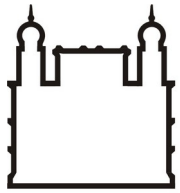


Ministério da Saúde

FIOCRUZ
Fundação Oswaldo Cruz

PROCC
PROGRAMA DE COMPUTAÇÃO CIENTÍFICA

Syndromic surveillance of arboviruses and respiratory infections

Marcelo F C Gomes

MAVE: Grupo de Métodos Analíticos em Vigilância Epidemiológica

(PROCC/Fiocruz e EMAp/FGV)

Fiocruz, PROCC

Geral

Chega a 100 o número de mortes confirmadas no Rio Grande do Sul

Chuvas deixam mais de 163 mil desabrigados e 63,7 mil desalojados

Publicado em 08/05/2024 - 13:40 Por Alex Rodrigues – Repórter da Agência Brasil - Brasília


Entulho toma conta de Cruzeiro do Sul, no Vale do Rio Taquari, onde bairros inteiros foram postos abaixo
Jornal Nacional
CRUZEIRO DO SUL
RS
00:15 / 03:42

https://www.vakinha.com.br/vaquinha/a-maior-campanha-solidaria-do-rs

vakinha

O que está procurando?

Explorar MG

Criar Vaquinha

TRAGÉDIAS / DESASTRES / ACIDENTES

A Maior Campanha Solidária do RS

ID: 4712837

Arrecadado

R$ 59.801.779,00

Meta
R$ 80.000.000,00

Apoiadores
1109752

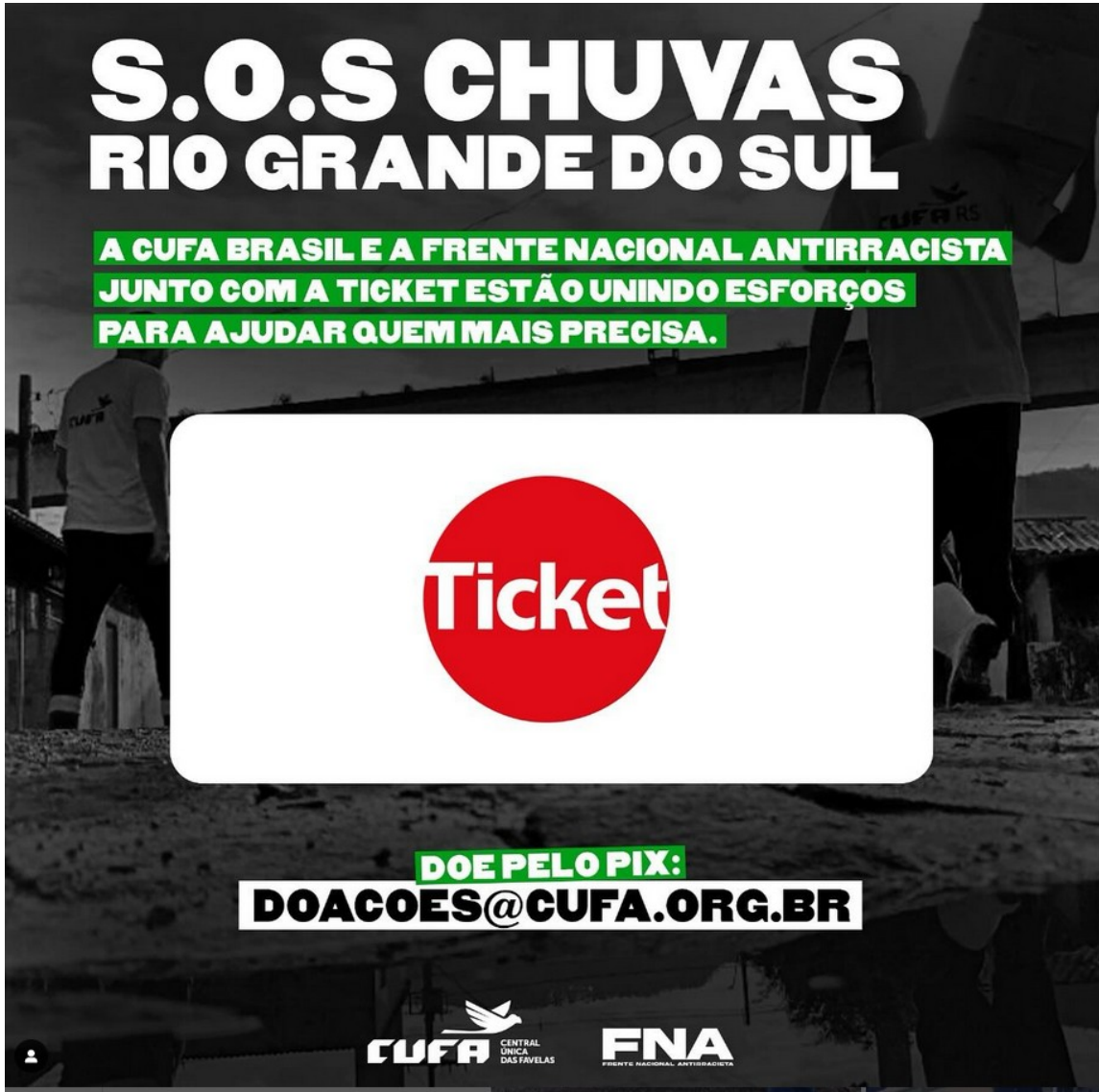
Você e a vaquinha concorrem a R$ 15 MIL

Doe e concorra

Instituto Vakinha
Porto Alegre / RS
Ativo(a) no Vakinha desde março/2023

COMPARTILHE ESTA VAQUINHA

https://www.vakinha.com.br/4712837 Copiar



PIX

SOS RIO GRANDE DO SUL

Leia o QR Code

Ajude doando qualquer valor

Chave pix (CNPJ) : 92.958.800/0001-38
Instituição: Banrisul

GOVERNO DO ESTADO
RIO GRANDE DO SUL

UNIDOS PELO RIO GRANDE DO SUL

Poder público, sociedade e empresas em apoio às vítimas das chuvas

FIOCRUZ

fiocruz.colabore.org/unidosporRioGrandedoSul

Message from a friend and colleague from the Lab for public health surveillance in Rio Grande do Sul:
Desculpa trazer um problema pessoal aqui, mas não estou vendo outra alternativa no momento e eu e minha família não conseguimos ajudar mais. Tenho 3 primos que perderam as casas. Uma tem um bebê, e um deles foi pra um abrigo com a esposa.

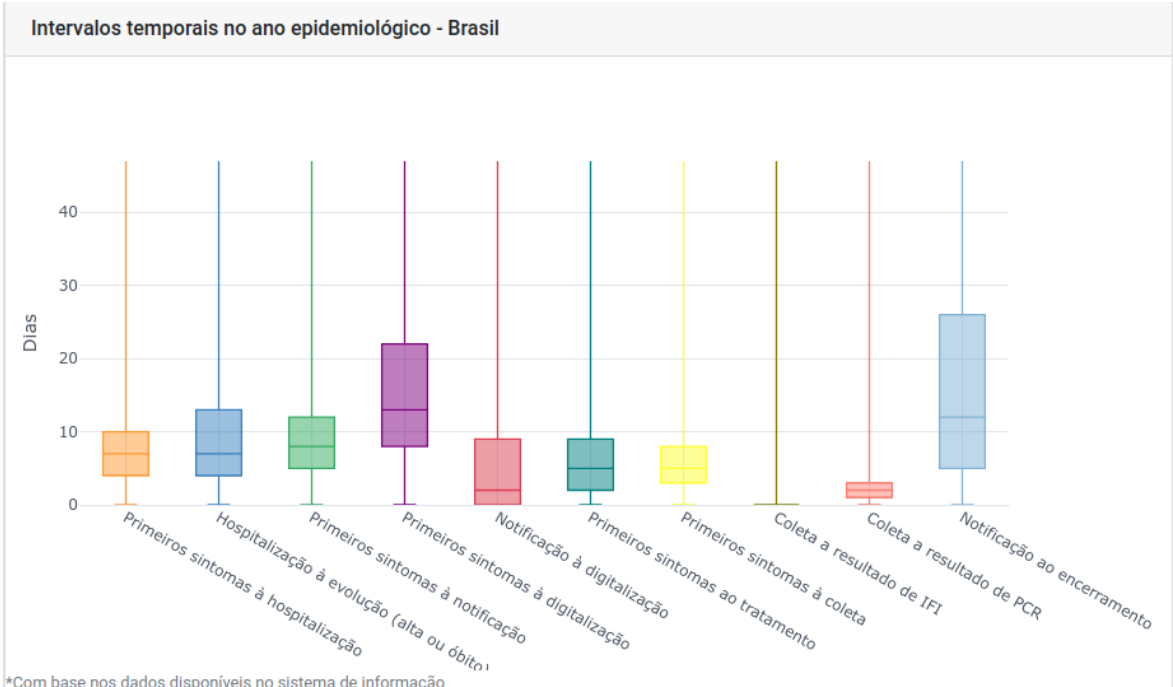
Estou fazendo uma vaquinha para ajudar financeiramente. Se vcs souberem de alguém que queira ajudar, deixo meu pix aqui.
CPF 49150081004 Tatiana Gregianini

FIOCRUZ

Epi surveillance and the need of nowcasting models

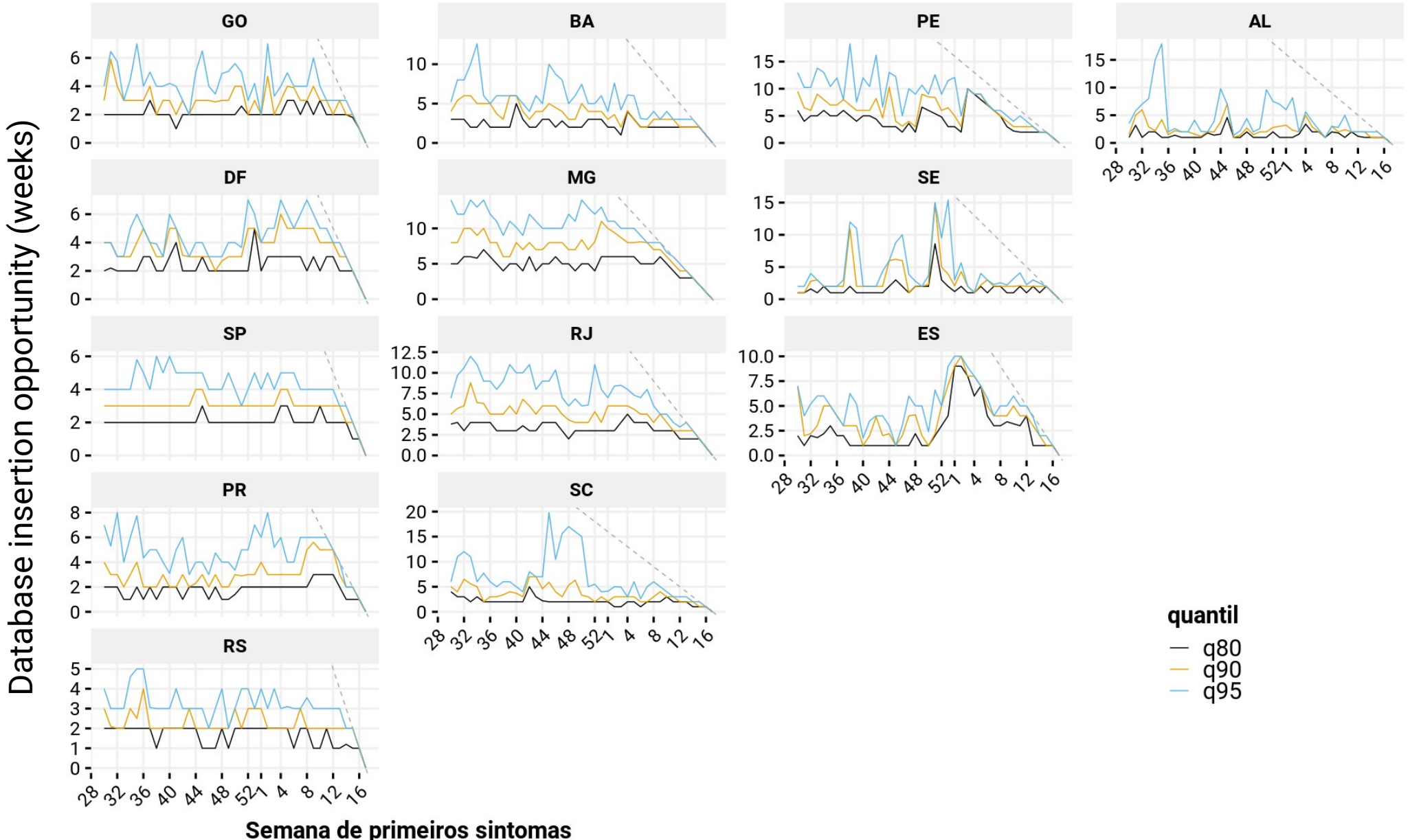
Challenge: time to database insertion (backfill)

