3rd FMD-Week
Istanbul, Turkey – 27th – 29th March 2012

Risk Mapping of Foot-and-Mouth Disease Seroprevalence in Central Asia Countries

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West Eurasia Roadmap FMD Control 2010-2020

Survey Background

✓ Country-wide survey have been carried out during Sep-2010 and Dec-2011

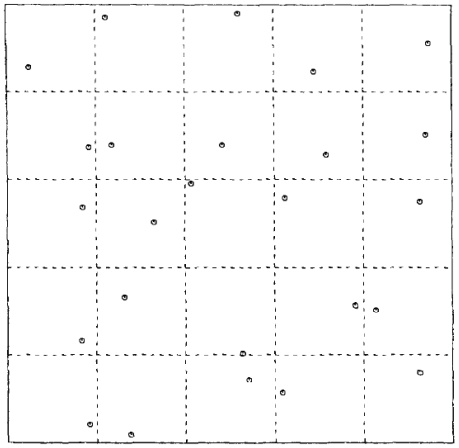
Survey Design

- ✓ Survey methodology based on a Two-Stage Cluster design where
  - 1st Stage, PSU = village, required No calculated by Intensity Sampling

$$N(Psu) = \frac{r}{Km^2}$$ where *r* = 25km

  - 2nd Stage, SSU = animal, required No calculated by Simple Random Sampling Formula for Binomial Data

$$N(Ssu) = \frac{1.96^2 \cdot p \cdot q}{d^2}$$ where *p* = event proportion (0.5)
q = non-event proportion (0.5)
d = standard error (25%) at 95% CI



Seroprevalence Analysis

- ✓ Survey data analysed using the survey procedures (*svy* command) in StataSE 12.1
- ✓ Sampling Base Weight and Finite Population Correction accounted for calculating seroprevalence

$$BW_{ij} = \frac{1}{\left(\frac{z_j}{Z_j}\right)\cdot\left(\frac{k_{ij}}{K_{ij}}\right)}$$

where

Z_j = TOT number of cluster (village) in the *j*th district
z_j = number of sampled cluster in the *j*th district
K_{ij} = TOT number of individual in the *i*th cluster of the *j*th district
kij = number of sampled individuals in the *i*th cluster of the *j*th district

$$FPC_{jl} = \sqrt{\frac{N_{jl} - n_{jl}}{N_{jl} - 1}}$$

where

N_{il} = TOT population of the *j*th district of the *l*th province
n_{il} = sample size of the *j*th district of the *l*th province

- ✓ Odds Ratio evaluated for categorical variables using Generalized Linear Model (Logit Link)
  - Specie (Cattle, Sheep, Goat, Buffalo)
  - Age (0-6m, 6-12m, 12-18m, >18m)
  - Farm System (Village, Dairy, Beef, Mixed, Genetic, TH?)
  - Origin (Internal, External)
  - Vaccination status (Yes/No)
  - Vaccination distance (VaccinationDATE – SamplingDATE)
  - Susceptible distance (6monthDATE – VaccinationDATE)
  - Susceptible status (Yes/No)

Spatial Analysis

✓ Getis-Ord Gi* (Spatial Cluster Hot-Spot Analysis)

- Looking at how feature (Prevalence) is clustering within the context of neighbouring features

$$G_i^* = \frac{\sum_{j=1}^{n} w_{i,j}x_j - \bar{X}\sum_{j=1}^{n} w_{i,j}}{S\sqrt{\frac{\left[n\sum_{j=1}^{n} w_{i,j}^2 - \left(\sum_{j=1}^{n} w_{i,j}\right)^2\right]}{n-1}}}$$

where

x_j = value for feature j
$\omega_{i,j}$ = spatial weight between neighbouring feat.
n = total number of features

✓ Risk Map Generated by Generalized Linear Model (Logit Link)

- Effect of explanatory variables assessed by Univariate Analysis
- Significant variables tested for linearity in the GLM (adjusted via 1000 bootstrap replications)
- Predicted Probability of FMD prevalence calculated using the GLM estimated logit as

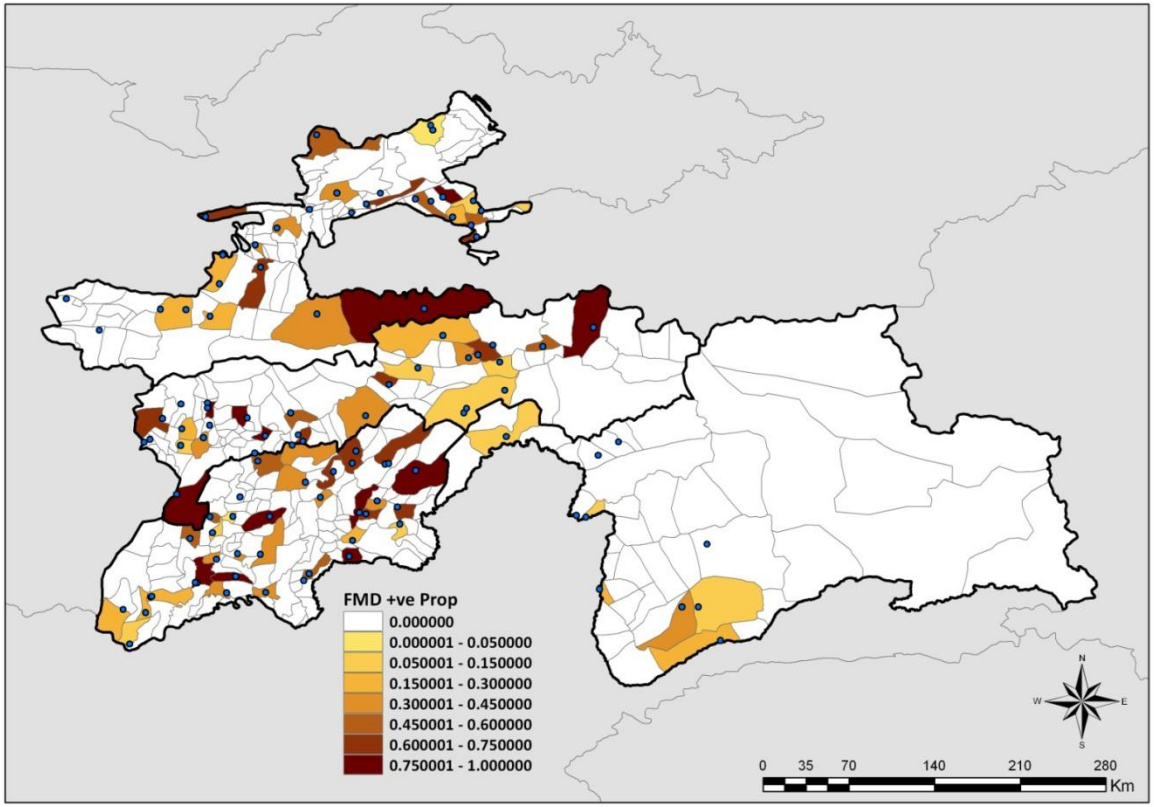
$$p(x) = \frac{e^{g(x)}}{1+e^{g(x)}}$$

where

$p(x)$ = probability of FMD seroprevalence
$g(x)$ = final GLM estimate

- Predicted Probability mapped in ArcGIS 10 by Kernel Smoothed Intensity map (5km grid cell, 50km bandwidth)

Tajikistan



Province	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-District Prevalence Range	Within-Village Prevalence Range
DRD	220/512	54.75% [54.94%]	52.77% to 56.72%	3.33% to 98.41%	0% to 100%
Khatlon	442/944	49.32% [49.46%]	47.90% to 50.74%	3.56% to 93.75%	0% to 93.75%
Sughd	171/496	42.96% [43.05%]	41.80% to 44.14%	0% to 68.75%	0% to 100%
VMCB	18/160	13.89% [13.71%]	12.52% to 15.38%	0% to 28.52%	0% to 37.50%
TOT	851/2112	47.83% [47.96%]	46.92% to 48.74%	0% to 93.75%	0% to 100%

†Adjusted-Wald test between provinces, F = 282.8666 (d.f. 3, 125) (p=0.000)

