Predictive Analysis of Malaysian Dengue Hemorrhagic Fever data from 2010 - 2017 Using BigML

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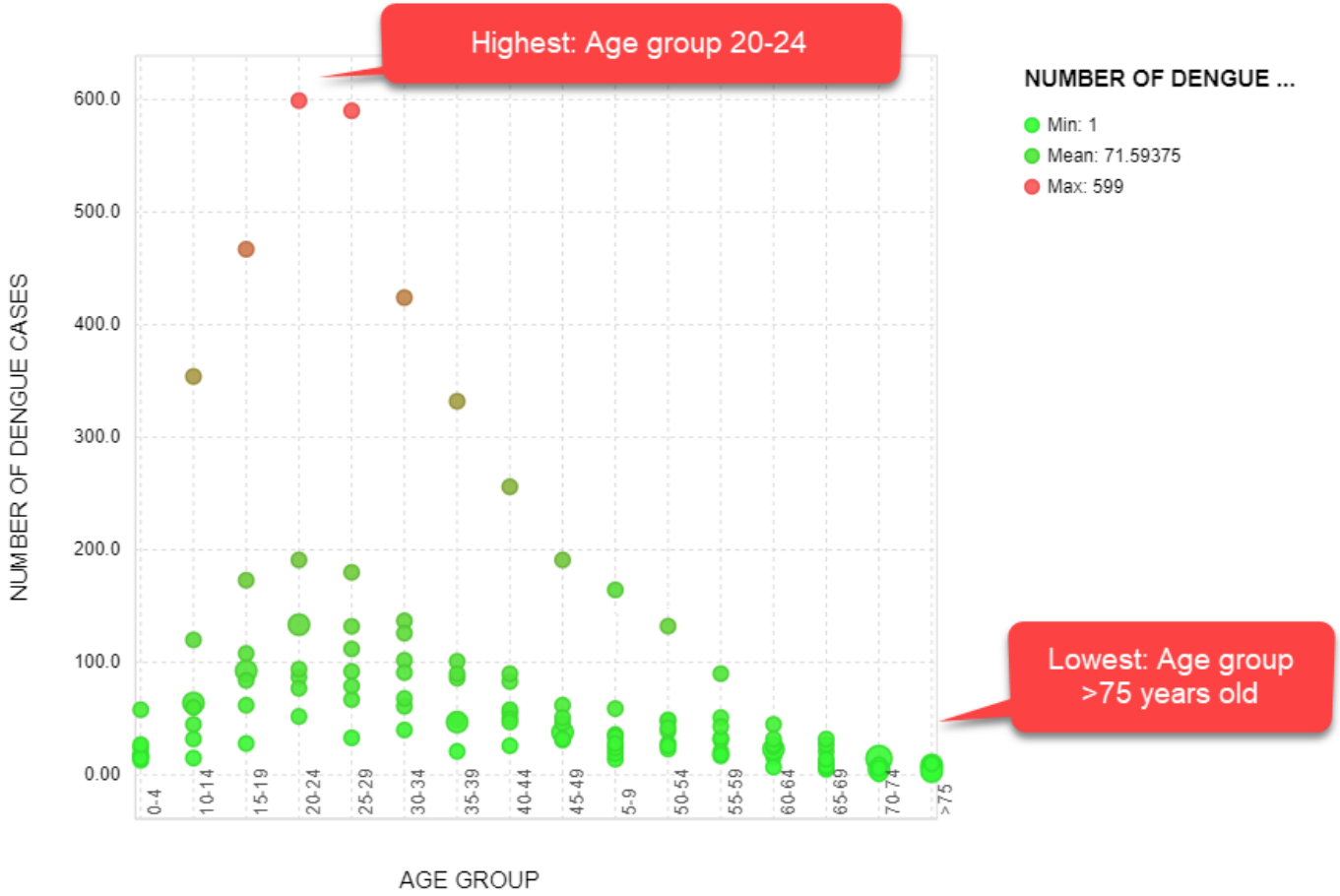
Recap

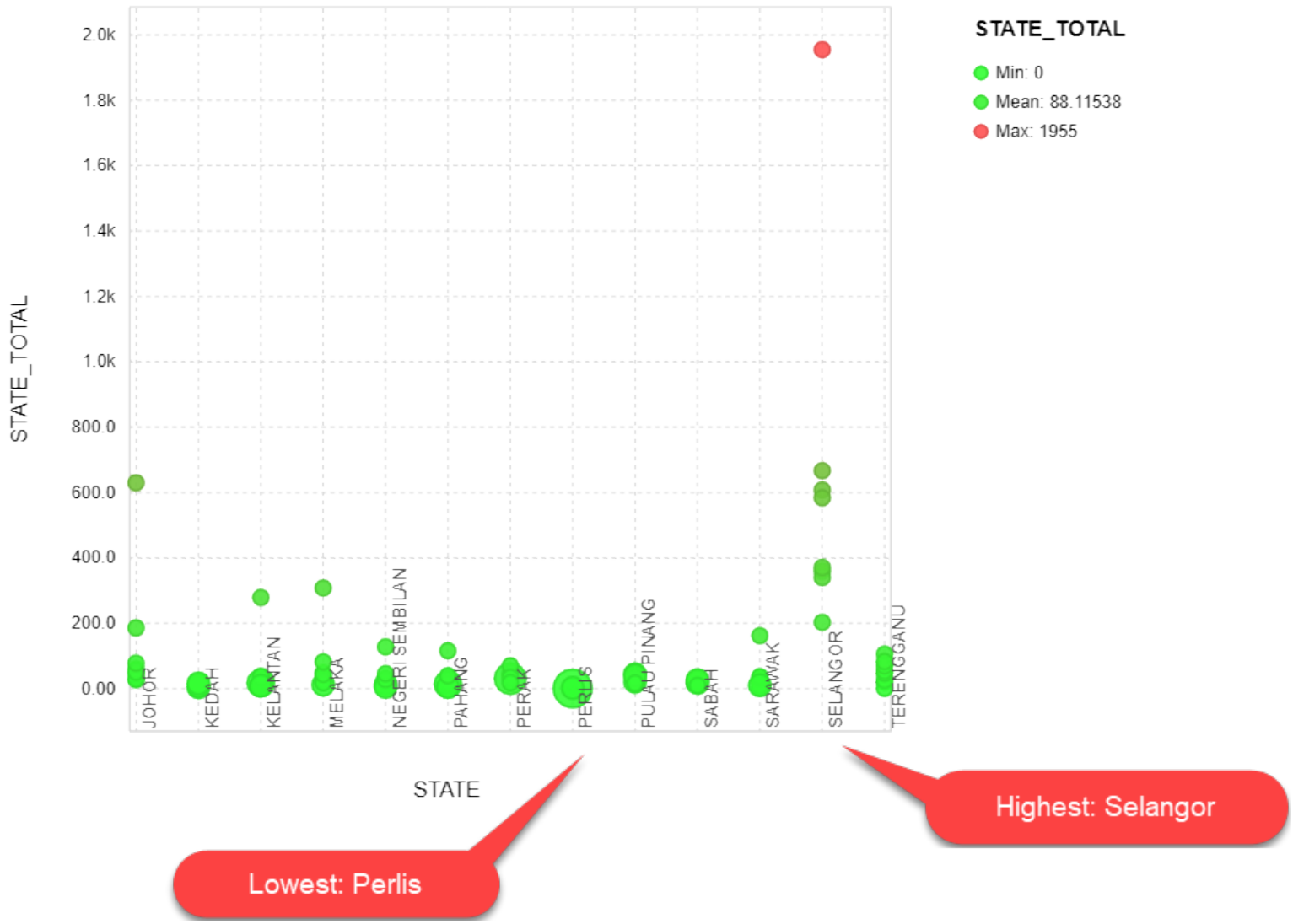
- Dengue Data Formatting and loading into BigML
- Historical Trend of Dengue Hemorrhagic Fever (DHF)
  1. Age Group
  2. States

