KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

AI in VECTOR BORN DISEASE CONTROL IN INDONESIA

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Artificial Intelligence Innovation Summit 2023
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Trend of Dengue in Indonesia 1968 – 2023

Need innovation to decrease Incidens

CFR getting low, but Incidens remain fluctuated

Sumber: Kementerian Kesehatan, Agustus 2023

Incidence Rate: Jumlah kasus baru per 100,000 penduduk
Case Fatality Rate: Jumlah kematian per jumlah kasus (%)

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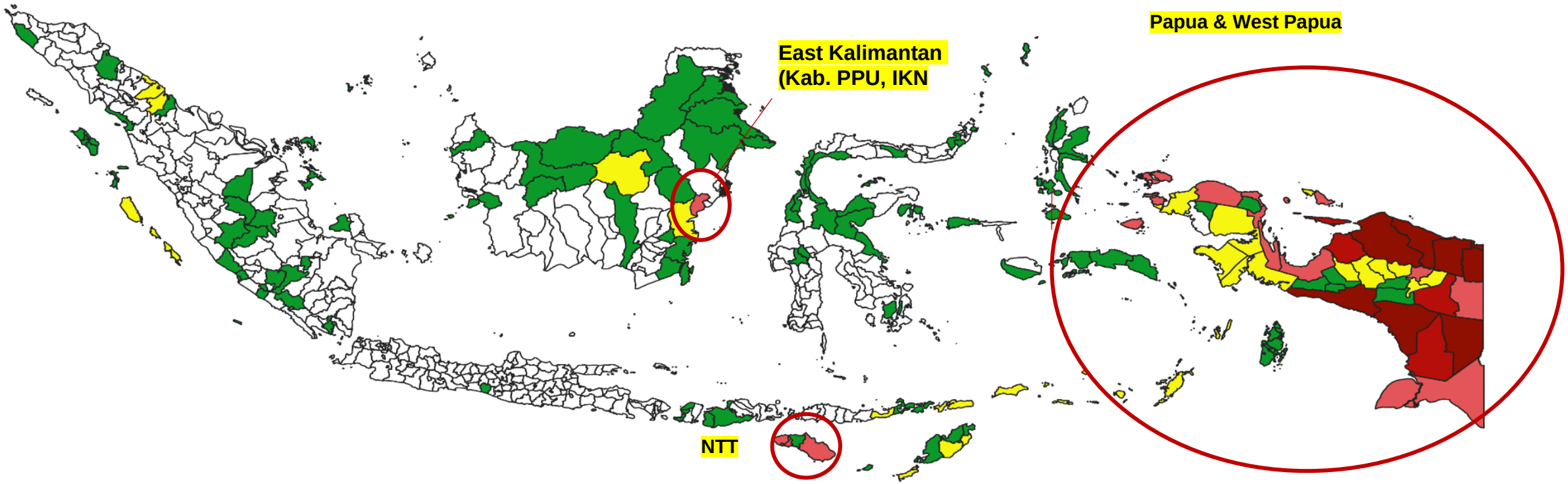
Malaria Situation in Indonesia 2022 - 2023 (Data Update s.d Juli)



