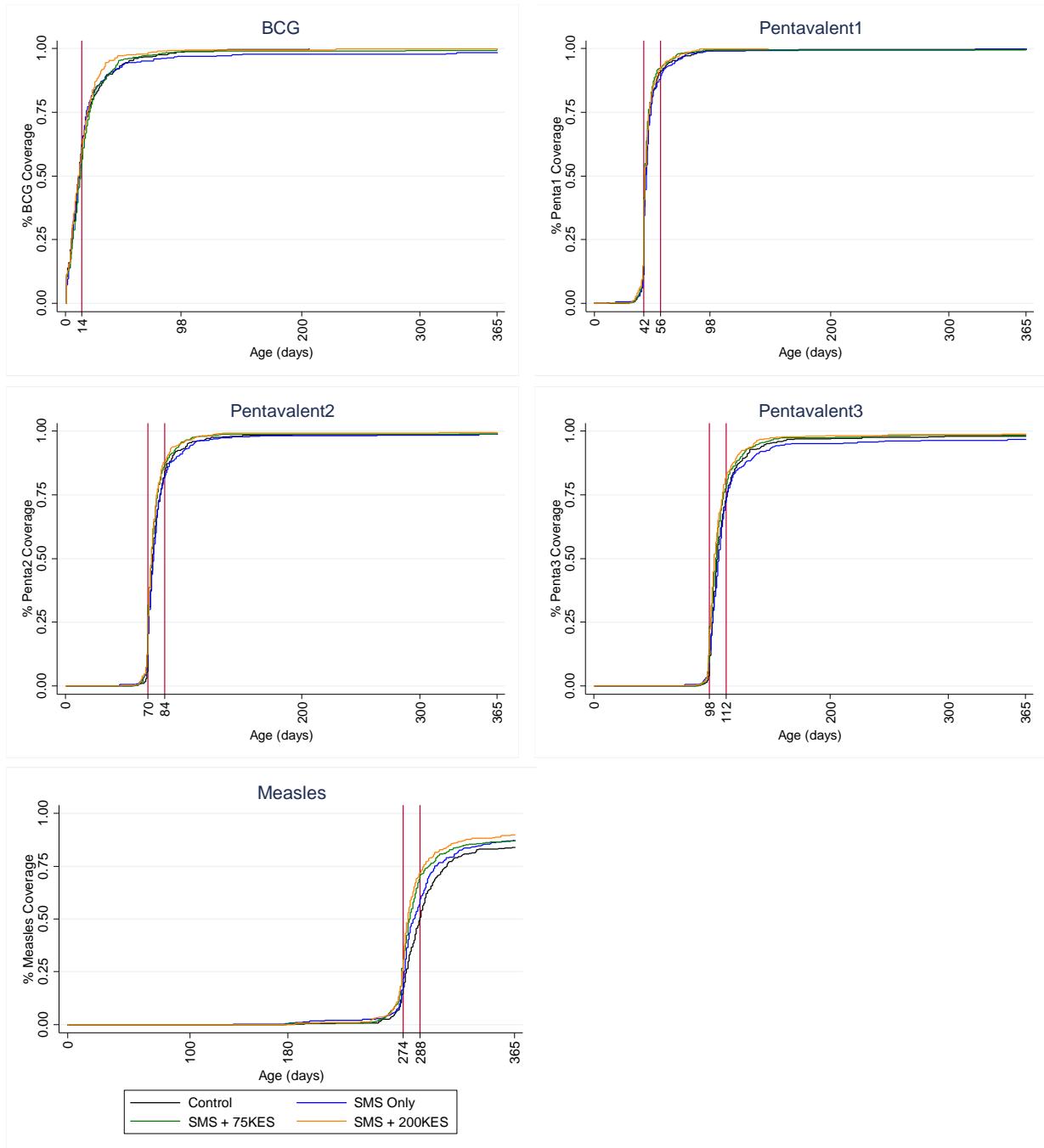
Data are median (IQR) and mean (SD) for vaccination delays (days) by study arm. Delays are counted from the recommended age. Children who did not receive vaccination are excluded from analyses. SMS=short message service. KES=Kenyan Shilling. FIC=fully immunised child. *FIC defined as a child who received BCG, three doses of pentavalent vaccine, three doses of polio vaccine, and measles vaccine by 12 months of age.