Date of symptoms' onset	Hospitalization date	Notification date	Digitization date
Event date	Search for care	Notification sheet fill out	Database insertion

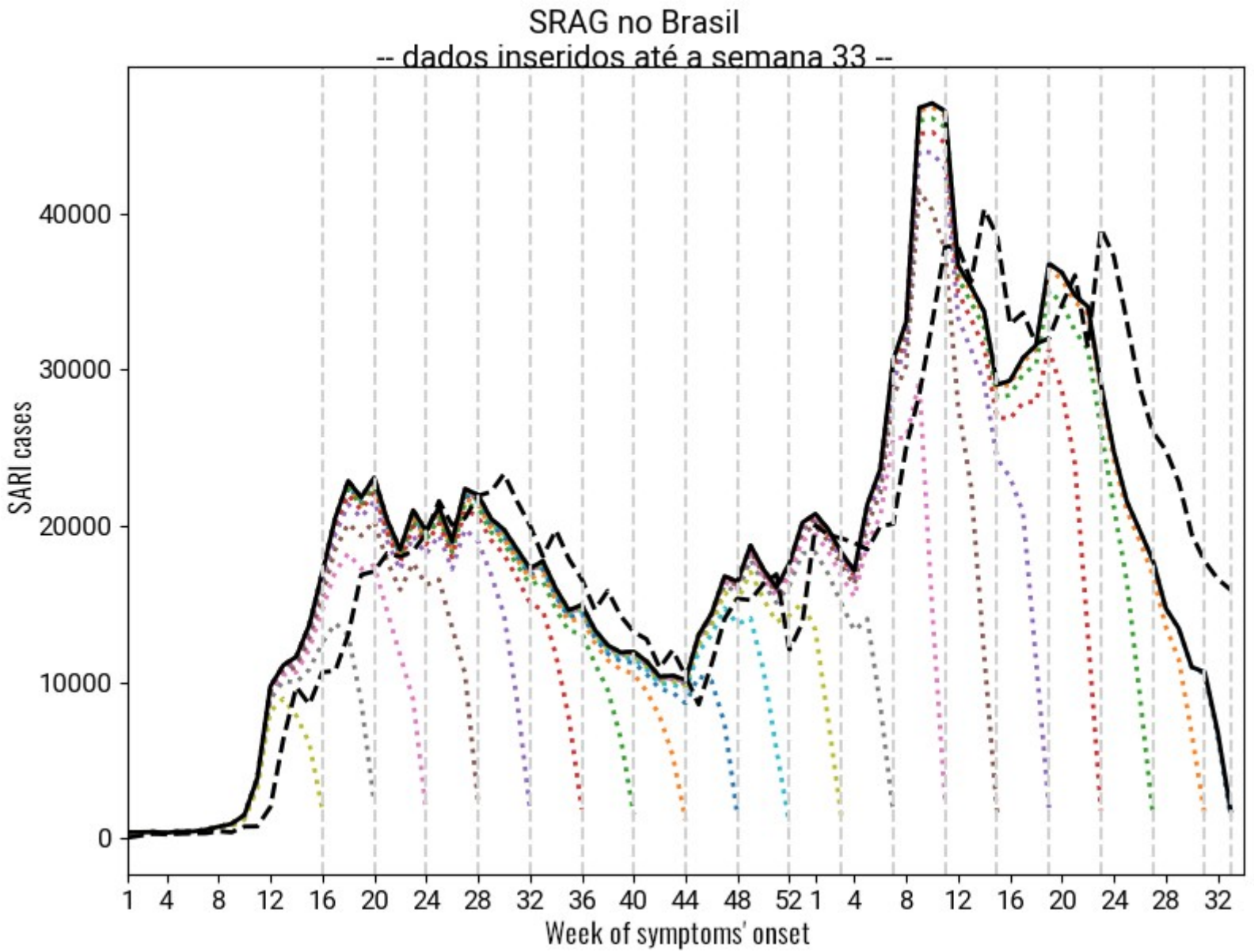


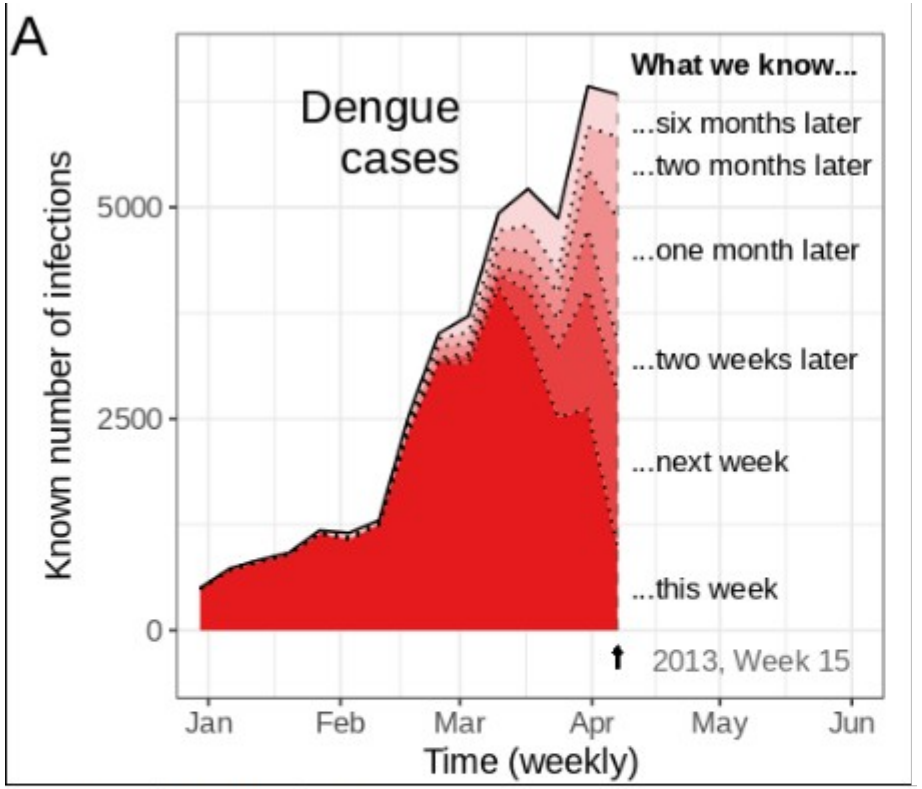
http://infogripe.fiocruz.br

Challenge: time to database insertion (backfill)



Challenge: from time of event to database entry





Challenge: from time of event to database entry

Time	0	1	2	⋯	D-2	D-1	D	N
1	$n_{1,0}$	$n_{1,1}$	$n_{1,2}$		$n_{1,D-2}$	$n_{1,D-1}$	$n_{1,D}$	N_1
2	$n_{2,0}$	$n_{2,1}$	$n_{2,2}$	⋯	$n_{2,D-2}$	$n_{2,D-1}$	$n_{2,D}$	N_2
3	$n_{3,0}$	$n_{3,1}$	$n_{3,2}$		$n_{3,D-2}$	$n_{3,D-1}$	$n_{3,D}$	N_3
⋮		⋮				⋮		
T-D	$n_{T-D,0}$	$n_{T-D,1}$	$n_{T-D,2}$		$n_{T-D,D-2}$	$n_{T-D,D-1}$	$n_{T-D,D}$	N_{T-D}
T-D+1	$n_{T-D+1,0}$	$n_{T-D+1,1}$	$n_{T-D+1,2}$		$n_{T-D+1,D-2}$	$n_{T-D+1,D-1}$	$n_{T-D+1,D}$	N_{T-D+1}
T-D+2	$n_{T-D+2,0}$	$n_{T-D+2,1}$	$n_{T-D+2,2}$		$n_{T-D+2,D-2}$	$n_{T-D+2,D-1}$	$n_{T-D+2,D}$	N_{T-D+2}
T-2	$n_{T-2,0}$	$n_{T-2,1}$	$n_{T-2,2}$		$n_{T-2,D-2}$	$n_{T-2,D-1}$	$n_{T-2,D}$	N_{T-2}
T-1	$n_{T-1,0}$	$n_{T-1,1}$	$n_{T-1,2}$		$n_{T-1,D-2}$	$n_{T-1,D-1}$	$n_{T-1,D}$	N_{T-1}
T	$n_{T,0}$	$n_{T,1}$	$n_{T,2}$	⋯	$n_{T,D-2}$	$n_{T,D-1}$	$n_{T,D}$	N_T
T+1	$n_{T+1,0}$	$n_{T+1,1}$	$n_{T+1,2}$		$n_{T+1,D-2}$	$n_{T+1,D-1}$	$n_{T+1,D}$	N_{T+1}
T+2	$n_{T+2,0}$	$n_{T+2,1}$	$n_{T+2,2}$		$n_{T+2,D-2}$	$n_{T+2,D-1}$	$n_{T+2,D}$	N_{T+2}
⋮		⋮		⋯		⋮		
T+K	$n_{T+K,0}$	$n_{T+K,1}$	$n_{T+K,2}$		$n_{T+K,D-2}$	$n_{T+K,D-1}$	$n_{T+K,D}$	N_{T+K}

