Appendix Tables and Figures

Figure A1: Map of Vadu HDSS with health facility density zones, 100m bandwidth
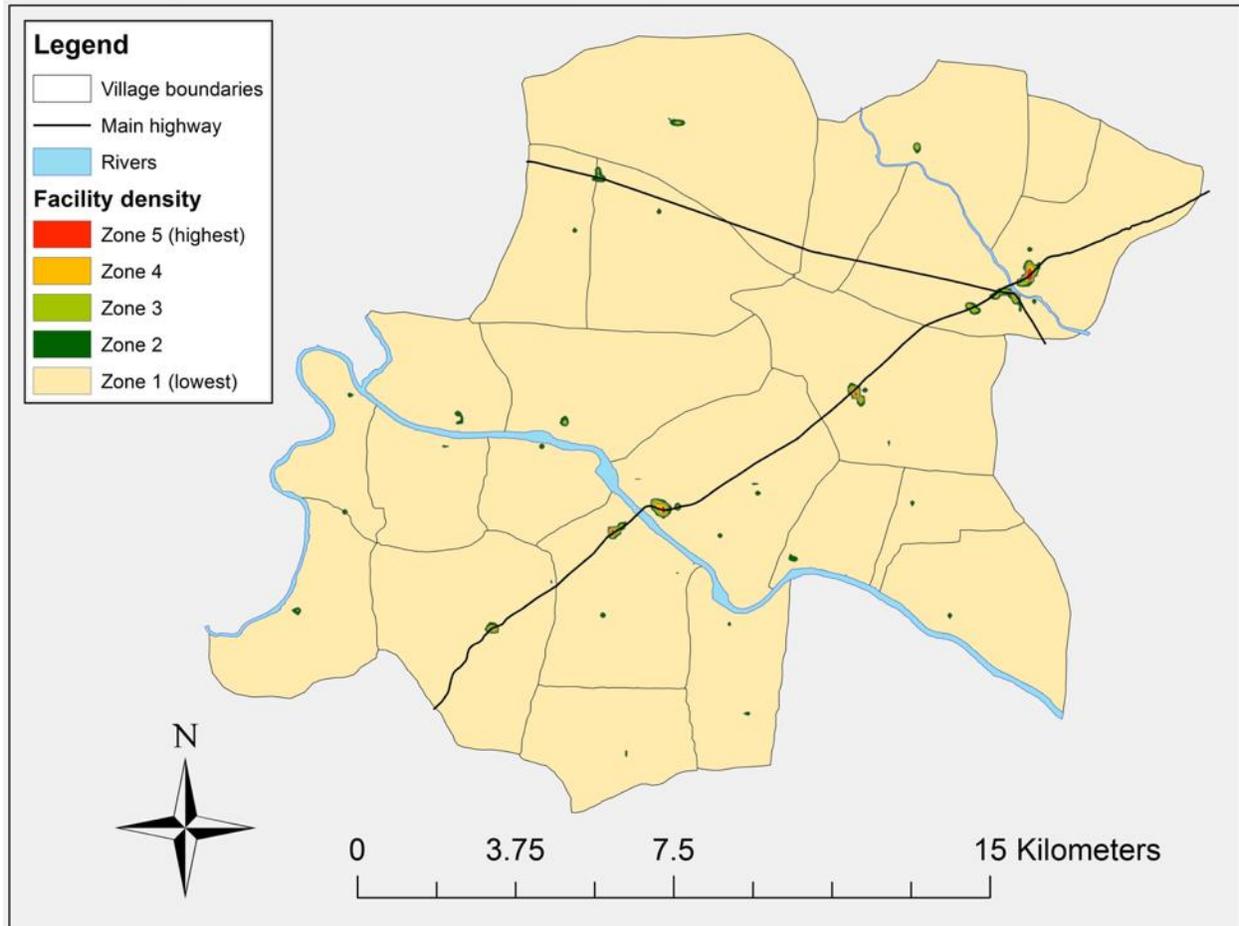
Figure A2: Map of Vadu HDSS with health facility density zones, 250m bandwidth

Figure A3: Map of Vadu HDSS with health facility density zones, 500m bandwidth

Figure A4: Map of Vadu HDSS with health facility density zones, 1000m bandwidth
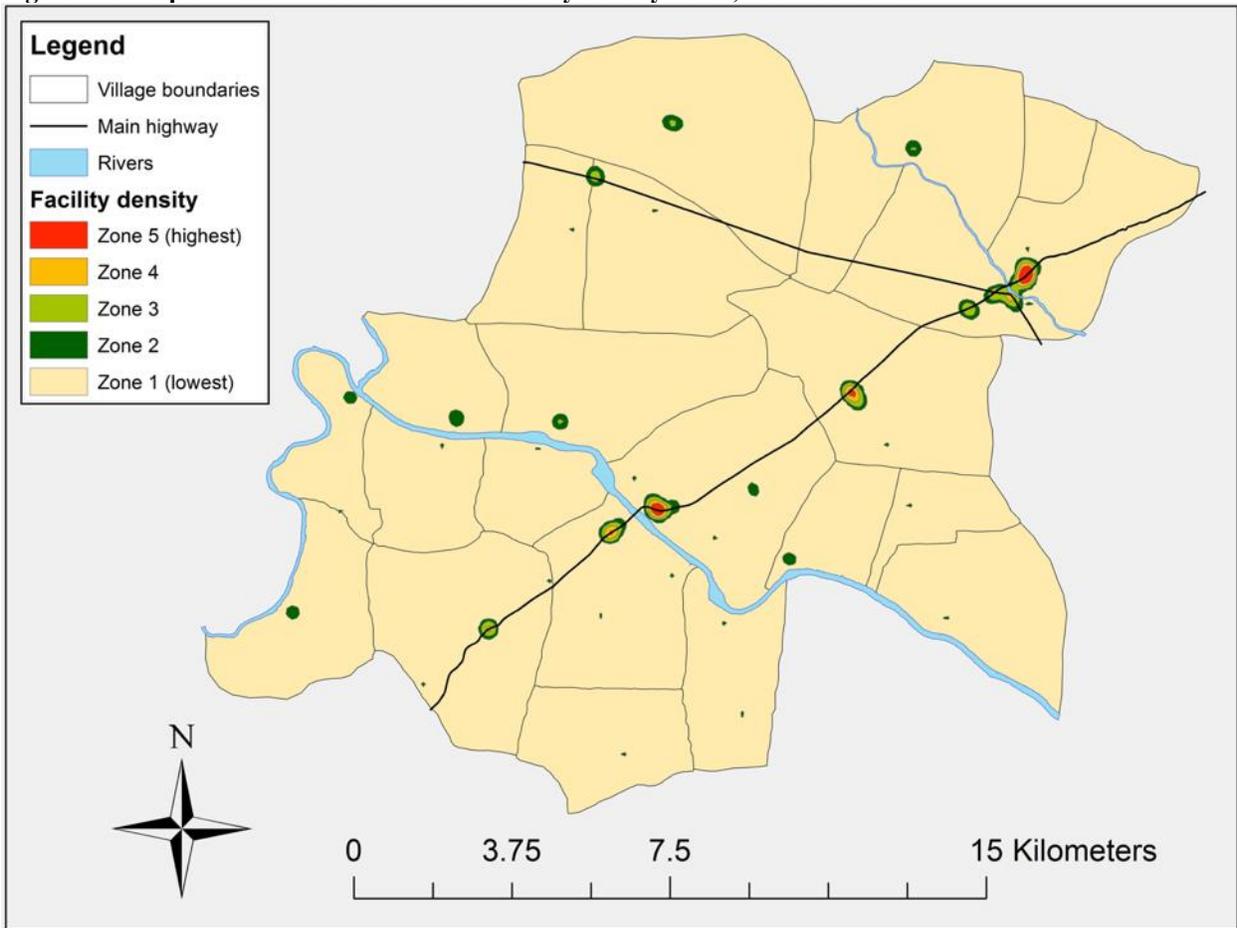
Figure A5: Map of Vadu HDSS with health facility density zones, 1500m bandwidth

