Local clusters of malaria transmission in the district of Kaya (Burkina Faso)

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Background

In Burkina Faso, malaria is holo-endemic with an annual transmission peak occurring at the end of the rainy season (June to October)[1]. Every year, malaria causes 40,000 deaths in Burkina Faso, most of them (60%) amongst children under-five[2,3].

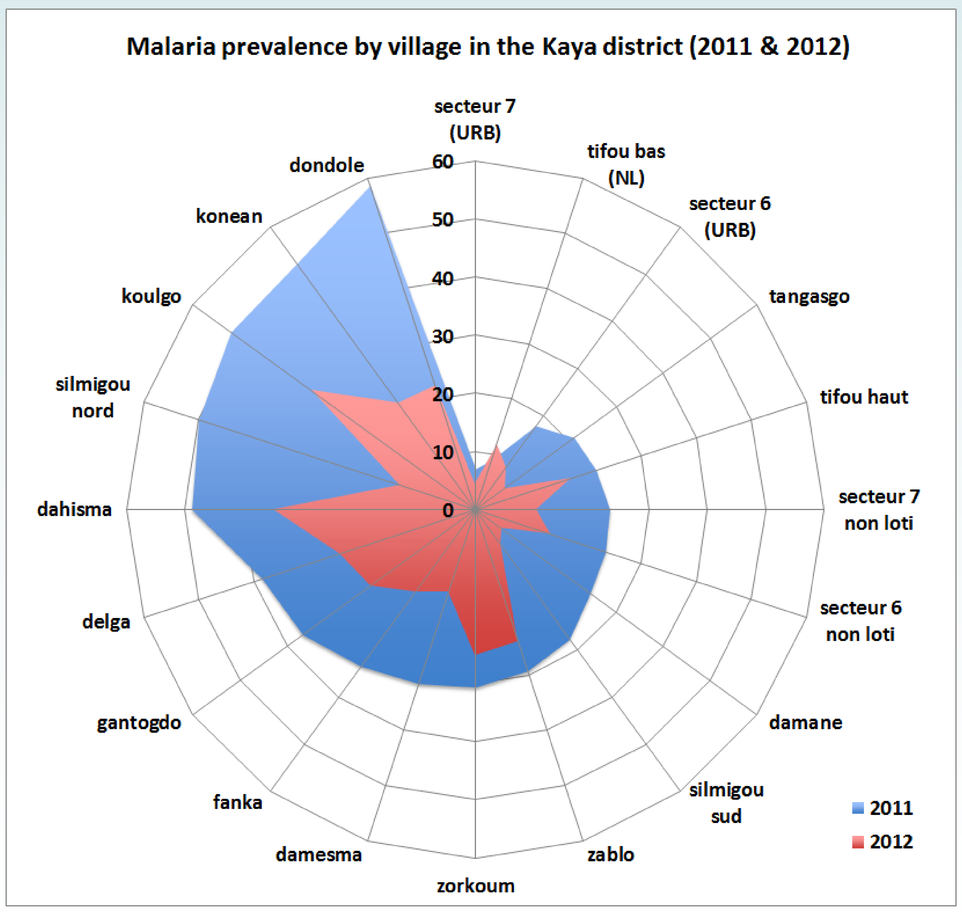
Local health authorities have been implementing population interventions such as universal bednet distribution and community case management of malaria in every village. However, recent studies conducted in other countries have revealed the existence of local clusters of malaria transmission and have argued that supplementary interventions should target these clusters.