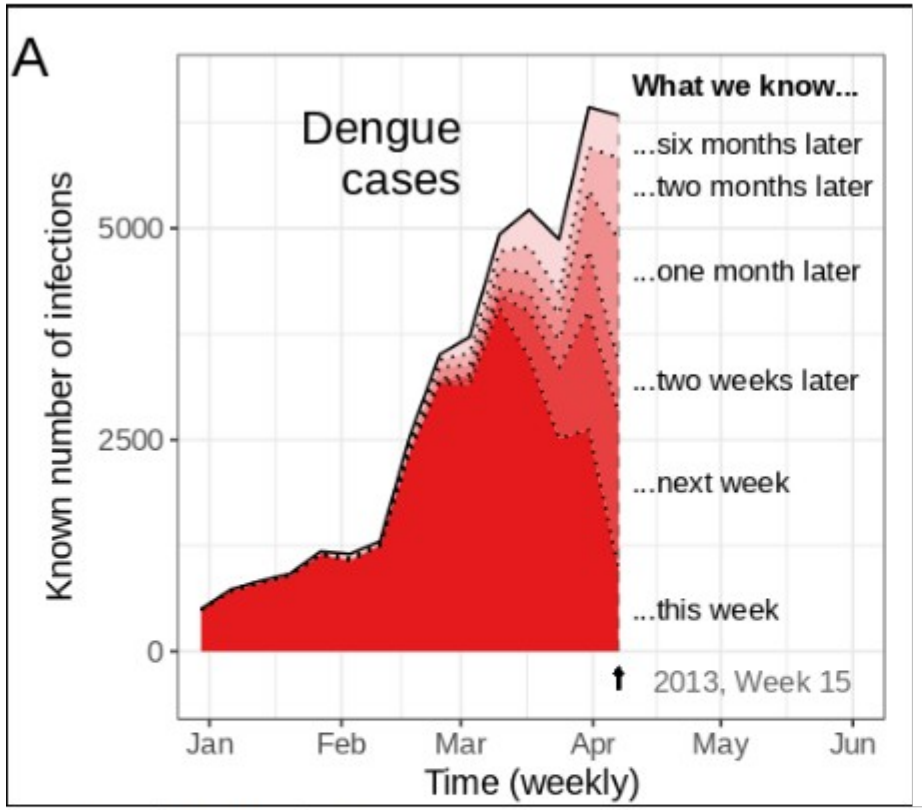
Observations Nowcasting Forecasting

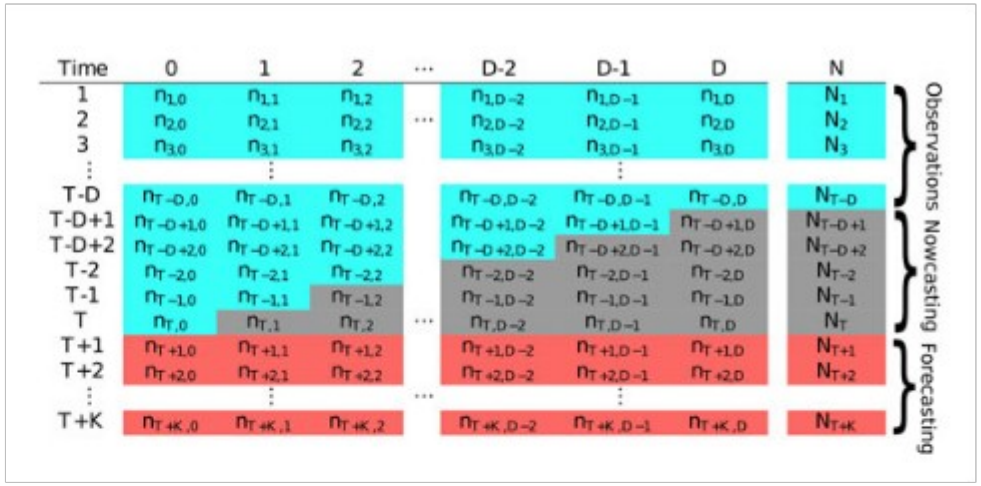
$$n_{t,d} \sim \text{NegBin}(\lambda_{t,d}, \phi),\ \lambda_{t,d} > 0,\ \phi > 0$$

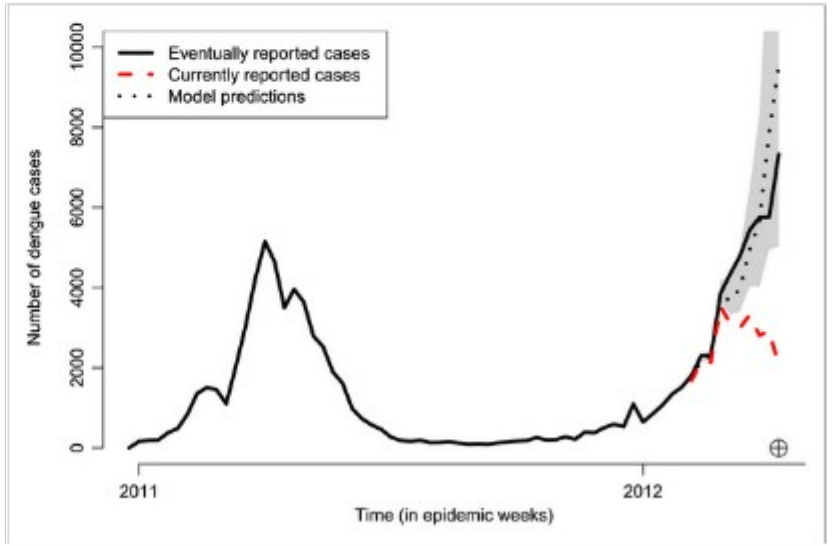
$$\log(\lambda_{t,d}) = \mu + \alpha_t + \beta_d$$

Bastos, LS, Economou, T, Gomes, MFC, et al.
A modelling approach for correcting reporting delays in disease surveillance data. Statistics in Medicine. 2019; 38: 4363– 4377.
https://doi.org/10.1002/sim.8303

https://covid19br.github.io/nowcaster/







Received: 15 May 2018 | Revised: 13 May 2019 | Accepted: 3 June 2019
DOI: 10.1002/sim.8303

RESEARCH ARTICLE

WILEY Statistics in Medicine

A modelling approach for correcting reporting delays in disease surveillance data

Leonardo S Bastos[1] | Theodoros Economou[2] | Marcelo F C Gomes[1] | Daniel A M Villela[1] | Flavio C Coelho[3] | Oswaldo G Cruz[1] | Oliver Stoner[2] | Trevor Bailey[2] | Claudia T Codeço[1]

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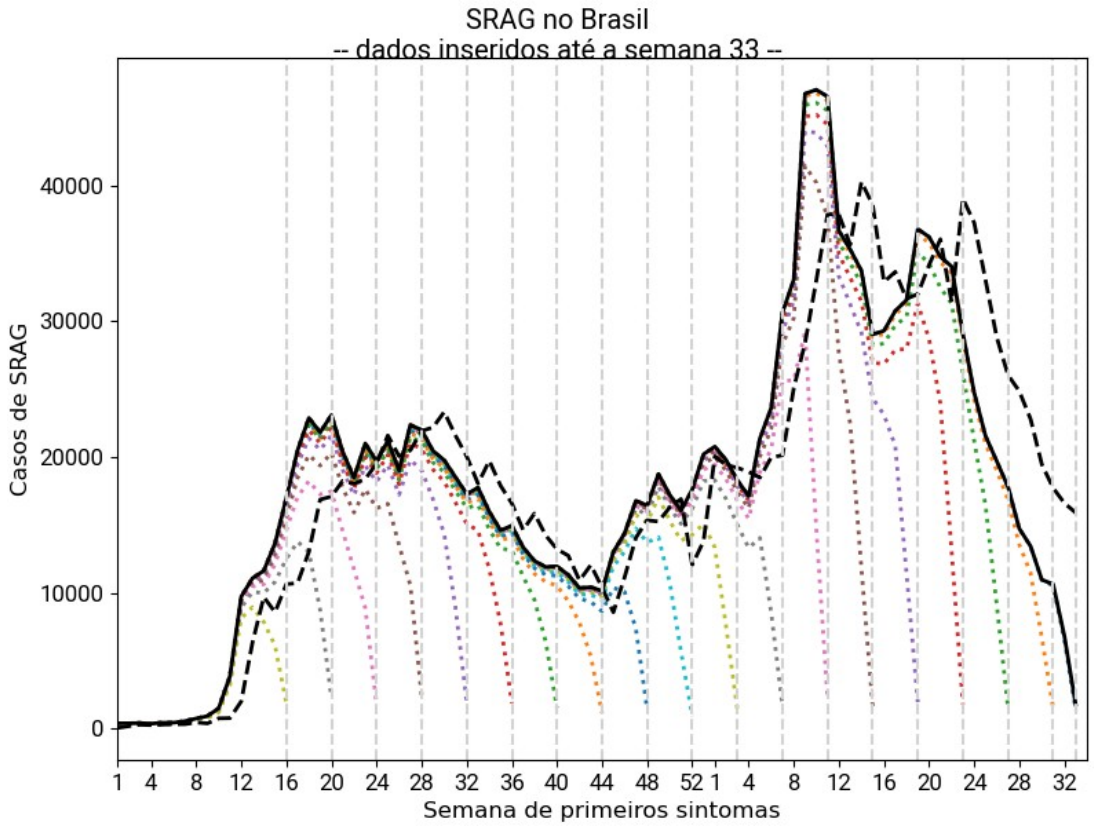

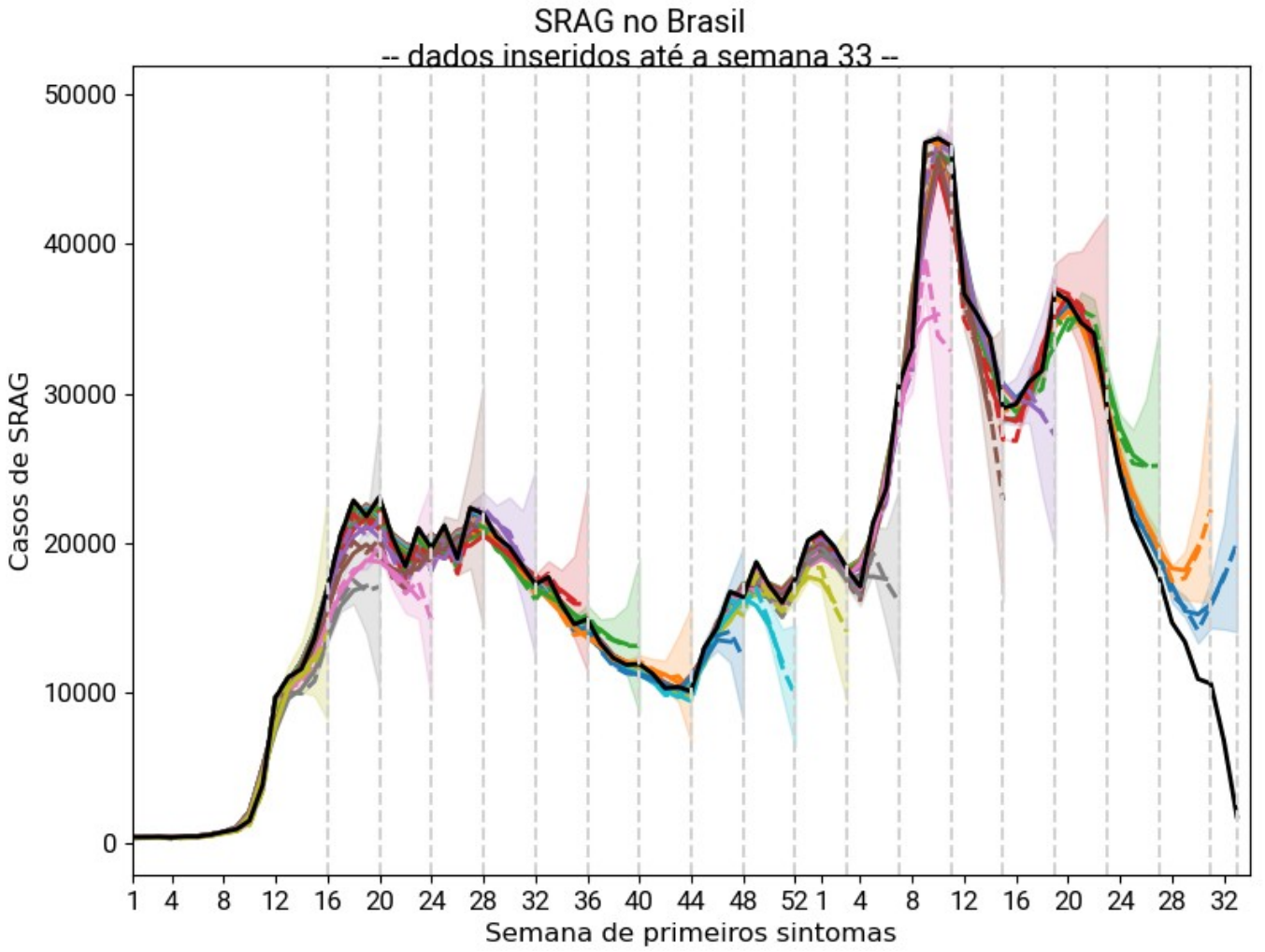

Bastos, LS, Economou, T, Gomes, MFC, et al.
A modelling approach for correcting reporting delays in disease surveillance data.
Statistics in Medicine. 2019; 38: 4363– 4377. https://doi.org/10.1002/sim.8303

