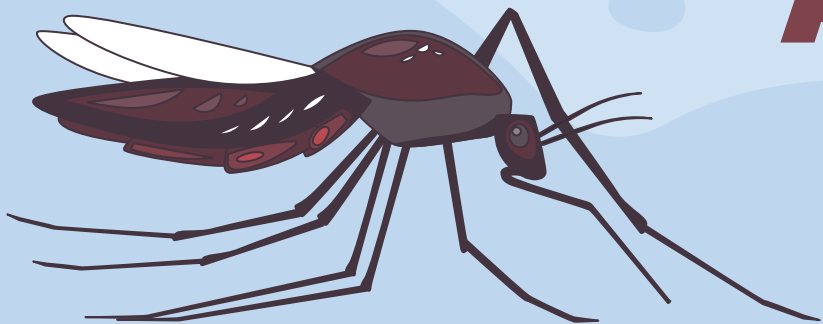




Dengue vs Rainfall Analysis



JIN JIN
DSI 37

Context



I am ...
A Junior Analyst

You are from ...
NEA

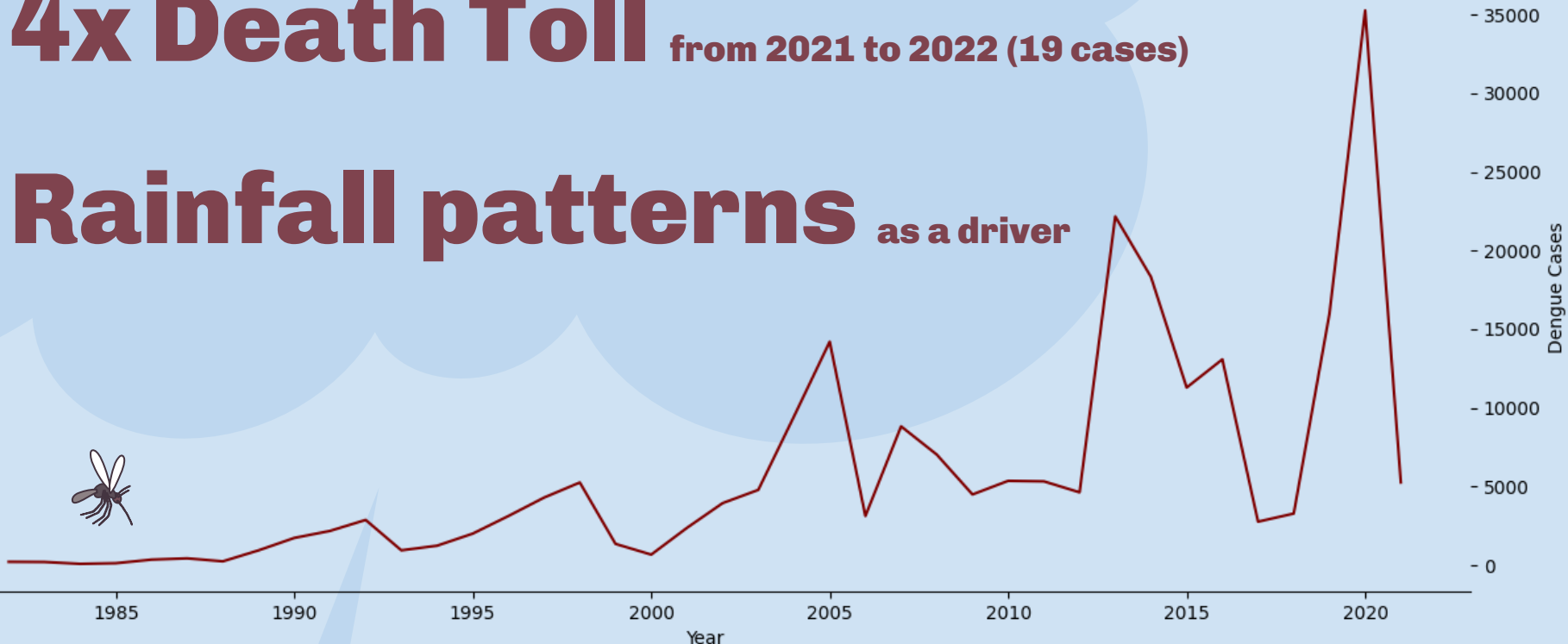
This is ...
an exploratory session on the
relationship between rainfall on
dengue cases