Recap: Data Overview - Age Groups



Age Group with the Most number of DHF cases: (20-24),
Age Group with the Least number of DHF cases: (> 75)

Recap: Data Overview - 13 states



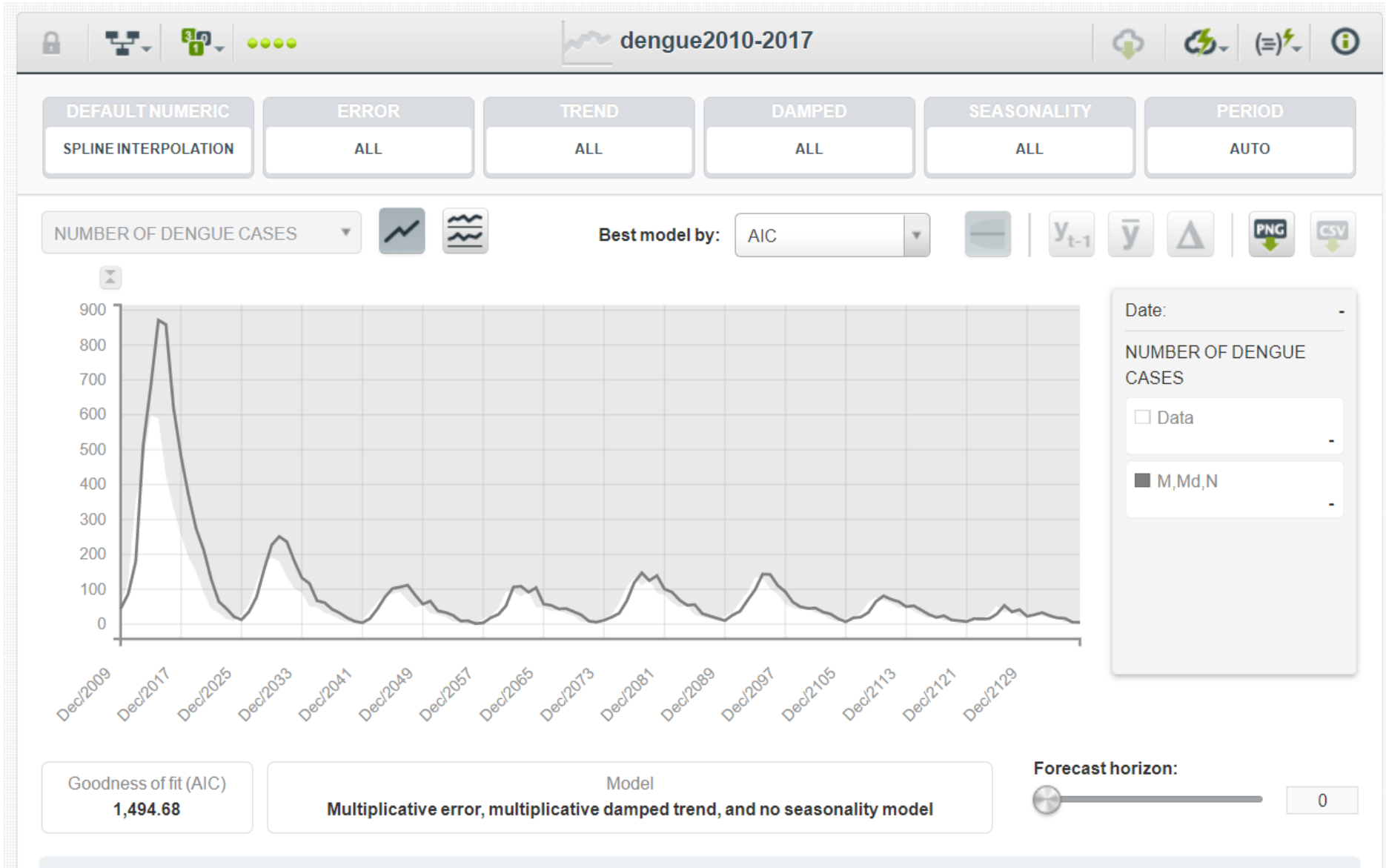
State with Most number of DHF cases: Selangor, Least: Perlis

Recap - Research Goals

- Run predictive analysis (logistic regression) to describe DHF Pattern & Probability
  - Age Group
  - States