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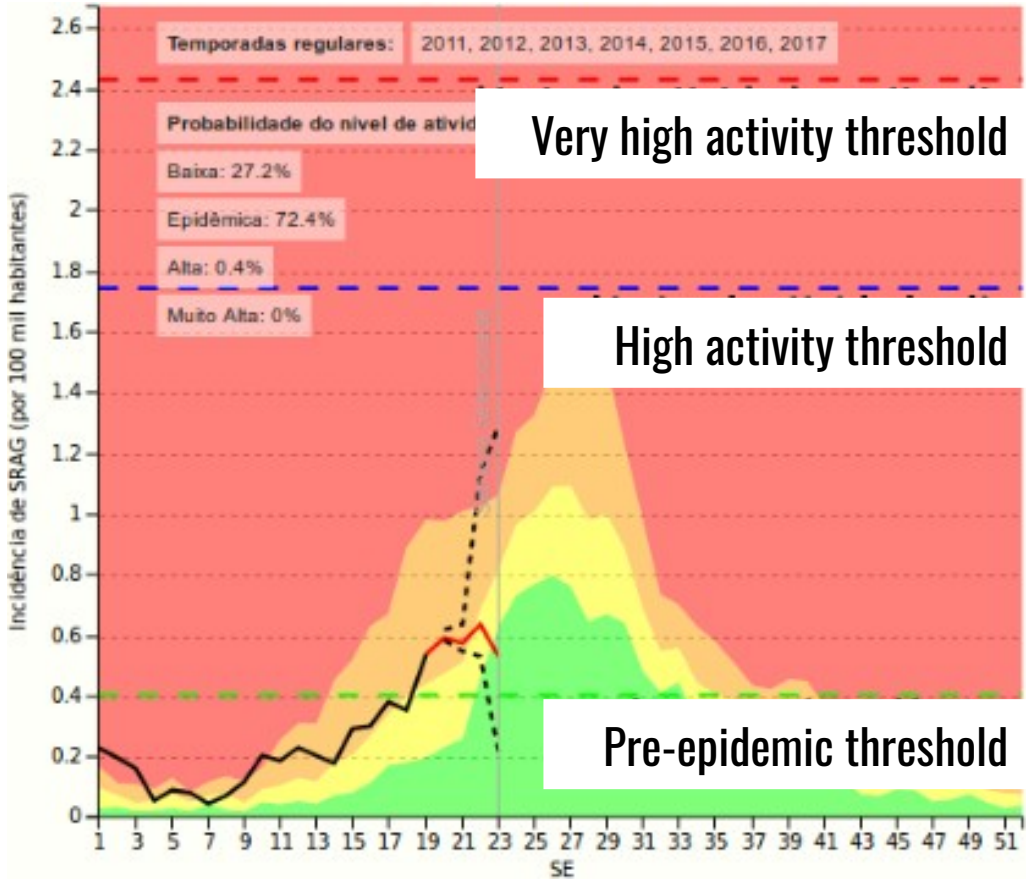
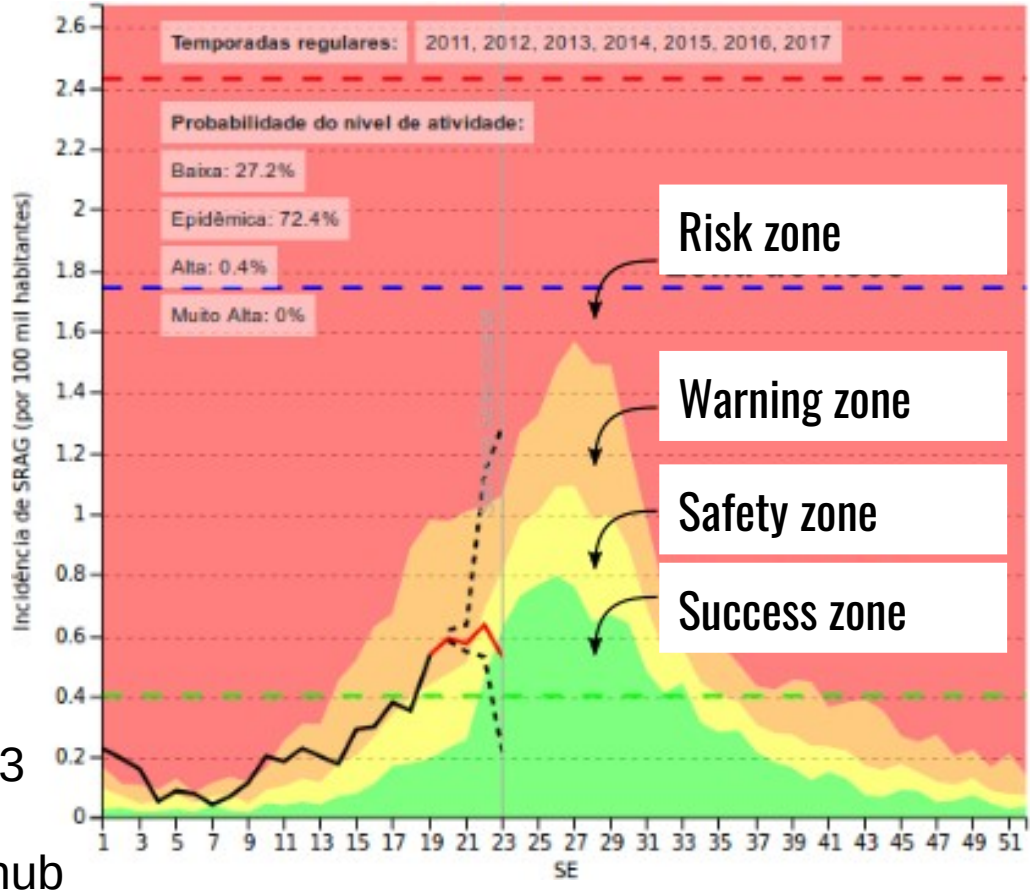
Respiratory infections

Seasonal profiels and activity thresholds

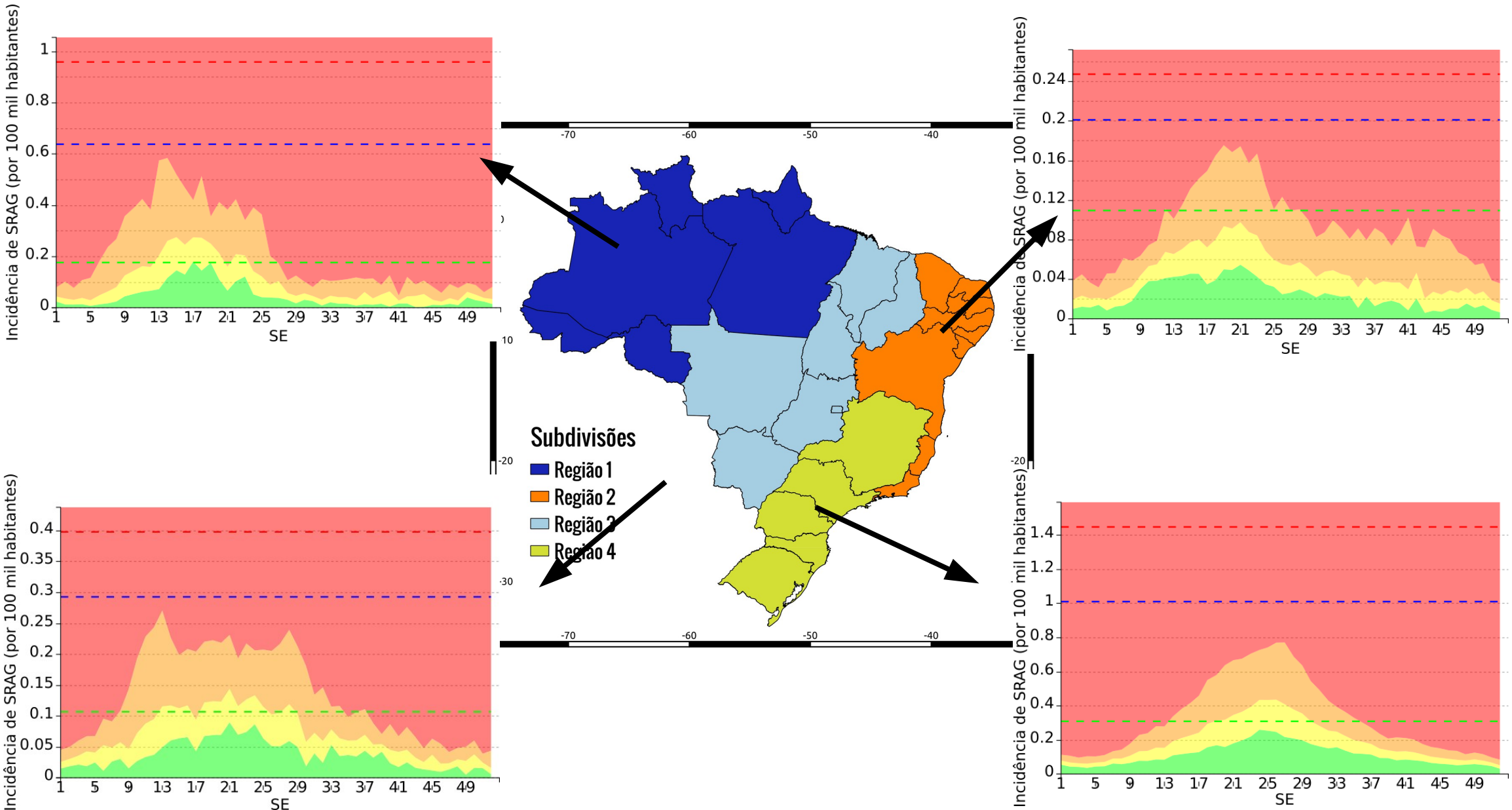




Moving epidemics method (MEM)
Tomás Vega et al. *Influenza and Other Respiratory Viruses* 2013
doi: 10.1111/j.1750-2659.2012.00422.x.
https://github.com/marfcg/mem **adapted** from lozalojo/mem github