Top endemic infectious disease

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

Rainfall patterns as a driver



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	

MONTHLY TREND (2014-2018)

Number of rainy days depends on monsoon cycles



NE Monsoon season

Dry phase

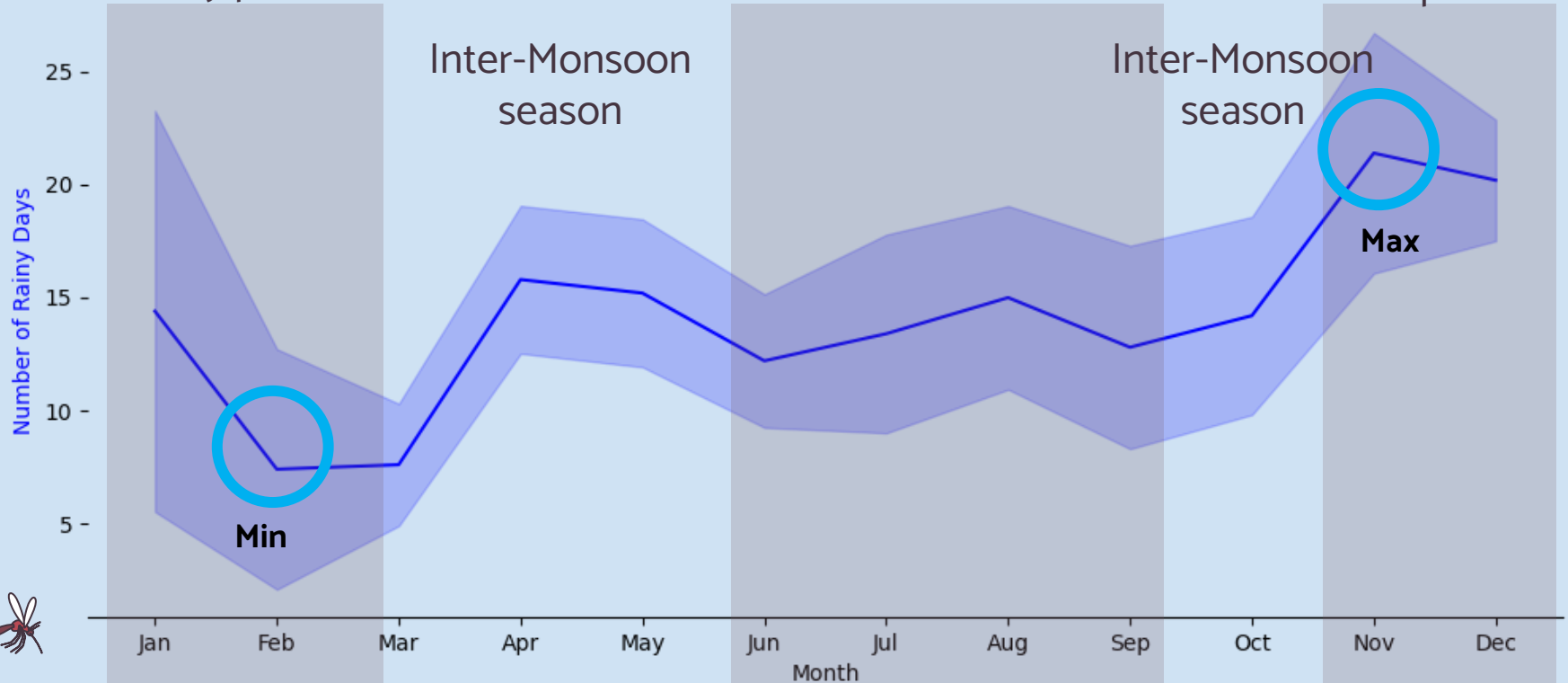
SW Monsoon season

NE Monsoon season

Wet phase

Inter-Monsoon
season

Inter-Monsoon
season



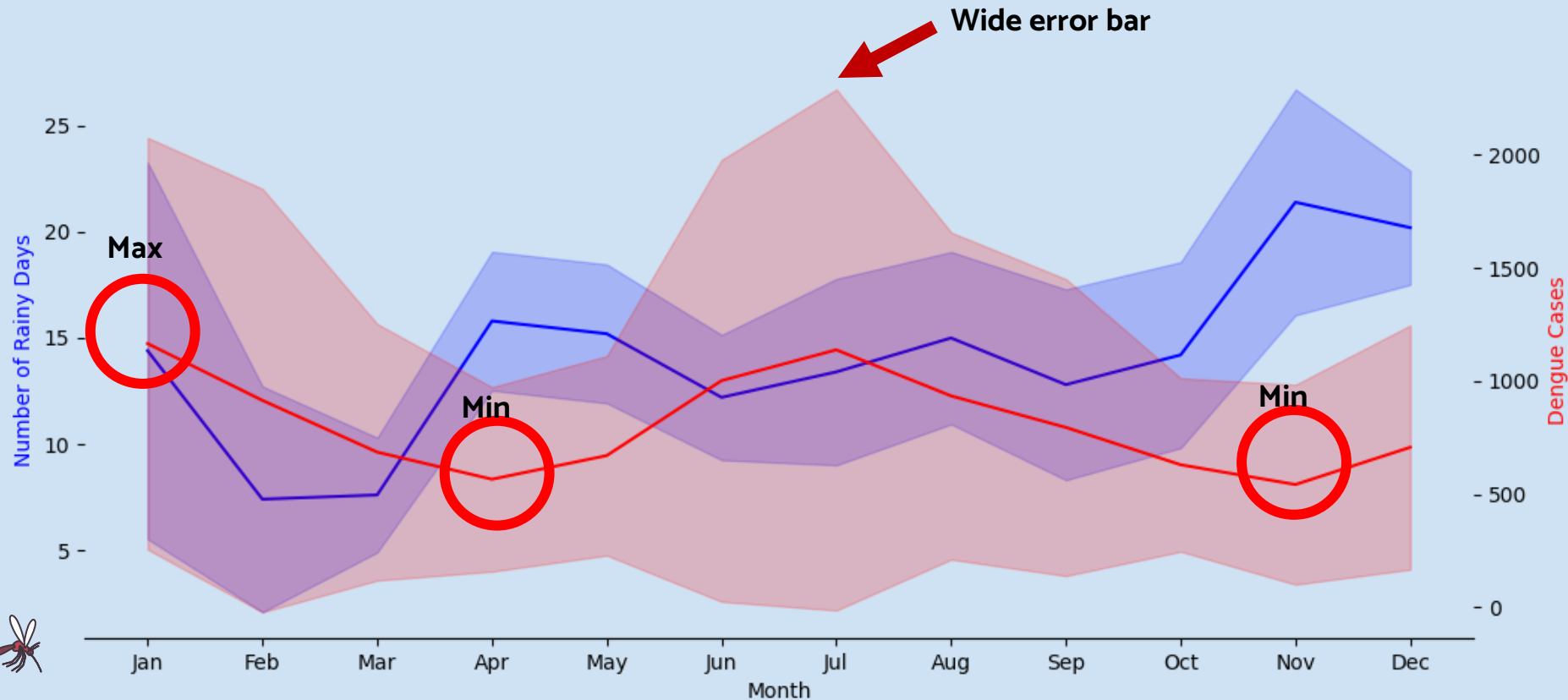
Min

Max



MONTHLY TREND (2014-2018)

Cyclic trend of dengue cases seemed to “lag behind”

