**Table 1: Current immunization schedule route of administration**

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| **Antigen**  | **Minimum age** | **Dose to be administered** | **Route of administration** |
| OPV 0 | At birth | 2 drops | By mouth-use provided dropper |
| BCG | At birth | 0.05 ml (infants 0-11 months) | Intradermal (within the skin): left arm |
| 0.01 ml (children above 11 months) |
| PENTA 1 | 6 weeks | 0.05 ml | Intramuscularly in the upper outer part of the thigh |
| OPV 1 | 6weeks | 2 drops | By mouth-use provided dropper |
| PENTA 2 | 10 weeks | 0.05 ml | Intramuscularly in the upper outer part of the thigh |
| OPV 2 | 10 weeks | 2 drops | By mouth-use provided dropper |
| PENTA 3 | 14 weeks | 0.05 ml | Intramuscularly in the upper outer part of the thigh |
| OPV 3 | 14 weeks | 2 drops | By mouth-use provided dropper |
| IPV | 14 weeks | 0.05 ml | Intramuscularly in the upper outer part of the thigh |
| Measles | 9 months | 0.05 ml | Measles vaccine is given subcutaneously in the outer aspect of the deltoid muscle (Lt) at 9 months. However, during supplementation activities, the target group may increase to 15 years as advised by WHO |

**Table 2 shows the adjusted estimates of the odds ratio for the main exposure**

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|  **Adjusted estimates of the odds ratio for the main exposures influencing children between 0-23 months old living in South Sudan from being on track with their routine immunisation schedule using Mantel-Haenszel method** |
| **Variables** | **Crude Estimates** | **Adjusted Estimates** |
| **Crude OR (95%CI)** | **P-value** | **Adjusted OR (95%CI)** | **P-value** |
| **Parity : Association adjusted for :** |
| Maternal Age (25-34 years) | 0.42 (0.19, 0.93) | 0.034 | 0.40 (0.24, 0.65) | <0.001 |
| **Immunization benefits adjusted for :** |
| Maternal Age (25-34 years) | 3.96 (1.35, 11.53) | **0.012** | 3.82 (1.25, 11.60) | 0.011 |
| Frequent provision of immunization at health facility on daily bases | 3.50(1.18, 10.34) | 0.016 |
| Health facility too far and no transportation to going for immunization | 3.95 (1.27, 12.23) | 0.01 |
| **Frequent provision of immunization at health facility on daily basis adjusted for :** |
| County | 1.80(1.11, 2.90) | 0.017 | 1.20 (0.70, 2.03) | 0.494 |
| Availability of children immunization card | 1.62 (0.97, 2.69) | 0.059 |
| Functional health facility in the area | 1.64 (0.98, 2.73) | 0.054 |
| Health facility conduct routine immunization outreach services | 1.33 (0.77, 2.27) | 0.303 |
| Health facility too far and no transportation to going for immunization | 1.53 (0.92, 2.53) | 0.099 |
| Vaccinator not happy for coming regularly to the community | 1.54 (0.94, 2.53) | 0.083 |
| Inadequate notice about immunization outreach visit to community | 1.32 (0.78, 2.22) | 0.293 |
| **vaccinator conduct outreach immunization adjusted for :** |
| Maternal Age (25-34 years) | 2.32 (1.45, 3.71) | **<0.001** | 2.15 (1.27, 3.63) | 0.003 |
| immunization benefits | 2.06 (1.231, 3.43) | 0.005 |
| Vaccinator visit during family livelihood business | 2.23 (1.36, 3.61) | 0.001 |
| Health facility too far and no transportation to going for immunization | 2.31 (1.40, 3.78) | 0.001 |
| Not completed all the immunization for my child, not informed to come back | 2.26 (1.39, 3.65) | 0.001 |