Tajikistan

	Status [No Herd]	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Vaccination	Vaccinated [87]	538/1520	38.41% [39.10%]	37.05% to 39.80%	0% to 100%	0.476 [0.347 to 0.652]
	0> mpv <6 [39]	216/640	36.86% [37.41%]	34.79% to 38.97%	0% to 100%	0.571 [0.424 to 0.768]
	6> mpv <12 [39]	238/623	39.74% [40.39%]	37.38% to 42.16%	0% to 100%	0.668 [0.484 to 0.923]
	>12 mpv [15]	84/257	39.05% [39.68%]	36.27% to 41.90%	0% to 100%	0.671 [0.428 to 1.053]
	Unvaccinated [32]	313/592	56.73% [58.02%]	55.58% to 57.87%	0% to 100%	2.102 [1.534 to 2.879]
Susceptibility	Susceptible [97]	685/1557	50.36% [51.61%]	45.92% to 54.80%	% to %	1.929 [1.392 to 2.673]
	Post Vacc. [60]	372/965	40.34% [41.26%]	35.53% to 45.34%	% to %	0.638 [0.476 to 0.855]
	Not Susceptible [35]	166/555	34.47% [35.20%]	28.58% to 40.87%	% to %	0.518 [0.374 to 0.718]
	0> mpv <6 [27]	119/435	35.08% [35.83%]	28.52% to 42.25%	% to %	0.545 [0.384 to 0.773]
	>6 mpv [7]	47/120	31.40% [32.02%]	19.86% to 45.80%	% to %	0.490 [0.260 to 0.924]

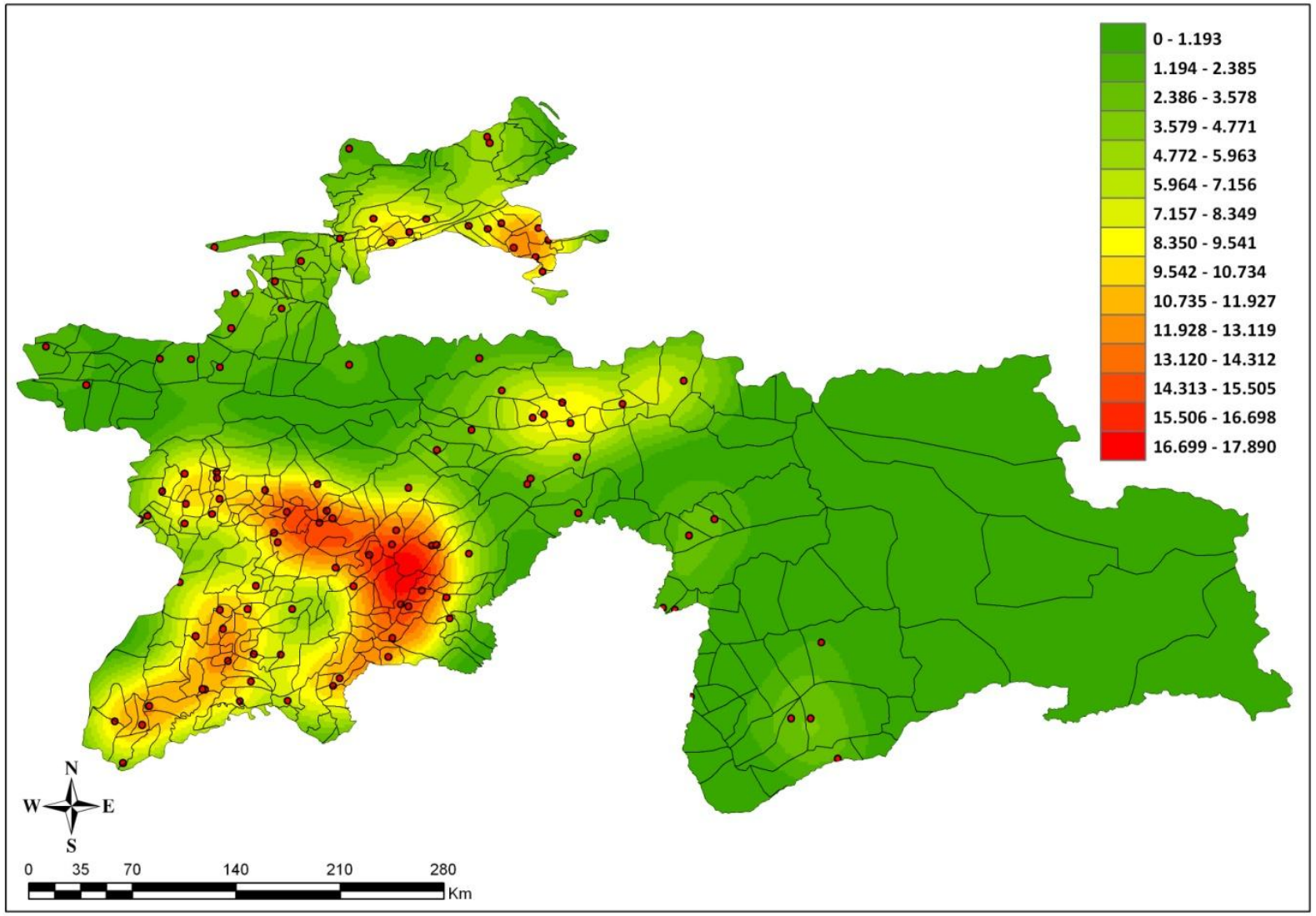
†Adjusted-Wald test between Vaccination group F = 131.6894 (d.f. 3, 125) (p=0.000)

†Adjusted-Wald test between Susceptibility group F = 8.2085 (d.f. 3, 8088) (p=0.000)

For vaccinated (DEFF = 11.46 DEFT = 3.385); for unvaccinated (DEFF = 8.339 DEFT = 2.888)

For 0> mpv <6 (DEFF = 11.12 DEFT = 3.334); for 6> mpv <12 (DEFF = 12.95 DEFT = 3.599); for >12 mpv (DEFF = 9.166 DEFT = 3.028)

Tajikistan


0 - 1.193
1.194 - 2.385
2.386 - 3.578
3.579 - 4.771
4.772 - 5.963
5.964 - 7.156
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8.350 - 9.541
9.542 - 10.734
10.735 - 11.927
11.928 - 13.119
13.120 - 14.312
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15.506 - 16.698
16.699 - 17.890
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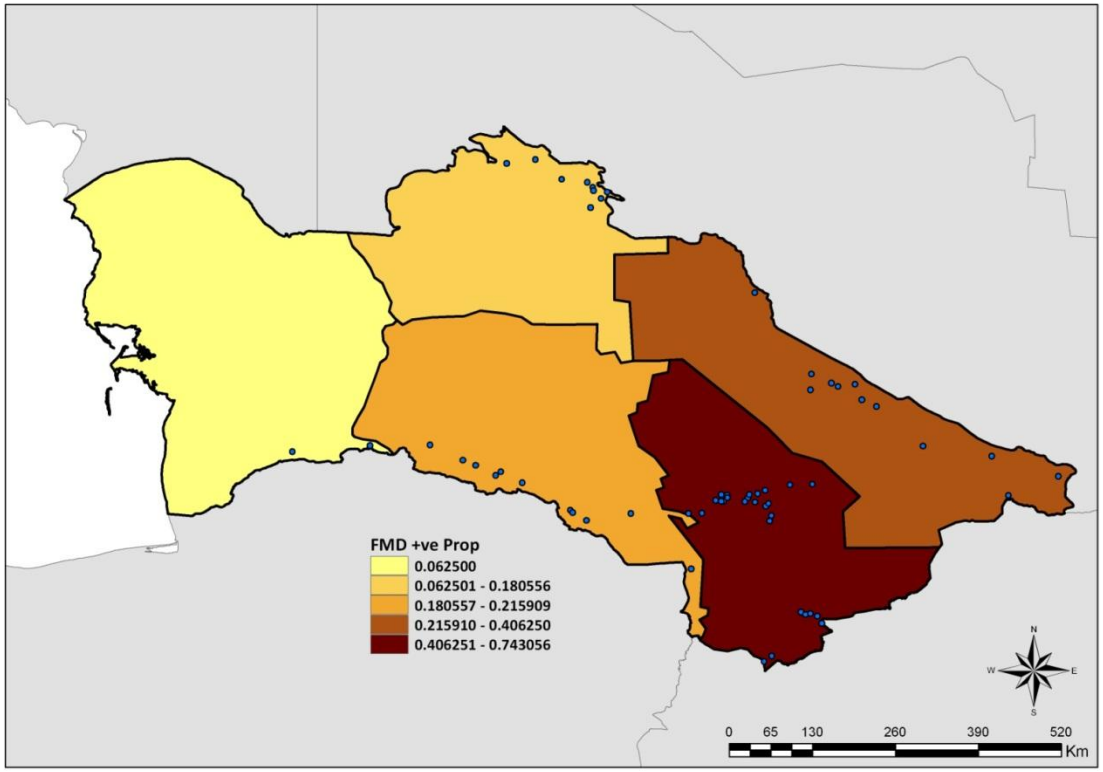
Turkmenistan