Figure S1 Histogram for delays (days) of pentavalent series and measles vaccine by study arms.



Delays are counted from the recommended age. Children who did not receive vaccination are excluded from analyses. SMS=short message service. KES=Kenyan Shilling. X axis range limits represent 99th percentile of days delayed for each vaccine. Kernel density plot used to smooth the distribution of days delayed

Figure S2. Effect of interventions on time to immunisation



Inverse time to immunisation curves were created using Kaplan-Meier survival analysis. Children were censored at 365 days of age. Vertical red lines indicate the two week window for timely immunisation using the Expanded Programme on Immunisation schedule. BCG=Bacille Calmette Guerin. FIC=fully immunised child. SMS=short message service. KES=Kenyan Shilling

Table S6. Vaccination timeliness for pentavalent2 and pentavalent3 using an interval-appropriate schedule

| | Control (n=360) | SMS* (n=388) | p value† | SMS+75KES* (n=446) | p value† | SMS+200KES* (n=406) | p value† |
|---------------------------|-----------------|-------------------------------------|-------------|-------------------------------------|-------------|-------------------------------------|-------------|
| Intention-to-treat | | | | | | | |
| Penta2 | 339/360 (94.2%) | 368/388 (94.9%) 1.01 (0.98–1.04) | 0.59 | 428/446 (96.0%) 1.02 (0.99–1.05) | 0.16 | 393/406 (96.8%) 1.03 (1.00–1.06) | 0.050 |
| Penta3 | 337/360 (93.6%) | 355/388 (91.5%) 0.98 (0.94–1.02) | 0.27 | 419/446 (94.0%) 1.01 (0.97–1.04) | 0.83 | 388/406 (95.6%) 1.02 (0.99–1.06) | 0.24 |
| Per Protocol‡ | | | | | | | |
| Penta2 | 339/360 (94.2%) | 269/284 (94.7%) 1.00 (0.97–1.04) | 0.80 | 325/341 (95.3%) 1.01 (0.98–1.05) | 0.59 | 308/341 (97.2%) 1.03 (1.00–1.07) | 0.068 |
| Penta3 | 337/360 (93.6%) | 287/309 (92.9%) 0.99 (0.95–1.03) | 0.71 | 344/366 (94.0%) 1.01 (0.97–1.04) | 0.85 | 326/338 (96.5%) 1.03 (0.99–1.07) | 0.091 |
| Sent any SMS§ | | | | | | | |
| Penta2 | 339/360 (94.2%) | 349/366 (95.4%) 1.01 (0.98–1.05) | 0.42 | 405/423 (95.7%) 1.02 (0.99–1.05) | 0.24 | 375/388 (96.7%) 1.03 (1.00–1.06) | 0.078 |
| Penta3 | 337/360 (93.6%) | 348/381 (91.3%) 0.98 (0.94–1.02) | 0.24 | 415/441 (94.1%) 1.01 (0.97–1.04) | 0.77 | 383/401 (95.5%) 1.02 (0.99–1.06) | 0.25 |

Data are n (%) and RR (95%CI) for 1600 children with immunisation data recorded on maternal and child health booklet at 12 months. SMS=short message service. KES=Kenyan Shilling. Immunisation timeliness was defined as a child receiving vaccination within 2 weeks of the EPI due date using an interval-appropriate schedule where pentavalent due dates were calculated to be 28 days after previous pentavalent receipt. *Risk Ratios and 95% CI were adjusted to account for correlation within clusters †As compared to control arm. ‡Per protocol is defined as being sent the appropriate number of SMS reminders per vaccine. §Sent any SMS is defined as a caregiver who was sent reminders per protocol or sent at least one SMS.