| **Vaccinator visit during family livelihood business adjusted for :** |
| Availability of children immunization card | 0.39 (0.21, 0.68) | **0.001** | 0.35 (0.19, 0.64) | 0.001 |
| Functional facility type in the area | 0.35 (0.19, 0.64) | < 0.001 |
| Health facility conduct routine immunization outreach services | 0.36 (0.19, 0.66) | 0.001 |
| **Health facility too far and no transportation to going for immunization adjusted for :** |
| Functional facility type in the area | 0.20 (9.10, 0.37) | <0.001 | 0.15 (0.07, 0.29) | < 0.001 |
| Inadequate notice about immunization outreach visit to community | 0.20 (0.10, 0.37) | < 0.001 |
| **Inadequate notice about immunization outreach visit to community adjusted for :** |
| Parity (above 6 children) | 0.23 (0.12, 0.42) | **<0.001** | 0.22 (0.11, 0.42) | < 0.001 |
| Availability of children immunization card | 0.24 (0.12, 0.45) | < 0.001 |
| Maternal Age | 0.11 (0.04, 0.29) | < 0.001 |
| Vaccinator conduct outreach immunization | 0.19 (0.09, 0.36) | < 0.001 |
| Health facility too far and no transportation to going for immunization | 0.22 (0.11, 0.42) | < 0.001 |
| Vaccinator not happy for coming regularly to the community | 0.28 (0.14, 0.53) | < 0.001 |
| **Churches discussed immunization importance adjusted for :** |
| County | 7.42(4.28, 12.82) | **<0.001** | 2.42 (1.15, 5.11) | 0.016 |
| Availability of children immunization card | 6.90 (3.63, 13.06) | < 0.001 |
| Functional facility type in the area | 6.60 (3.46, 12.54) | < 0.001 |
| Health facility conduct routine immunization outreach services | 6.94 (3.66, 13.15) | < 0.001 |
| Frequent provision of immunization at health facility on daily bases | 6.90 (3.94, 12.09) | < 0.001 |
| Vaccinator visit during family livelihood business | 6.48 (3.56, 11.76) | < 0.001 |
| Health facility too far and no transportation to going for immunization | 6.07 (3.28, 11.21) | < 0.001 |
| Not completed all the immunization for my child, not informed to come back | 6.59 (3.58, 12.11) | < 0.001 |
| Inadequate notice about immunization outreach visit to community | 6.91 (3.78, 12.61) | < 0.001 |
| Community leaders discussed immunization importance | 2.29 (0.98, 5.35) | 0.049 |
| Are you Parent/guardian of the child | 6.38 (3.26, 12.45) | < 0.001 |
| **Community discussed immunization importance adjusted for :** |
| Availability of children immunization card | 7.76(4.50, 13.36) | **<0.001** | 6.43 (3.40, 12.16) | < 0.001 |
| Functional facility type in the area | 6.81 (3.50, 13.25) | < 0.001 |
| Health facility conduct routine immunization outreach services | 7.61 (3.90, 14.85) | < 0.001 |
| Frequent provision of immunization at health facility on daily bases | 7.52 (4.22, 13.41) | < 0.001 |
| Vaccinator visit during family livelihood business | 6.86 (3.78, 12.45) | < 0.001 |
| Health facility too far and no transportation to going for immunization | 6.57 (3.54, 12.16) | < 0.001 |
| Not completed all the immunization for my child, not informed to come back | 6.98 (3.78, 12.84) | < 0.001 |
| Inadequate notice about immunization outreach visit to community | 6.83 (3.68, 12.63) | < 0.001 |
| Churches discussed immunization importance | 3.14 (1.33, 7.38) | 0.006 |
| Are you Parent/guardian of the child | 6.71 (3.44, 13.03) | < 0.001 |
| Parity (above 6 children) | 7.00 (3.87, 12.65) | < 0.001 |

