Geospatial Clusters of Recent HIV Infection in Malawi, October 2019–March 2020

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Recent HIV infection surveillance data were used to identify 3 geospatial clusters of recent HIV transmission across both rural and urban Malawi districts.

BACKGROUND

- Individuals in early stages of HIV infection are more likely to transmit the virus.
- Surveillance using a novel assay for detecting recent HIV infection (within the last year) was implemented in PEPFAR-funded countries.
- Rollout in Malawi began in April 2019 in facilities offering HIV testing services.

METHODS

- Testing was done at facilities offering routine HIV testing services, and "recent" results were confirmed by testing viral load ≥1,000 copies/mL.
- We analyzed data collected from October 2019 to March 2020, from 155 facilities and 11 districts.
- Primary cluster analysis used a discrete Poisson scan statistic in SaTScan software to analyze the rate of recent HIV infections per 100,000 negative HIV tests adjusting for age and sex, specifying a maximum cluster radius of 20km to enable feasible response efforts.
- Secondary cluster analysis was done for 18 facilities in urban Blantyre district, which represented 52% of all tests, with a maximum cluster radius of 5km.
- Clusters (p<0.05) were ranked by the log-likelihood of occurrence.

RESULTS

PRIMARY COUNTRY-WIDE ANALYSIS (Fig. A)

- Clusters 1 and 3 occurred in urban Blantyre district, and Cluster 2 spanned facilities in rural Machinga and Zomba districts.
- Across clusters, median age of recently infected individuals ranged from 26-30 years, and average percent female ranged from 60-82% (Fig. C).

SECONDARY BLANTYRE ANALYSIS (Fig. B)

- Cluster 1 contained two facilities within a radius of 2km; Clusters 2 and 3 each contained 1 facility.
- Across clusters, median age ranged from 25-30 years, and average percent female ranged from 60-78% (Fig. C).