http://info.gripe.fiocruz.br

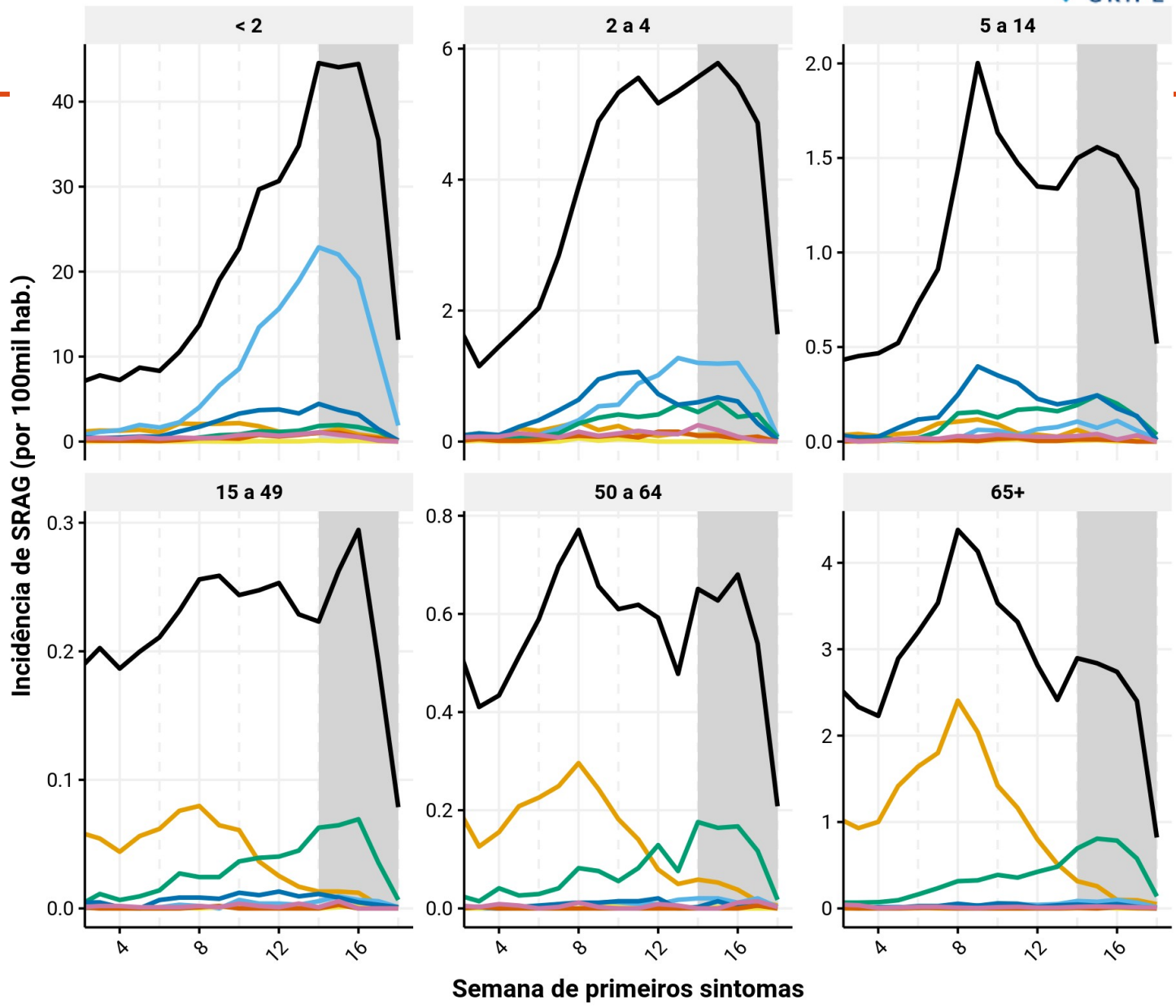
SARI surveillance in Brazil: InfoGripe



INFO GRIPE

InfoGripe

Novos casos de SRAG semanais por faixa etária. Dados até a semana 18 2024.
Para semanas recentes os dados são parciais (área cinza).



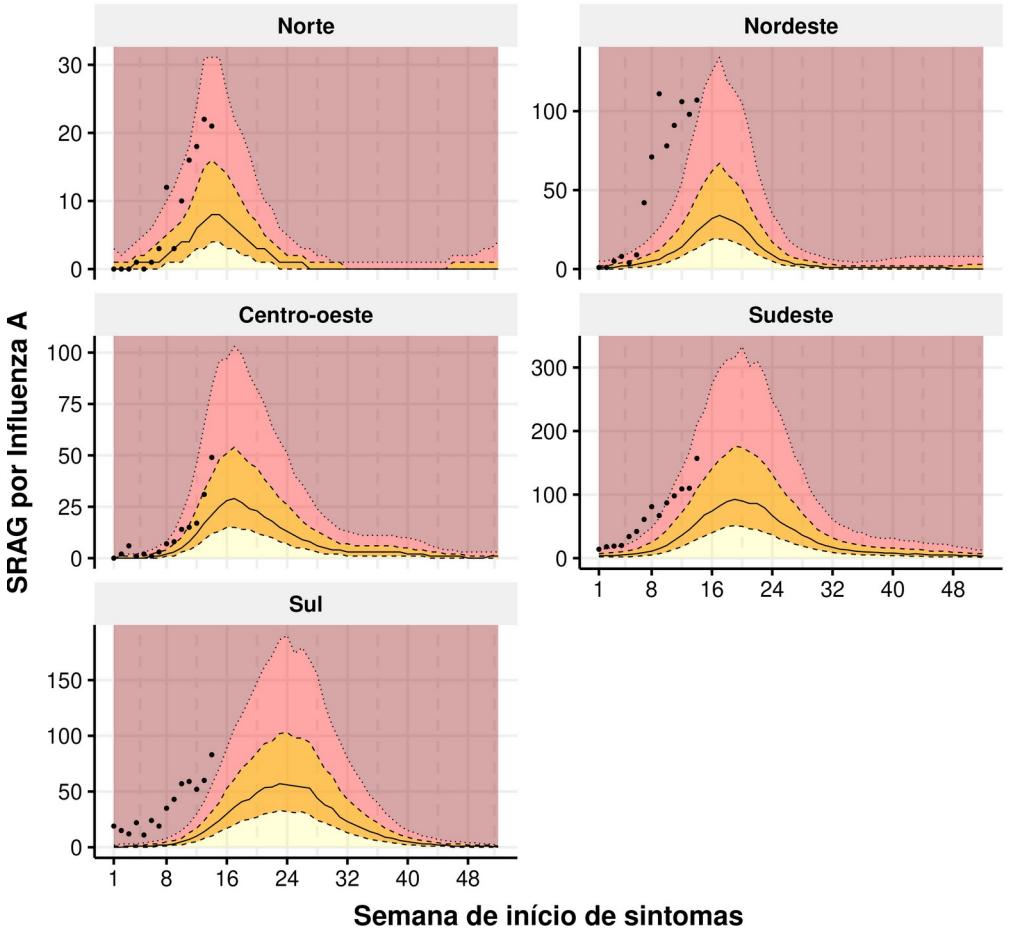
http://info.gripe.fiocruz.br
http://bit.ly/mave-repo-fiocruz

Model-based projections

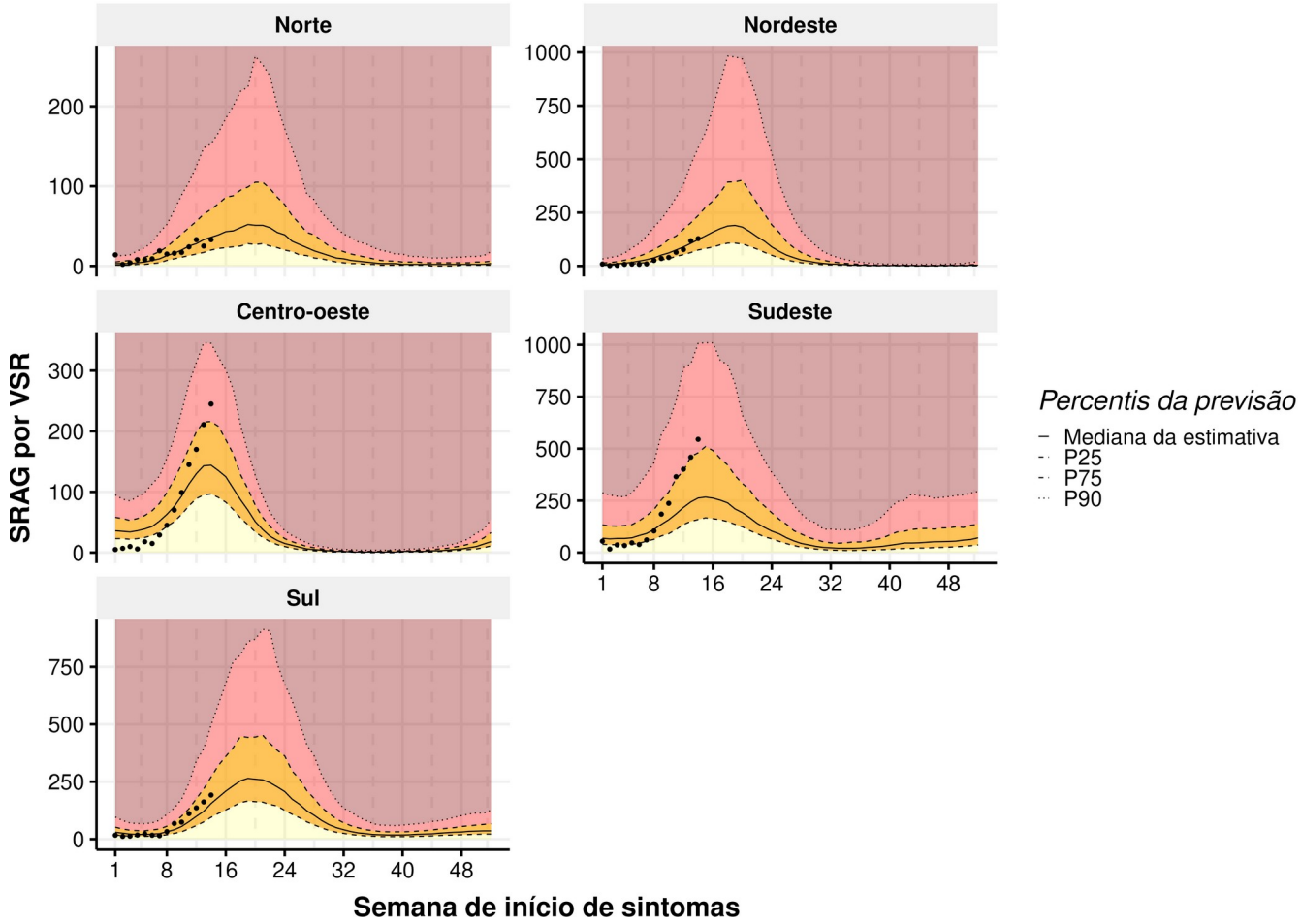
$$N_t \sim NegBin(\lambda_t, \phi), \quad \phi > 0, \lambda_t > 0, t = 1, 2, 3, ..., T$$

$$\log(\lambda_t) = \alpha + \beta_{Y[t]} + \gamma_{w[t]}$$

Anos de referência: 2014-2019.