Objective

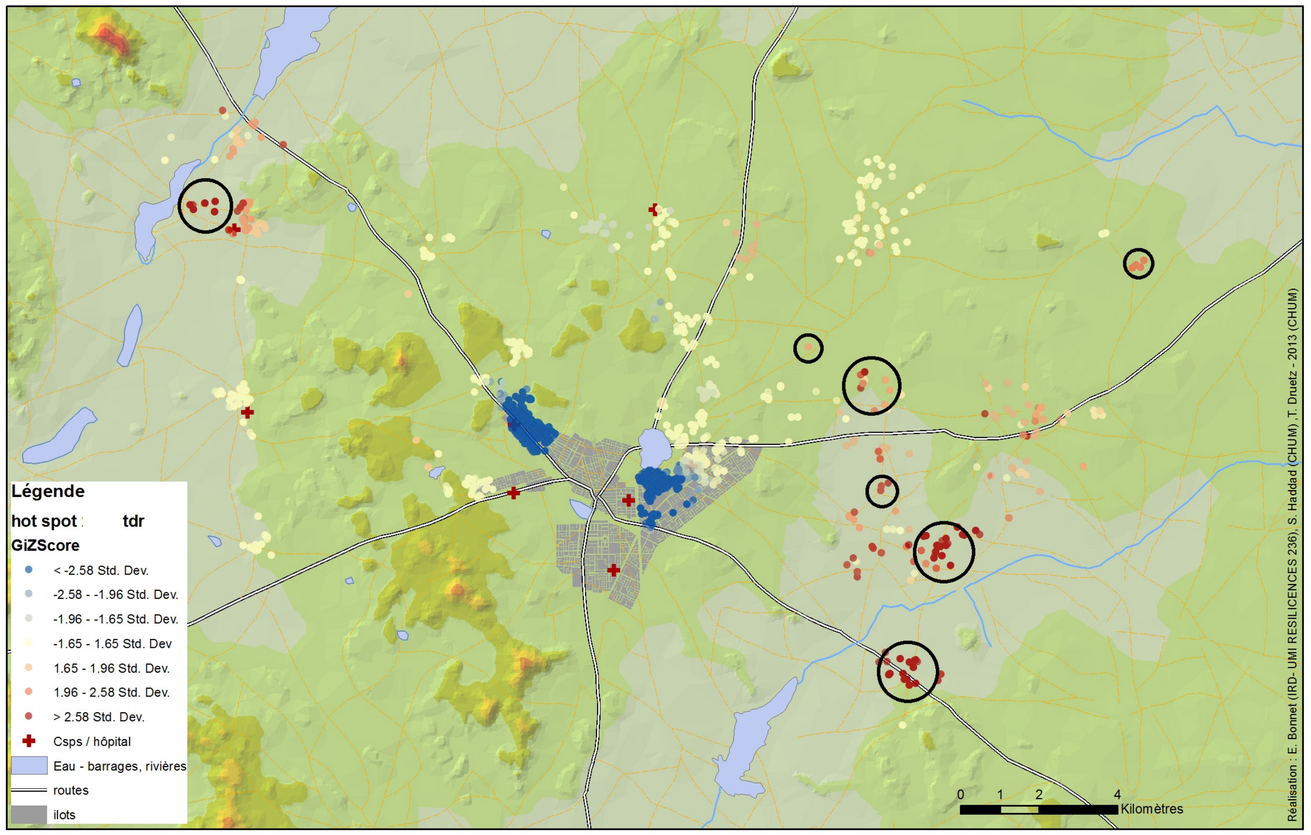
The objective of this study is to detect clusters of malaria transmission in a study area near the city of Kaya, Burkina Faso

Methods

The study area is located near the city of Kaya. We randomly selected 2000 households from the population living within a 15-kilometer radius of Kaya – an equal number of households came from rural and urban areas. Each household was located using GPS and visited once a year during the season of high-transmission of malaria (July 2011 and August 2012). During the visits, household surveys were administered and rapid diagnostic tests for malaria were performed on every child under five years of age. Moran's indices of spatial autocorrelation were used to define clusters of malaria transmission, known as malarial hot spots (Getis-Ord Gi*)[4].



Superposition des Hot Spot test détéction rapide du paludisme 2011 et 2012



Results

Malaria transmission varied considerably depending on the area (urban vs rural), on the village and on the year. Malaria prevalence in the urban area reached 13% in 2011 and 7% in 2012; in the rural area, prevalence was of 34% in 2011 and of 18% in 2012.

Several clusters of high transmission (hot spots) were identified in rural areas while the cold spots were all located in the urban area. Despite the reduction of malaria transmission observed in 2012, some hot spots persisted. Most of the recurrent hot spots were located in specific environments (areas of lower altitude and/or in proximity to stagnant waters or artisanal dams).

Conclusions

The study established: (1) local and temporal variations in malaria prevalence and (2) the presence of recurrent clusters of malaria transmission in the holo-endemic district of Kaya. Hot spots are known to play a catalysing role in malaria transmission and to fuel the annual epidemic in the entire population.

In addition to population-based programs, specific additional interventions should target hot spots. However, the detection of hot spots by local health authorities remains a challenge. To that end, community health workers (already present in each village) could be used as sentinels to report high concentration of presumptive malaria cases. The report of early malaria cases may be appropriate to locate hot spots since seasonal epidemics likely stem from these.

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