Table S7. Per protocol analysis of SMS reminders on vaccination timeliness

| | Control (n=360) | SMS (n=388)* | p value† | SMS+75KES (n=446)* | p value† | SMS+200KES (n=406)* | p value† |
|----------------------|--------------------|-------------------------------------|-------------|-------------------------------------|-------------|-------------------------------------|-------------|
| Per Protocol‡ | | | | | | | |
| Penta1 | 328/360 (91.1%) | 277/306 (90.5%) 0.99 (0.95–1.04) | 0.81 | 338/367 (92.1%) 1.01 (0.97–1.06) | 0.65 | 319/341 (93.6%) 1.03 (0.98–1.07) | 0.24 |
| Penta2 | 303/360 (84.2%) | 247/284 (87.0%) 1.03 (0.97–1.10) | 0.31 | 304/341 (89.2%) 1.06 (1.00–1.12) | 0.045 | 291/317 (91.8%) 1.09 (1.03–1.15) | 0.002 |
| Penta3 | 267/360 (74.2%) | 243/309 (78.6%) 1.07 (0.97–1.17) | 0.18 | 292/366 (79.8%) 1.07 (0.98–1.17) | 0.14 | 287/338 (84.9%) 1.14 (1.05–1.25) | 0.002 |
| Measles | 183/360 (50.8%) | 230/386 (59.6%) 1.18 (1.01–1.39) | 0.037 | 313/442 (70.8%) 1.37 (1.19–1.59) | <0.0001 | 290/403 (72.0%) 1.42 (1.23–1.64) | <0.0001 |
| Sent any SMS§ | | | | | | | |
| Penta1 | 328/360 (91.1%) | 324/362 (89.5%) 0.99 (0.94–1.03) | 0.48 | 384/415 (92.5%) 1.02 (0.97–1.06) | 0.49 | 351/379 (92.6%) 1.02 (0.97–1.06) | 0.47 |
| Penta2 | 303/360 (84.2%) | 303/366 (82.8%) 0.98 (0.92–1.05) | 0.61 | 364/423 (86.1%) 1.02 (0.97–1.08) | 0.44 | 341/388 (88.9%) 1.04 (0.99–1.11) | 0.14 |
| Penta3 | 267/360 (74.2%) | 282/381 (74.0%) 1.01 (0.91–1.10) | 0.94 | 350/441 (79.4%) 1.07 (0.97–1.16) | 0.17 | 332/401 (82.8%) 1.12 (1.02–1.22) | 0.012 |
| Measles | 183/360 (50.8%) | 231/387 (59.7%) 1.19 (1.01–1.39) | 0.035 | 316/446 (70.9%) 1.37 (1.19–1.59) | <0.0001 | 292/406 (71.9%) 1.42 (1.23–1.64) | <0.0001 |

Data are n (%) and RR (95%CI) for children with immunisation data recorded on maternal and child health booklet at 12 months and using a per protocol analysis. SMS=short message service. KES=Kenyan Shilling. Immunisation timeliness was defined as a child receiving vaccination within 2 weeks of the EPI due date for vaccines that were reminded or incentivized. *Risk Ratios and 95% CI were calculated using General Estimating Equations with an exchangeable correlation matrix to account for correlation within clusters. †As compared to control arm. ‡Per protocol SMS reminders defined as being sent the appropriate number of reminders per vaccine. §Sent any SMS is defined as a caregiver who was sent reminders per protocol or sent at least one SMS.