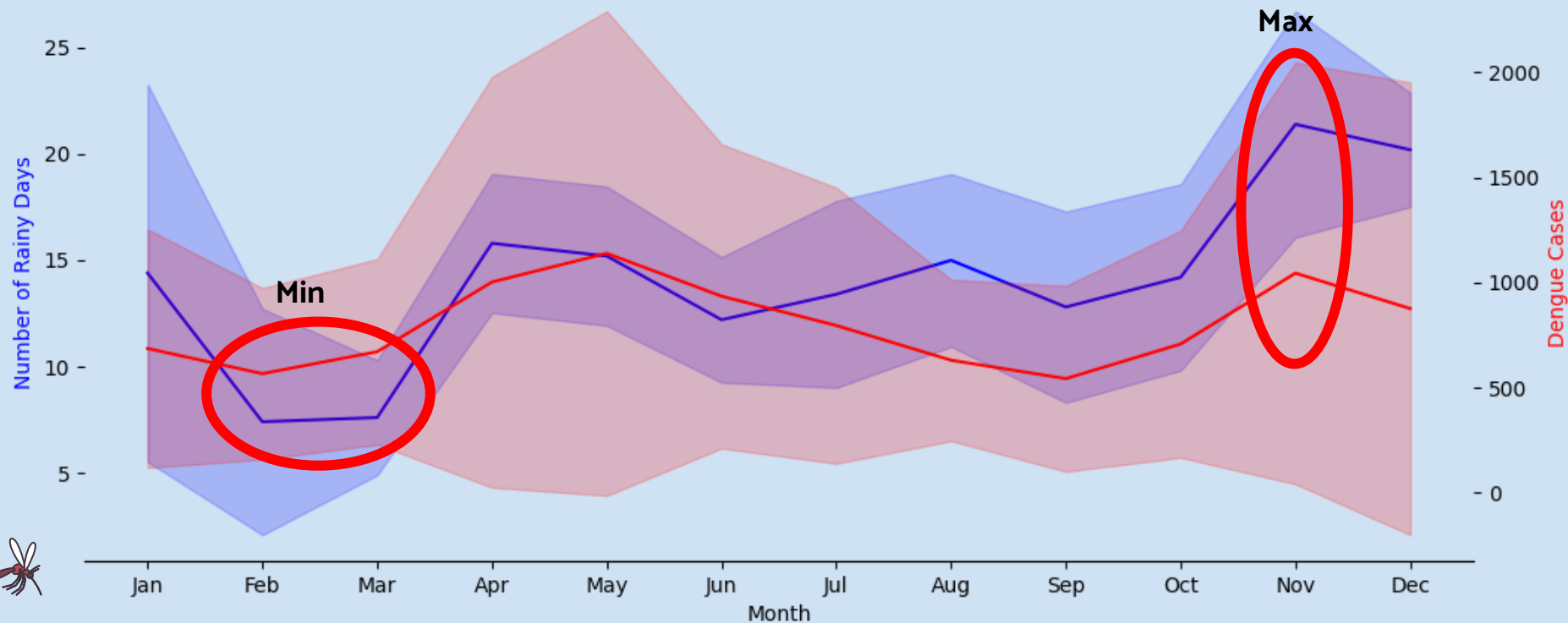


MONTHLY TREND (2014-2018)

Lagged Analysis: Optimal 'match' at 2 months lagged period



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



YEARLY TREND (1982-2022)