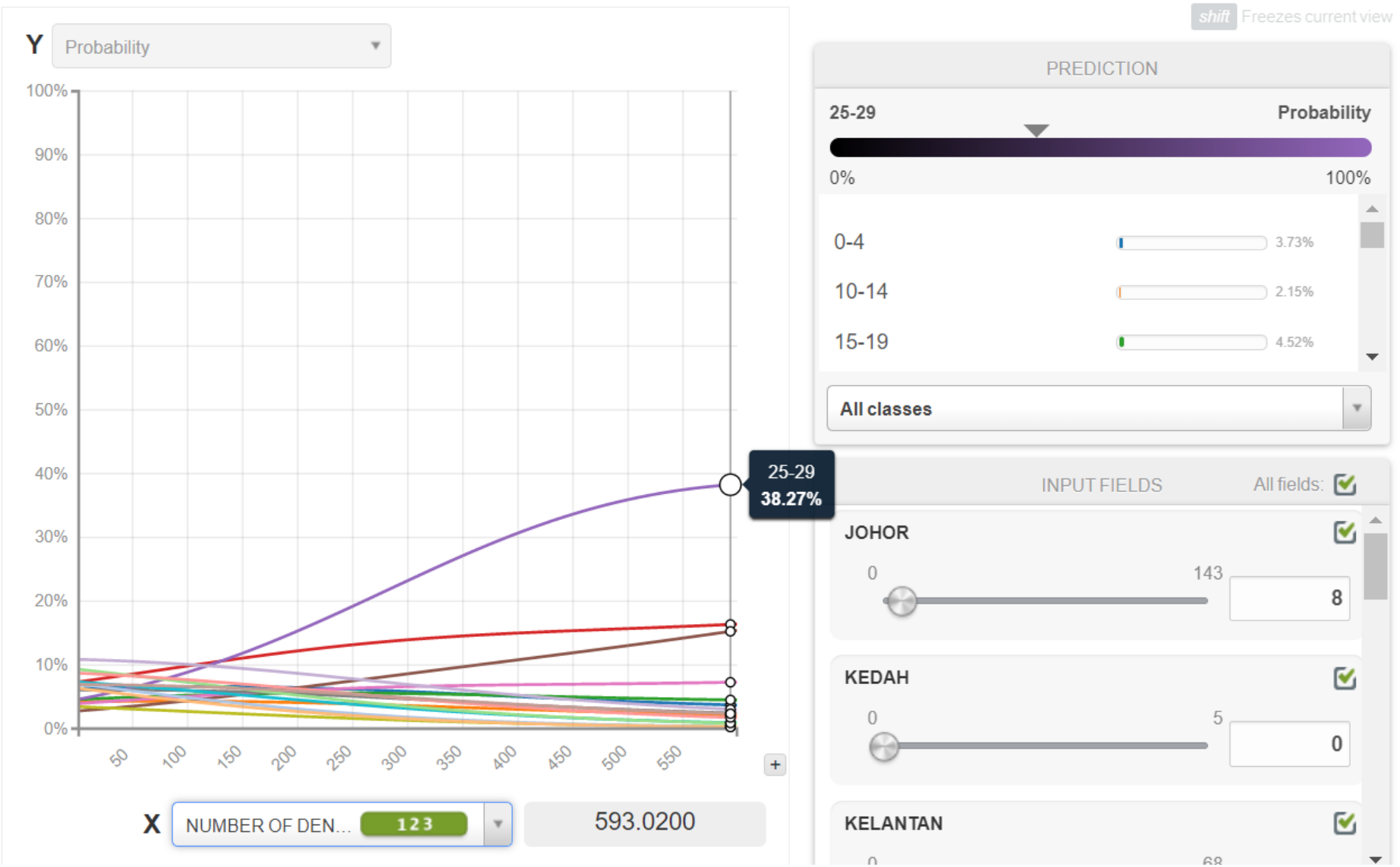
Contents

Time Series Model to predict future DHF cases

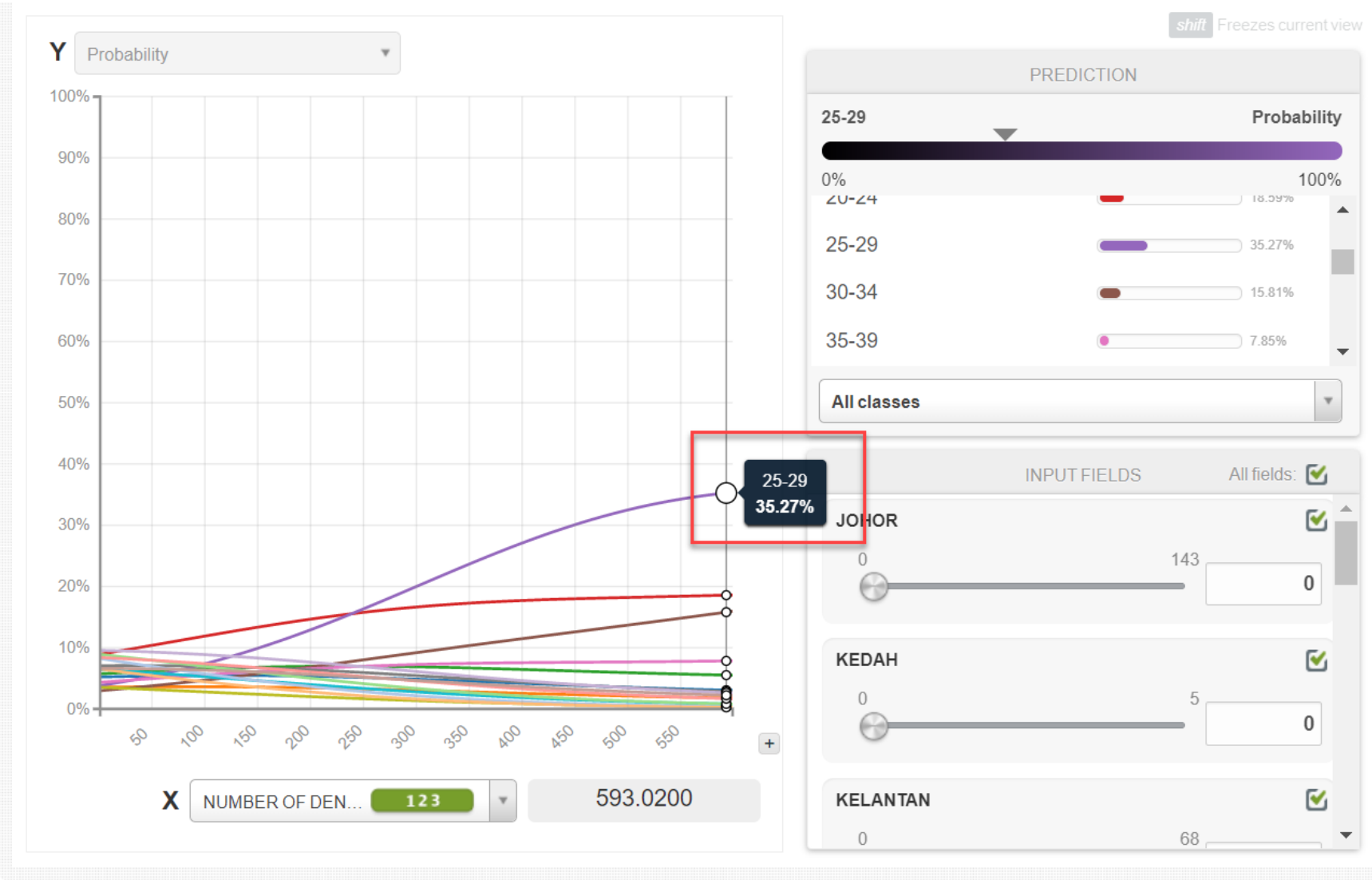


Time Series Model predicting Number of DHF cases in future

Logistic regression - Age Groups