Province	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-District Prevalence Range	Within-Village Prevalence Range
Ahal	38/176	14.07% [13.89%]	13.43% to 14.74%	0% to 31.82%	0% to 50.00%
Balkan	2/32	8.71% [8.49%]	7.94% to 9.53%	0% to 12.50%	0% to 12.50%
Daşoguz	26/144	7.28% [7.04%]	6.41% to 8.27%	0% to 39.85%	0% to 56.25%
Lebap	78/192	38.16% [38.20%]	36.81% to 39.52%	0% to 81.25%	0% to 100%
Mary	321/432	75.90% [76.29%]	75.27% to 76.52%	43.83% to 100%	37.50% to 100%
TOT	465/976	41.93% [42.01%]	41.27% to 42.59%	0% to 100%	0% to 100%

†Adjusted-Wald test between provinces = 3030.7745 (d.f. 4, 50) (p=0.000)

Turkmenistan

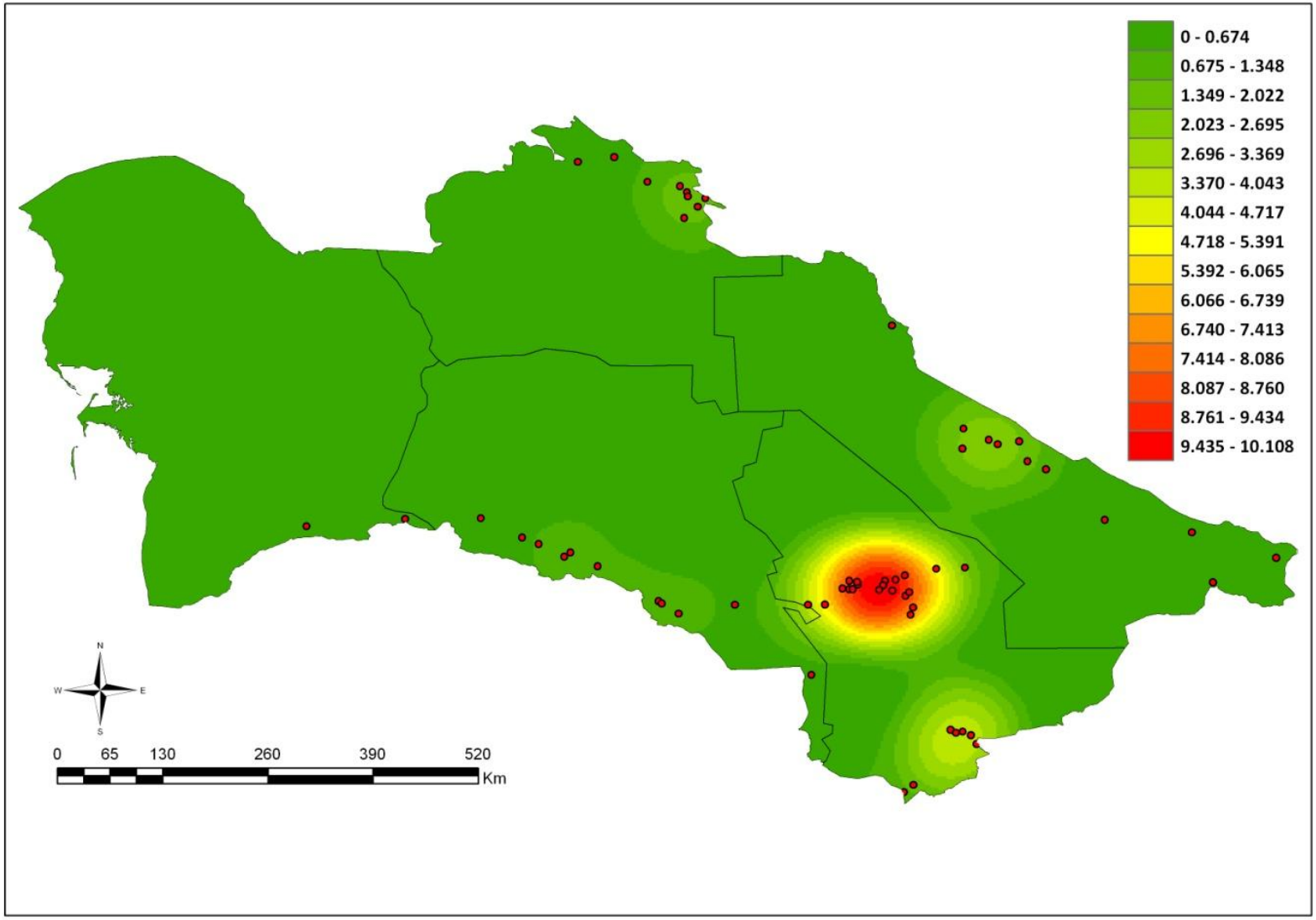
	Status [No Village]	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Vaccination	Vaccinated [52]	452/960	41.61% [42.34%]	40.92% to 42.28%	0% to 100%	0.164 [0.046 to 0.583]
	0> mpv <6 [19]	119/336	24.57% [24.66%]	23.76% to 25.40%	0% to 100%	0.324 [0.232 to 0.455]
	6> mpv <12 [30]	303/528	53.72% [54.90%]	52.70% to 54.74%	0% to 100%	3.326 [2.401 to 4.591]
	>12 mpv [6]	30/96	25.62% [25.75%]	24.67% to 26.59%	0% to 62.50%	0.444 [0.238 to 0.827]
	Unvaccinated [1]	13/16	81.25% [83.45%]	-	-	6.079 [1.715 to 21.550]
Susceptibility	Susceptible [61]	465/976	41.93% [42.90%]	38.26% to 45.69%	0% to 100%	-
	Post Vacc. [60]	452/960	41.61% [42.57%]	37.92% to 45.40%	0% to 100%	-
	Not Susceptible [-]	-	-	-	-	-
	0> mpv <6 [-]	-	-	-	-	-
	>6 mpv [-]	-	-	-	-	-

†Adjusted-Wald test between Vaccination Distance groups, F = 1.00e+04 (d.f. 3, 51) (p=0.000)

For vaccinated (DEFF = 8.197 DEFT = 2.863); for unvaccinated (DEFF = 3.6e-32 DEFT = 1.9e-16)

For 0> mpv <6 (DEFF = 4.817 DEFT = 2.195); for 6> mpv <12 (DEFF = 9.91 DEFT = 3.148); for >12 mpv (DEFF = 2.447 DEFT = 1.564)