**Table 3 shows the multivariable logistic regression model controlling for confounders using forward selection stepwise regression**

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| **Multivariable logistic regression models to control for them using forward selection stepwise regression** |
|  | **Crude Estimates** | **Adjusted Estimates** |
| **Variables** | **Crude Odd Ratio (95% CI)** | **P-value** | **Adj Odd Ratio (95% CI)** | **P-value** |
| **Immunization benefits: Association:** |
| Immunisation benefit adjusted for Frequent provision of immunization at health facility on daily bases | 3.96 (1.35,11.53) | 0.012 | 3.53 (1.199, 10.36) | 0.022 |
| Immunisation benefit adjusted for (Frequent provision of immunization at health facility on daily bases + Maternal Age (25-34 years) ) | 3.36 (1.12, 10.05) | 0.03 |
| Immunisation benefit adjusted for (Frequent provision of immunization at health facility on daily bases + Maternal Age (25-34 years) + Health facility too far and no transportation to going for immunization) | 4.34 ( 1.23, 15.24) | 0.022 |
| **Vaccinator conduct outreach immunization** |
| vaccinator conduct outreach immunization adjusted for immunisation benefit | 2.32 (1.45,3.71) | <0.001 | 2.05 ( 1.24, 3.39) | 0.005 |
| vaccinator conduct outreach immunization adjusted for (immunisation benefit + Maternal age (25-34 years old)) | 2.18 ( 1.25, 3.78) | 0.005 |
| vaccinator conduct outreach immunization adjusted for (immunisation benefit + Maternal age (25-34 years old) + Vaccinator visit during family livelihood business) | 2.27 (1.29, 3.96) | 0.004 |
| vaccinator conduct outreach immunization adjusted for (immunisation benefit + Maternal age (25-34 years old) + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back) | 2.26 (1.29, 3.94) | 0.004 |
| vaccinator conduct outreach immunization adjusted for (immunisation benefit + Maternal age (25-34 years old) + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back + Health facility too far and no transportation to going for immunization) | 1.81 (1.00, 3.25) | 0.046 |
| **Vaccinator visit during family livelihood business :** |
| Vaccinator visit during family livelihood business adjusted for Availability of children immunization card | 0.40 (0.21,0.68) | 0.001 | 0.35 (0.19, 0.64) | 0.001 |
| Vaccinator visit during family livelihood business adjusted for Availability of children immunization card + Functional facility type in the area) | 0.32 (0.17, 0.59) | <0.001 |
| Vaccinator visit during family livelihood business adjusted for Availability of children immunization card + Functional facility type in the area + Health facility conduct routine immunization outreach services | 0.33 (0.17, 0.62) | 0.001 |
| **Health facility too far and no transportation to going for immunization :**  |
| Health facility too far and no transportation to going for immunization adjusted for Functional facility type in the area | 0.20 (0.10,0.37) | <0.001 | 0.14 (0.07, 0 .26) | <0.001 |
| Health facility too far and no transportation to going for immunization adjusted for Functional facility type in the area + Inadequate notice about immunization outreach visit to community) | 0.15 (0.07, 0.28) | <0.001 |
| **Inadequate notice about immunization outreach visit to community :**  |
| Inadequate notice about immunization outreach visit to community adjusted for Maternal Age | 0.23 (0.12, 0.42) | <0.001 | 0.11 (0.04, 0.28) | <0.001 |
| Inadequate notice about immunization outreach visit to community adjusted for Maternal Age + vaccinator conduct outreach immunisation | 0.10 (0.03, 0.25) | <0.001 |
| Inadequate notice about immunization outreach visit to community adjusted for Maternal Age + vaccinator conduct outreach immunisation + Parity (above 6 children) | 0.10 (0.03, 0.25) | <0.001 |
| Inadequate notice about immunization outreach visit to community adjusted for Maternal Age + vaccinator conduct outreach immunisation + Parity (above 6 children) + Health facility too far and no transportation to going for immunization | 0.11 (0.04, 0.27) | <0.001 |
| Inadequate notice about immunization outreach visit to community adjusted for Maternal Age + vaccinator conduct outreach immunisation + Parity (above 6 children) + Health facility too far and no transportation to going for immunization +child card availability | 0.12 (0.04, 0.31) | <0.001 |
| Inadequate notice about immunization outreach visit to community adjusted for Maternal Age + vaccinator conduct outreach immunisation + Parity (above 6 children) + Health facility too far and no transportation to going for immunization +child card availability +Vaccinator not happy for coming regularly to the community | 0.14 (0.05, 0.37) | <0.001 |
| **Churches discussed immunization importance :**  |
| Churches discussed immunization importance adjusted for county | 7.42 (4.28,12.82) | <0.001 | 2.42 (1.16, 5.01) | 0.018 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation | 1.95 (0.92, 4.13) | 0.081 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian | 2.02 (0.87, 4.65) | 0.099 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business | 1.82 (0.77, 4.24) | 0.169 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back | 1.77 (0.75, 4.18) | 0.191 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back + Functional facility type in the area | 1.93 (0.80, 4.63) | 0.139 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business + Availability of children immunization card | 2.19 (0.87, 5.47) | 0.094 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business + Availability of children immunization card + Frequent provision of immunisation at health facility | 2.26 (0.89, 5.72) | 0.085 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business + Availability of children immunization card + Frequent provision of immunisation at health facility + Inadequate notice about immunization outreach visit to community | 2.19 (0.82, 5.82) | 0.115 |
| Churches discussed immunization importance adjusted for county + Health facility too far and no transportation to go for immunisation + Are you parent or guardian + Vaccinator visit during family livelihood business + Availability of children immunization card + Frequent provision of immunisation at health facility + Inadequate notice about immunization outreach visit to community + Health Facility conduct routine immunisation outreach | 2.09 (0.78, 5.59) | 0.141 |
| **Community discussed immunization importance:**  |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance | 7.76 (4.50,13.36) | <0.001 | 3.62 (1.42, 9.18) | 0.007 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card | 2.22 (0.85, 5.80) | 0.103 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization | 2.22 (0.85, 5.74) | 0.099 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child | 1.94 (0.74, 5.07) | 0.178 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types | 1.38 (0.47, 3.97) | 0.551 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types + Inadequate notice about immunization outreach visit to community | 1.13 (0.36, 3.43) | 0.836 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types + Inadequate notice about immunization outreach visit to community + Vaccinator visit during family livelihood business | 1.13 (0.37, 3.364) | 0.829 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types + Inadequate notice about immunization outreach visit to community + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back | 1.23 (0.40, 3.71) | 0.711 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types + Inadequate notice about immunization outreach visit to community + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back + Parity (above 6 children) | 1.18 (0.38, 3.59) | 0.777 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types + Inadequate notice about immunization outreach visit to community + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back + Parity (above 6 children) + Frequent provision of immunisation at health facility | 1.24 (0.39, 3.84) | 0.713 |
| Community discussed immunization importance: adjusted for Churches discussed immunization importance + Availability of children immunization card + Health facility too far and no transportation to going for immunization + Are you Parent/guardian of the child + Functional health facility types + Inadequate notice about immunization outreach visit to community + Vaccinator visit during family livelihood business + Not completed all the immunization for my child, not informed to come back + Parity (above 6 children) + Frequent provision of immunisation at health facility + Health facility conduct routine immunisation outreaches | 1.29 (0.40, 4.05) | 0.665 |