Table S8. Sub-group analyses of timely measles vaccination

| | Control (n=360) | SMS (n=388) | Stratum- specific RR | p value* | SMS+ 75KES (n=446) | Stratum- specific RR | p value* | SMS+ 200KES (n=406) | Stratum- specific RR | p value* |
|----------------------------------|--------------------|------------------|-------------------------|-------------|--------------------------|-------------------------|-------------|---------------------------|-------------------------|-------------|
| Overall | | | | | | | | | | |
| Phone access | | | | | | | | | | |
| Owns | 102/182 (56%) | 123/205 (60%) | 1.08 (0.90–1.31) | 0.167 | 161/210 (77%) | 1.35 (1.15–1.60) | 0.745 | 138/193 (72%) | 1.28 (1.07–1.52) | 0.081 |
| Shares | 81/178 (46%) | 108/183 (59%) | 1.30 (1.04–1.62) | | 155/236 (66%) | 1.41 (1.15–1.73) | | 154/213 (72%) | 1.58 (1.29–1.92) | |
| Infant gender | | | | | | | | | | |
| Male | 89/174 (51%) | 125/209 (60%) | 1.18 (0.96–1.44) | 0.949 | 154/218 (71%) | 1.37 (1.13–1.65) | 0.910 | 140/199 (70%) | 1.37 (1.13–1.66) | 0.605 |
| Female | 94/186 (50%) | 106/179 (59%) | 1.19 (0.97–1.45) | | 162/228 (71%) | 1.38 (1.15–1.66) | | 152/207 (73%) | 1.46 (1.22–1.75) | |
| SES | | | | | | | | | | |
| Bottom 40% | 58/132 (44%) | 70/144 (49%) | 1.10 (0.84–1.44) | 0.483 | 118/181 (65%) | 1.42 (1.12–1.79) | 0.782 | 118/172 (69%) | 1.51 (1.20–1.91) | 0.473 |
| Top 60% | 125/228 (55%) | 161/244 (66%) | 1.22 (1.03–1.45) | | 198/265 (75%) | 1.37 (1.17–1.60) | | 174/234 (74%) | 1.38 (1.18–1.62) | |
| Time to clinic | | | | | | | | | | |
| ≤ 30 minutes | 99/202 (49%) | 140/225 (62%) | 1.30 (1.06–1.59) | 0.132 | 210/293 (72%) | 1.46 (1.21–1.76) | 0.300 | 177/255 (69%) | 1.43 (1.19–1.74) | 0.886 |
| > 30 minutes | 84/158 (53%) | 91/163 (56%) | 1.05 (0.84–1.31) | | 106/153 (69%) | 1.28 (1.04–1.56) | | 115/151 (76%) | 1.41 (1.17–1.71) | |
| Education | | | | | | | | | | |
| ≤ 7 years | 29/83 (35%) | 56/97 (58%) | 1.66 (1.16–2.36) | 0.024 | 79/124 (64%) | 1.80 (1.29–2.52) | 0.066 | 68/107 (64%) | 1.82 (1.29–2.55) | 0.088 |
| > 7 years | 154/277 (56%) | 175/291 (60%) | 1.09 (0.92–1.28) | | 237/322 (74%) | 1.30 (1.13–1.51) | | 224/299 (75%) | 1.34 (1.16–1.55) | |
| Maternal age | | | | | | | | | | |
| ≤ 25 years | 87/174 (50%) | 121/203 (60%) | 1.19 (0.98–1.45) | 0.960 | 161/221 (73%) | 1.43 (1.18–1.72) | 0.629 | 164/227 (72%) | 1.44 (1.19–1.73) | 0.803 |
| > 25 years | 95/184 (52%) | 110/183 (60%) | 1.18 (0.96–1.45) | | 155/223 (70%) | 1.35 (1.12–1.61) | | 128/179 (72%) | 1.40 (1.16–1.68) | |
| Children under 5 yrs in house | | | | | | | | | | |
| ≤ 1 | 65/122 (53%) | 83/133 (62%) | 1.14 (0.91–1.43) | 0.684 | 113/146 (77%) | 1.41 (1.16–1.72) | 0.741 | 116/157 (74%) | 1.36 (1.11–1.66) | 0.635 |
| > 1 | 118/238 (50%) | 148/255 (58%) | 1.20 (1.00–1.45) | | 203/300 (68%) | 1.36 (1.14–1.62) | | 176/249 (71%) | 1.44 (1.21–1.72) | |
| District | | | | | | | | | | |
| Gem | 135/285 (47%) | 168/301 (56%) | 1.18 (0.99–1.42) | 0.874 | 243/354 (69%) | 1.42 (1.21–1.68) | 0.382 | 235/325 (72%) | 1.52 (1.29–1.79) | 0.044 |
| Asembo | 48/75 (64%) | 63/87 (72%) | 1.15 (0.90–1.48) | | 73/92 (79%) | 1.25 (0.99–1.58) | | 57/81 (70%) | 1.12 (0.86–1.44) | |

Data are n/N (%) and RR (95% CI) for 1600 children with immunisation data recorded on maternal and child health booklet at 12 months. SMS=short message service. KES=Kenya Shilling. SES=socioeconomic status. *p values obtained from an interaction term between intervention arms and risk factor. †6 missing values.