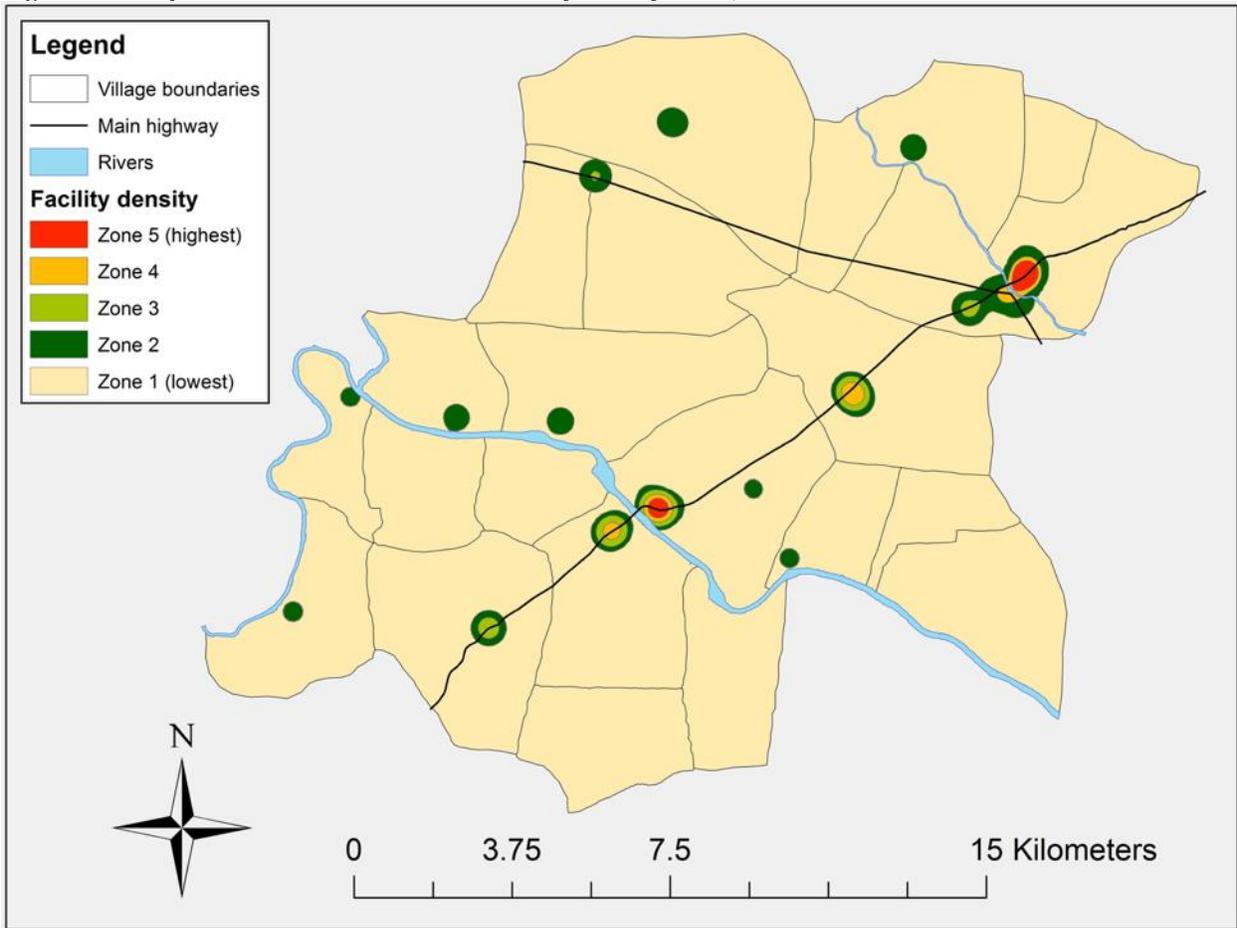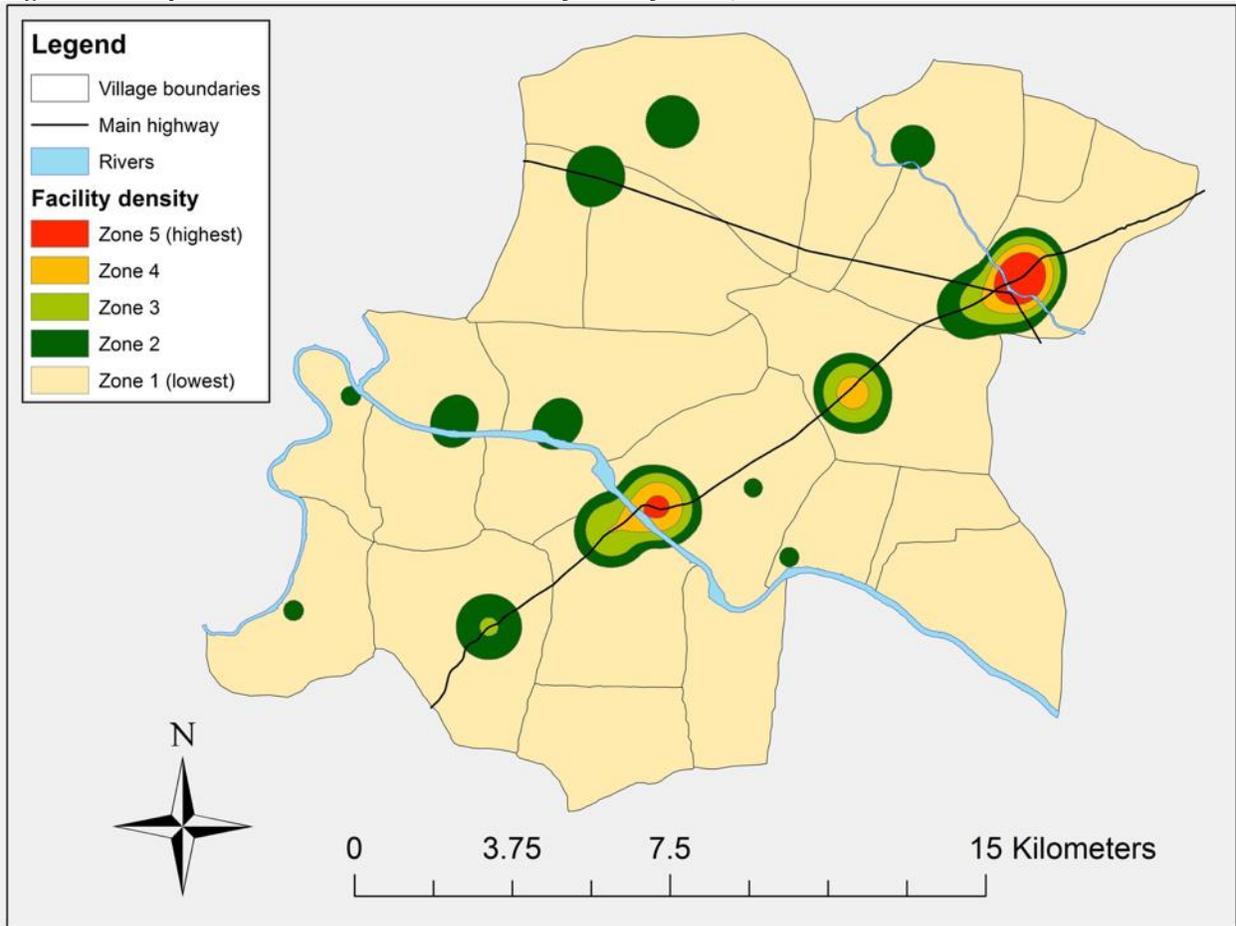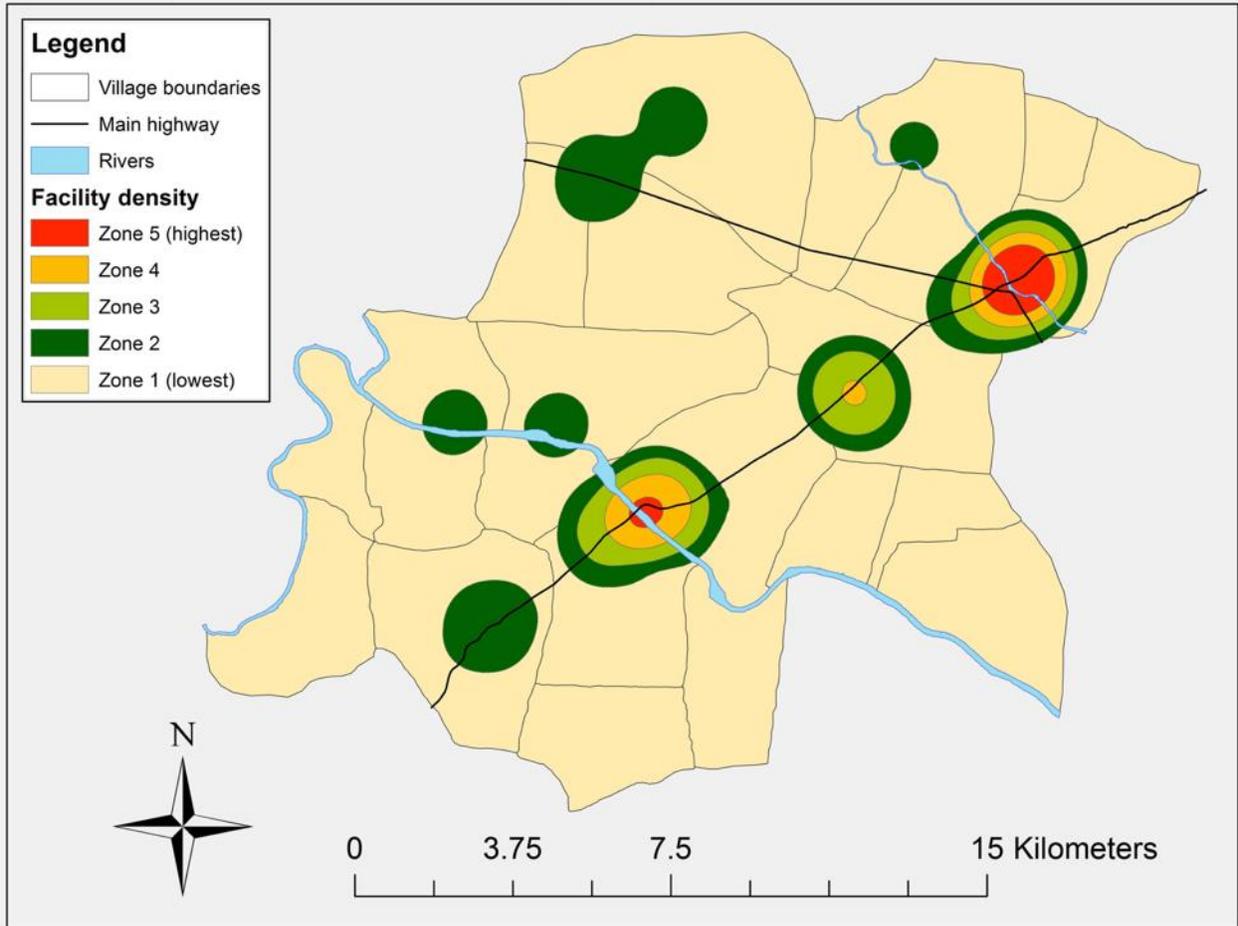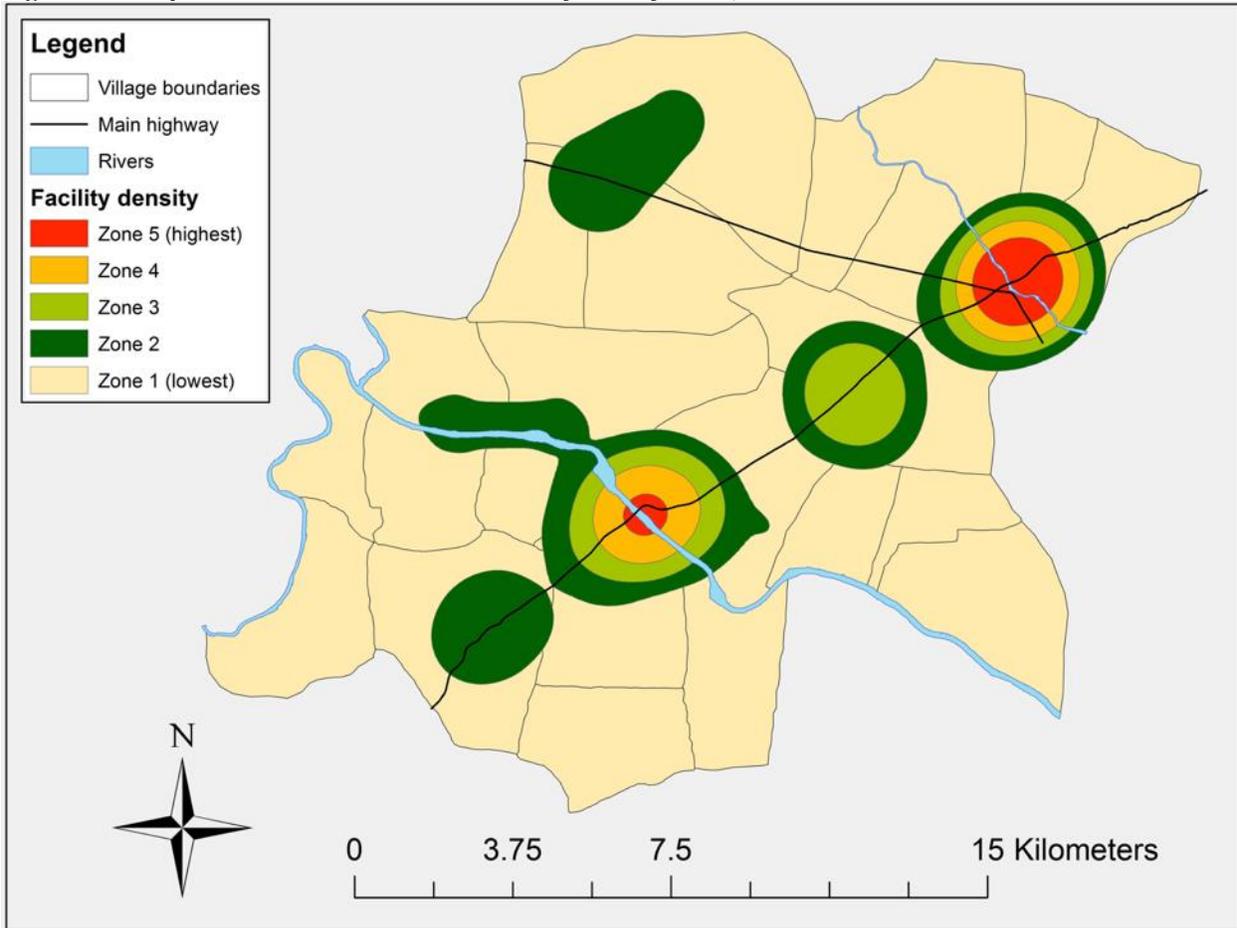**Figure A6: Map of Vadu HDSS with health facility density zones, 2000m bandwidth**

Figure A7: Map of Vadu HDSS with health facility density zones, 2500m bandwidth
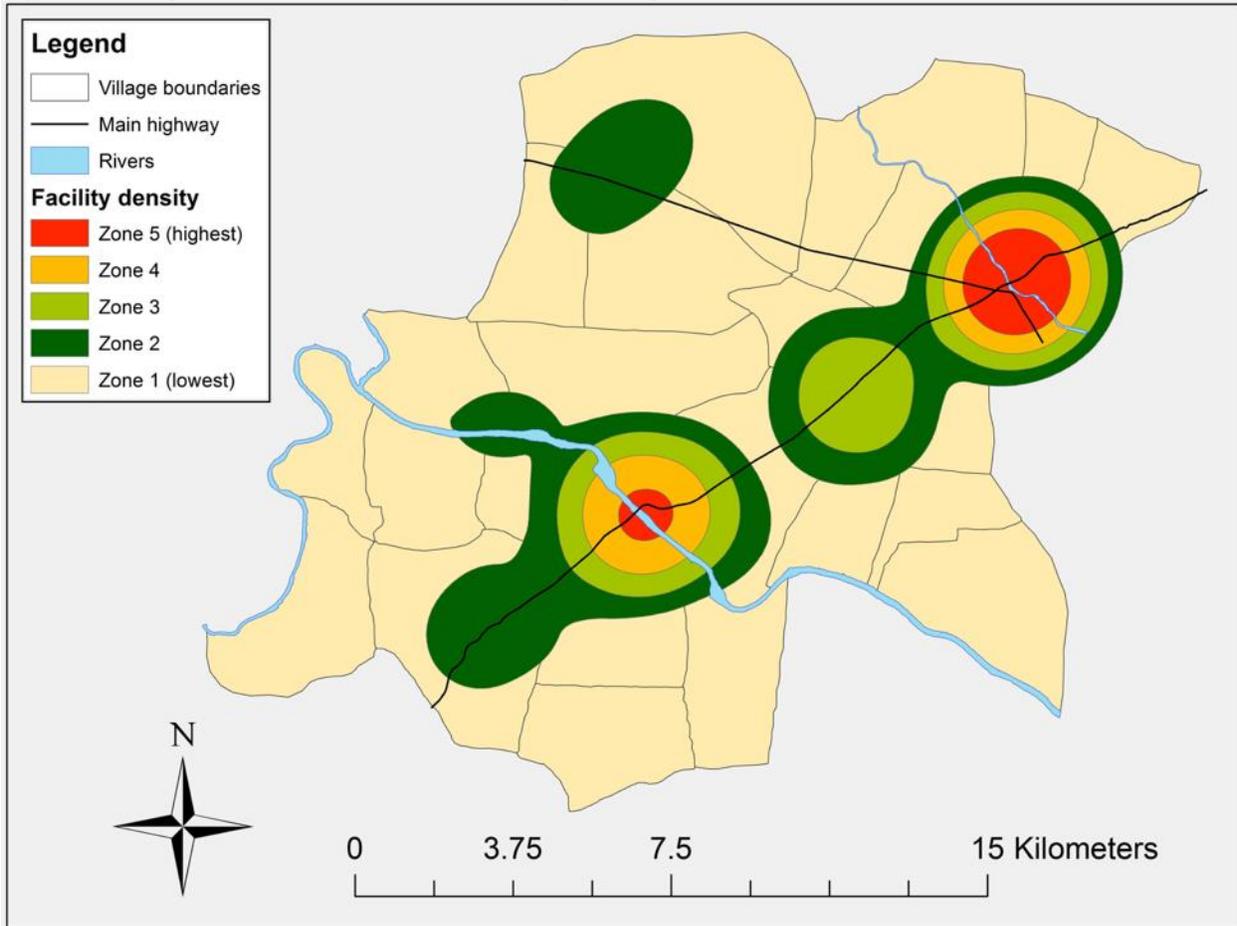
Table A1. Summary GPS visit detection performance when applied to simulated facility visit data, all combinations overall and stratified by parameter values

	N	Measure of GPS visit detection performance, median (interquartile range)					
