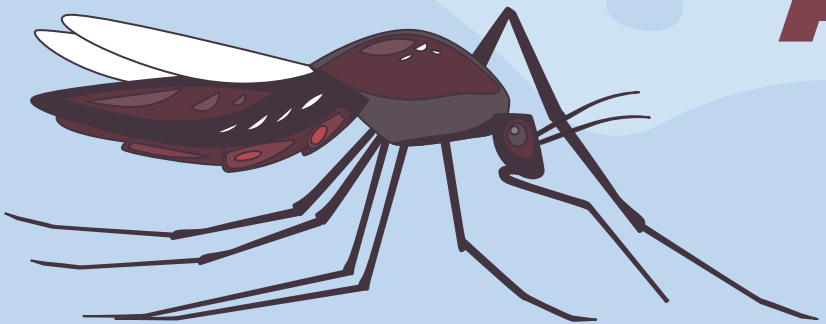
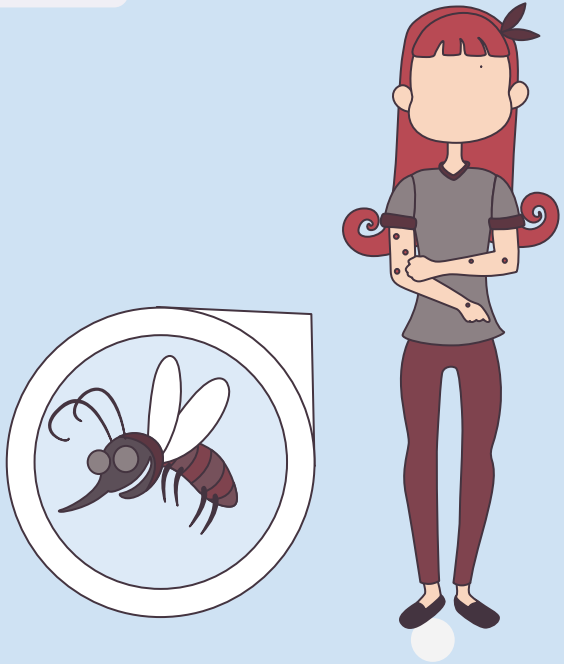
Dengue vs Rainfall Analysis



JIN JIN
DSI 37

Context



I am ...
A Junior Analyst

You are from ...
NEA

This is ...
an exploratory session on the relationship between rainfall on dengue cases

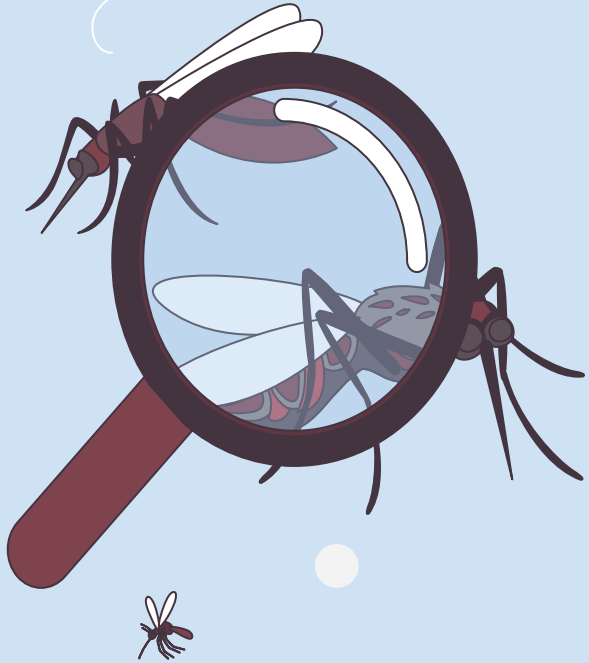
[1] National Medical Research Council (NMRC). (n.d.). Integrated Dengue Surveillance in Singapore.
[2] Chong, K. (n.d.). Singapore records 19 dengue deaths in 2022, nearly four times 2021's toll. The Straits Times.
[3] Met Office. (n.d.). Singapore Holiday Weather Guide.
[4] Ng, L. C., et. al (2018). IL-1β, IL-6, and RANTES as biomarkers of Chikungunya severity. PLOS Neglected Tropical Diseases, 12(5), e0006935.