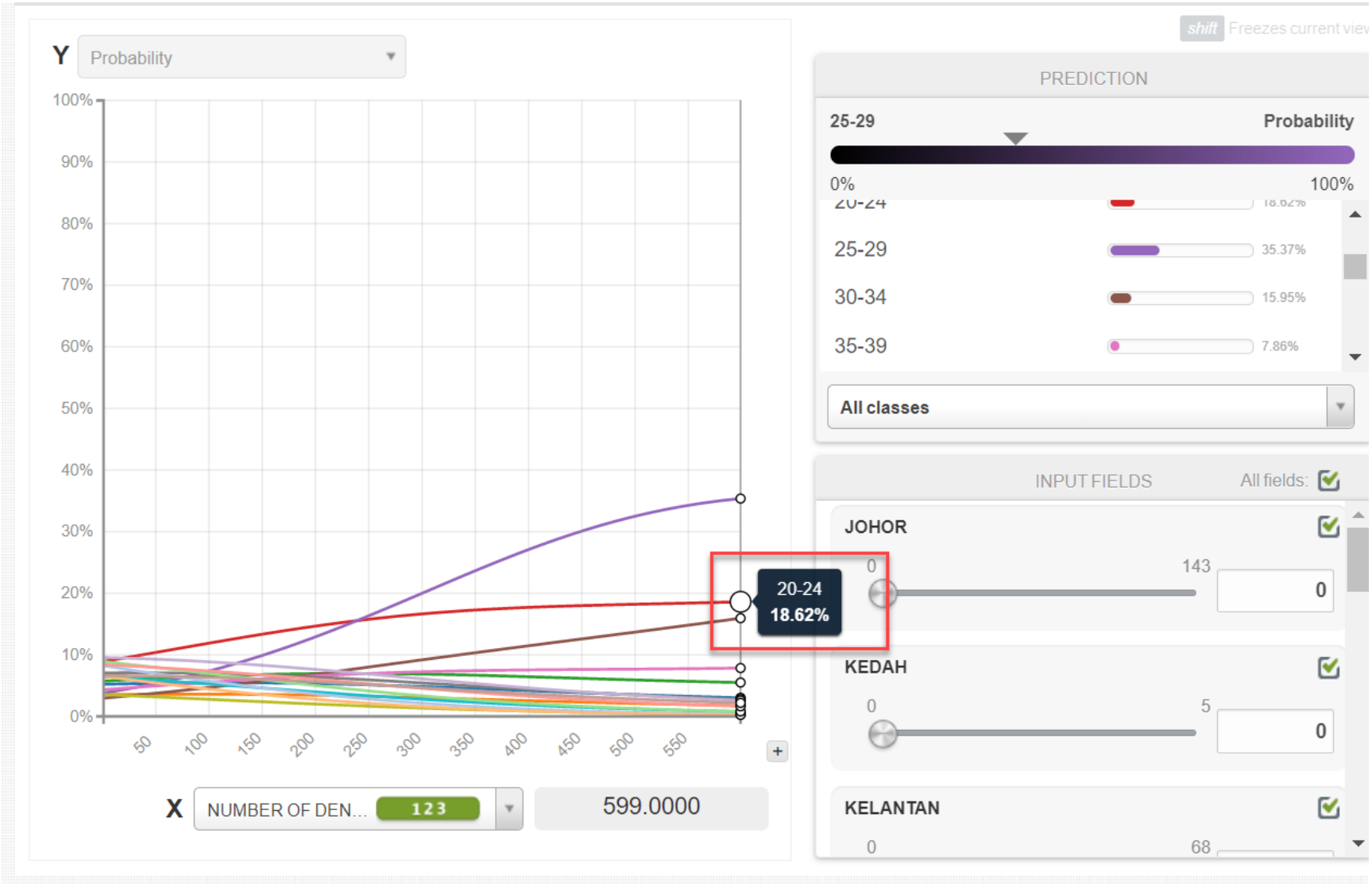


Logistic regression - Age Groups (cont.)



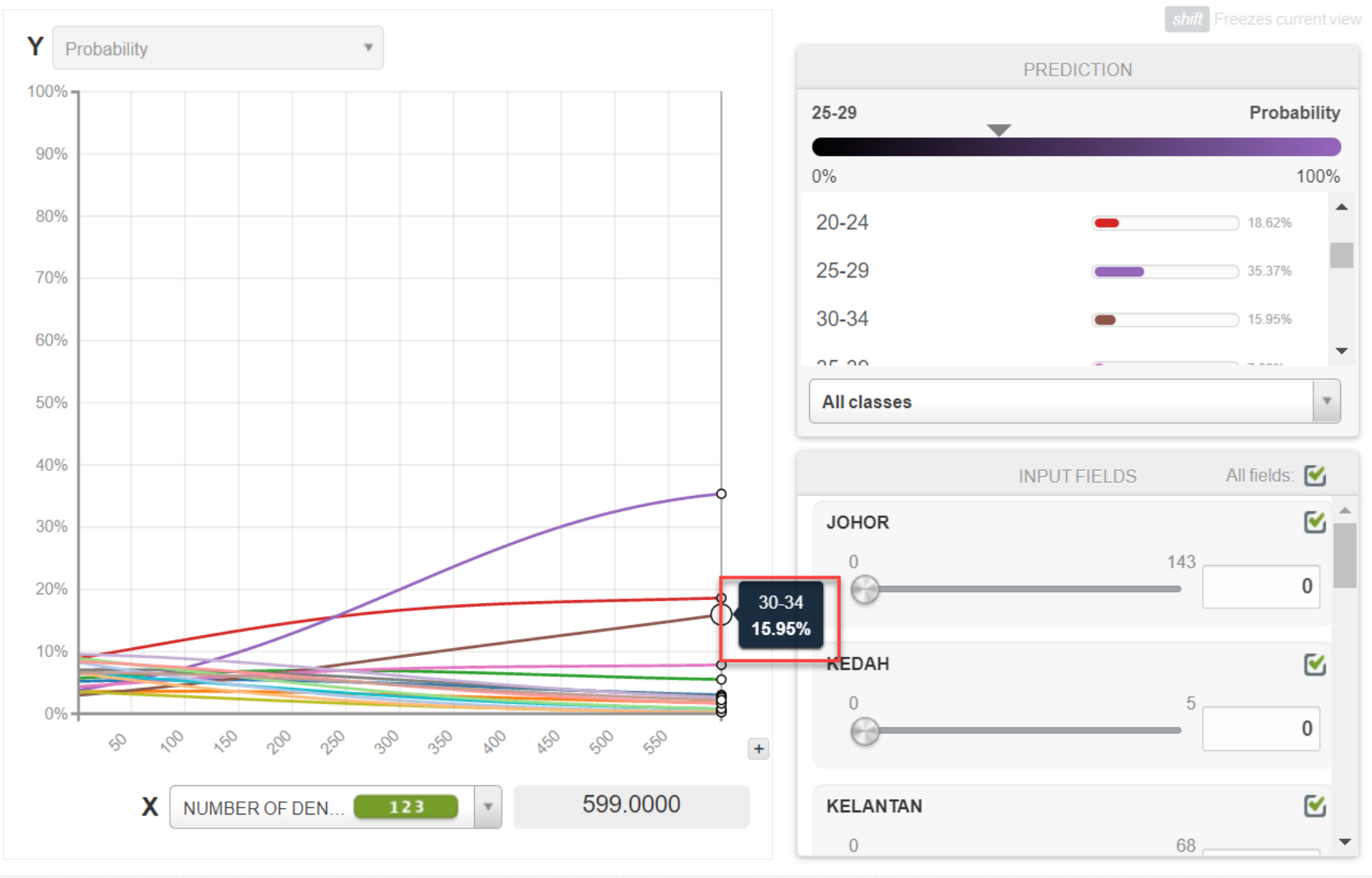
Age 25 - 29: 36% Infected with DHF **(Highest)**

Logistic regression - Age Groups (cont.)