		Sensitivity	**Specificity**	**AUC**	**PPV**	**NPV**	**Accuracy**
All combinations	432	0.93 (0.87, 0.93)	0.92 (0.87, 0.96)	0.91 (0.88, 0.93)	0.64 (0.52, 0.78)	0.99 (0.98, 0.99)	0.92 (0.88, 0.94)
Distance (meters)							
15	54	0.73 (0.60, 0.87)	0.98 (0.98, 0.98)	0.86 (0.79, 0.89)	0.83 (0.80, 0.86)	0.96 (0.94, 0.98)	0.94 (0.91, 0.95)
20	54	0.87 (0.73, 0.93)	0.97 (0.96, 0.97)	0.92 (0.85, 0.95)	0.79 (0.75, 0.81)	0.98 (0.96, 0.99)	0.96 (0.92, 0.96)
25	54	0.93 (0.80, 0.93)	0.96 (0.95, 0.96)	0.94 (0.89, 0.95)	0.77 (0.74, 0.78)	0.99 (0.97, 0.99)	0.95 (0.93, 0.96)
30	54	0.93 (0.93, 0.93)	0.93 (0.91, 0.94)	0.92 (0.91, 0.94)	0.67 (0.61, 0.70)	0.99 (0.99, 0.99)	0.93 (0.91, 0.94)
35	54	0.93 (0.93, 0.93)	0.93 (0.90, 0.93)	0.92 (0.90, 0.93)	0.65 (0.58, 0.67)	0.99 (0.99, 0.99)	0.93 (0.91, 0.93)
40	54	0.93 (0.93, 0.93)	0.92 (0.87, 0.92)	0.91 (0.89, 0.93)	0.62 (0.52, 0.64)	0.99 (0.99, 0.99)	0.91 (0.88, 0.92)
45	54	0.93 (0.93, 1.00)	0.87 (0.82, 0.88)	0.90 (0.87, 0.91)	0.52 (0.45, 0.54)	0.99 (0.99, 1.00)	0.88 (0.85, 0.89)
50	54	0.93 (0.93, 1.00)	0.86 (0.80, 0.87)	0.90 (0.87, 0.90)	0.50 (0.43, 0.52)	0.99 (0.99, 1.00)	0.87 (0.83, 0.88)
Duration (minutes)							