Top endemic infectious disease [1]

4x Death Toll from 2021 to 2022 (19 cases) [2]

Rainfall patterns as a driver [3] [4]

Problem Statement



Improving resource allocation and preventive measures by exploring rainfall-dengue trends to reduce public resource overload.

Method

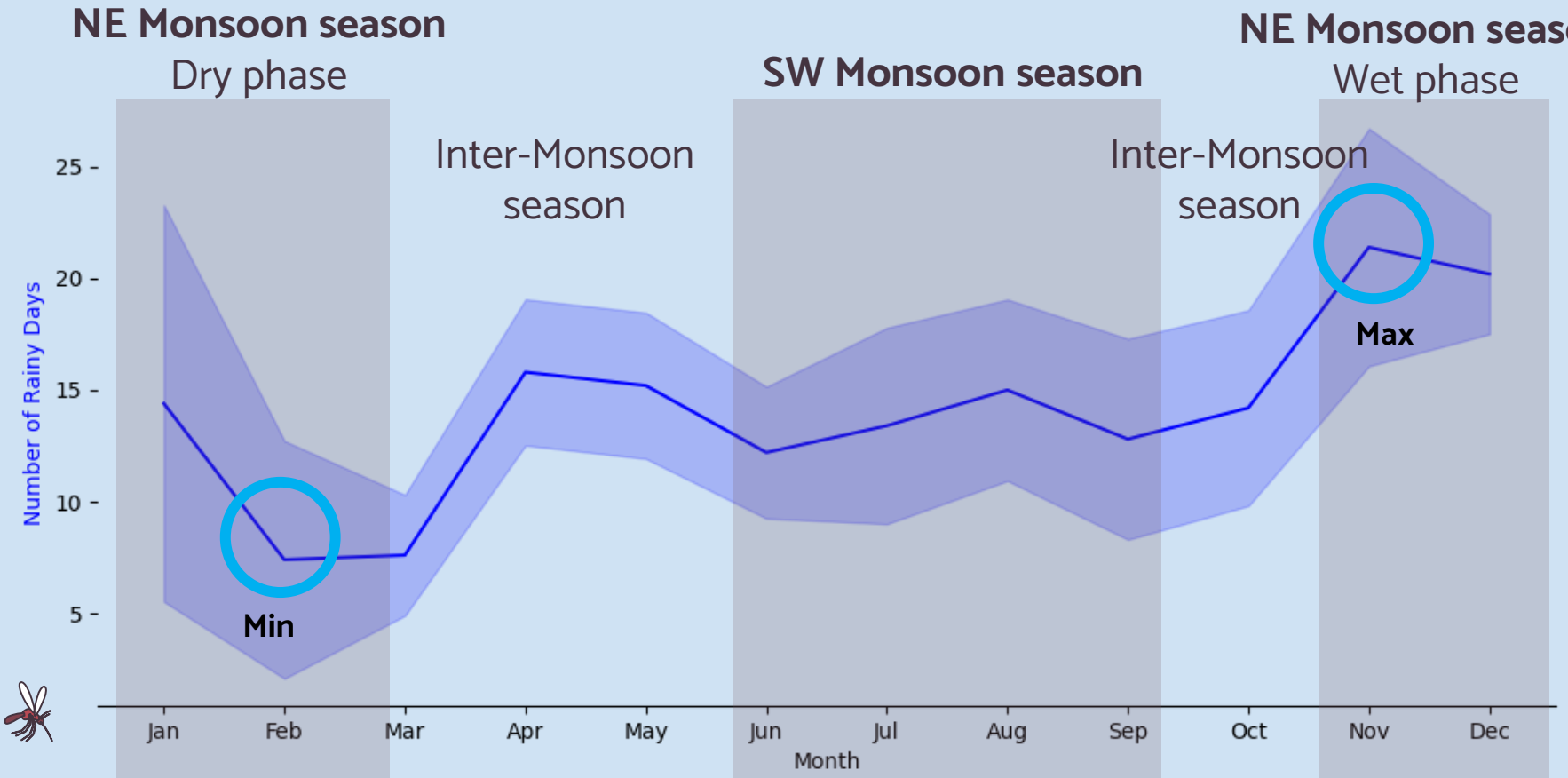
Datasets	
Number of Rainy Days	
Dengue Cases	
Yearly (1966 -2021)	Weekly (2014-2018)

