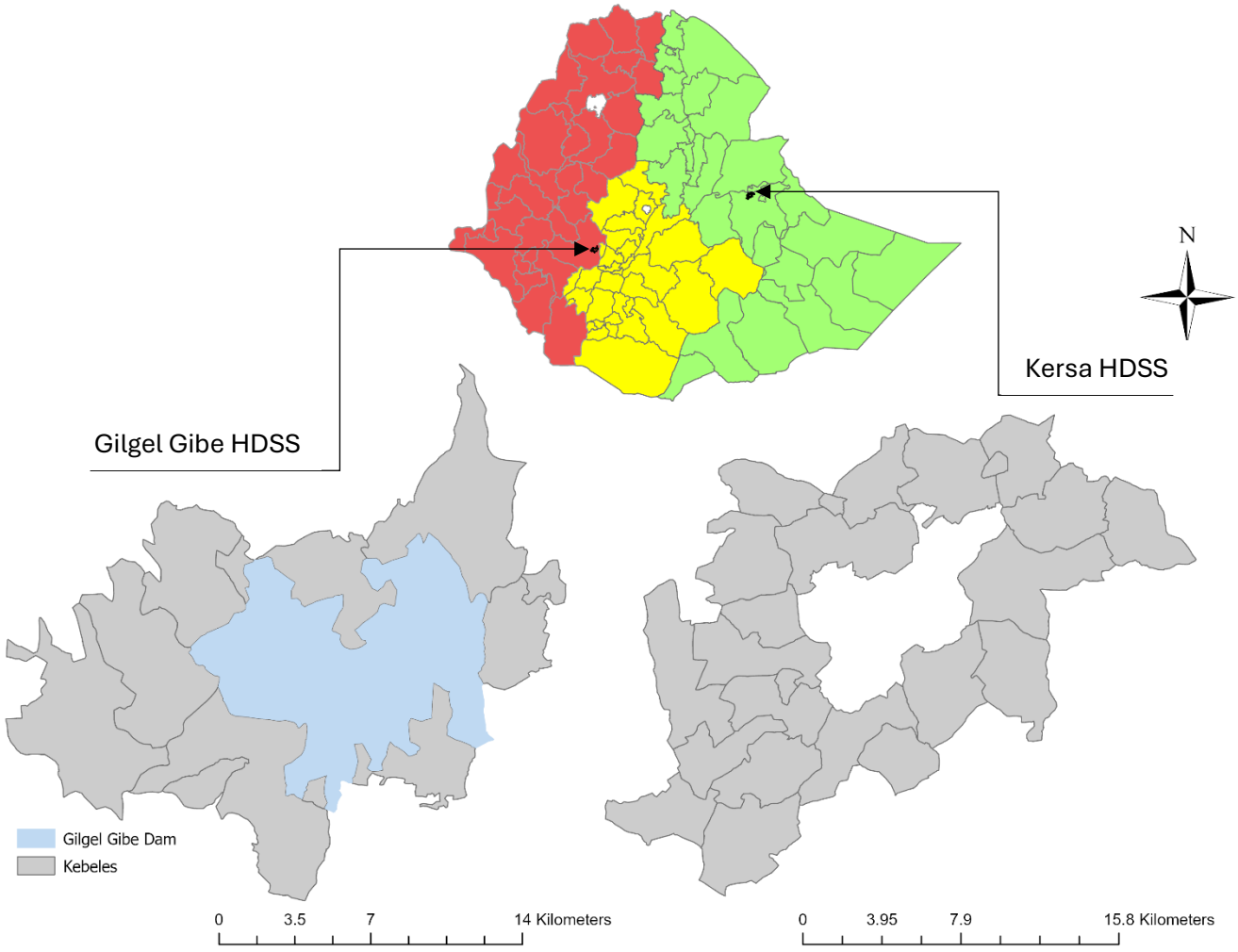
**Supplement Material**




Supplement Figure 1: Study area map of Kersa HDSS in eastern and Gilgelgibe HDSS in southwestern Ethiopia, 2024