0	72	1.00 (1.00, 1.00)	0.81 (0.75, 0.88)	0.89 (0.87, 0.92)	0.44 (0.37, 0.55)	1.00 (1.00, 1.00)	0.83 (0.78, 0.89)
>1	72	0.93 (0.93, 1.00)	0.91 (0.84, 0.96)	0.92 (0.90, 0.92)	0.60 (0.49, 0.74)	0.99 (0.99, 1.00)	0.91 (0.86, 0.95)
>2	72	0.93 (0.93, 0.93)	0.93 (0.92, 0.97)	0.93 (0.90, 0.94)	0.67 (0.62, 0.78)	0.99 (0.99, 0.99)	0.93 (0.92, 0.95)
>3	72	0.93 (0.87, 0.93)	0.93 (0.92, 0.97)	0.92 (0.90, 0.93)	0.67 (0.61, 0.79)	0.99 (0.98, 0.99)	0.93 (0.91, 0.95)
>4	72	0.93 (0.87, 0.93)	0.93 (0.92, 0.97)	0.92 (0.90, 0.93)	0.67 (0.63, 0.78)	0.99 (0.98, 0.99)	0.93 (0.91, 0.94)
>5	72	0.87 (0.67, 0.87)	0.94 (0.92, 0.97)	0.88 (0.82, 0.90)	0.68 (0.61, 0.77)	0.98 (0.95, 0.98)	0.92 (0.90, 0.94)
Interval (minutes)							
2	48	0.87 (0.60, 0.93)	0.93 (0.90, 0.98)	0.87 (0.77, 0.90)	0.65 (0.57, 0.76)	0.98 (0.94, 0.99)	0.91 (0.89, 0.92)
3	48	0.93 (0.83, 0.93)	0.93 (0.89, 0.96)	0.91 (0.88, 0.92)	0.67 (0.55, 0.75)	0.99 (0.97, 0.99)	0.92 (0.89, 0.93)
4	48	0.93 (0.87, 0.93)	0.93 (0.89, 0.96)	0.92 (0.90, 0.93)	0.67 (0.55, 0.78)	0.99 (0.98, 0.99)	0.93 (0.89, 0.94)
5	48	0.93 (0.87, 0.93)	0.92 (0.87, 0.96)	0.91 (0.89, 0.93)	0.64 (0.52, 0.78)	0.99 (0.98, 0.99)	0.92 (0.88, 0.94)