Analysis	
Monthly Trend	
Correlation	Lagged
Yearly Trend	
Anomalies	

[5] Meteorological Service Singapore. (n.d.). Climate of Singapore.

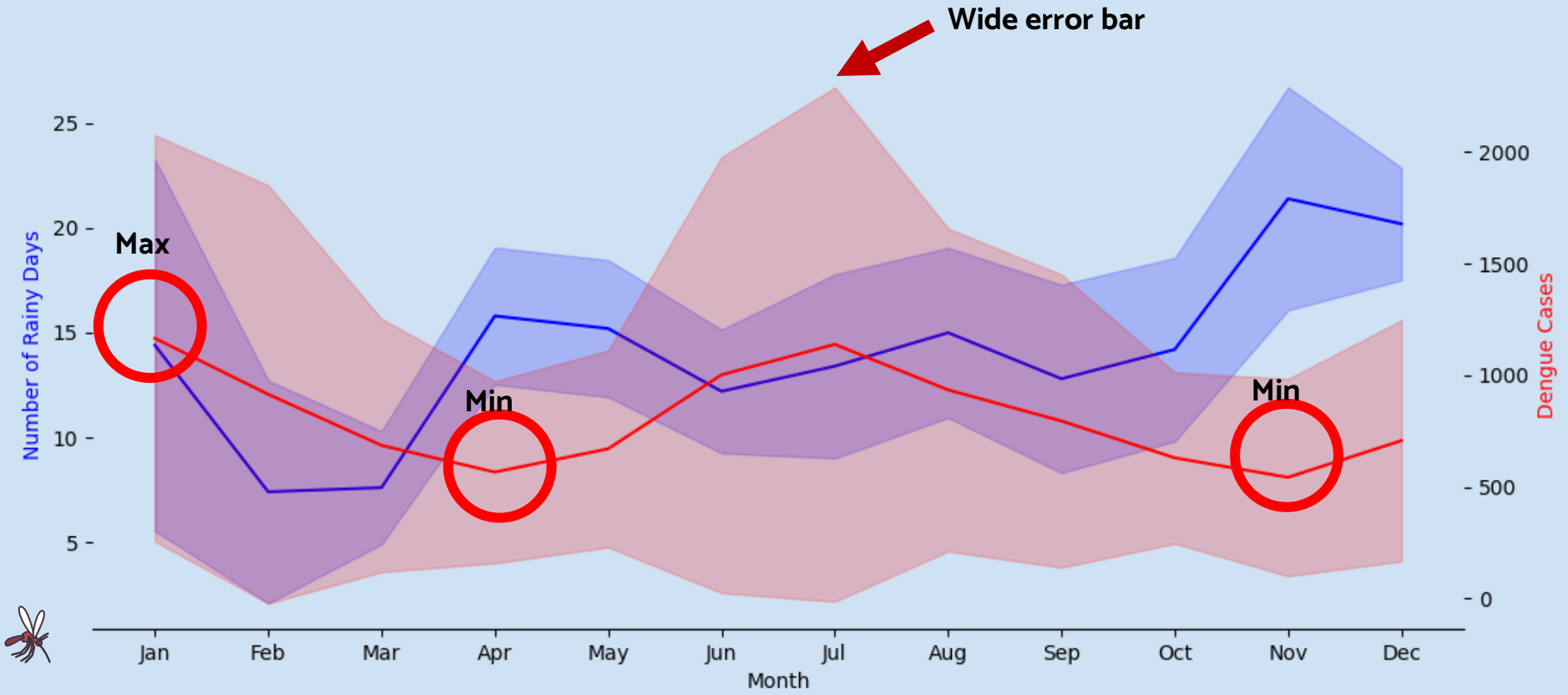
MONTHLY TREND (2014-2018)