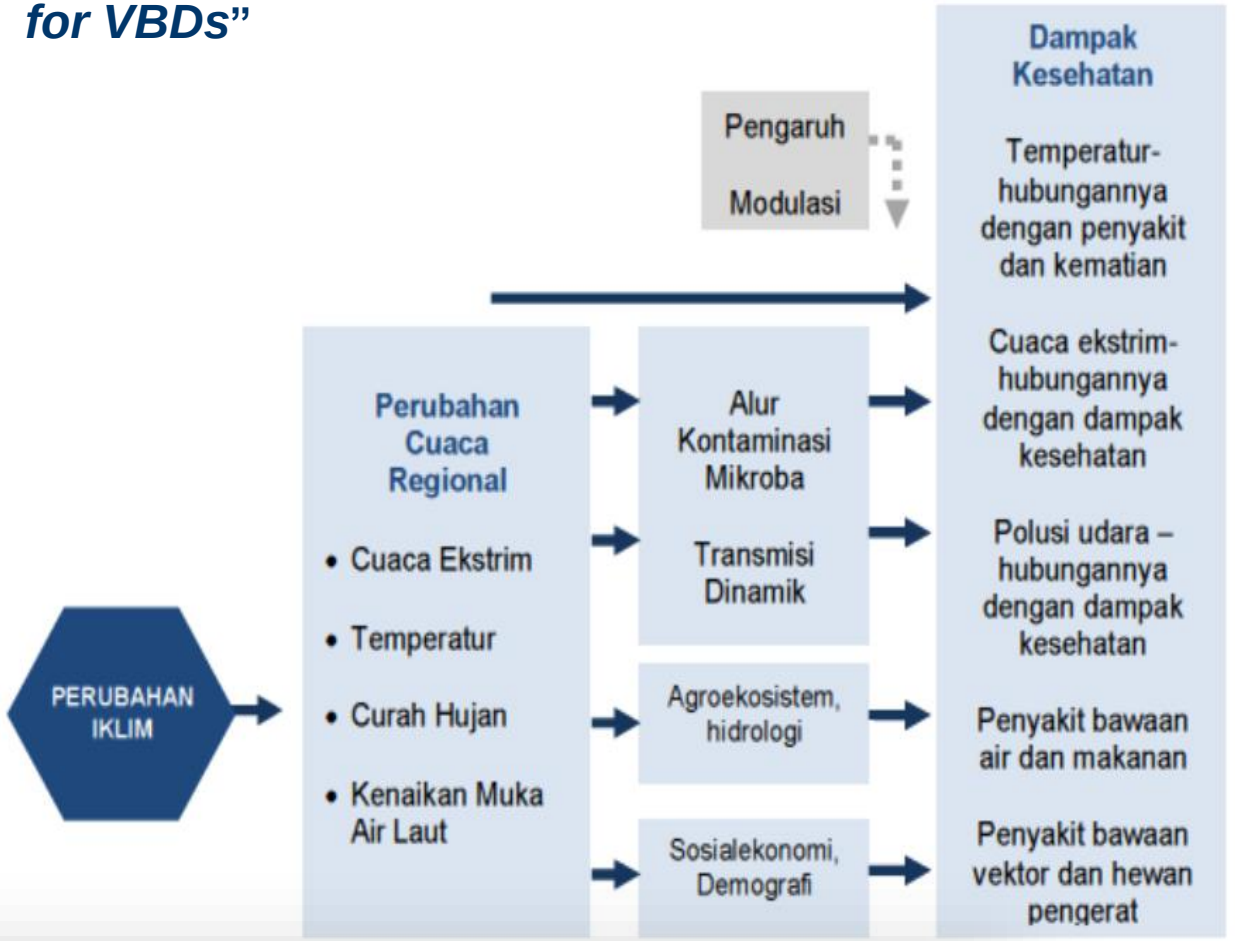
Endemisitas
- Eliminasi
- Endemis Rendah
- Endemis Sedang
- Endemis Tinggi I
- Endemis Tinggi II
- Endemis Tinggi III

- Malaria High Endemic Province: Papua, West Papua, NTT dan East Kalimantan (Kab.PPU)

Endemisitas	Penduduk 2022		Kabupaten 2022	
	Jumlah	%	Jumlah	%
Eliminasi (Bebas Malaria)	243 796 793	89%	372	72%
Endemis Rendah (API <1‰)	22 004 854	8%	87	17%
Endemis Sedang (API 1 - 5 ‰)	5 457 056	2%	27	5%
Endemis Tinggi (API > 5 ‰)	3 600 391	1%	28	5%
TOTAL	274 859 094	100%	514	100%

Penduduk 2023		Kabupaten 2023	
Jumlah	%	Jumlah	%
247,209,453	89%	381	74%
20,464,612	7%	74	14%
5,896,796	2%	30	6%
3,861,499	1%	29	6%
277,432,360	**100%**	**514**	**100%**

"Climate change is creating more suitable conditions for VBDs"