Turkmenistan

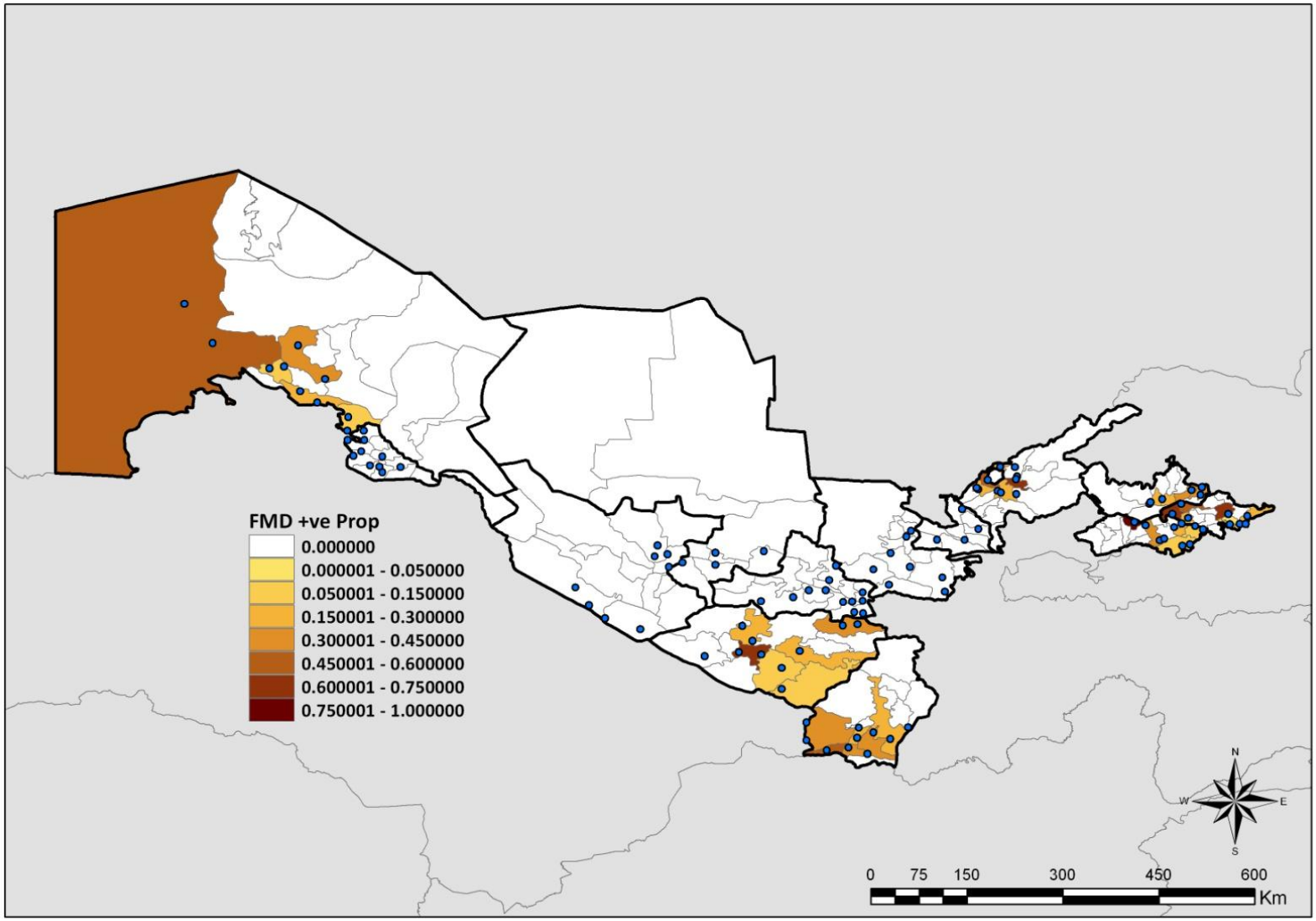


Uzbekistan

Province	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-District Prevalence Range	Within-Village Prevalence Range
Andijan	41/128	36.69% [37.23%]	38.56% to 40.83%	0% to 68.75%	0% to 68.75%
Bukhara	0/128	0% [0%]	-	-	-
Fergana	46/160	26.80% [26.97%]	25.72% to 27.91%	1.32% to 81.25%	0% to 81.25%
Jizzakh	0/128	0% [0%]	-	-	-
Kashkadarya	37/160	26.00% [26.14%]	25.42% to 26.59%	0% to 36.74%	0% to 68.75%
Khorezm	0/160	0% [0%]	-	-	-
Namangan	27/96	26.22% [26.37%]	25.84% to 26.60%	18.75% to 38.34%	18.75% to 43.75%
Navoiy	0/64	0% [0%]	-	-	-
Karakalpaks.	42/160	28.15% [28.37%]	27.36% to 28.95%	12.50% to 47.68%	0% to 50.00%
Samarqand	0/192	0% [0%]	-	-	-
Surkhandar.	44/160	21.45% [21.42%]	20.73% to 22.19%	14.02% to 56.25%	0% to 50.00%
Sirdarya	0/64	0% [0%]	-	-	-
Tashkent	44/160	25.96% [26.10%]	24.36% to 27.63%	6.73% to 67.09%	0% to 82.00%
TOT	281/1760	14.35% [14.06%]	13.99% to 14.72%	0% to 81.25%	0% to 82.00%

†Adjusted-Wald test between provinces, F = 1847.6132 (d.f. 12, 85) (p=0.000)

Uzbekistan


FMD +ve Prop
0.000000
0.000001 - 0.050000
0.050001 - 0.150000
0.150001 - 0.300000
0.300001 - 0.450000
0.450001 - 0.600000
0.600001 - 0.750000
0.750001 - 1.000000
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S
0 75 150 300 450 600
Km

Uzbekistan

	Status [No Herd]	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Vaccination	Vaccinated [53]	104/880	10.24% [9.79%]	10.01% to 10.48%	0% to 56.25%	0.506 [0.313 to 0.818]
	0> mpv <6 [53]	104/880	10.24% [9.79%]	10.01% to 10.48%	0% to 56.25%	0.506 [0.313 to 0.818]
	6> mpv <12 [-]	-	-	-	-	-
	>12 mpv [-]	-	-	-	-	-
	Unvaccinated [53]	177/880	18.40% [18.26%]	17.73% to 19.09%	0% to 82.00%	1.977 [1.223 to 3.196]
Susceptibility	Susceptible [66]	202/1056	16.54% [16.67%]	12.40% to 21.72%	0% to 82.00%	1.600 [0.982 to 2.607]
	Post Vacc. [11]	25/176	7.08% [6.83%]	4.25% to 11.66%	0% to 75.00%	0.427 [0.232 to 0.786]
	Not Susceptible [44]	79/704	11.02% [10.97%]	8.00% to 15.00%	0% to 75.00%	0.625 [0.383 to 1.019]
	0> mpv <6 [24]	51/390	15.26% [15.35%]	10.47% to 21.70%	0% to 75.00%	1.097 [0.647 to 1.860]
	>6 mpv [19]	28/314	6.18% [5.97%]	3.43% to 10.88%	0% to 100%	0.340 [0.173 to 0.669]

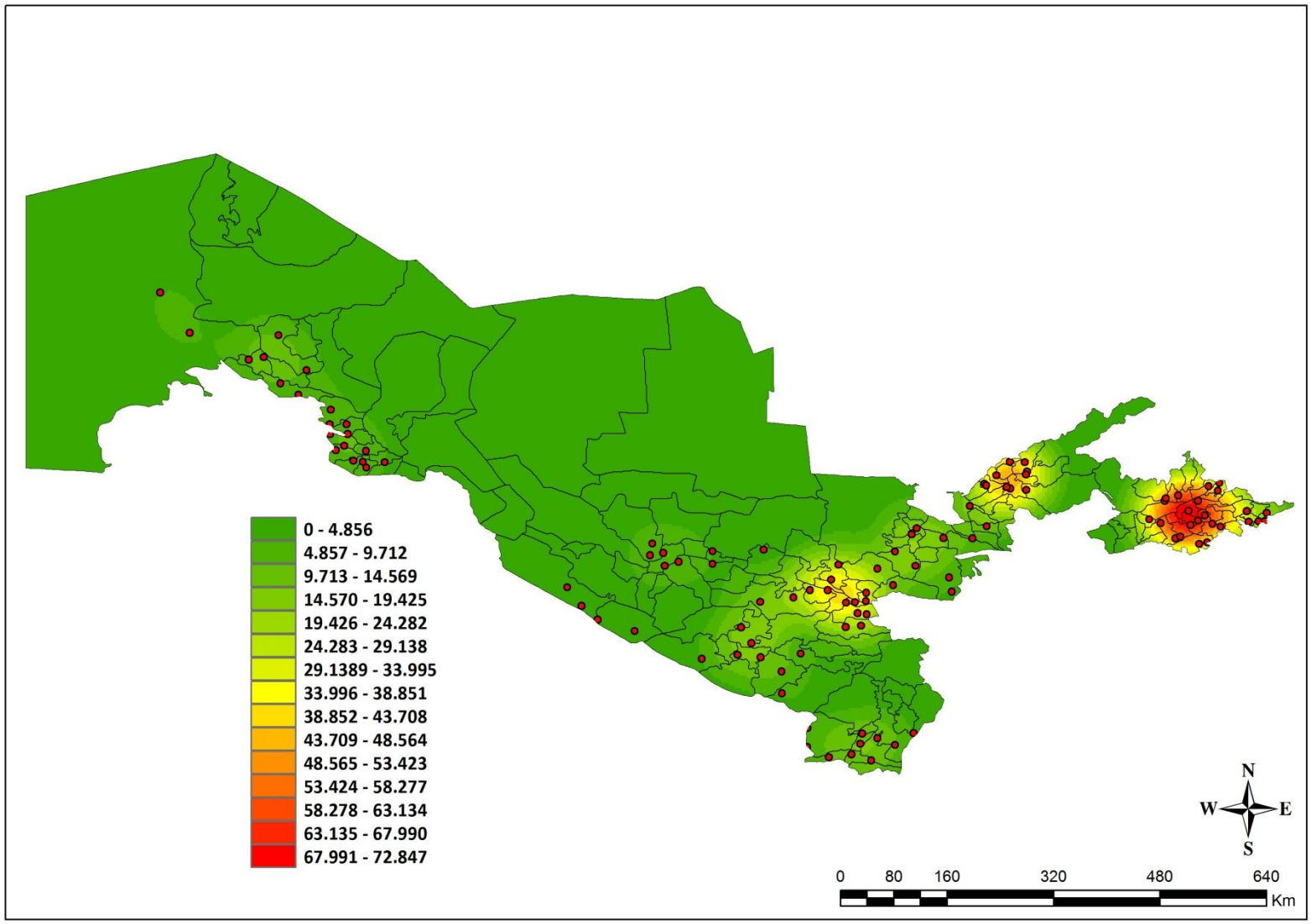
†Adjusted-Wald test between Vaccination groups, F = 604.4646 (d.f. 1, 96) (p=0.000)