Number of rainy days depends on monsoon cycles [5]



MONTHLY TREND (2014-2018)

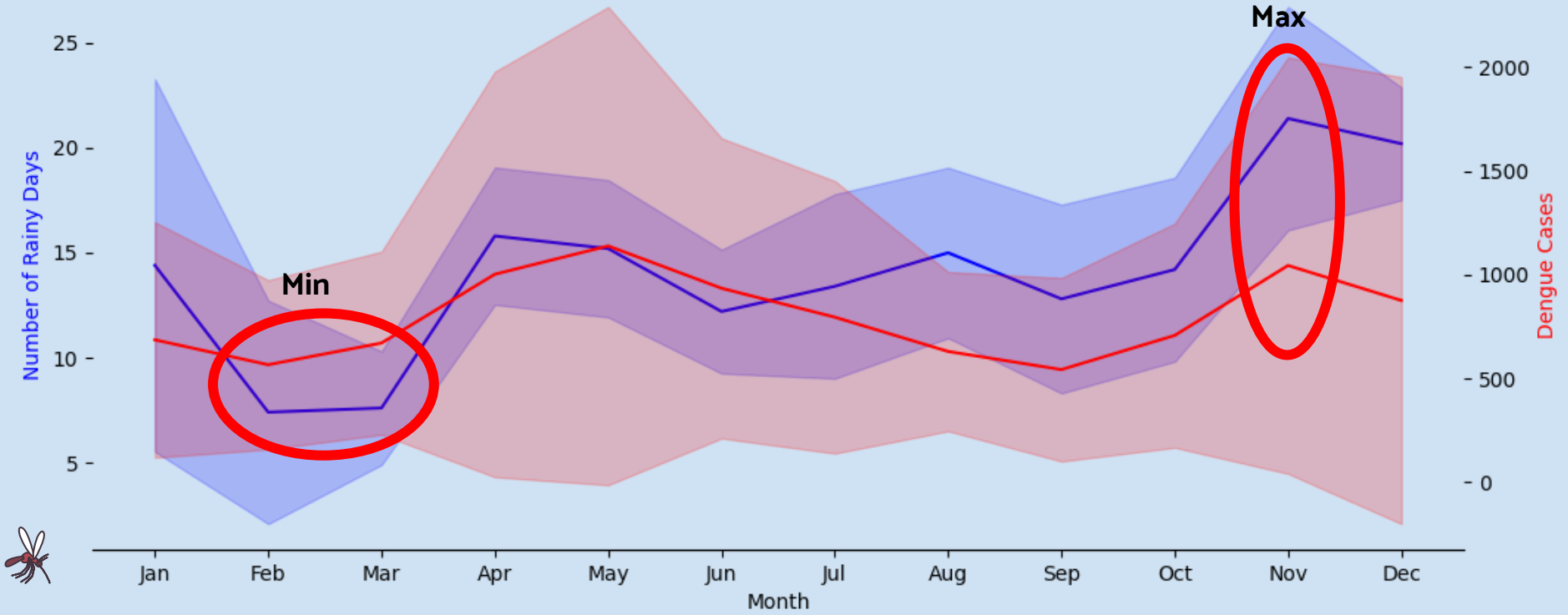
Cyclic trend of dengue cases seemed to “lag behind”



MONTHLY TREND (2014-2018)

Lagged Analysis: Optimal ‘match’ at 2 months lagged period

Shifted dengue data forward by 2 months - Mosquitoes take time to breed and transmit diseases