6	48	0.93 (0.87, 0.93)	0.92 (0.87, 0.96)	0.91 (0.89, 0.93)	0.64 (0.52, 0.78)	0.99 (0.98, 0.99)	0.92 (0.88, 0.94)
7	48	0.93 (0.87, 0.93)	0.92 (0.87, 0.96)	0.91 (0.89, 0.93)	0.64 (0.52, 0.78)	0.99 (0.98, 0.99)	0.92 (0.88, 0.94)
8	48	0.93 (0.87, 0.93)	0.92 (0.87, 0.96)	0.91 (0.89, 0.93)	0.64 (0.52, 0.78)	0.99 (0.98, 0.99)	0.92 (0.88, 0.94)
9	48	0.93 (0.87, 0.93)	0.92 (0.87, 0.96)	0.91 (0.90, 0.93)	0.64 (0.52, 0.78)	0.99 (0.98, 0.99)	0.92 (0.88, 0.94)
10	48	1.00 (0.93, 1.00)	0.91 (0.84, 0.96)	0.92 (0.90, 0.95)	0.60 (0.48, 0.78)	1.00 (0.99, 1.00)	0.91 (0.86, 0.94)

Note: AUC = Area under the receiver operating characteristic curve; PPV = positive predictive value; NPV = negative predictive value

Figure A8. Forest plot of multivariable logistic regression on visit confirmation status by GPS completion threshold used
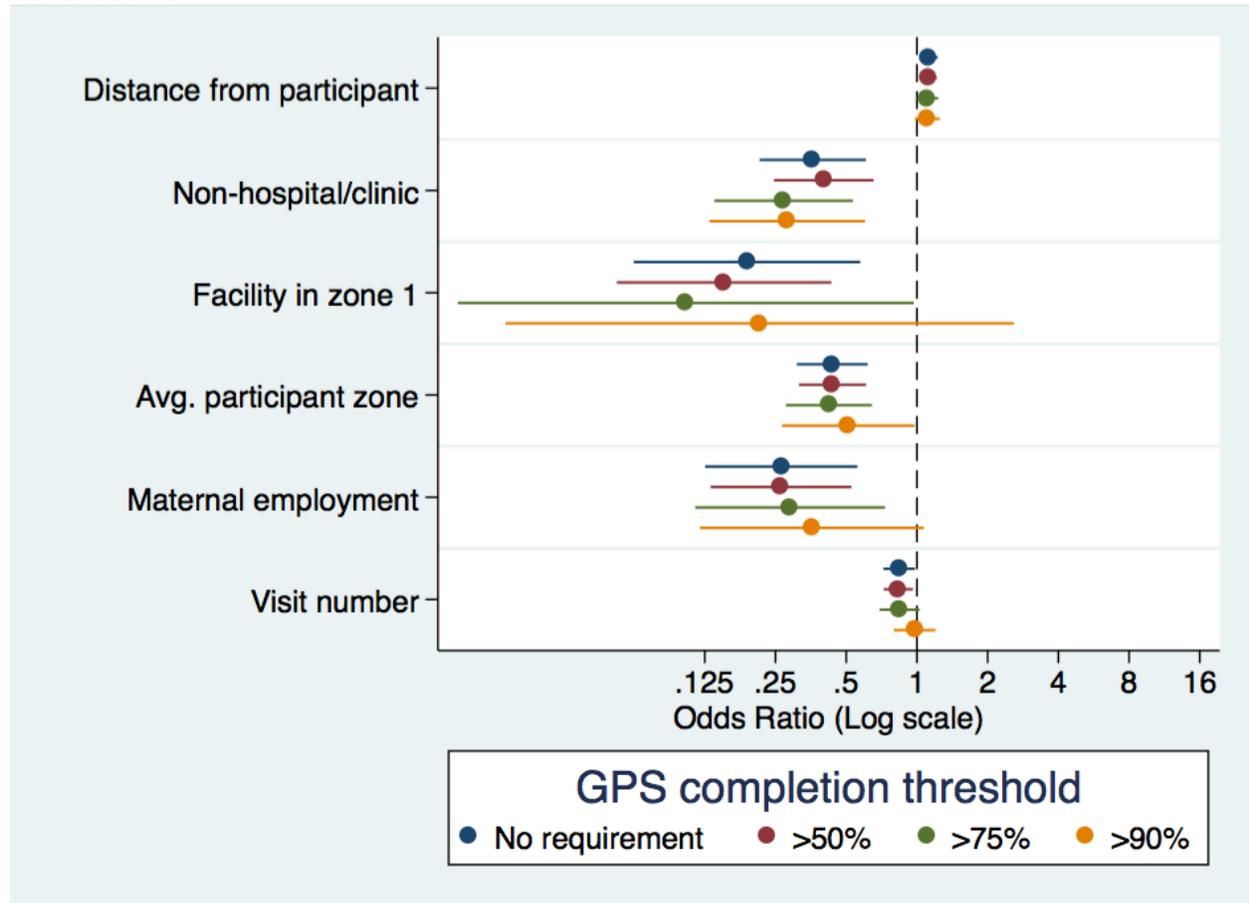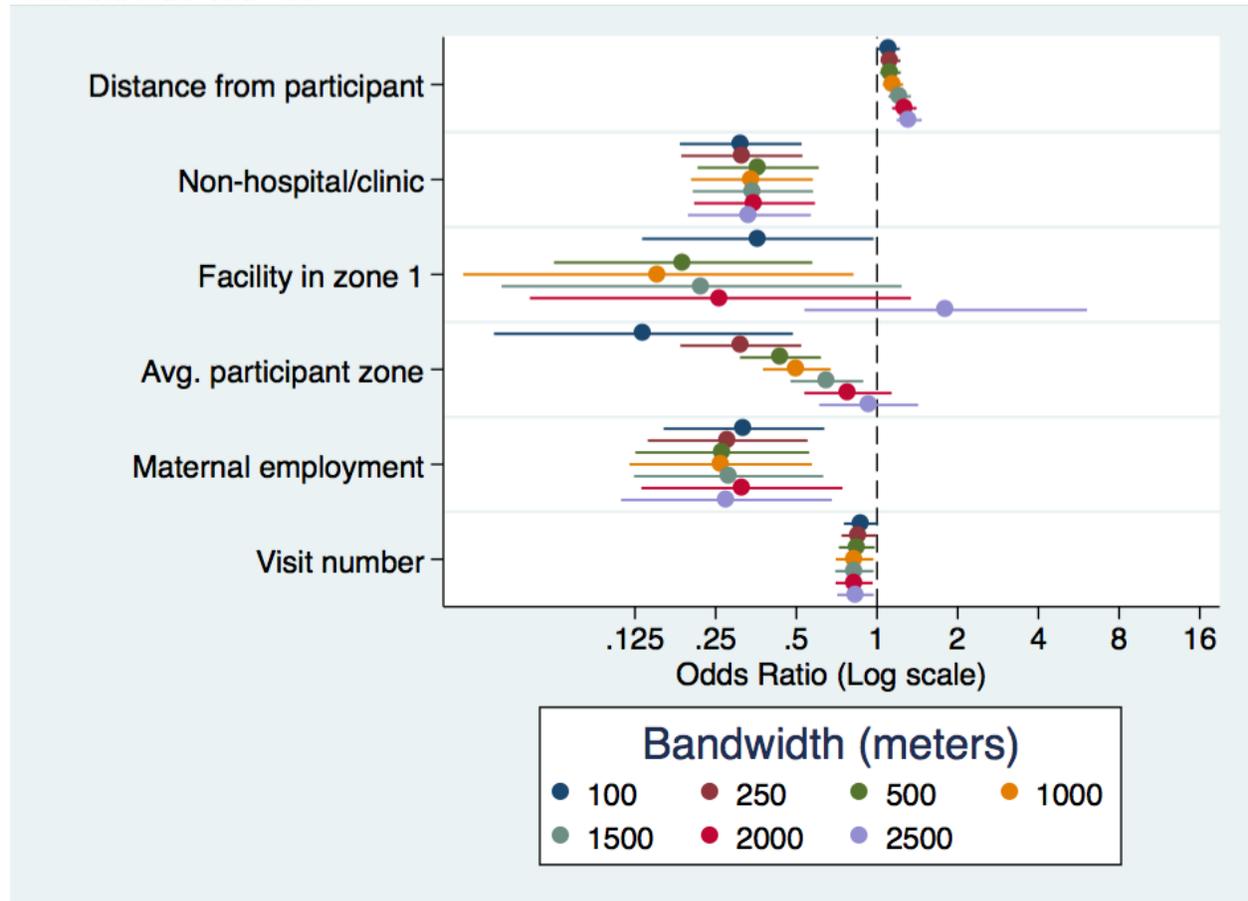
Figure A9. Forest plot of multivariable logistic regression on visit confirmation status by kernel density estimation bandwidth value

Note: Facility located in zone 1 perfectly predicted failure at a bandwidth to 250 meters and could not be estimated