

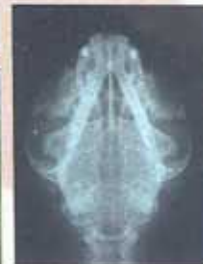
# PROCEEDINGS

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## DETECTION OF HOTSPOTS AREA IN MALARIA SURVEILLANCE IN BANGKA DISTRICT, INDONESIA

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### Introduction

Indonesia is one of the malaria endemic countries. According to malaria endemicity map of Indonesia year 2007, it is estimated 45% of Indonesia population is living in high risk of malaria contagion area. One of the endemic areas in Indonesia is Bangka District in Bangka Belitung Province. Bangka District is categorized as medium level for Malaria endemicity with represented by annual malaria incidence (AMI) of 29.3 of 1000 people in 2007 (Ministry of Health, 2008). Surveillance activity is one of the important events to eradicate and control malaria. From this surveillance activity it is expected could establish a preventive action in a quick response especially in certain malaria hotspot area at a certain time to control the diseases.

### Methods

Data of malaria cases was collected from laboratory log book at all health centers in Bangka District, in the period of June 2007 until July 2008. Definition of malaria case was who tested positive by examination of *Plasmodium* parasites in the laboratory. Clinical examination and dignontic rapid test are not recorded as a case. If in one community health center work area was found a case of malaria which originated from other community health center work area, then the case was put in the list of patient domicile address. Geographical coordinates of health centers were recorded by GPS (*Global Positioning System*). Demography data was obtained from BPS (National Bureau of Statistics) and Bappeda of Bangka District. It was assumed that all Bangka residents were in risk of malaria contagion. Geospatial analysis used was prospective space-time scan statistics developed by Kulldorff, 1997. The data were assumed spreading with Poisson distribution. Data were analyzed using SatScan version 7.0. Mapping was done using ArcGIS version 9.3.1 (ESRI, Redlands, CA, USA).

### Results and Discussion

Malaria incidence (*annual parasites incidence/API*) varied according to work area of Community Health Center and observation period. During the research time, the overall malaria incidence in Bangka District was 1.78%. The highest incidence rate was in Sinar Baru Community Health Center which had 3.45%, followed by Kenanga Community Health Center with 3.14%. Both Community Health Center were having work area surrounded by beaches, which was a potential area for *Anopheles mosquito*. Surveillance result during observation period was spatially presented in a monthly malaria incidence rate for each community health center shown in Figure 1. A darker color gradation is showing increment of a higher malaria incidence rate. From Figure1, it was shown that in initial stage of research Belinyu Community Health Center was having the highest malaria incidence rate, but then gradually decreasing towards the ending of observation period. On the other hand, Bakam area was having low malaria incidence rate at initial stage, but then increasing towards the ending of observation period.



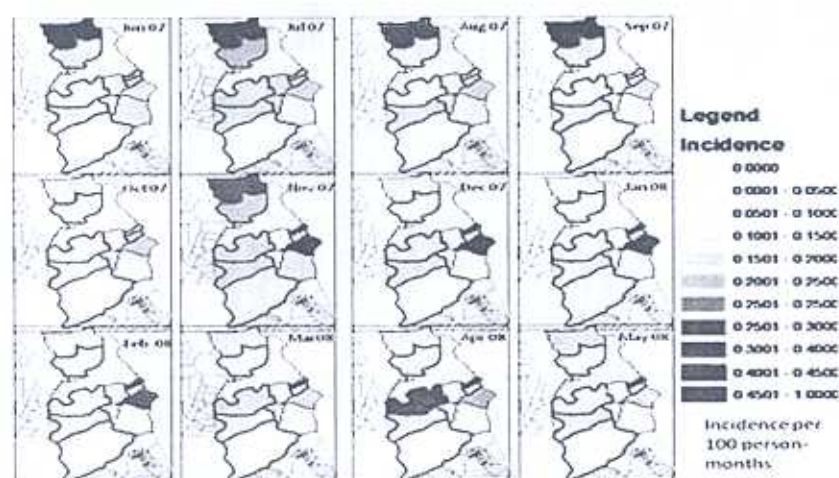


Figure 1 Monthly malaria incidence rate of each community health center in Bangka District.

Using the prospective space-time scan statistics, for observation period of June 1<sup>st</sup>, 2007 to July 31<sup>st</sup>, 2008, time aggregation length was 1 month, maximum spatial cluster size was 50% of population at risk, and maximum temporal cluster size was 50% of study period, results were shown in Table 1.

Table 1 Detection of recently emerging clusters of malaria in Bangka

Most likely cluster	Cluster period	Cases	Expected	Relative risk	<i>p</i>
<i>Primary cluster:</i>					
Sinar Baru	2008/1/1 - 2008/7/31	187	56.76	3.455	0.001
<i>Secondary cluster:</i>					
Kenanga	2008/1/1 - 2008/7/31	133	53.05	2.581	0.001
Bakam	2008/3/1 - 2008/7/31	93	68.12	1.378	0.145

From Table 1, it was shown that the first emerging cluster was Sinar Baru Community Health Center with cluster period January 1<sup>st</sup>, 2008 to July 31<sup>st</sup>, 2008 with relative risk value of 3.455; the second emerging cluster was Kenanga Community Health Center with 133 case and relative risk value of 2.581; the next emerging cluster was Bakam Community Health Center but showing no significant *p* values.

## Conclusion

The most likely emerging cluster is Sinar Baru with time frame during January 2008 until July 2008. The secondary emerging clusters are Kenanga with time frame during January 2008 until July 2008 and Bakam with time frame during March 2008 and July 2008, but not significant for Bakam. Sinar Baru and Kenanga were the areas which need a further investigation and priority in the control.

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## References

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