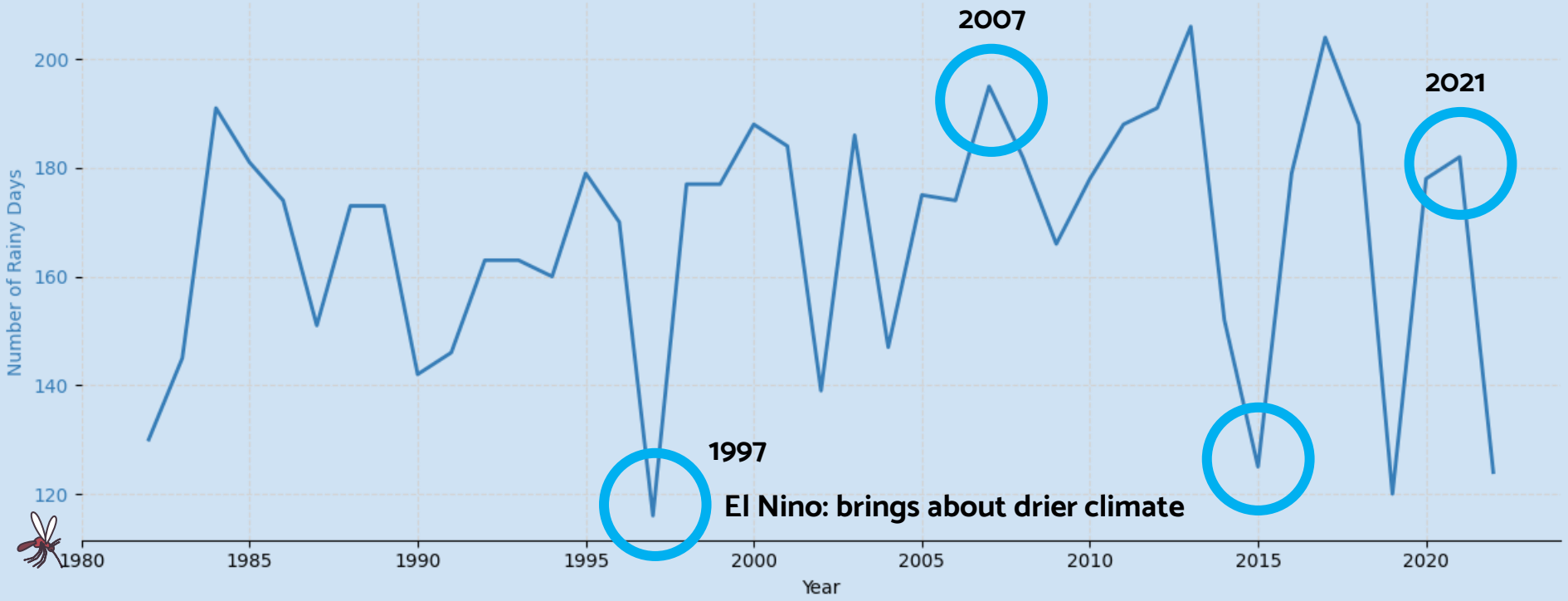
[6] Tehran Times. (n.d.). 1997: Singapore's hottest, driest year.

YEARLY TREND (1982-2022)

Rather irregular fluctuations

Extremities attributed to La Nina and El Nino effects [6]