†Adjusted-Wald test between Susceptibility groups, F = 6.0575 (d.f. 3, 8088) (p=0.000)

For vaccinated (DEFF = 5.059 DEFT = 2.249); for unvaccinated (DEFF = 32.43 DEFT = 5.695)

For 0> mpv <6 (DEFF = 5.059 DEFT = 2.249)

Uzbekistan


0 - 4.856
4.857 - 9.712
9.713 - 14.569
14.570 - 19.425
19.426 - 24.282
24.283 - 29.138
29.1389 - 33.995
33.996 - 38.851
38.852 - 43.708
43.709 - 48.564
48.565 - 53.423
53.424 - 58.277
58.278 - 63.134
63.135 - 67.990
67.991 - 72.847
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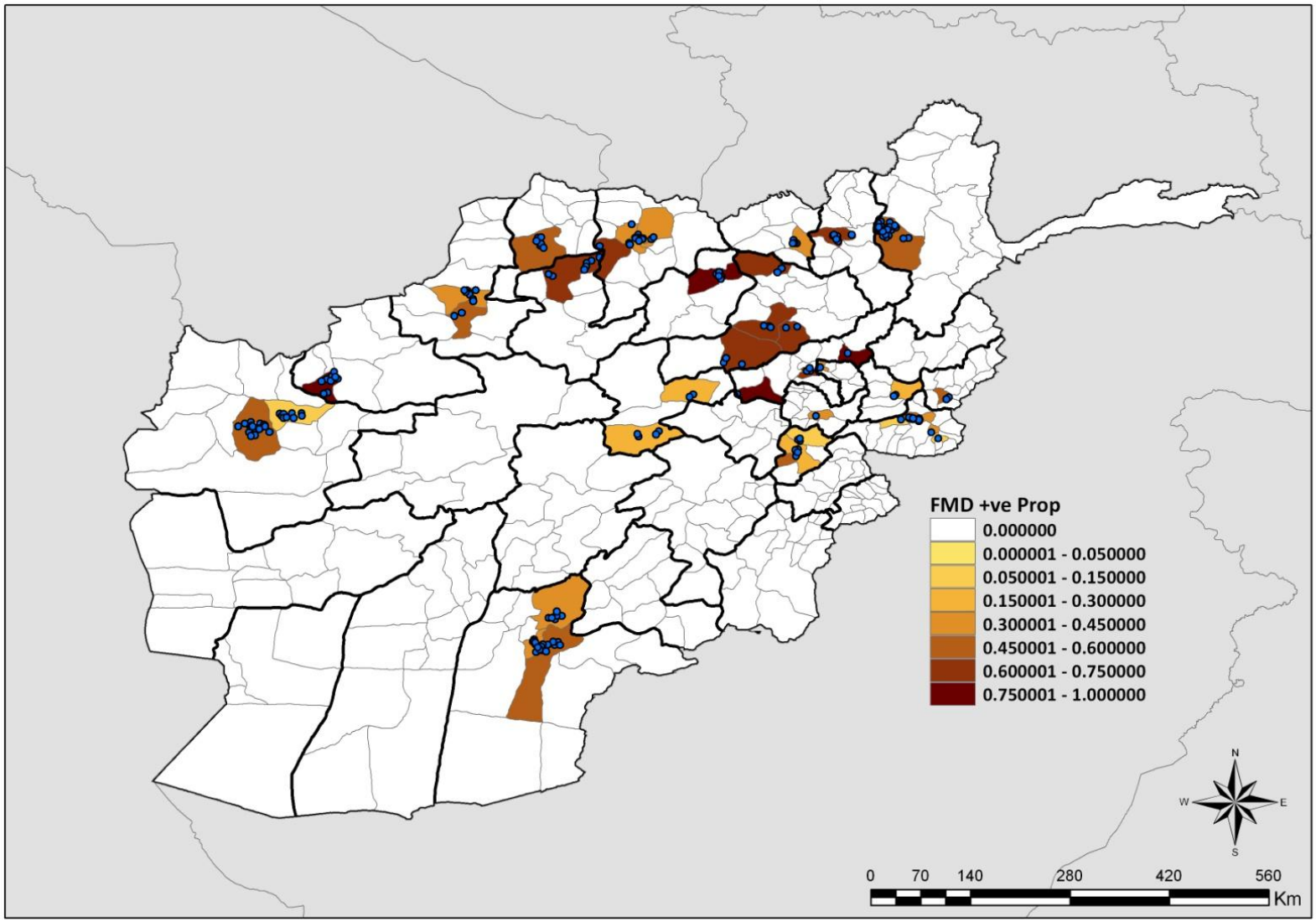
Afghanistan

Province	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-District Prevalence Range	Within-Village Prevalence Range
Badakhshan	228/499	48.97% [49.97%]	41.67% to 56.31%	-	0% to 100%
Badghis	140/162	88.41% [90.88%]	82.05% to 92.72%	-	55.56% to 100%
Baghlan	101/160	63.31% [64.84%]	55.17% to 70.76%	62.83% to 63.85%	50.00% to 81.25%
Balkh	83/225	37.29% [37.85%]	29.16% to 46.21%	33.58% to 43.75%	18.75% to 73.33%
Bamyan	20/109	25.72% [25.85%]	14.33% to 41.75%	10.14% to 26.21%	0% to 34.78%
Faryab	65/160	39.04% [39.67%]	27.90% to 51.45%	31.36% to 44.51%	25.00% to 50.00%
Herat	172/432	47.92% [48.88%]	40.45% to 55.48%	14.18% to 57.50%	0% to 93.75%
Jowzjan	55/96	59.72% [61.12%]	48.86% to 69.70%	-	18.75% to 81.25%
Kabul	14/32	43.75% [44.55%]	27.89% to 61.00%	-	-
Kandahar	175/431	39.01% [39.64%]	33.94% to 44.32%	32.22% to 47.92%	6.25% to 75.00%
Kapisa	5/16	31.25% [31.59%]	13.63% to 56.69%	-	-
Kunduz	25/60	41.67% [42.40%]	29.94% to 54.41%	-	33.33% to 46.67%
Konar	15/32	50.93% [52.00%]	33.66% to 67.97%	-	31.25% to 62.50%
Laghman	8/32	30.00% [30.29%]	16.08% to 48.93%	-	0% to 50.00%
Logar	25/142	19.16% [19.04%]	13.21% to 26.94%	6.25% to 27.98%	6.25% to 50.00%
Nangarhar	95/256	34.80% [35.27%]	28.87% to 41.25%	12.50% to 47.61%	0% to 87.50%
Panjshir	32/32	100% [100%]	-	-	100% to 100%
Parvan	28/46	61.14% [62.59%]	46.49% to 74.02%	-	50.00% to 68.75%
Samangan	73/96	73.78% [75.70%]	63.52% to 81.97%	-	62.50% to 93.75%
Sare Pol	87/135	64.35% [65.92%]	54.88% to 72.81%	-	50.00% to 81.25%
Takhar	58/90	62.75% [64.26%]	51.06% to 73.12%	-	40.00% to 87.50%
TOT	1504/3243	46.81% [47.73%]	43.40% to 50.24%	6.25% to 63.85%	0% to 100%

†Adjusted-Wald test between provinces, F = 1847.6132 (d.f. 20, 3223) (p=0.000)

Afghanistan



Afghanistan

	Status [No Herd]	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Vaccination	Vaccinated [88]	652/1411	48.60% [49.58%]	44.59% to 52.63%	0% to 100%	1.111 [0.868 to 1.422]
	0> mpv <6 [50]	400/812	49.51% [50.53%]	44.22% to 54.81%	0% to 100%	1.145 [0.876 to 1.497]
	6> mpv <12 [28]	182/439	45.90% [46.78%]	39.28% to 52.67%	6.25% to 81.25%	0.960 [0.705 to 1.307]
	>12 mpv [10]	70/160	49.00% [50.00%]	37.54% to 60.57%	6.25% to 62.50%	1.096 [0.672 to 1.789]
	Unvaccinated [110]	852/1832	45.97% [46.87%]	41.37% to 50.64%	0% to 100%	0.900 [0.703 to 1.152]
Susceptibility	Susceptible [181]	1298/2894	45.40% [46.49%]	41.78% to 49.08%	0% to 100%	0.528 [0.368 to 0.757]
	Post Vacc. [66]	446/1062	43.71% [44.74%]	39.18% to 48.35%	0% to 100%	0.851 [0.661 to 1.095]
	Not Susceptible [22]	206/349	61.17% [62.78%]	53.15% to 68.62%	0% to 100%	1.894 [1.321 to 2.714]
	0> mpv <6 [12]	105/187	62.24% [63.88%]	53.07% to 70.60%	0% to 81.25%	1.927 [1.288 to 2.883]
	>6 mpv [10]	101/162	60.13% [61.70%]	47.02% to 71.93%	0% to 100%	1.758 [1.015 to 3.043]