*(This map contains meningococcal outbreak risk classification based on historical meningococcal outbreaks and large epidemics trends in Ethiopia high-risk (red), medium-risk (yellow) and low-risk (green) regions*, and carriage survey sites (Gilgelgibe from southwestern and Kersa from Eastern Ethiopia)).*

**: A Meningitis risk assessment conducted by WHO in 2012 determined the risk profile by region, before the Ethiopia launched large scale campaigns in three phases targeting all regions over a period of three years under the leadership of the Federal Ministry of Health.*

*Supplement Table 1: Age standardized Carriage prevalence for Gilgel Gibe HDSS*

| | Gilgelgibe Sample | Gilgelgibe positives | Gilgelgibe prevalence | Kersa sample | Gilgelgibe prevalence x Kersa sample |
|---|---|---|---|---|---|
| 1-4 | 39 | 0 | 0.00% | 103 | 0.000 |
| 5-9 | 111 | 2 | 1.80% | 145 | 2.613 |
| 10-14 | 209 | 7 | 3.35% | 191 | 6.397 |
| 15-19 | 131 | 1 | 0.76% | 115 | 0.878 |
| 20-24 | 84 | 1 | 1.19% | 86 | 1.024 |
| 25-29 | 98 | 0 | 0.00% | 94 | 0.000 |
| 30-34 | 78 | 1 | 1.28% | 68 | 0.872 |
| 35-39 | 57 | 1 | 1.75% | 66 | 1.158 |
| 40-44 | 42 | 0 | 0.00% | 36 | 0.000 |
| 45-49 | 42 | 0 | 0.00% | 41 | 0.000 |
| 50+ | 75 | | 0.00% | 55 | 0.000 |
| | 966 | 13 | | 1000 | 12.94 |

*Prevalence in Gilgelgibe standardised to the age structure of Kersa HDSS = 12.94/1000 = 1.29% (95%CI: 0.59%, 1.65%)*
*Age standardized prevalence also adjusted for transport sensitivity = 7/5 * 12.94/1000 = 1.81% (95%CI: 0.83%, 2.31%)*

*Supplement Table 2. Whole-genome sequencing (WGS) results and metadata for participants with positive pharyngeal carriage of Neisseria meningitidis.*

| id | isolate | town_or_city | age_yr | sex | genogroup | ST (MLST) | clonal_complex (MLST) | PorA_VR1 | PorA_VR2 |
|---|---|---|---|---|---|---|---|---|---|
| 166109 | GI0248 | Gilgel gibe | 20 | female | NG | 175 | ST-175 complex | 22-11 | 15-64 |
| 166110 | GI0277 | Gilgel gibe | 13 | male | cnl | 192 | ST-192 complex | 18-11 | 42-1 |
| 166111 | GI0305 | Gilgel gibe | 32 | male | E | 11535 | Unassigned clonal complexes | 22-1 | 14 |
| 166112 | GI0433 | Gilgel gibe | 9 | male | NG | 175 | ST-175 complex | 22-11 | 15-64 |
| 166114 | GI0589 | Gilgel gibe | 10 | male | cnl | 192 | ST-192 complex | 18-11 | 42-1 |
| 166115 | GI0625 | Gilgel gibe | 40 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166116 | GI0629 | Gilgel gibe | 11 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166117 | GI0703 | Gilgel gibe | 15 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166118 | GI0813 | Gilgel gibe | 7 | male | NG | 175 | ST-175 complex | 22-11 | 15-64 |
| 166119 | GI0874 | Gilgel gibe | 12 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166120 | GI0876 | Gilgel gibe | 12 | male | NG | 175 | ST-175 complex | 22-11 | 15-64 |
| 175362 | GI0950 | Gilgel Gibe | 14 | female | W | 11 | ST-11 complex | 5 | 2 |