Greater fluctuations in recent years



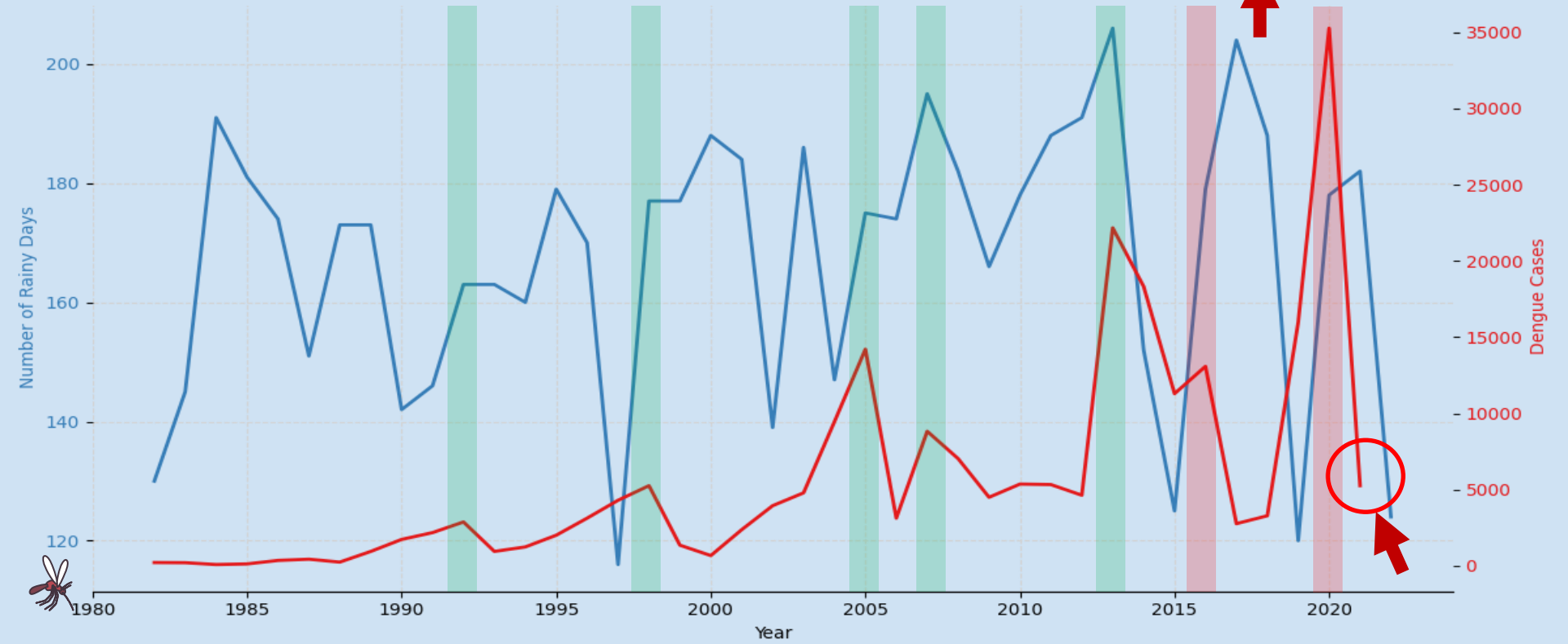
YEARLY TREND (1982-2022)

Most dengue peaks are associated with peaks in total rainfall

2020: Dengue transmission in or near homes due to increase in WFH [7]

2021: Covid-19 surge in cases, affecting detection and reporting of dengue cases [8] [9]

Inconsistent observation in recent years



[7] National Centre for Infectious Diseases. (n.d.). Epidemic Dengue in Singapore During COVID-19 Pandemic.