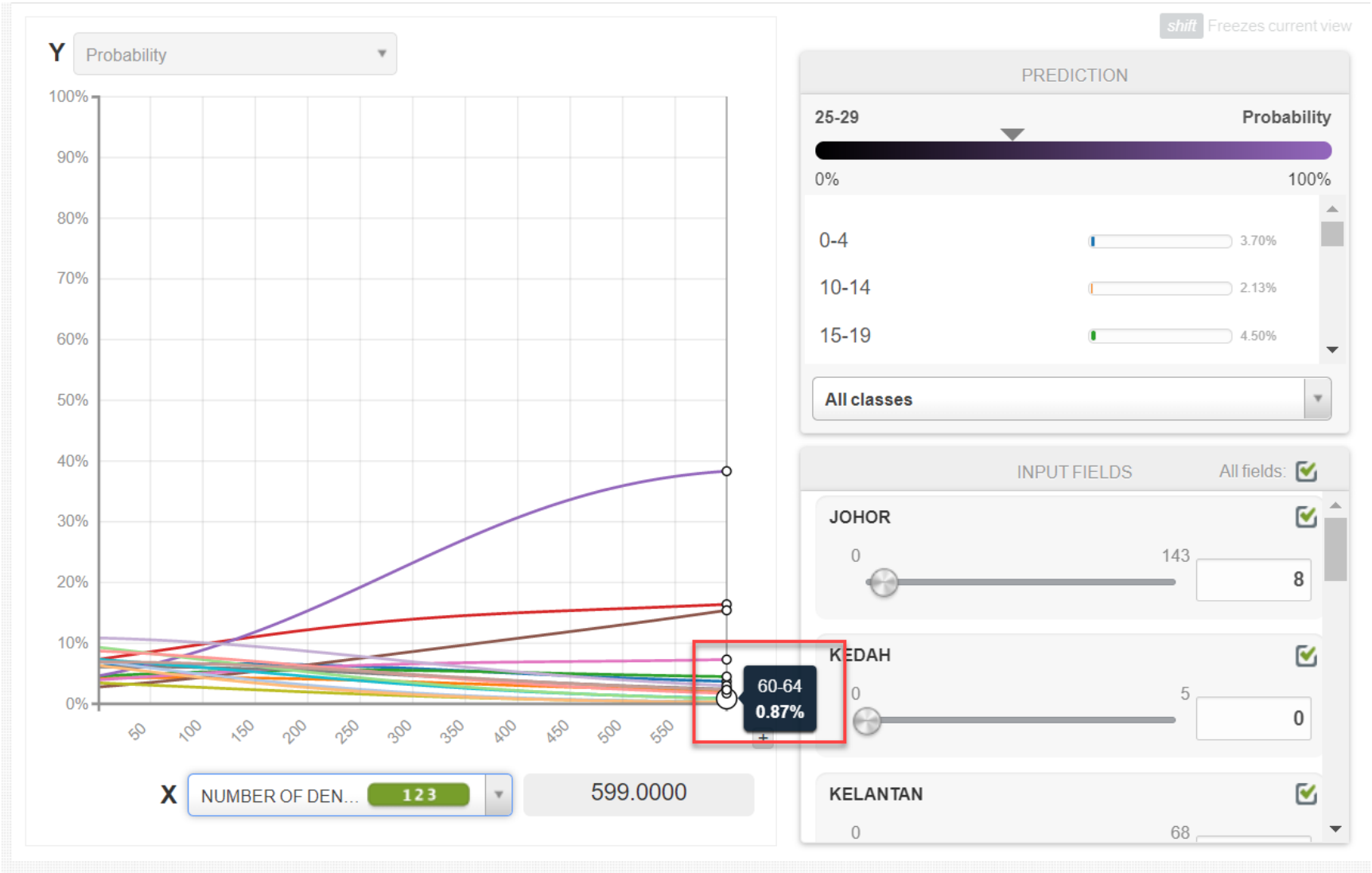
Age 20 - 24: 16% Infected with DHF **(Second Highest)**

Logistic regression - Age Groups (cont.)



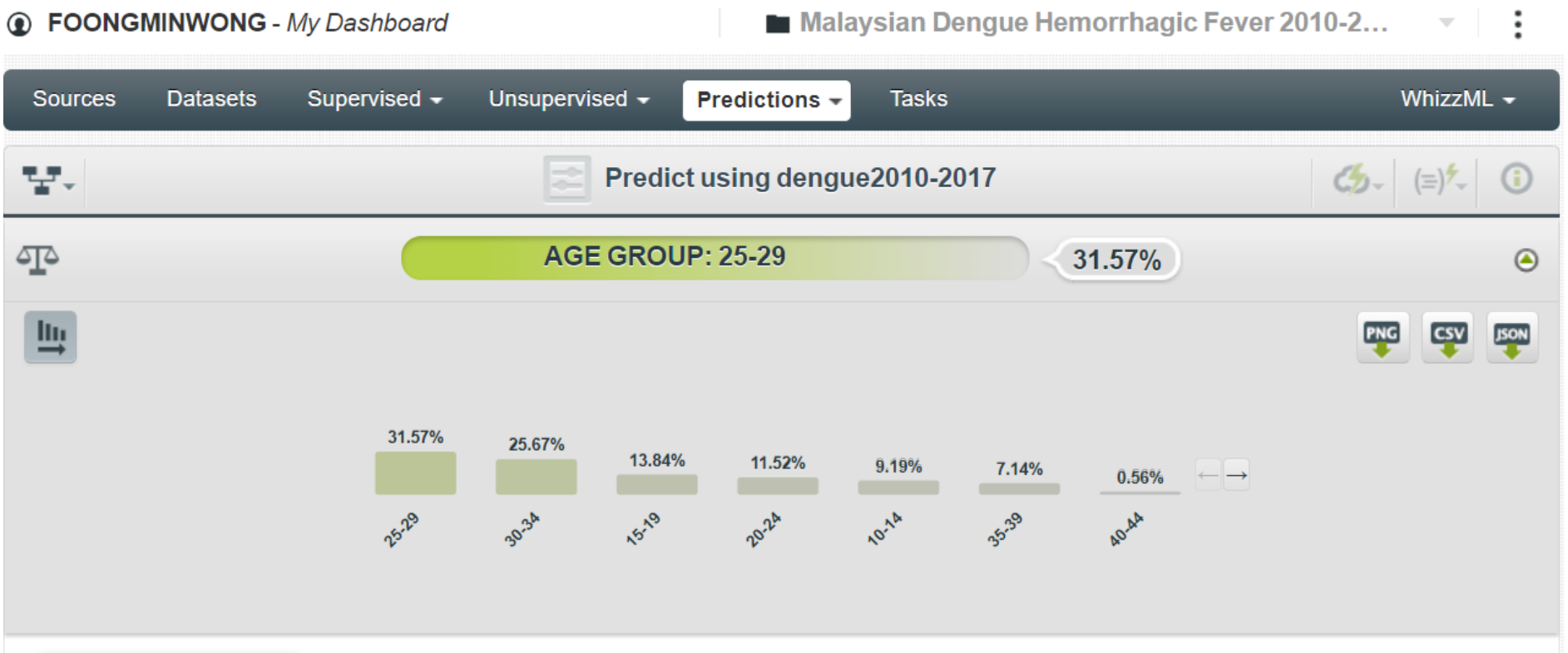
Age 30 - 34: 15% Infected with DHF **(Third Highest)**