Rather irregular fluctuations

Extremities attributed to La Nina and El Nino effects

Greater fluctuations in recent years



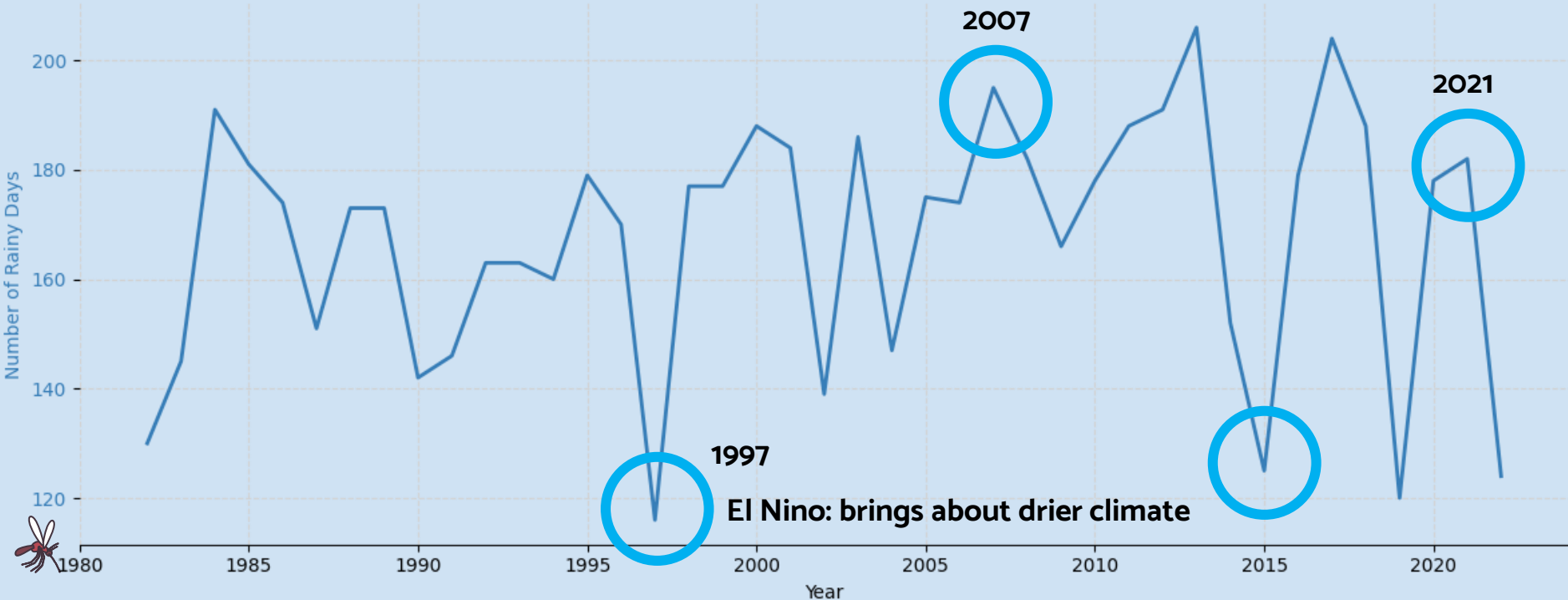
La Nina: brings more rain over equatorial SEA

2007

2021

1997

El Nino: brings about drier climate



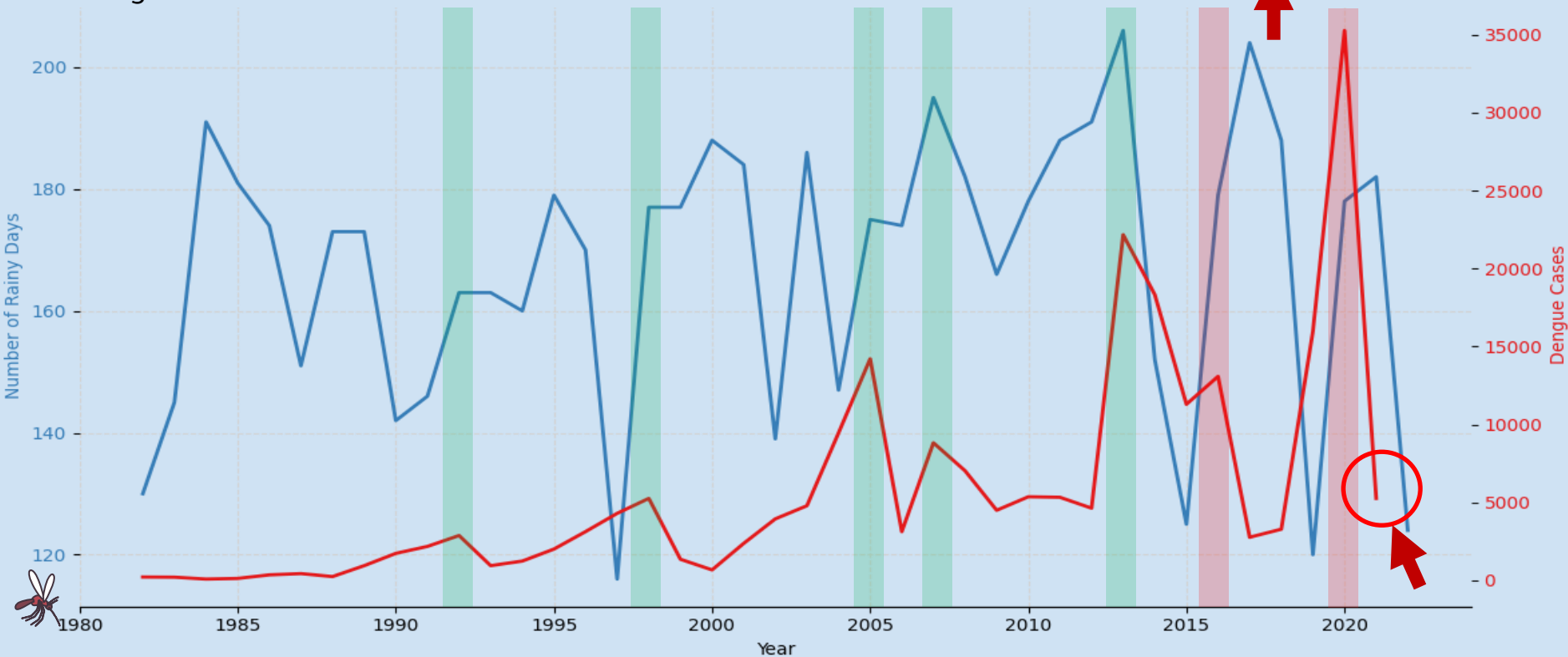
YEARLY TREND (1982-2022)