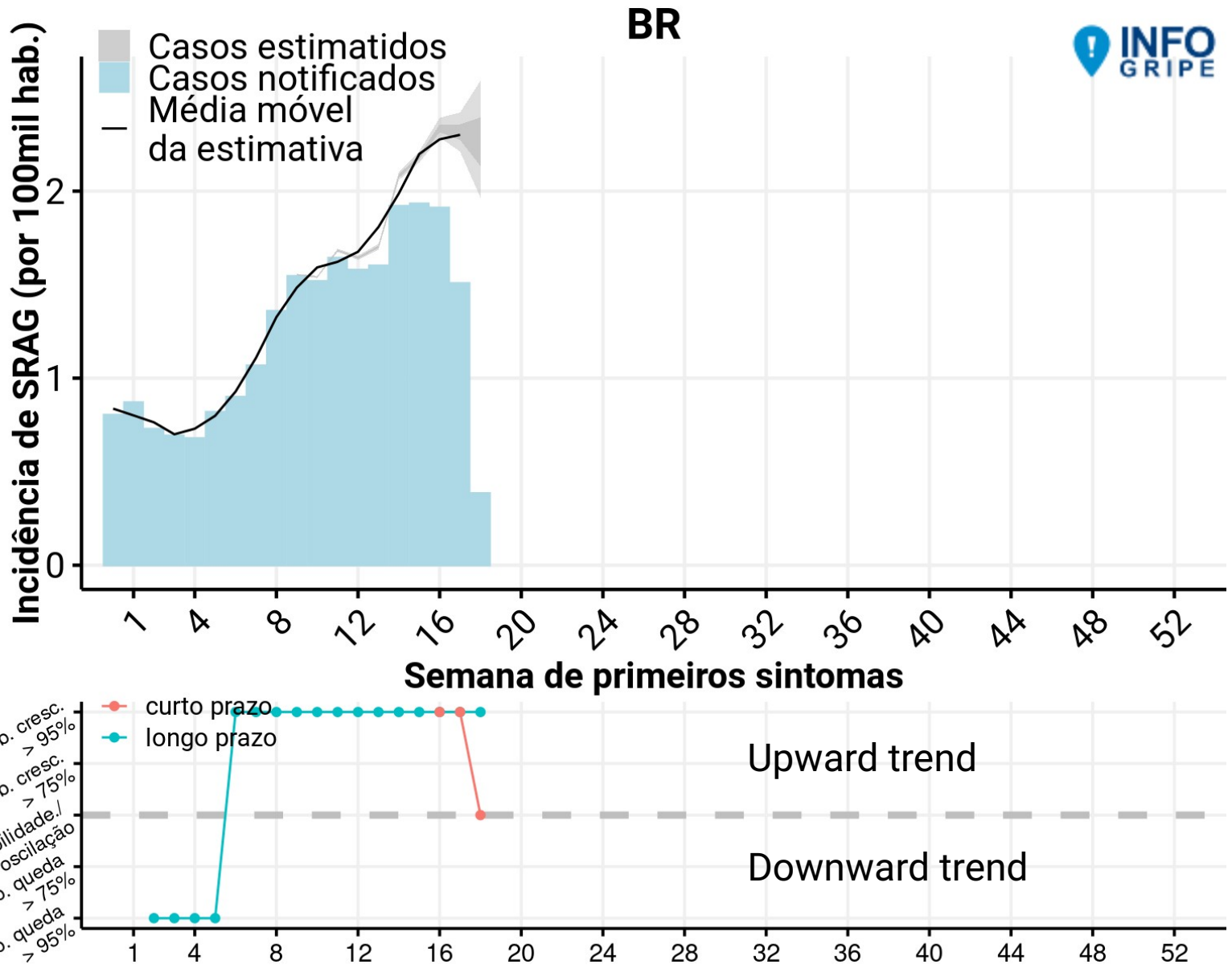


Anos de referência: 2019, 2022 e 2023.



SARI by Influenza A and RSV in 2024

InfoGripe: nowcasting and trend



Bastos, Carvalho & Gomes, 2021.
Modelling misreported data, in: Building a Platform for Data-Driven Pandemic Prediction

http://info.gripe.fiocruz.br
http://bit.ly/mave-repo-fiocruz

InfoGripe

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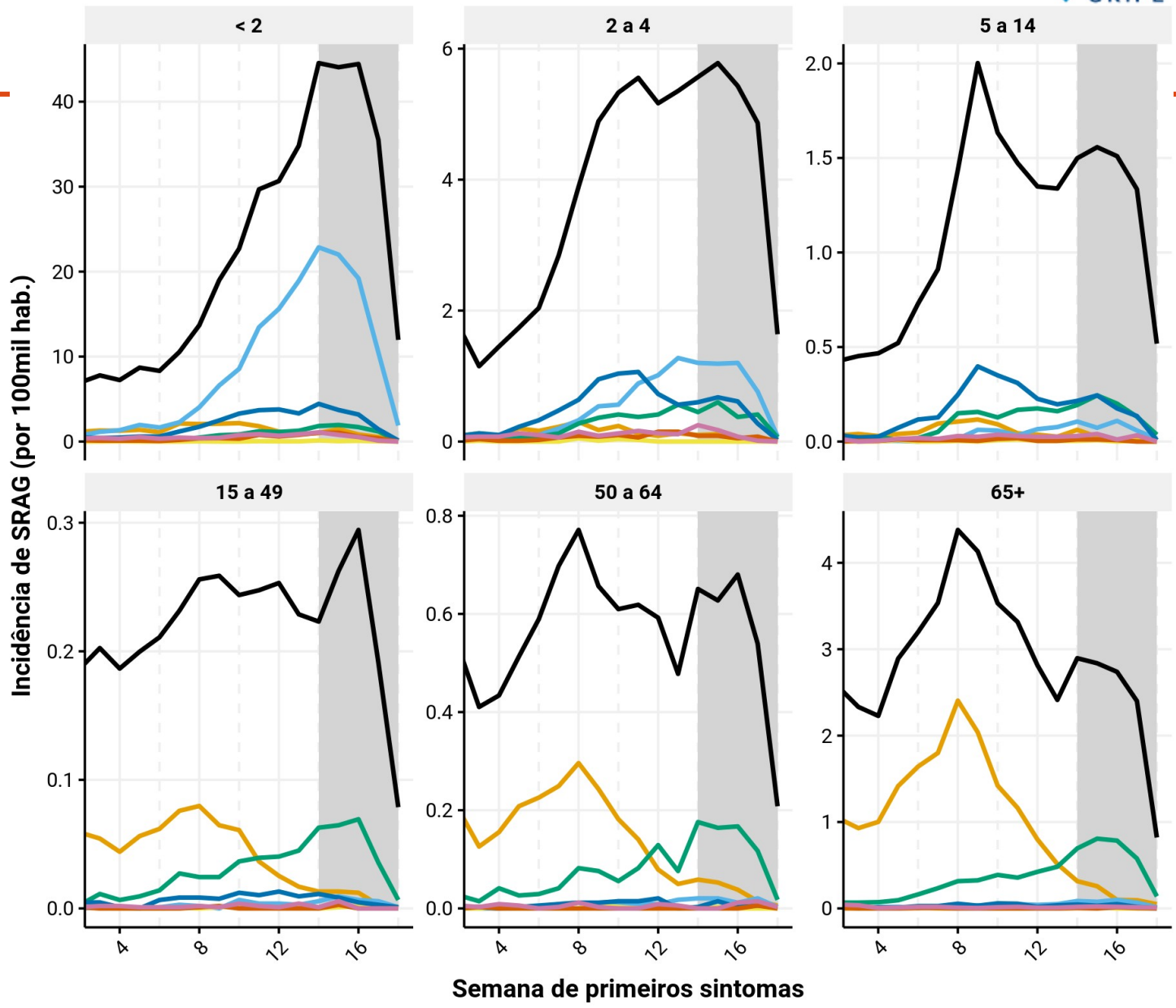

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InfoGripe

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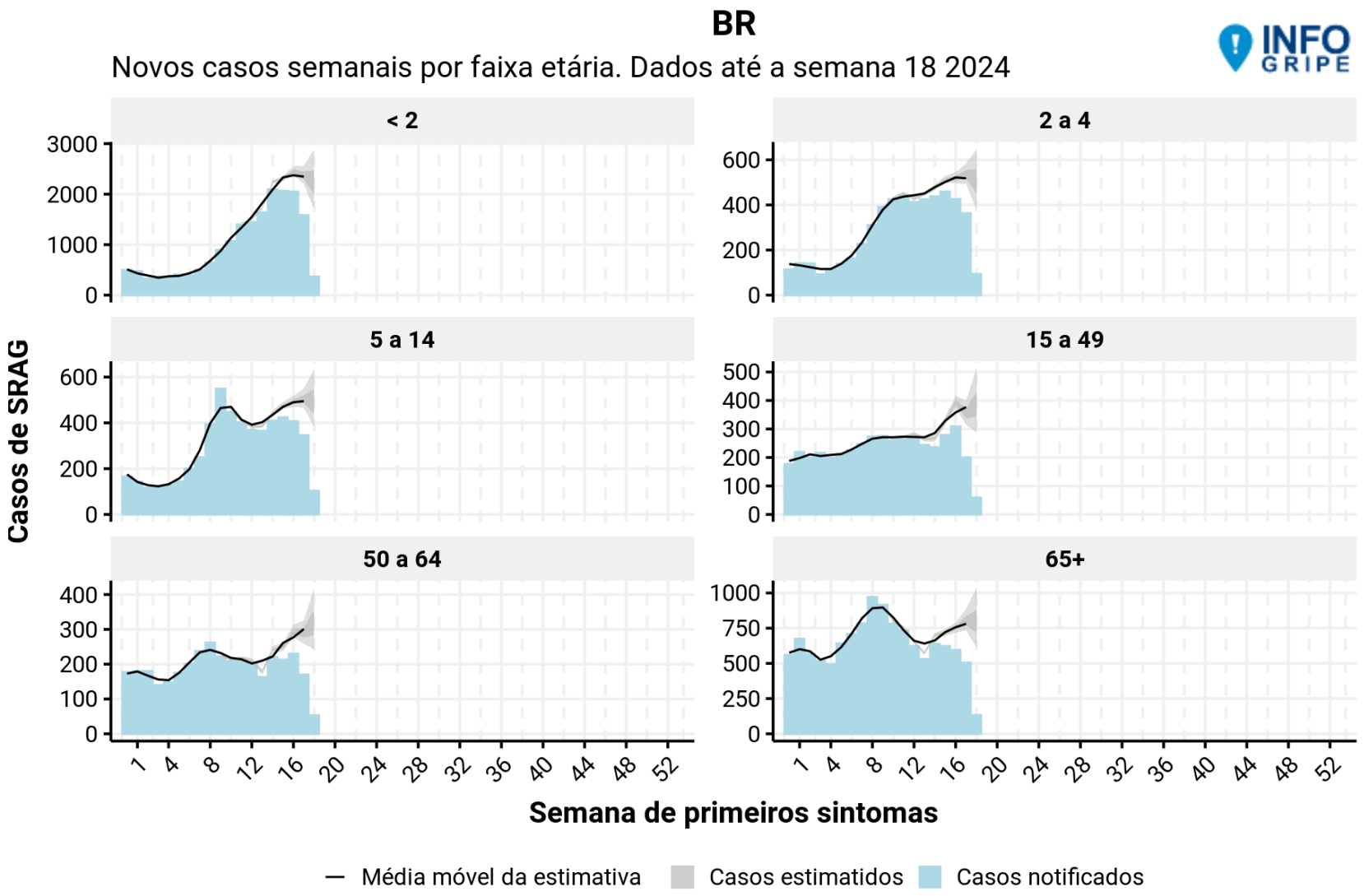