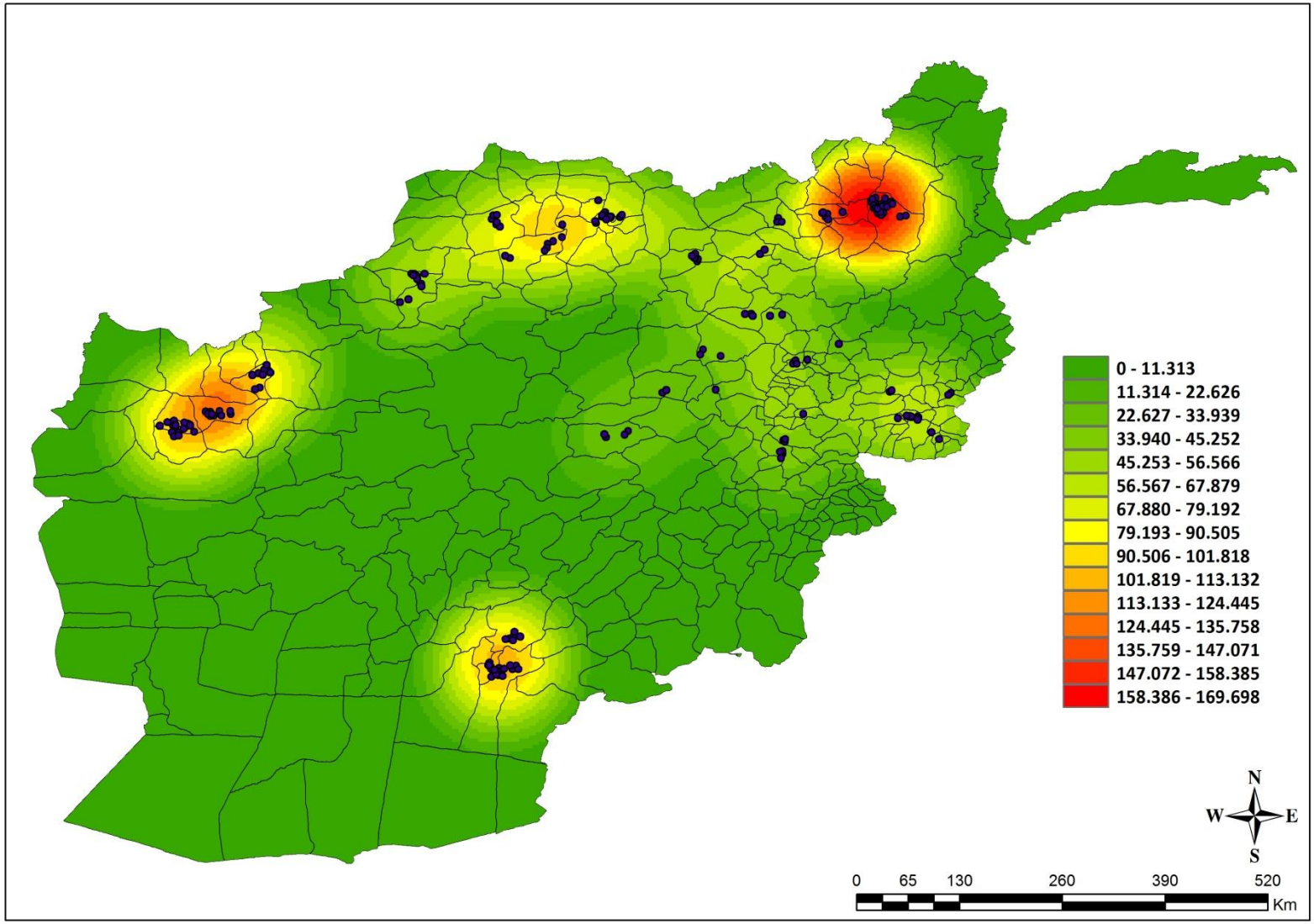
†Adjusted-Wald test between Vaccination groups, F = 0.4087 (d.f. 3, 3240) (p=0.747)

†Adjusted-Wald test between Susceptibility groups, F = 5.4314 (d.f. 3, 8088) (p=0.001)

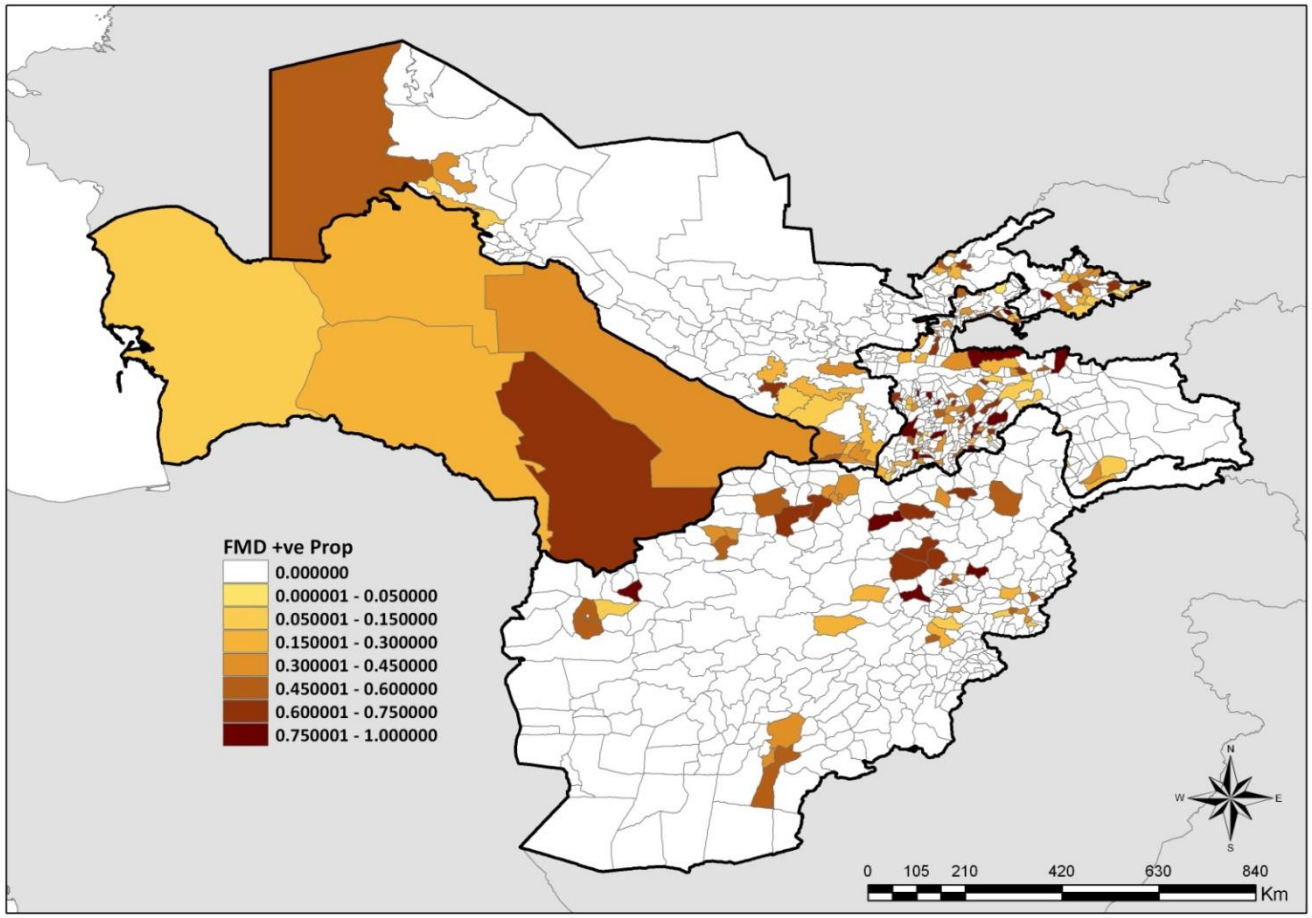
For vaccinated (DEFF = 6.802 DEFT = 2.608); for unvaccinated (DEFF = 17.56 DEFT = 4.191)

For 0> mpv <6 (DEFF = 9.175 DEFT = 3.029); for 6> mpv <12 (DEFF = 2.366 DEFT = 1.538); for >12 mpv (DEFF = 2.881 DEFT = 1.697)

Afghanistan



Central Asia



	Result/ No Sampled	Observed [True] Seroprevalence	95% CI	Within-Specie Prevalence Range	Within-Farm Sys. Prevalence Range
Positive	3101/8091	23.98% [29.94%]	21.67% to 26.45%	22.21% to 50.18%	18.64% to 57.99%
Negative	4990/8091	76.02% [78.12%]	73.55% to 78.33%	45.82% to 77.88%	42.01% to 81.36%