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|---|---|---|---|---|---|---|---|---|---|
| 166121 | K1059 | Kersa | 16 | male | W | 17342 | ST-11 complex | 5 | 2 |
| 166049 | KI0046 | Kersa | 12 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166050 | KI0056 | Kersa | 30 | female | cnl | 18833 | Unassigned clonal complexes | 22 | 1-Oct |
| 166051 | KI0074 | Kersa | 6 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166052 | KI0116 | Kersa | 24 | male | NG | 175 | ST-175 complex | 7 | 30-5 |
| 166053 | kI0121 | Kersa | 35 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166054 | KI0190 | Kersa | 28 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166122 | KI0205 | Kersa | 25 | female | cnl | 53 | ST-53 complex | 7 | 30 |
| 166123 | KI0228 | Kersa | 24 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166124 | KI0236 | Kersa | 12 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166125 | KI0238 | Kersa | 9 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166126 | KI0239 | Kersa | 5 | female | B | 1946 | ST-461 complex | 19-2 | 13-2 |
| 166127 | KI0240 | Kersa | 28 | female | C | 175 | ST-175 complex | 22-11 | 15-85 |
| 166128 | KI0272 | Kersa | 6 | male | cnl | 175 | ST-175 complex | 22-11 | 15-25 |
| 166129 | KI0279 | Kersa | 18 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166055 | KI0309 | Kersa | 9 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166056 | kI0325 | Kersa | 13 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166057 | kI0331 | Kersa | 22 | female | C | 175 | ST-175 complex | 22-11 | 15-85 |
| 166058 | KI0333 | Kersa | 5 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166059 | kI0338 | Kersa | 15 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166060 | kI0359 | Kersa | 9 | female | NG | 175 | ST-175 complex | 22-11 | 15-64 |
| 166130 | KI0360 | Kersa | 50 | female | B | 35 | ST-35 complex | 22-1 | 14 |
| 166131 | KI0373 | Kersa | 28 | male | NG | 175 | ST-175 complex | 22-11 | 15-87 |
| 166061 | KI0382 | Kersa | 14 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166062 | KI0387 | Kersa | 14 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166063 | KI0388 | Kersa | 41 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166064 | KI0389 | Kersa | 50 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166065 | KI0410 | Kersa | 7 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166066 | KI0412 | Kersa | 26 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166067 | KI0420 | Kersa | 25 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166068 | KI0428 | Kersa | 12 | male | NG | 18840 | ST-175 complex | 19-2 | 15-1 |
| 166069 | KI0445 | Kersa | 22 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166070 | KI0454 | Kersa | 14 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166071 | KI0468 | Kersa | 16 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166072 | KI0470 | Kersa | 60 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166073 | KI0482 | Kersa | 13 | male | cnl | 192 | ST-192 complex | 18-11 | 42-1 |
| 166074 | KI0483 | Kersa | 16 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166075 | KI0485 | Kersa | 10 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166076 | KI0497 | Kersa | 20 | female | E | 35 | ST-35 complex | 22-1 | 14 |
| 166077 | KI0546 | Kersa | 32 | female | cnl | 192 | ST-192 complex | 18-11 | 42-1 |
| 166078 | KI0558 | Kersa | 12 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |