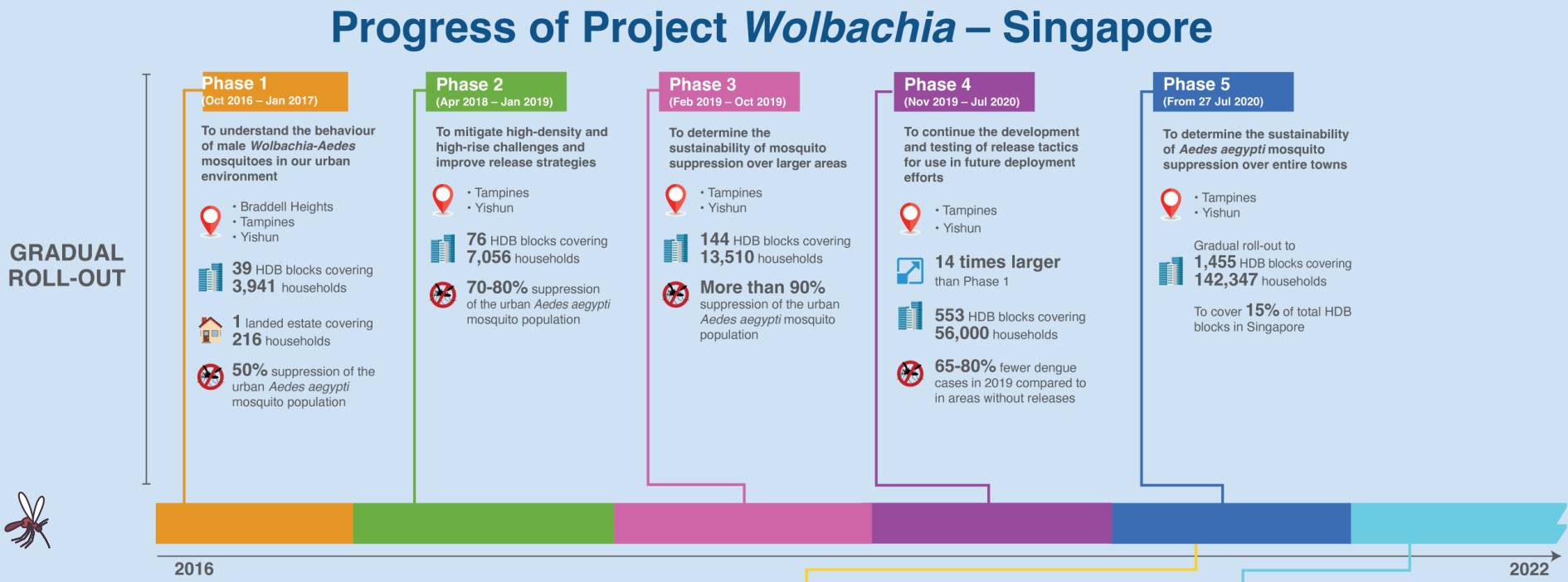
[8] Channel NewsAsia. (n.d.). Dengue cases in Southeast Asia plummeted in 2021 amid COVID-19 lockdowns.

[9] Duke-NUS Medical School. (n.d.). Singapore dengue numbers may swell again.

[10] National Environment Agency. (n.d.). Wolbachia-Aedes mosquito suppression strategy.

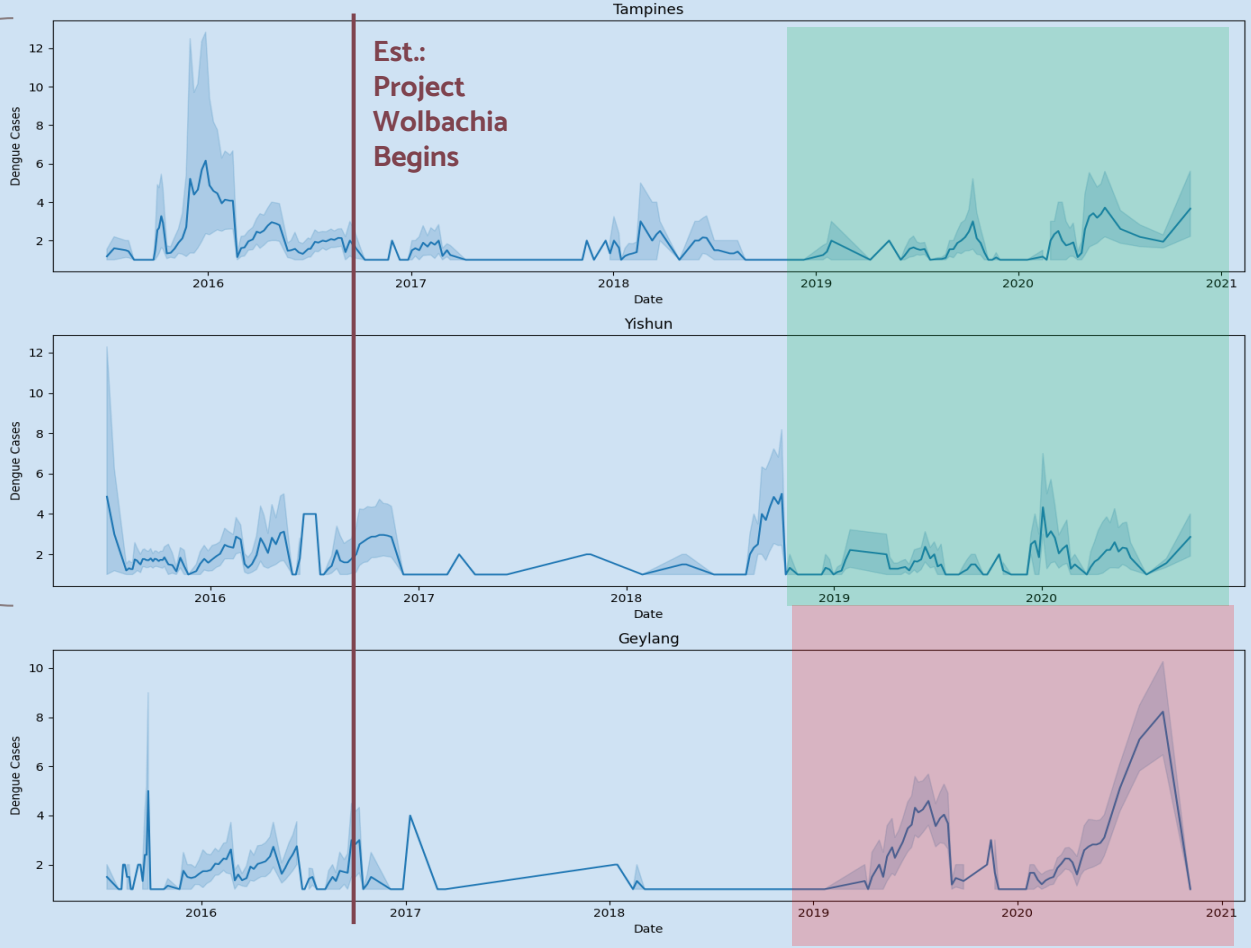
CLUSTER TREND (2015-2020)