Most dengue peaks are associated with peaks in total rainfall



2021: Covid-19 surge in cases, affecting detection and reporting of dengue cases

Inconsistent observation in recent years



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

Progress of Project *Wolbachia* – Singapore

GRADUAL
ROLL-OUT

Phase 1 (Oct 2016 – Jan 2017)

To understand the behaviour of male *Wolbachia-Aedes* mosquitoes in our urban environment

- Braddell Heights
- Tampines
- Yishun

39 HDB blocks covering 3,941 households

1 landed estate covering 216 households

50% suppression of the urban *Aedes aegypti* mosquito population

Phase 2 (Apr 2018 – Jan 2019)

To mitigate high-density and high-rise challenges and improve release strategies

- Tampines
- Yishun

76 HDB blocks covering 7,056 households

70-80% suppression of the urban *Aedes aegypti* mosquito population

Phase 3 (Feb 2019 – Oct 2019)

To determine the sustainability of mosquito suppression over larger areas

- Tampines
- Yishun

144 HDB blocks covering 13,510 households

More than 90% suppression of the urban *Aedes aegypti* mosquito population

Phase 4 (Nov 2019 – Jul 2020)

To continue the development and testing of release tactics for use in future deployment efforts

- Tampines
- Yishun

14 times larger than Phase 1

553 HDB blocks covering 56,000 households

65-80% fewer dengue cases in 2019 compared to in areas without releases

Phase 5 (From 27 Jul 2020)

To determine the sustainability of *Aedes aegypti* mosquito suppression over entire towns

- Tampines
- Yishun

Gradual roll-out to 1,455 HDB blocks covering 142,347 households

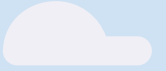
To cover 15% of total HDB blocks in Singapore