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|---|---|---|---|---|---|---|---|---|---|
| 166079 | KI0568 | Kersa | 6 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166080 | KI0570 | Kersa | 25 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166081 | kI0577 | Kersa | 4 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166082 | kI0584 | Kersa | 19 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166083 | KI0588 | Kersa | 56 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166084 | kI0602 | Kersa | 10 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166085 | kI0603 | Kersa | 12 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166086 | KI0610 | Kersa | 6 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166087 | KI0622 | Kersa | 15 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166088 | KI0637 | Kersa | 15 | female | B | 18843 | ST-461 complex | 19-2 | 13-2 |
| 166089 | KI0641 | Kersa | 25 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166090 | KI0656 | Kersa | 25 | male | W | 11 | ST-11 complex | 5 | 2 |
| 175361 | KI0657 | Kersa | 13 | female | cnl | 192 | ST-192 complex | 18-11 | 42-1 |
| 166154 | KI0663 -M | Kersa | 11 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166091 | KI0667 | Kersa | 46 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166092 | KI0699 | Kersa | 20 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166155 | KI0708 -M | Kersa | 12 | male | B | 35 | ST-35 complex | 22-1 | 14 |
| 166156 | KI0711 -M | Kersa | 20 | female | NG | 812 | ST-35 complex | 22-1 | 14 |
| 166093 | KI0720 | Kersa | 18 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166094 | KI0734 | Kersa | 15 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166095 | KI0742 | Kersa | 20 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166096 | KI0746 | Kersa | 14 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166097 | KI0753 | Kersa | 22 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166098 | KI0758 | Kersa | 14 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166099 | KI0761 | Kersa | 55 | male | C | 175 | ST-175 complex | 22-11 | 15-85 |
| 166132 | KI0795 | Kersa | 15 | female | cnl | 18835 | Unassigned clonal complexes | 22-56 | 15-25 |
| 166133 | KI0797 | Kersa | 25 | female | cnl | 18833 | Unassigned clonal complexes | 22 | 1-Oct |
| 166100 | KI0810 | Kersa | 20 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166159 | KI0826 -M | Kersa | 30 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166101 | KI0848 | Kersa | 18 | female | B | 35 | ST-35 complex | 22-1 | 14 |
| 166102 | KI0898 | Kersa | 12 | male | cnl | 14712 | Unassigned clonal complexes | 22-11 | 15-86 |
| 166103 | KI0906 | Kersa | 14 | male | E | 35 | ST-35 complex | 22-1 | 14 |
| 166104 | KI0923 | Kersa | 30 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166105 | KI0952 | Kersa | 4 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166134 | KI0971 | Kersa | 10 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166135 | KI0972 | Kersa | 14 | male | B | 18845 | ST-35 complex | 22-1 | 14 |
| 175363 | Ki0973 -M B | Gilgel gibe | 12 | male | W | 11 | ST-11 complex | 5 | 2 |

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|---|---|---|---|---|---|---|---|---|---|
| 166136 | KI0978 | Kersa | 10 | male | cnl | 823 | ST-198 complex | 18 | 25-14 |
| 166106 | KI0984 | Kersa | 14 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166107 | KI0989 | Kersa | 8 | female | cnl | 18835 | Unassigned clonal complexes | 22-56 | 15-84 |
| 166137 | KI1000 | Kersa | 19 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166138 | KI1001 | Kersa | 7 | female | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166139 | KI1003 | Kersa | 15 | male | E | 35 | ST-35 complex | 22-1 | 14 |
| 166140 | KI1011 | Kersa | 22 | male | NG | 175 | ST-175 complex | 22-11 | 15-88 |
| 166141 | KI1025 | Kersa | 3 | male | W | 17342 | ST-11 complex | 5 | 2 |
| 166142 | KI1031 | Kersa | 10 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |
| 166143 | KI1039 | Kersa | 28 | male | E | 18847 | ST-35 complex | 22-1 | 14 |
| 166144 | KI1043 | Kersa | 17 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166145 | KI1061 | Kersa | 46 | male | W | 11 | ST-11 complex | 5 | 2 |
| 166146 | KI1064 | Kersa | 13 | female | B | 1946 | ST-461 complex | 19-2 | 13-2 |
| 166147 | KI1079 | Kersa | 23 | female | W | 11 | ST-11 complex | 5 | 2 |
| 166148 | KI1110 | Kersa | 11 | male | NG | 175 | ST-175 complex | 22-11 | 15-25 |