Logistic regression - Age Groups (cont.)



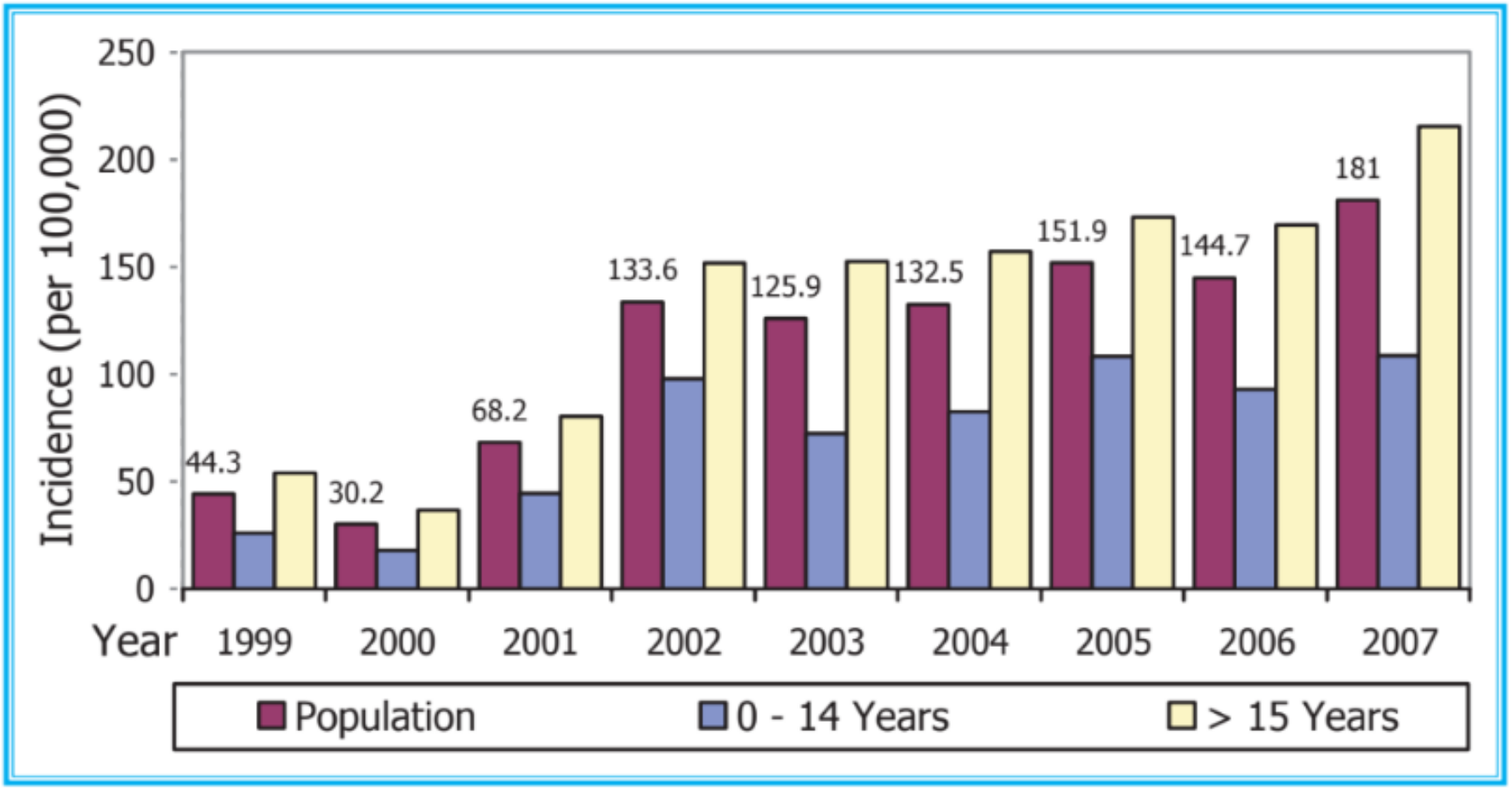
Age 60 - 64: 0.87% Infected with DHF (Lowest) *(Not Age > 75)*