Project Wolbachia - suppresses urban Aedes aegypti mosquito populations, as eggs produced by matings between released male Wolbachia-Aedes mosquitoes and urban female Aedes aegypti mosquitoes do not hatch. –NEA [10]



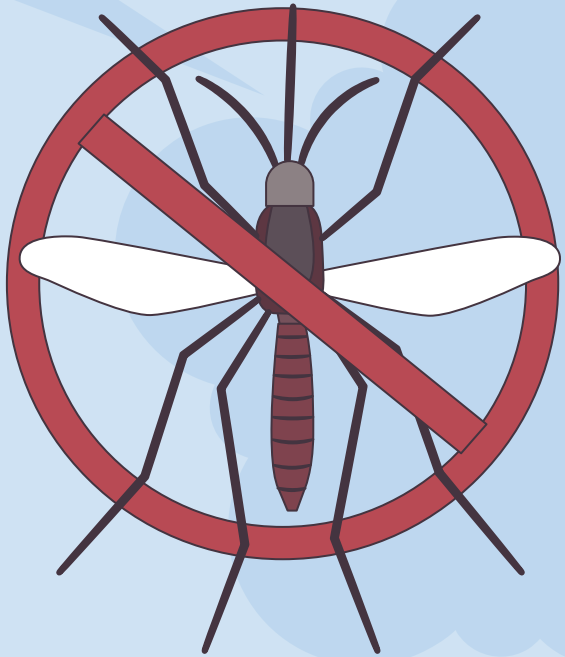
CLUSTER TREND (2015-2020)

Targeted estates



No significant increase in dengue cases at targeted estates.

Future work to integrate estate rain data.



Recommendations

Resource allocation

Use lead time of 2 months to optimise prevention strategy and medical resources

Data-sharing

Share data after 2019 to leverage crowd efforts to generate better analysis and prediction of dengue cases

Accelerate Project Wolbachia

Prioritise efforts to wetter areas

Thank You

CREDITS: This presentation template was created by Slidesgo, including icons by Flaticon, and infographics & images by Freepik

Please keep this slide for the attribution