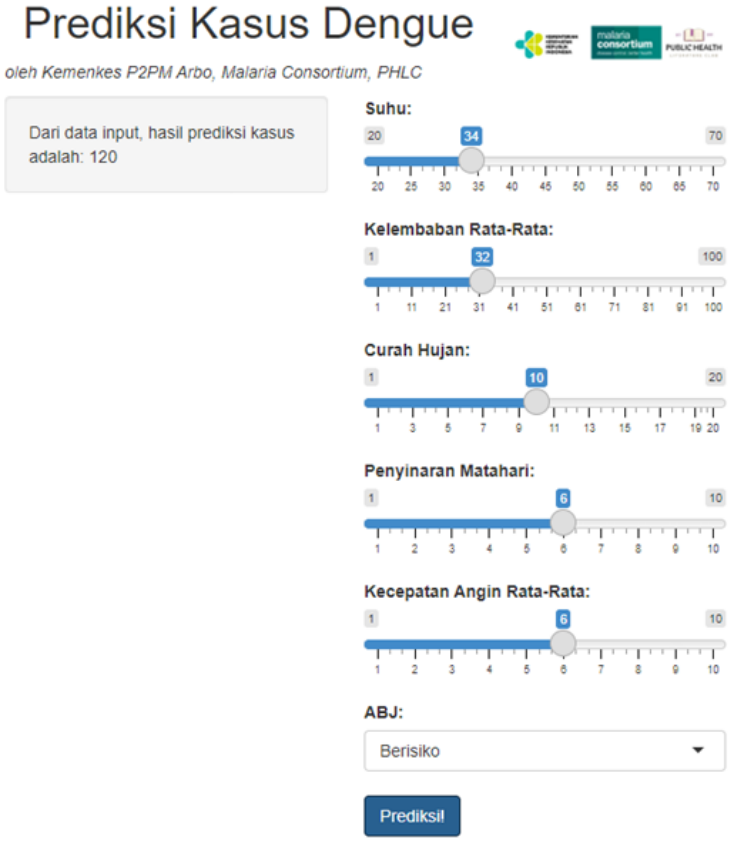


Climate change to health

Dengue Prediction Application

MoH develop prototype Dengue case prediction with weather and vector factors

Application Prototype



Presiding in Dengue Summit 2023

DELEGATES' ABSTRACTS

053 Dengue prediction in Bandung Indonesia using machine learning methods

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5. Malaria Consortium Asia, Thailand
6. Public Health Literature Club, Indonesia
7. Ministry of Health, Arboviroses Working Group

Background:

Dengue hemorrhagic fever (DHF) is a notifiable vector-borne disease caused by female mosquito that impacts tropical countries, including Indonesia. Over the past four years, there was a notable upward trend in DHF cases, which peaked in 2019 and 2020 at the national level. Although Covid movement restriction applied during 2020-2021, dengue was still a major problem in Bandung, with the highest DHF cases recorded in 2021. *Aedes aegpyti* and Ae. albopictus are prevalent throughout the country, and the climatic variations heavily impact dengue transmission dynamics. This study was addressed to find the correlation between DHF and the climatic factors (sun exposure, temperature, and humidity), also risk of dengue from ovitrap index from Indonesia's vector surveillance application (Silantor) in Bandung Indonesia.

Methods:

This study implemented several machine learning methods (Linear Regression, Ridge Regression, Lasso Regression, Regression Tree, Random Forest, and Support Vector Regression) to find the most precision model (with RMSE, R2, and Mean Absolute Error [MAE]) in predicting dengue trend from 2018 to 2022. The machine learning models utilized a cross-validation method where the 2018 to 2021 data were used for data training and 2022 for data testing.

Results:

Random Forest model was the best model (RMSE = 3.65, R2 = 32.5%, and MAE = 2.76). Thereafter, the biggest Variable of Importance (VIF) was ovitrap index and temperature.

Summary

- *There is a delay in reporting dengue cases at health facilities*
- *Many studies show the relationship between climate and vector factors related to the incidence of dengue cases*
- *The research uses monthly case data for 2018-2022, ABJ in Bandung City, and open source climate data from BMKG*
- *Temperature and ABJ determine the rise and fall of dengue cases*
- *Complement the early warning system related to the prevention of soaring cases*

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The Use of Digital Technology in VBD Control Program

Regulatory Sandbox malaria

As a form of program regulation supervision in overcoming the impact of the presence of new digital health technologies in society

AI Technology

- AI based technology to predict the impact of climate change on malaria and dengue (Malaria on going progress with KORIKA)
- Digital microscopy with AI
- AI Based - Malaria Migration surveillance

Surveillance system

- Recording and reporting system

“ AI WILL DO THE ANALYTICAL THINKING, WHILE HUMANS WILL WRAP THAT ANALYSIS WITH WARMTH AND COMPASSIONS”

Kai – Fu Lee

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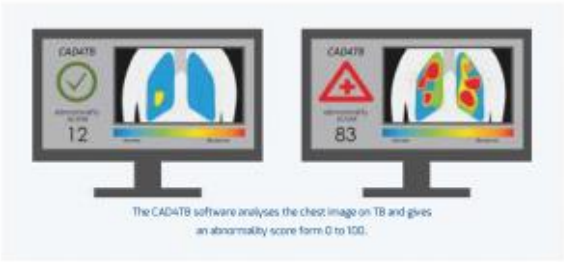
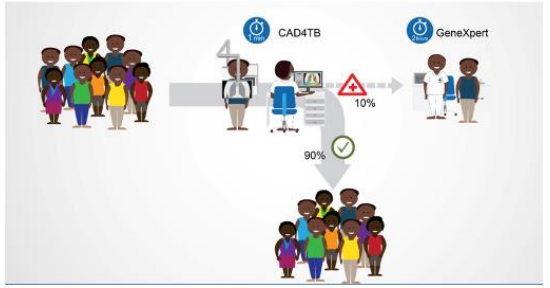
TB Screening with AI



Score
> 65

Bacteriological confirm

Combining TB AI software and GeneXpert
Saving both time and costs in screening programs



Sample output from an TB AI tool.
ore for this subject was 91.7 (0=normal, 100=most abnormal) and the Xpert test was positive.

The original
radiograph

With abnormality
heatmap, based on
the AI result