2016

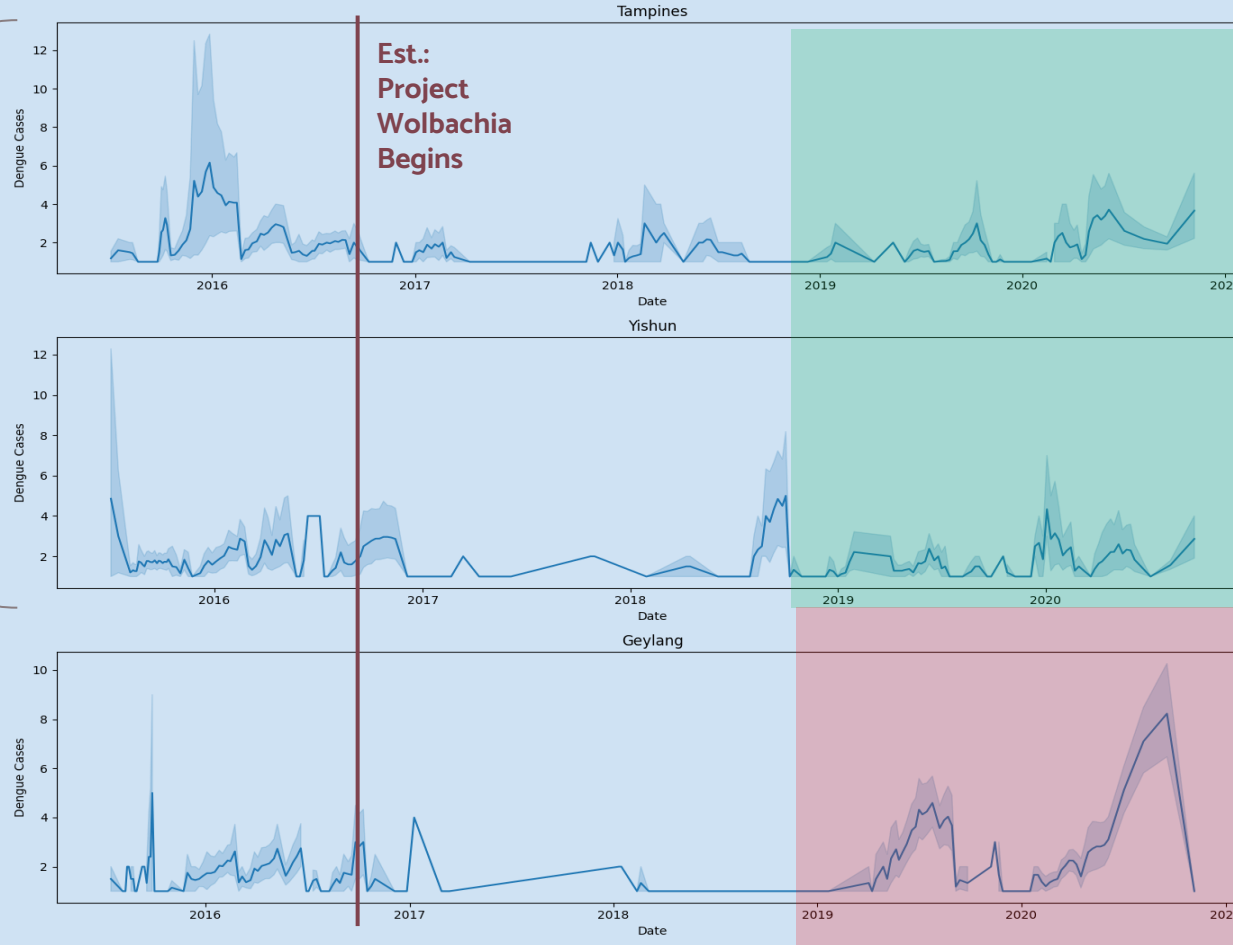
2022



CLUSTER TREND (2015-2020)



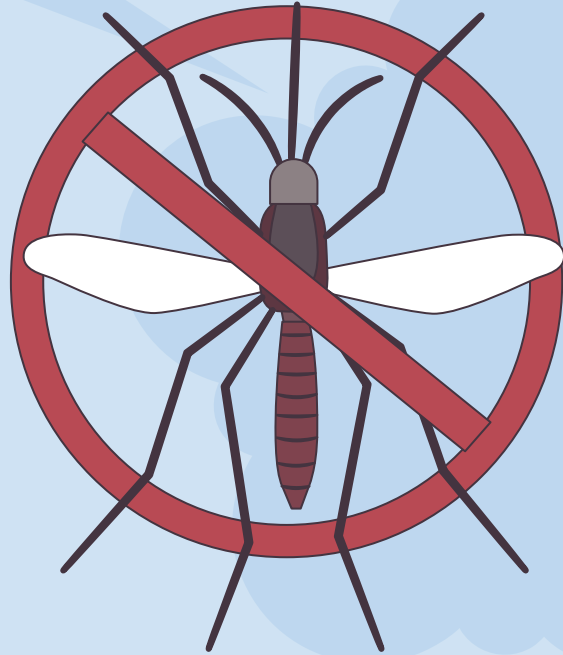
Targeted estates



No significant increase in dengue cases at targeted estates.

Future work to integrate estate rain data.





Recommendations

Resource allocation

Use rainfall forecast to optimise prevention strategy
and medical resources

Data-sharing

Accelerate Project Wolbachia



Thank You



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