Prediction on Age Groups



1999 - 2007 Malaysian Dengue Report

Figure 2 : Dengue Incidence Rate by Age Group in Malaysia, 1999-2007



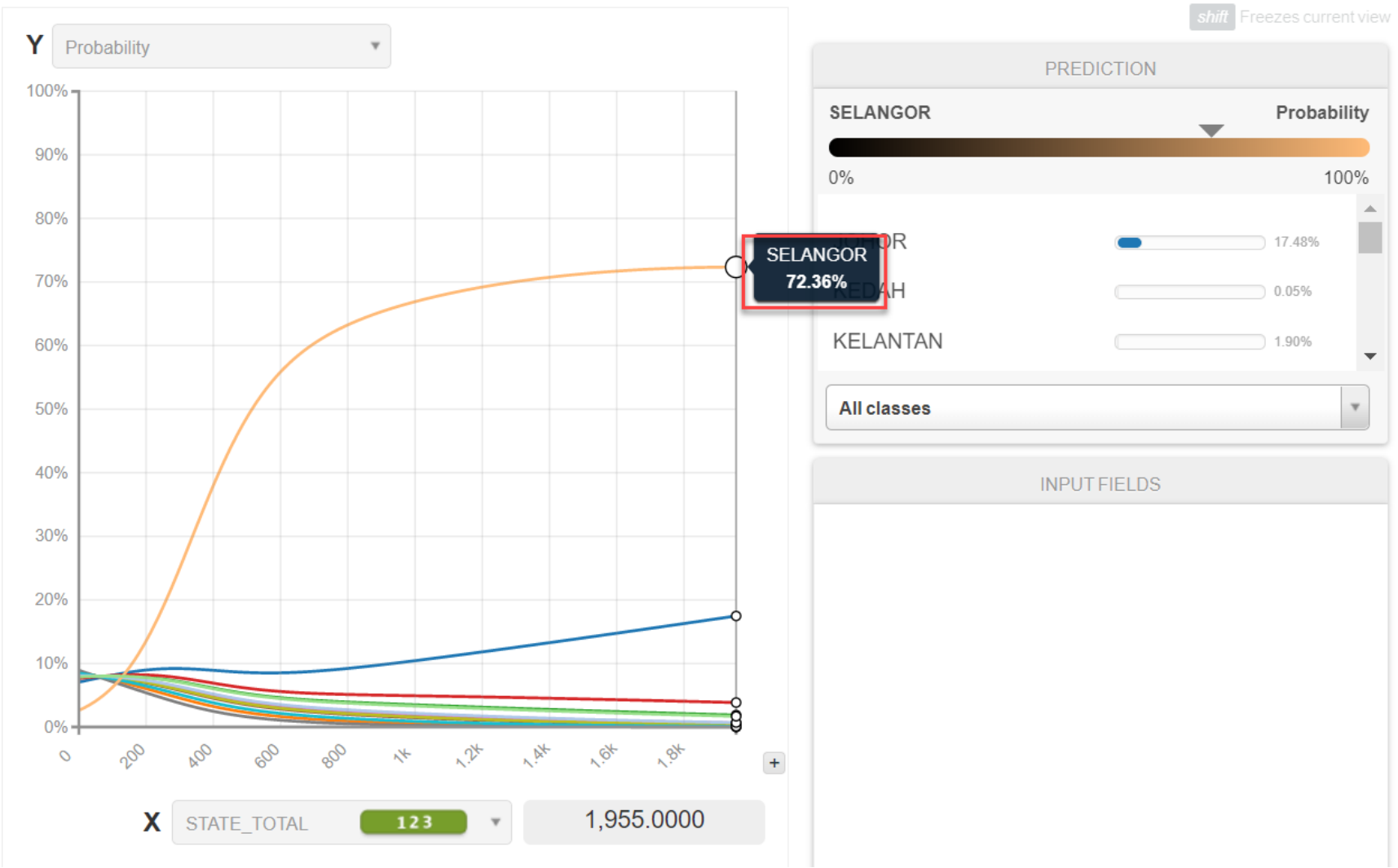
Dengue seroprevalence in the Malaysian adult population

- Seroprevalence: The level of a pathogen (dengue) in a population, as measured in blood serum.
- If a person has a high dengue seroprevalence, he or she is positive for dengue virus based on serology (blood serum)

Dengue seroprevalence in the Malaysian adult population (cont.)

- In Malaysia, majority of the affected community are now identified as the age group of 13–35 years old (Pang & Loh, 2016)
- In fact, high dengue seropositivity (91.6%) had been detected among Malaysian adults.

Logistic regression - States

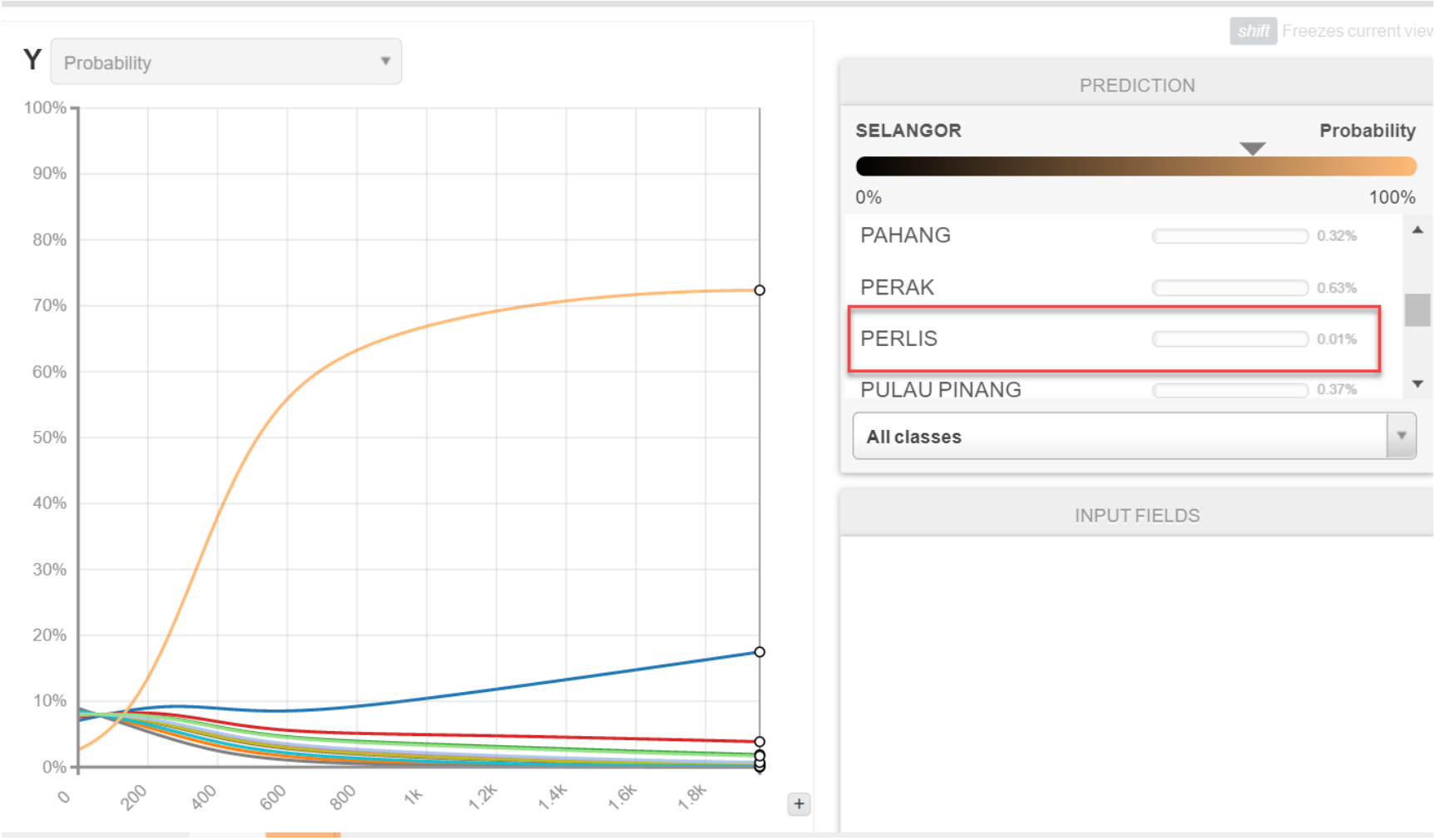


Selangor: 72% Infected with DHF **(Highest)**

Logistic regression - States (cont.)