CONCLUSIONS AND NEXT STEPS

- Elevated recent infection rates were identified in urban Blantyre and rural Machinga/Zomba districts.
- A cluster in Machinga/Zomba districts spanned borders and may not have been identified if analysis was conducted according to borders of subnational units (modifiable areal unit problem).
- Facilities and populations included in clusters should be evaluated for unsuppressed viral load and presence of high-risk behavior to determine drivers of elevated recent infection rates and identify opportunities for intervention and program response activities.
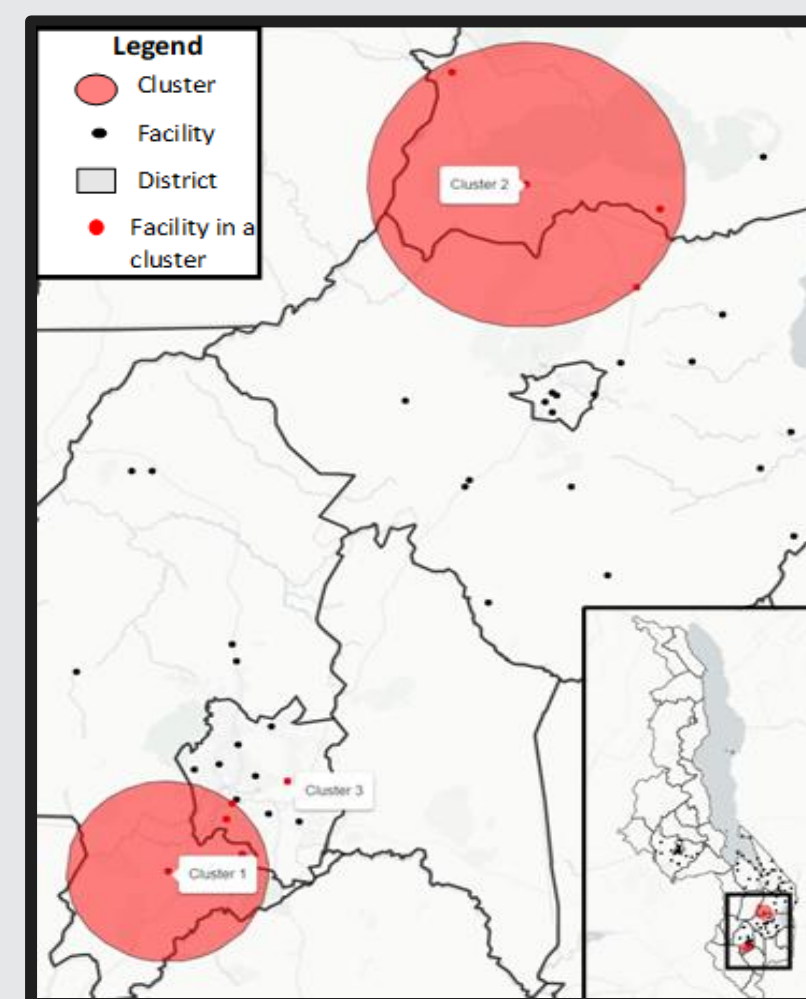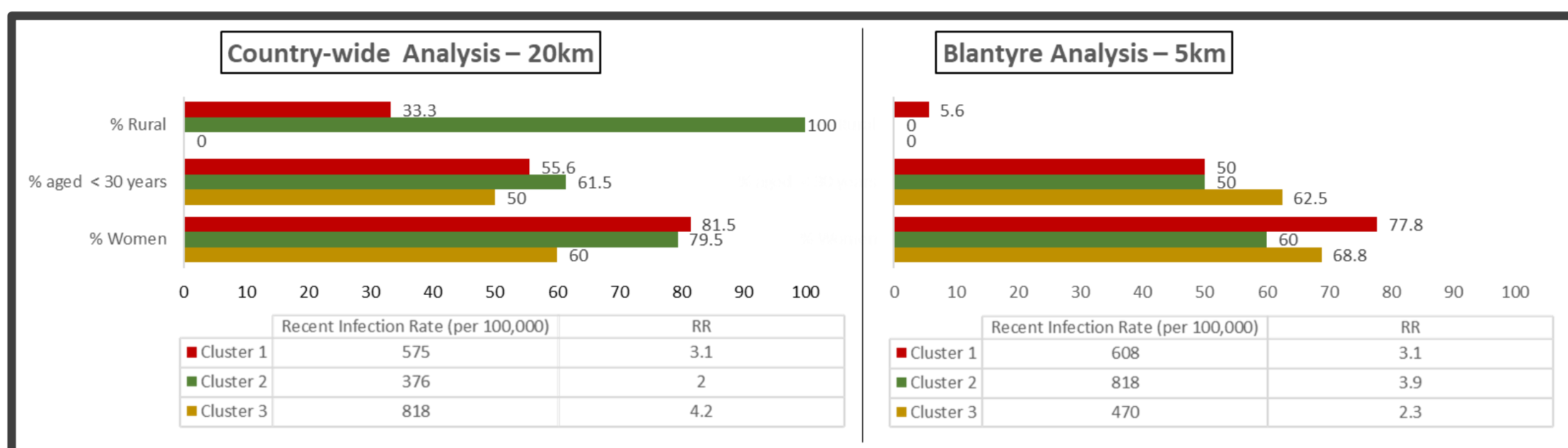
Figure A. COUNTRY-WIDE CLUSTERS

Figure B. BLANTYRE-ONLY CLUSTERS

Figure C. CLUSTER DEMOGRAPHICS

Country-wide Analysis – 20km

	Recent Infection Rate (per 100,000)	RR
Cluster 1	575	3.1
Cluster 2	376	2
Cluster 3	818	4.2

Blantyre Analysis – 5km

	Recent Infection Rate (per 100,000)	RR
Cluster 1	608	3.1
Cluster 2	818	3.9
Cluster 3	470	2.3

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