DEFF = 6.594, DEFT = 2.568

Central Asia

Specie	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Cattle	2856/7592	22.12% [22.44%]	19.75% to 24.68%	0% to 100%	0.290 [0.202 to 0.415]
Goat	191/368	54.18% [55.56%]	44.77% to 63.31%	0% to 100%	4.143 [2.768 to 6.201]
Sheep	13/51	28.25% [28.77%]	15.27% to 46.25%	6.25% to 34.78%	1.252 [0.567 to 2.766]
Buffalo	41/80	50.81% [52.08%]	39.62% to 61.91%	0% to 87.50%	3.276 [2.043 to 5.253]
TOT	3101/8091	23.98% [24.36%]	21.67% to 26.45%	0% to 100%	2.267 [1.688 to 3.044]

†Adjusted-Wald test F = 23.0642 (d.f. 3, 8088) (p=0.000)

Farm System	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Village	2726/7082	23.78% [24.15%]	21.45% to 26.28%	0% to 100%	0.482 [0.378 to 0.616]
Dairy	59/240	18.64% [18.84%]	13.68% to 24.88%	6.25% to 50.00%	0.726 [0.491 to 1.073]
Beef	35/97	35.11% [35.86%]	23.57% to 48.70%	20.00% to 73.33%	1.717 [0.964 to 3.059]
Mixed	39/208	22.93% [23.27%]	15.62% to 32.36%	0% to 75.00%	0.943 [0.576 to 1.543]
Genetic	125/256	49.33% [50.55%]	41.85% to 56.84%	0% to 100%	3.090 [2.223 to 4.295]
TH	117/208	57.99% [59.49%]	48.95% to 66.52%	12.50% to 100%	4.418 [2.999 to 6.509]
TOT	3101/8091	23.98% [24.36%]	21.67% to 26.45%	0% to %100	1.276 [1.195 to 1.363]

†Adjusted-Wald test F = 20.4805 (d.f. 5, 8088) (p=0.000)

Age Group	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
0-6m	1587/3675	33.41% [34.10%]	28.89% to 38.24%	0% to 100%	1.755 [1.349 to 2.283]
6-12m	629/2131	22.61% [22.94%]	18.91% to 26.81%	0% to 100%	0.866 [0.661 to 1.136]
12-18m	884/2282	21.74% [22.04%]	18.34% to 25.58%	0% to 100%	0.822 [0.627 to 1.077]
>18m	1/3	6.20% [5.99%]	0.57% to 43.23%	-	0.209 [0.018 to 2.422]
TOT	3101/8091	23.98% [24.36%]	21.67% to 26.45%	0% to 100%	0.770 [0.657 to 0.903]

†Adjusted-Wald test F = 23.0642 (d.f. 3, 8088) (p=0.000)

Central Asia

Origin	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Internal	1656/4176	19.49% [19.72%]	16.43% to 22.97%	0% to 100%	1.670 [0.996 to 2.799]
External	247/922	12.66% [12.66%]	8.29% to 18.88%	0% to 100%	0.599 [0.357 to 1.004]
TOT	3101/8091	23.98% [24.36%]	21.67% to 26.45%	0% to 100%	0.599 [0.357 to 1.004]

†Adjusted-Wald test F = 3.7853 (d.f. 1, 5097) (p=0.052)

Data	Status [No Herd]	Positive/ No Sampled	Observed [True] Seroprevalence†	95% CI	Within-Herd Prevalence Range	Odds Ratio [95% CI]
Vaccination	Vaccinated [298]	1746/4771	19.01% [19.22%]	16.81% to 21.42%	0% to 100%	0.582 [0.453 to 0.747]
	0> mpv <6 [167]	839/2668	14.57% [14.64%]	12.20% to 17.31%	0% to 100%	0.387 [0.297 to 0.505]
	6> mpv <12 [99]	723/1590	44.02% [45.06%]	39.88% to 48.25%	0% to 100%	2.655 [2.127 to 3.314]
	>12 mpv [32]	184/513	39.48% [40.37%]	32.07% to 47.41%	0% to 100%	2.113 [1.488 to 2.999]
	Unvaccinated [207]	1355/3320	28.74% [29.28%]	24.83% to 33.00%	0% to 100%	1.718 [1.339 to 2.206]
Susceptibility	Susceptible [405]	2650/6483	28.42% [28.95%]	25.36% to 31.69%	0% to 100%	2.354 [1.746 to 3.173]
	Post Vacc. [197]	1290/3147	27.45% [27.94%]	24.36% to 30.77%	0% to 100%	1.249 [0.997 to 1.565]
	Not Susceptible [100]	451/1608	14.43% [14.49%]	11.56% to 17.87%	0% to 100%	0.425 [0.315 to 0.573]
	0> mpv <6 [64]	280/1028	18.99% [19.20%]	14.64% to 24.27%	0% to 100%	0.701 [0.496 to 0.989]
	>6 mpv [37]	176/596	8.65% [8.52%]	5.72% to 12.79%	0% to 100%	0.263 [0.166 to 0.416]

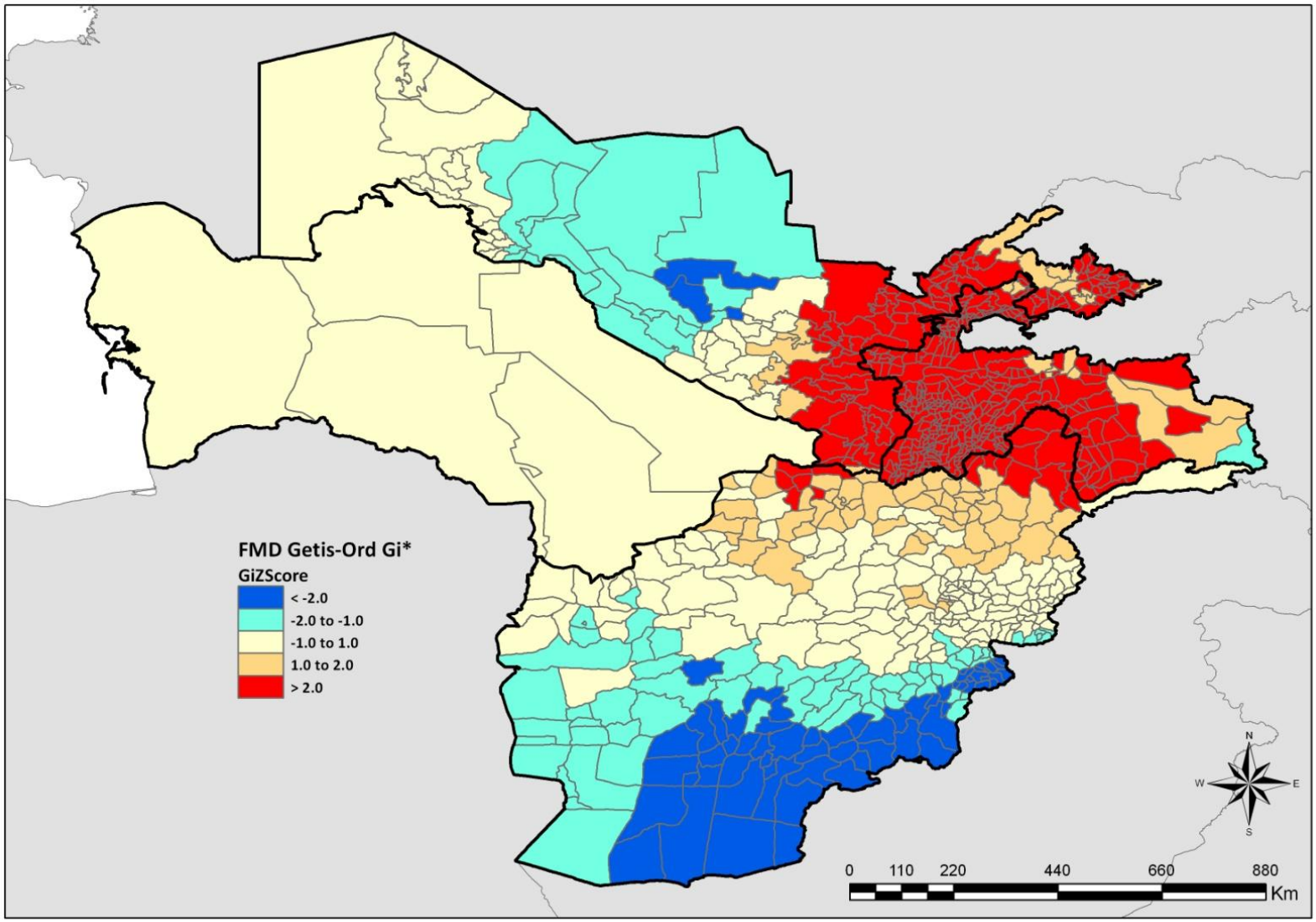
†Adjusted-Wald test between Vaccination F = 45.1170 (d.f. 3, 8088) (p=0.000)