Johor: 17% Infected with DHF **(Second Highest)**

Logistic regression - States (cont.)

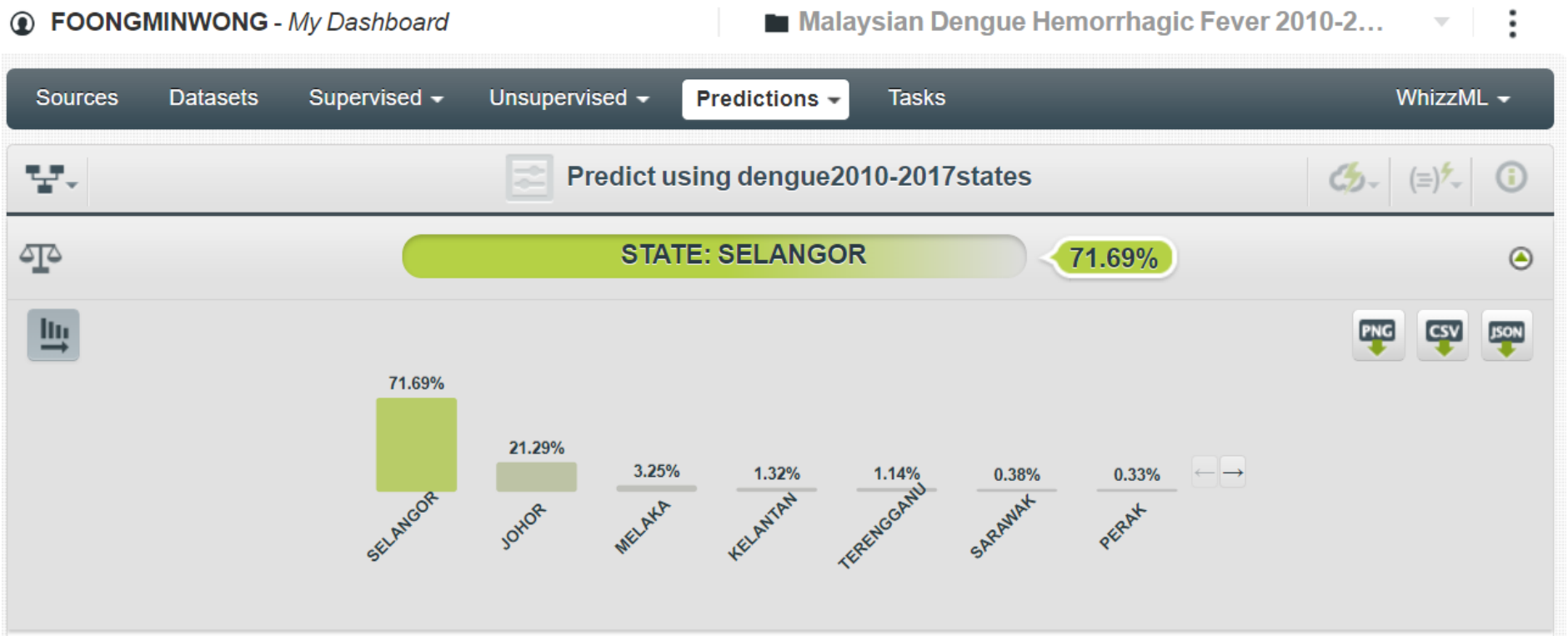


Perlis: 0.01% Infected with DHF **(Lowest)**

Why Selangor has the highest probability of dengue outbreak?

- Selangor state recorded the highest number of dengue cases in Malaysia.
- Selangor is a state with a high population density in Malaysia compared to other states (Ghani et al, 2019)
  - Household cleanliness
  - Behavior of its citizens

Prediction on States



Comparison of Knowledge, Attitude, and Practice among Communities Living in Hotspot and Non-Hotspot Areas of Dengue (Ghani et al, 2019)

- Communities living in non-hotspot areas of dengue had better knowledge and attitude about dengue
- People are not clear about dengue treatment and people's behavior not keeping household clean

Filthy water in household area

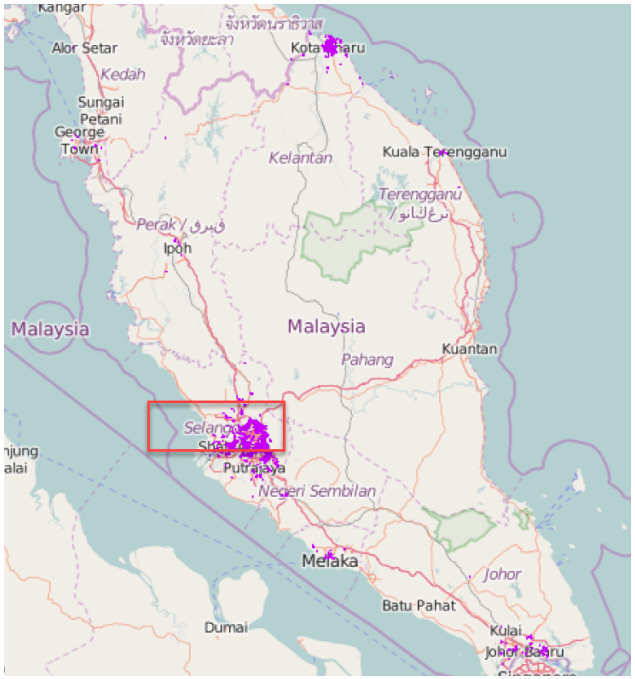
Comparison of Knowledge, Attitude, and Practice among Communities Living in Hotspot and Non-Hotspot Areas of Dengue (cont.)

- Low education, socioeconomic status and knowledge on dengue prevention
- Educational campaigns for those with lower income and education, Government prevention

Spraying insecticide smoke to prevent the spread of dengue fever

Conclusion

- Used BigML to run predictive analysis to describe Dengue Hemorrhagic Fever Pattern & Probability using logistic regression
  - Age group (25-29)(Highest), 60-64 (Lowest)
  - Selangor (Highest), Perlis (Lowest)



Future Improvements

- Use BigML/other software to predict dengue hemorrhagic occurence using time series analysis
- Run predictive analysis on Dengue Death Cases Data

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- S.S. Sam, S.F. Omar, B.T. Teoh, J. Abd-Jamil, S. AbuBakar Review of dengue hemorrhagic fever fatal cases seen among adults: a retrospective study PLoS Negl Trop Dis, 7 (5) (2013), p. e2194

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Nurul Akmar Ghani ,Shamarina Shohaimi,Alvin Kah-Wei Hee,Hui-Yee Chee ,Oguntade Emmanuel and Lamidi Sarumoh Alaba Ajibola Comparison of Knowledge, Attitude, and Practice among Communities Living in Hotspot and Non-Hotspot Areas of Dengue in Selangor, Malaysia Trop. Med. Infect. Dis. (2019), p. 37

Thank You!

Questions?