Table S9. Sub-group analyses of timely pentavalent3 vaccination

| | Control (n=360) | SMS (n=388) | Stratum- specific RR | p value* | SMS+ 75KES (n=446) | Stratum- specific RR | p value* | SMS+ 200KES (n=406) | Stratum- specific RR | p value* |
|----------------------------------|--------------------|------------------|-------------------------|-------------|--------------------------|-------------------------|-------------|---------------------------|-------------------------|-------------|
| Overall | | | | | | | | | | |
| Phone access | | | | | | | | | | |
| Owens | 143/182 (79%) | 160/205 (78%) | 1.00 (0.90–1.12) | 0.999 | 174/210 (83%) | 1.05 (0.95–1.17) | 0.717 | 163/193 (84%) | 1.08 (0.97–1.20) | 0.323 |
| Shares | 124/178 (70%) | 128/183 (70%) | 1.00 (0.87–1.16) | | 180/236 (76%) | 1.08 (0.95–1.23) | | 174/213 (82%) | 1.16 (1.03–1.32) | |
| Infant gender | | | | | | | | | | |
| Male | 129/174 (74%) | 153/209 (73%) | 0.99 (0.87–1.12) | 0.690 | 173/218 (79%) | 1.06 (0.94–1.20) | 0.966 | 161/199 (81%) | 1.09 (0.97–1.22) | 0.453 |
| Female | 138/186 (75%) | 135/179 (75%) | 1.02 (0.90–1.16) | | 181/228 (79%) | 1.07 (0.95–1.20) | | 176/207 (85%) | 1.15 (1.03–1.28) | |
| SES | | | | | | | | | | |
| Bottom 40% | 92/132 (70%) | 98/144 (68%) | 0.98 (0.83–1.15) | 0.656 | 137/181 (76%) | 1.07 (0.92–1.24) | 0.969 | 135/172 (78%) | 1.12 (0.97–1.29) | 0.955 |
| Top 60% | 175/228 (77%) | 190/244 (78%) | 1.02 (0.92–1.13) | | 217/265 (82%) | 1.07 (0.97–1.18) | | 202/234 (86%) | 1.13 (1.02–1.24) | |
| Time to clinic | | | | | | | | | | |
| ≤ 30 minutes | 148/202 (73%) | 166/225 (74%) | 1.02 (0.90–1.16) | 0.741 | 233/293 (80%) | 1.08 (0.96–1.21) | 0.703 | 211/255 (83%) | 1.13 (1.02–1.27) | 0.669 |
| > 30 minutes | 119/158 (75%) | 122/163 (75%) | 0.99 (0.87–1.13) | | 121/153 (79%) | 1.05 (0.92–1.19) | | 126/151 (83%) | 1.10 (0.97–1.24) | |
| Education | | | | | | | | | | |
| ≤ 7 years | 56/83 (67%) | 68/97 (70%) | 1.04 (0.85–1.27) | 0.746 | 87/124 (70%) | 1.03 (0.85–1.25) | 0.614 | 91/107 (85%) | 1.26 (1.06–1.49) | 0.108 |
| > 7 years | 211/277 (76%) | 220/291 (76%) | 1.00 (0.90–1.11) | | 267/322 (83%) | 1.09 (0.99–1.19) | | 246/299 (82%) | 1.08 (0.8–1.18) | |
| Maternal age† | | | | | | | | | | |
| ≤ 25 years | 133/174 (76%) | 150/203 (74%) | 0.97 (0.85–1.09) | 0.348 | 181/221 (82%) | 1.06 (0.95–1.19) | 0.899 | 188/227 (83%) | 1.08 (0.97–1.20) | 0.385 |
| > 25 years | 133/184 (72%) | 137/183 (%) | 1.05 (0.92–1.19) | | 173/223 (78%) | 1.07 (0.95–1.21) | | 149/179 (83%) | 1.16 (1.03–1.30) | |
| Children under 5 yrs in house | | | | | | | | | | |
| ≤ 1 | 94/122 (77%) | 101/133 (76%) | 0.99 (0.86–1.14) | 0.720 | 117/146 (80%) | 1.03 (0.90–1.18) | 0.522 | 133/157 (85%) | 1.09 (0.97–1.24) | 0.670 |
| > 1 | 173/238 (73%) | 187/255 (73%) | 1.02 (0.91–1.14) | | 237/300 (79%) | 1.09 (0.97–1.21) | | 204/249 (82%) | 1.13 (1.02–1.26) | |
| District | | | | | | | | | | |
| Gem | 208/285 (73%) | 227/301 (75%) | 1.03 (0.93–1.15) | 0.258 | 277/354 (78%) | 1.07 (0.96–1.18) | 0.968 | 267/325 (82%) | 1.12 (1.02–1.24) | 0.950 |
| Asembo | 59/75 (79%) | 61/87 (70%) | 0.91 (0.74–1.11) | | 77/92 (84%) | 1.07 (0.90–1.26) | | 70/81 (86%) | 1.11 (0.95–1.31) | |