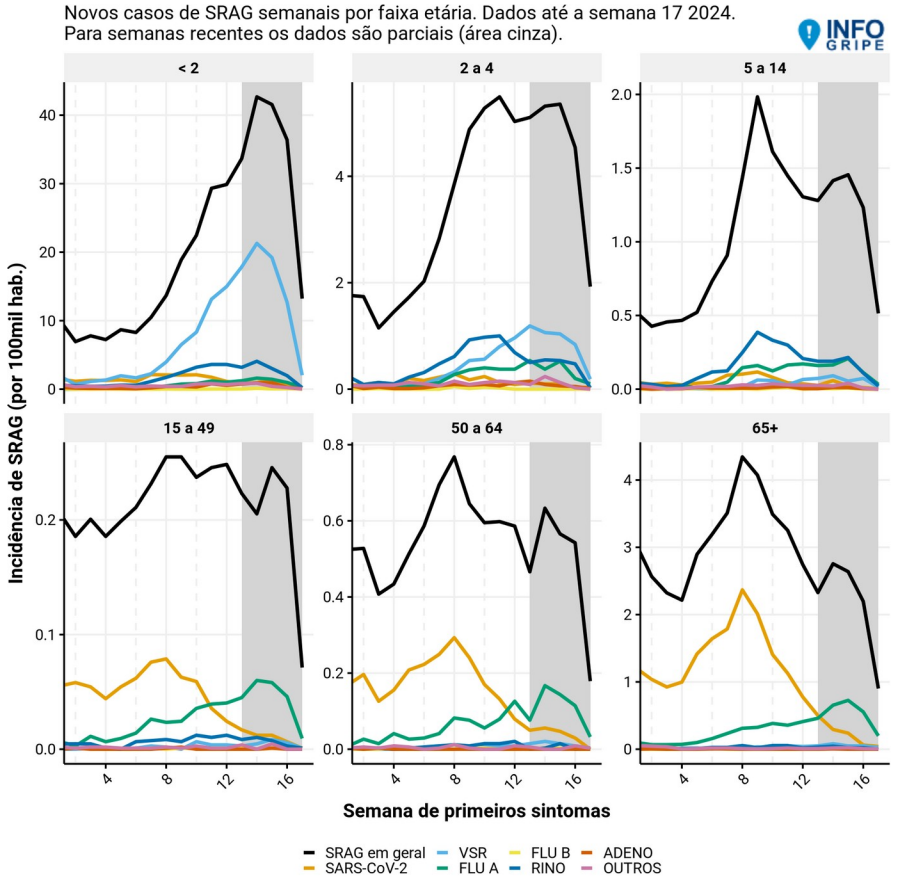

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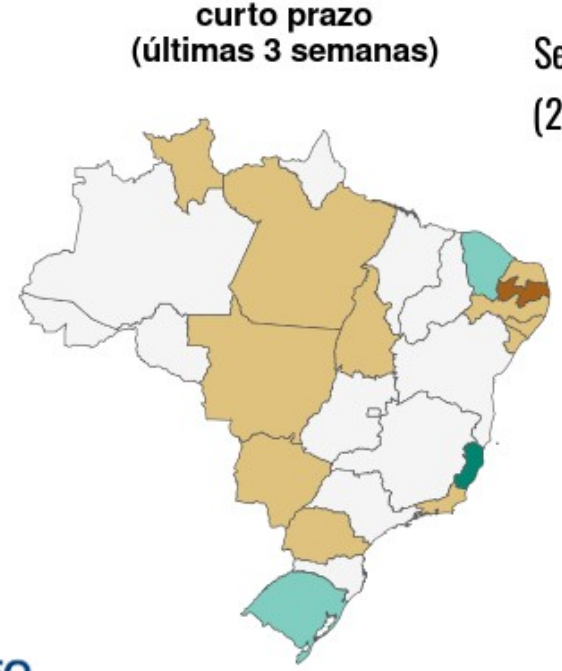
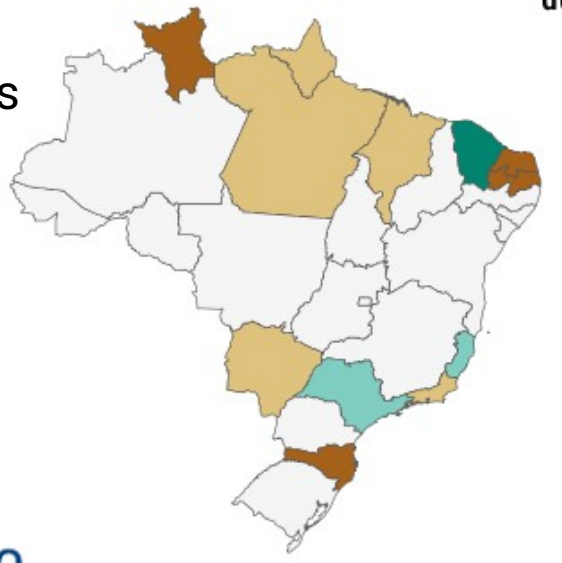
InfoGripe



Semana 18 2024
(28/04 - 04/05):
Estados e DF

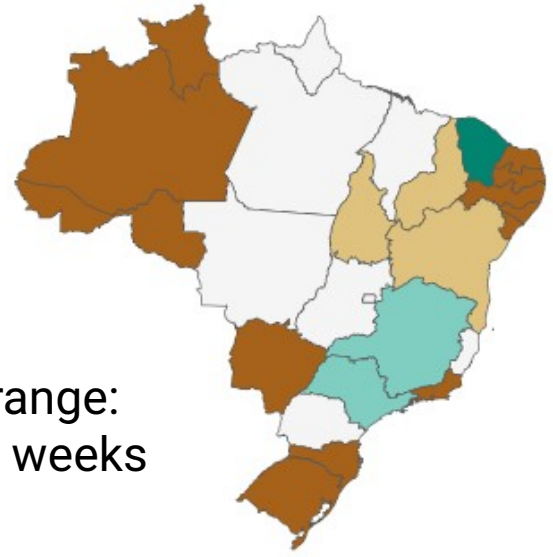
States

Short range:
Last 3 weeks

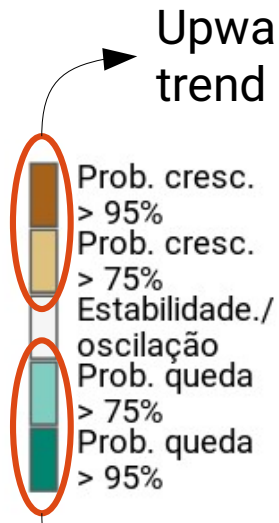


Capitais e região central
de saúde do DF

State
capitals



Long range:
Last 6 weeks



http://info.gripe.fiocruz.br
http://bit.ly/mave-repo-fiocruz

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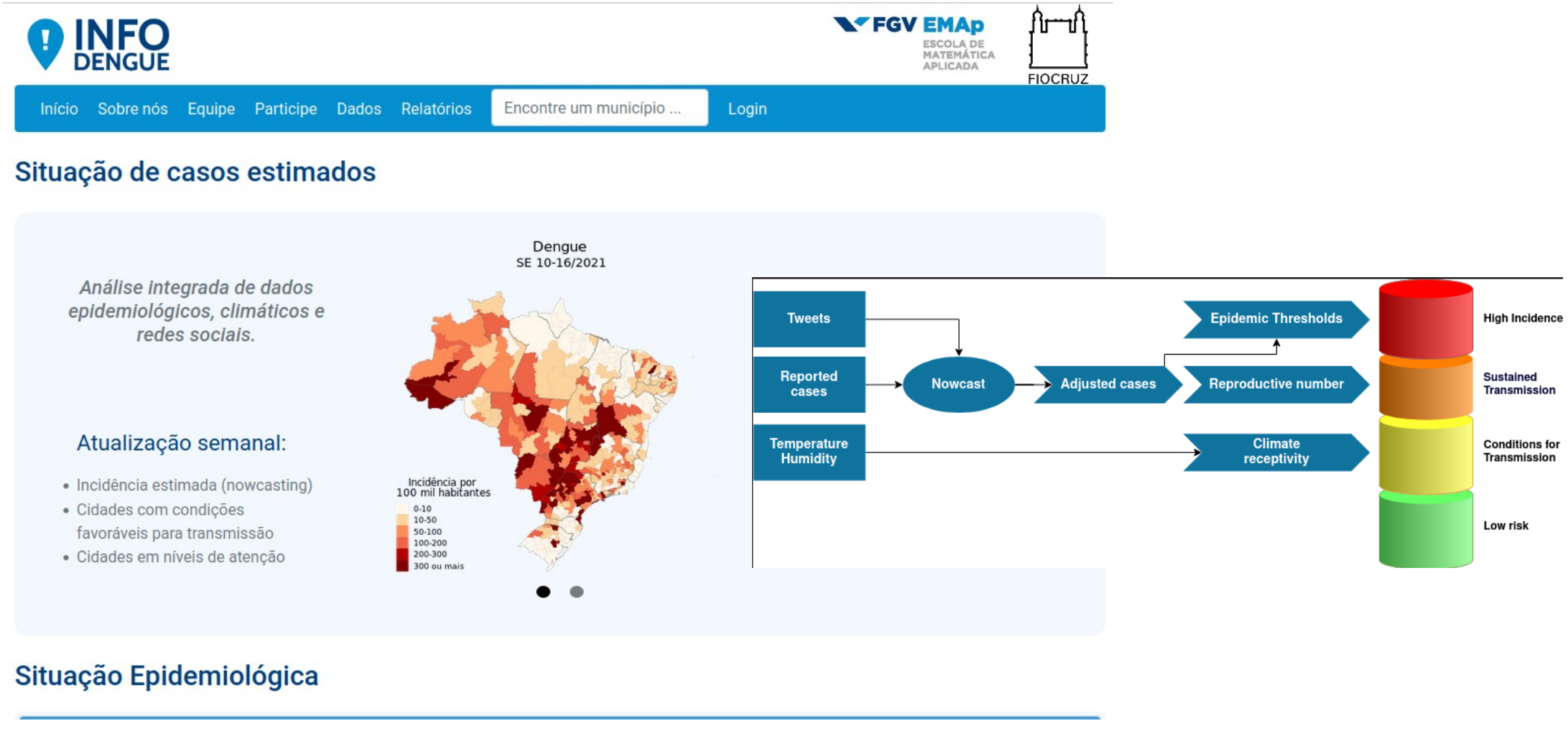
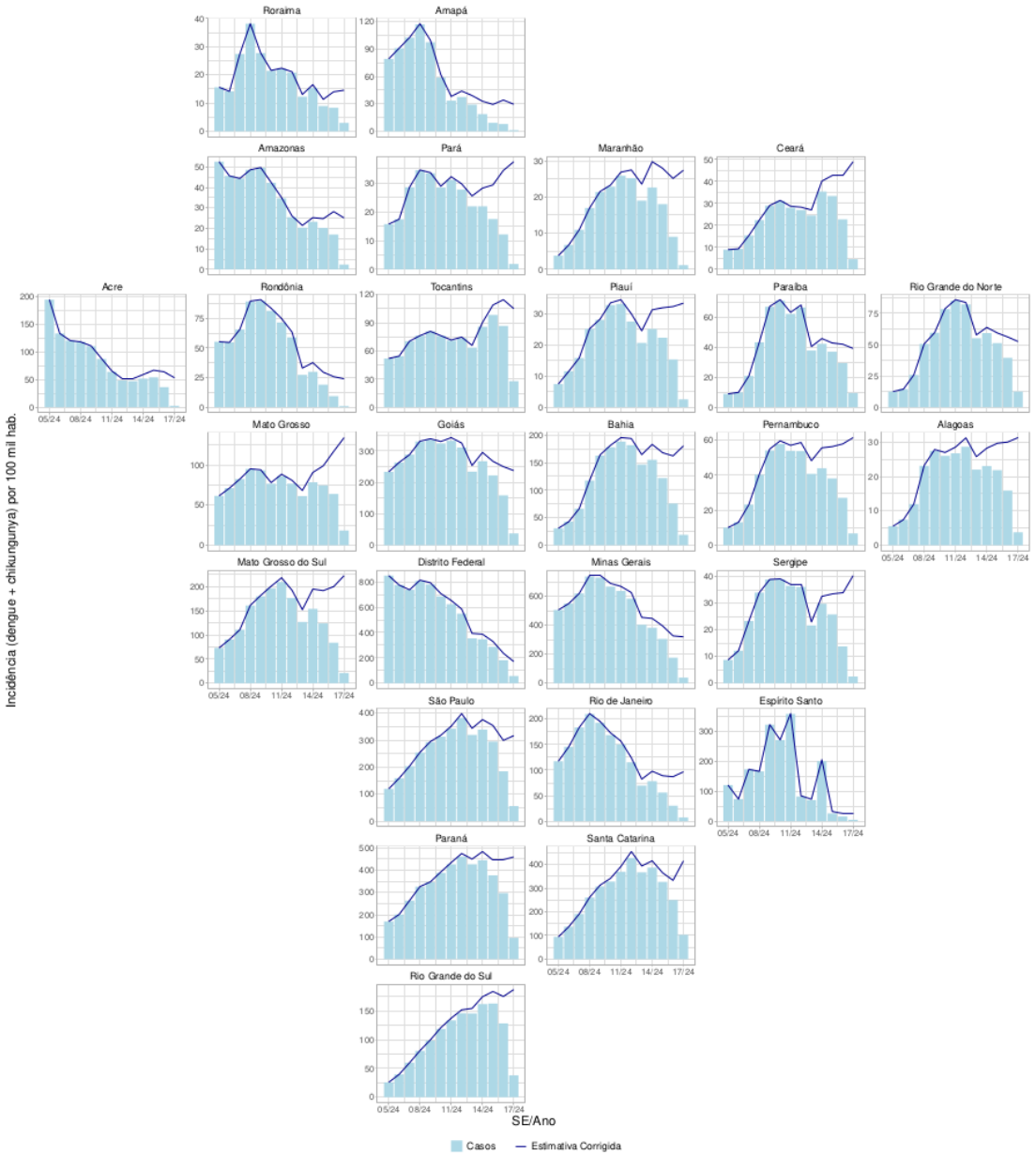
Arboviruses