Adjusted-Wald test between Susceptible F = 14.1695 (d.f. 3, 8088) (p=0.000)

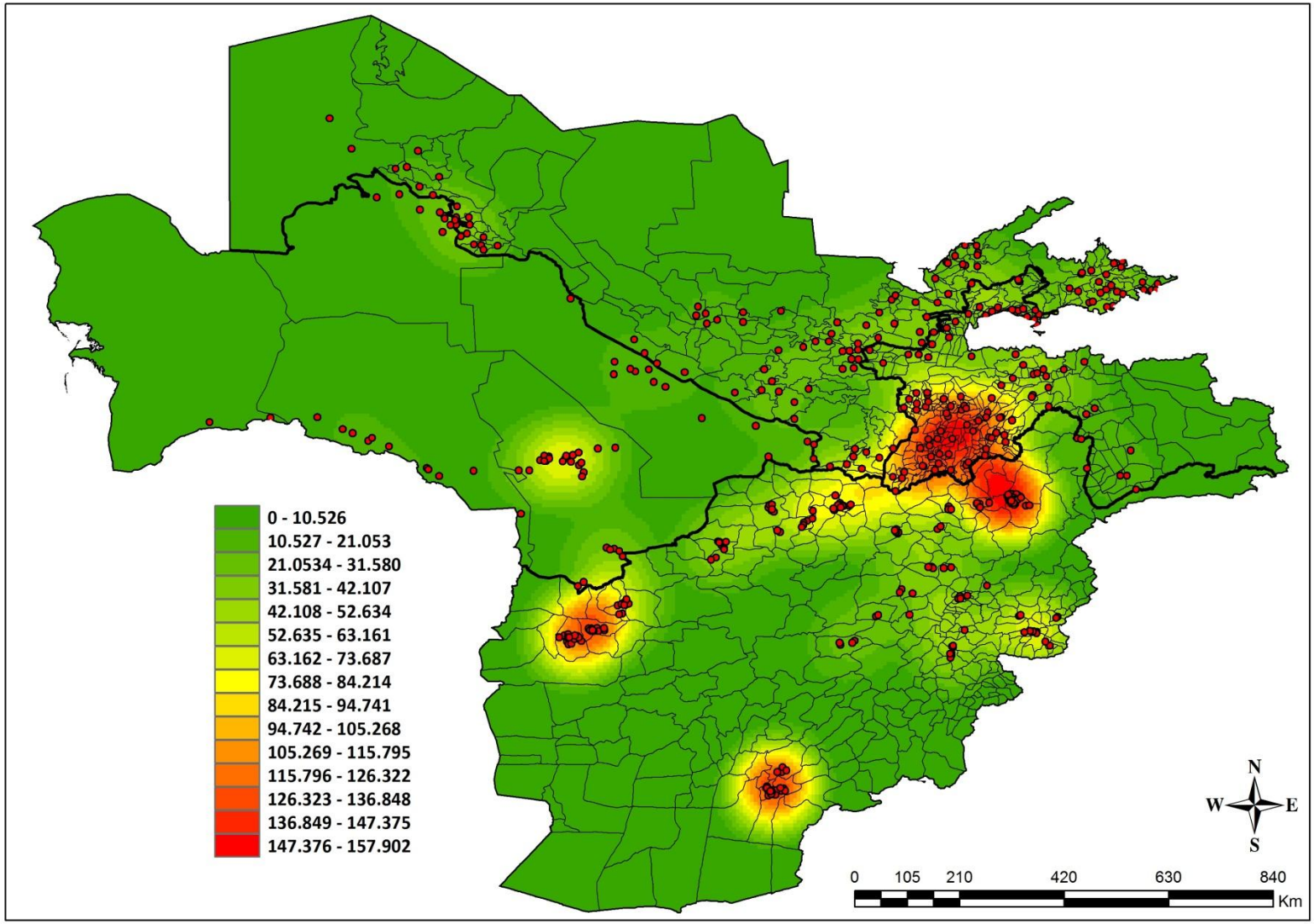
For vaccinated (DEFF = 2.485 DEFT = 1.577); for unvaccinated (DEFF = 2.676 DEFT = 1.636)

For 0> mpv <6 (DEFF = 2.335 DEFT = 1.528); for 6> mpv <12 (DEFF = 2.449 DEFT = 1.565)

Central Asia



Central Asia



Discussion

✓Results

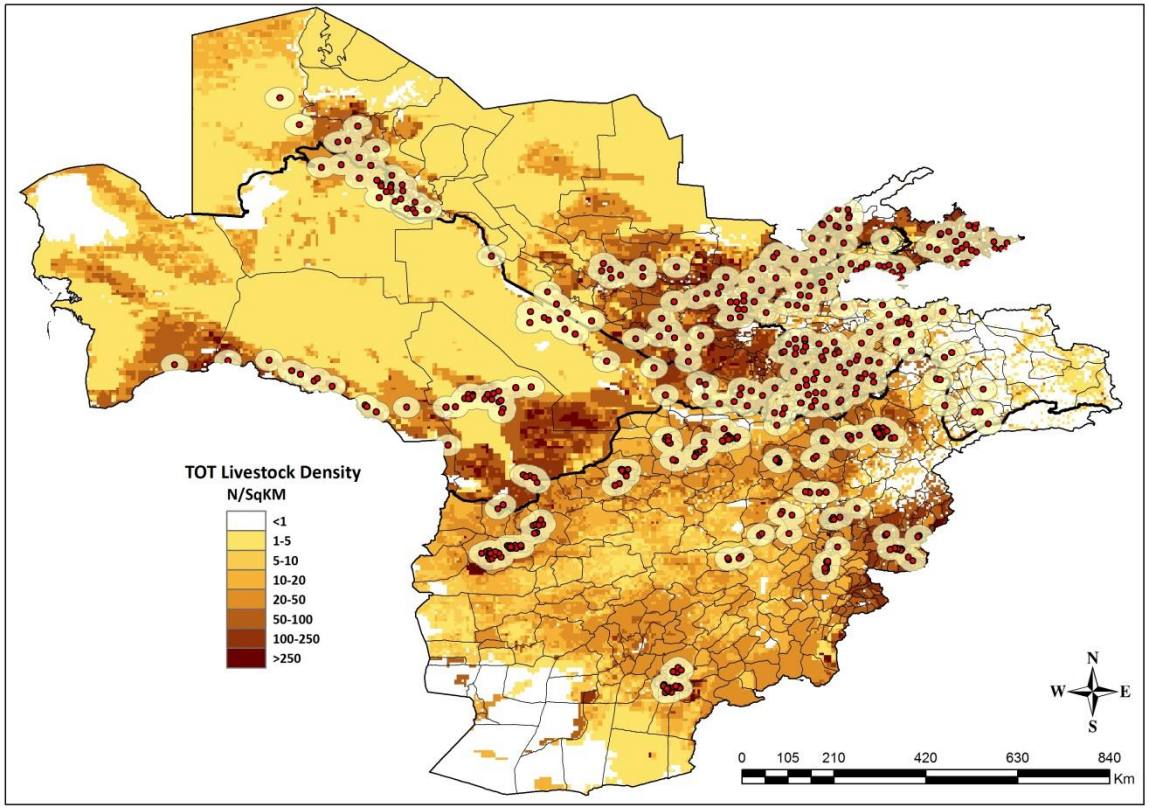
- Trend of FMD Prevalence Increasing with Distance from Vaccination (not always)
- No Vaccination Effect in Afghanistan (might be compromised by multiple occurrences of different serotypes/strains)
- Susceptibility Variable might explains failed Vaccination Effect
- Different Farm Systems show different FMD Prevalence Risk
- Identified FMD Risk Areas can be used as Target Points for improving FMD surveillance (High Risk of FMD Prevalence found in bordering areas between Afghanistan-Tajikistan)

Discussion

✓ Limitation

- Consistency of Sampling
- Sampling Density in District/Province/Country
- Systematic Collection Epidemiological Metadata
- DEFF and DEFT valid for Regional Merged Data, but high values for Country Data

	CV	DEFF	DEFT
Afghanistan	7.100	3.336	1.826
Tajikistan	7.640	7.729	2.780
Uzbekistan	11.160	11.900	3.449
Turkmenistan	10.790	8.197	2.863
TOT	5.084	6.594	2.568



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Thank you!