Data are n/N (%) and RR (95% CI) for 1600 children with immunisation data recorded on maternal and child health booklet at 12 months. SMS=short message service. KES=Kenya Shilling. SES=socioeconomic status. *p values obtained from an interaction term between intervention arms and risk factor. †6 missing values.

Table S10: Indirect indicators of health and health utilization

| | Control (n=360) | SMS only (n=388) | p value | SMS+75KES (n=446) | p value | SMS+200KES (n=406) | p value |
|--|--------------------|---------------------|------------|----------------------|---------|-----------------------|---------|
| Received Vitamin A | | | | | | | |
| Yes | 329 (91%) | 337 (87%) | 0.29 | 396 (89%) | 0.74 | 356 (88%) | 0.27 |
| | | 0.96 (0.89–1.04) | | 0.99 (0.92–1.06) | | 0.96 (0.89–1.03) | |
| Child slept under bed net last night | | | | | | | |
| Yes | 344 (96%) | 362 (93%) | 0.17 | 418 (94%) | 0.25 | 392 (97%) | 0.53 |
| | | 0.98 (0.94–1.01) | | 0.98 (0.95–1.01) | | 1.01 (0.98–1.04) | |
| Attended HF ≤ 2 weeks (non-vaccination) | | | | | | | |
| Yes | 90 (25%) | 93 (24%) | 0.77 | 112 (24%) | 0.99 | 102 (24%) | 0.99 |
| | | 0.96 (0.73–1.25) | | 1.00 (0.78–1.30) | | 1.00 (0.77–1.30) | |
| Child hospitalized in past month | | | | | | | |
| Yes | 15 (4%) | 17 (4%) | 0.87 | 20 (4%) | 0.83 | 18 (4%) | 0.84 |
| | | 1.06 (0.51–2.23) | | 1.08 (0.53–2.22) | | 1.08 (0.52–2.24) | |
| MCH card available at follow-up visit* | | | | | | | |
| Yes | 360/396 (91%) | 388/409 (95%) | 0.041 | 446/476 (94%) | 0.16 | 406/426 (95%) | 0.021 |
| | | 1.04 (1.00–1.09) | | 1.03 (0.99–1.07) | | 1.05 (1.01–1.09) | |
| Caregiver out-migrated† | | | | | | | |
| Yes | 77/473 (16%) | 54/463 (12%) | 0.065 | 67/543 (12%) | 0.069 | 50/476 (11%) | 0.0057 |
| | | 0.73 (0.53–1.02) | | 0.75 (0.55–1.02) | | 0.62 (0.44–0.87) | |
| Child died before 12 months of age‡ | | | | | | | |
| Yes | 15/411 (4%) | 13/422 (3%) | 0.66 | 17/493 (3%) | 0.84 | 15/441 (3%) | 0.85 |
| | | 0.84 (0.39–1.80) | | 0.93 (0.45–1.90) | | 0.94 (0.45–1.94) | |

Data are n (%) and RR (95%CI). SMS=short messages service. KES=Kenyan Shilling. FIC=fully immunised child. *Data are for 1600 children with MCH booklet and 107 children who verbally reported immunisation at 12 months of age. †Data are for 1600 children with MCH booklet at 12 months, 107 children who verbally reported immunisation history at 12 months, and 248 children who migrated and were lost to follow-up. Children who died (n=60) and withdrew from study (n=3) excluded from sample. Adjusted for maternal age, children under 5 years old in the household, and region ‡Data are for 1600 children with MCH booklet at 12 months, 107 children who verbally reported immunisation history at 12 months, and 60 children who died. Children who out-migrated (n=248) and withdrew from study (n=3) excluded from sample.