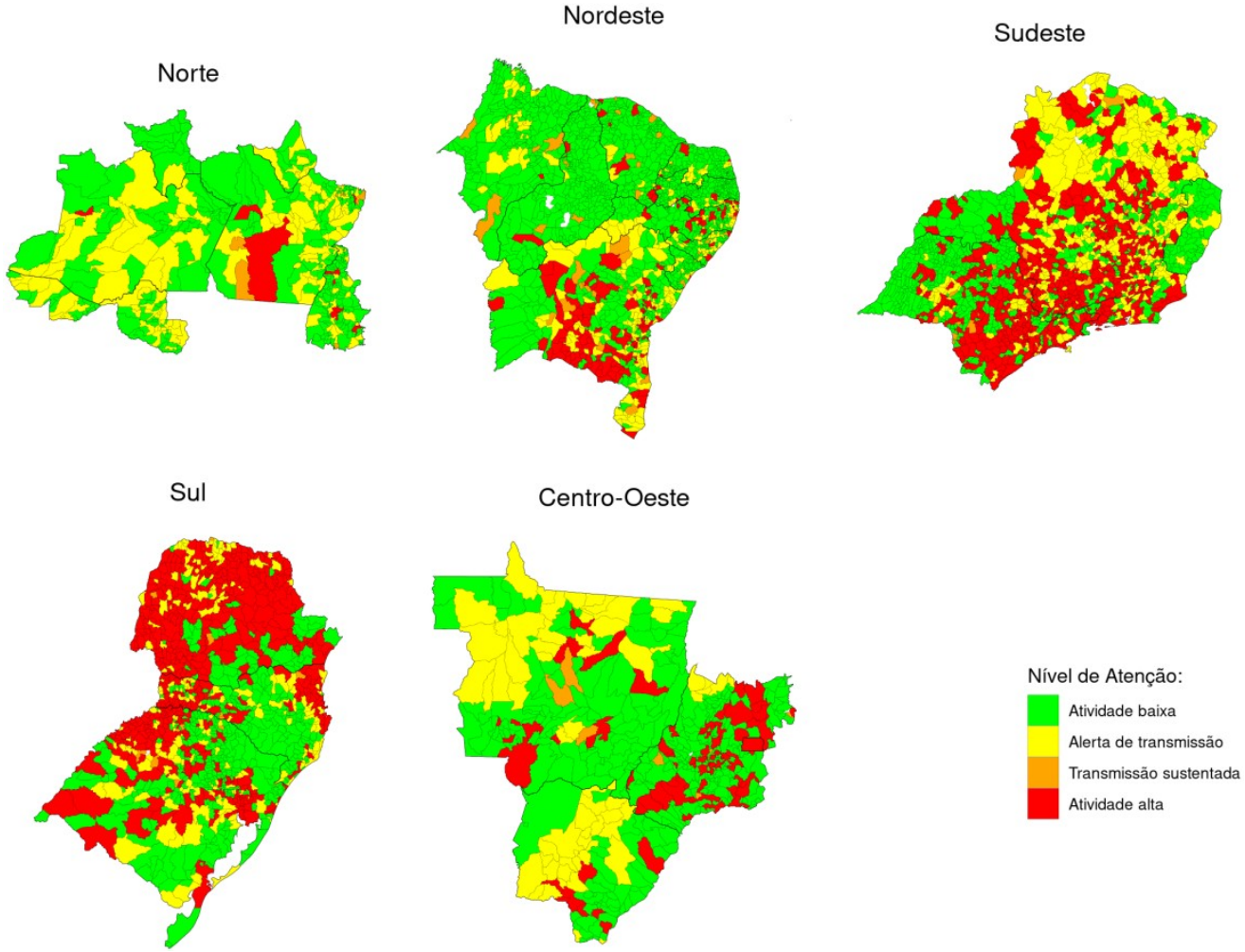
Dengue, Zika, Chikungunya surv.: InfoDengue



Website: http://info.dengue.mat.br/

Dengue, Zika, Chikungunya surv.: InfoDengue





Website: http://info.dengue.mat.br/

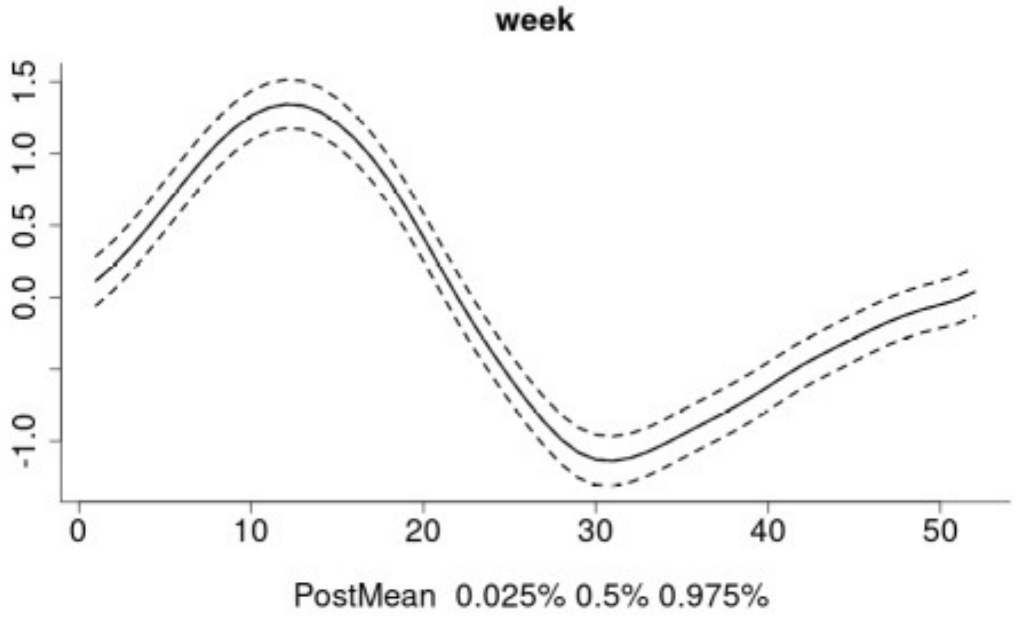
Model-based MEM-like expected season projections

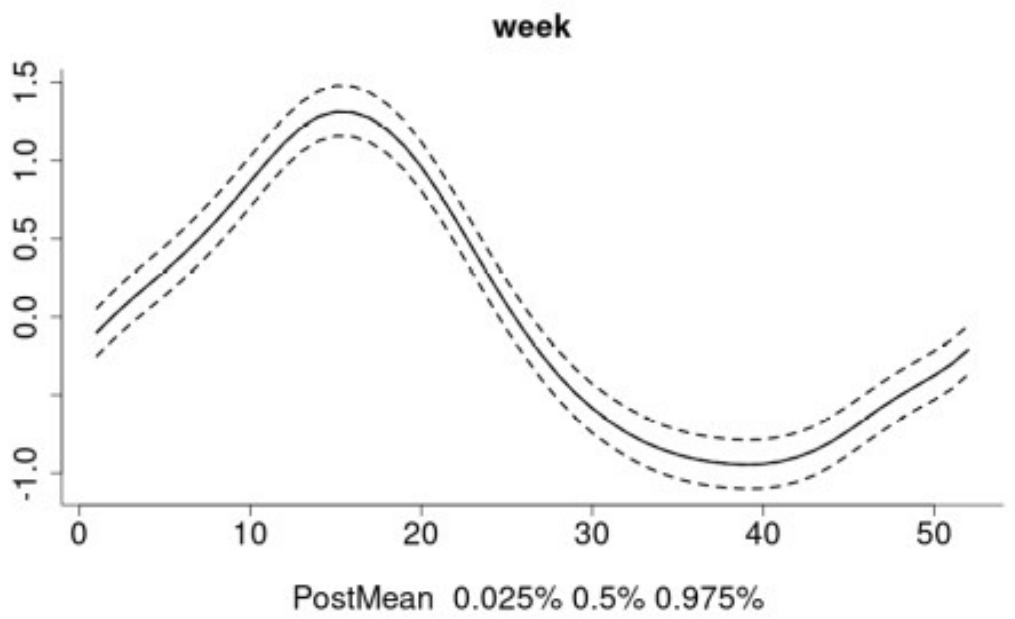
$$N_t \sim NegBin(\lambda_t, \phi), \quad \phi > 0, \lambda_t > 0, t = 1, 2, 3, ..., T$$

$$\log(\lambda_t) = \alpha + \beta_{Y[t]} + \gamma_{w[t]}$$

$$Y = 2010, 2011, \ldots, 2022; \quad w = 1, 2, \ldots, 52$$

Foz	Rio

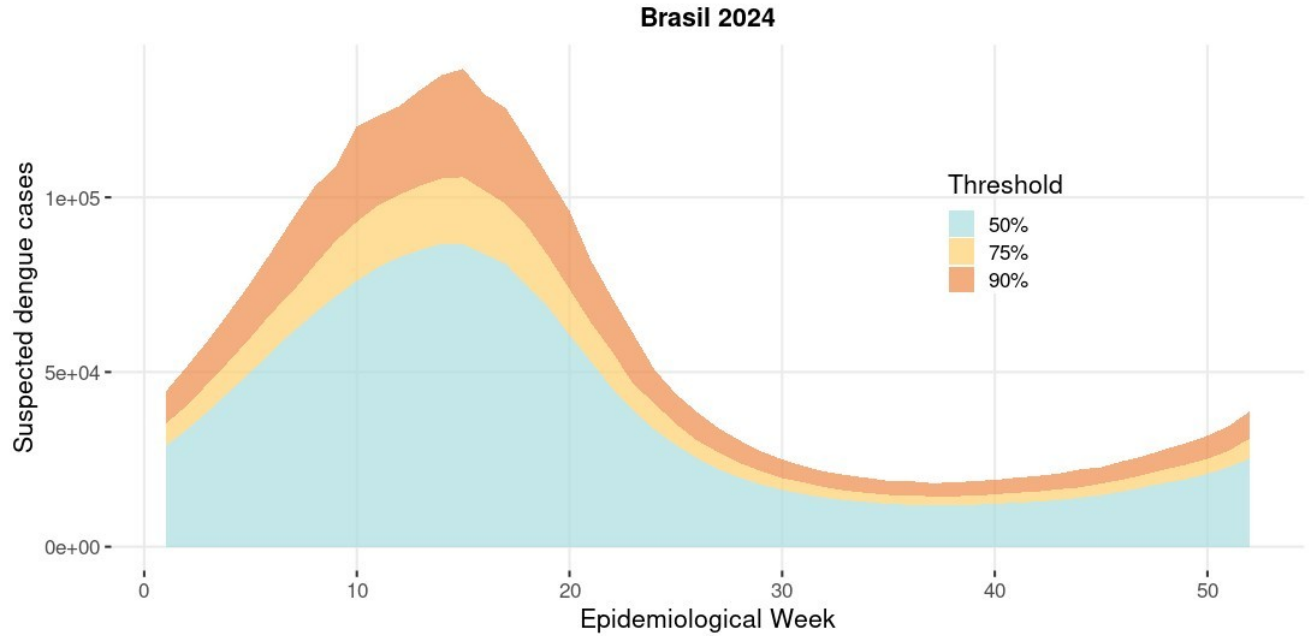


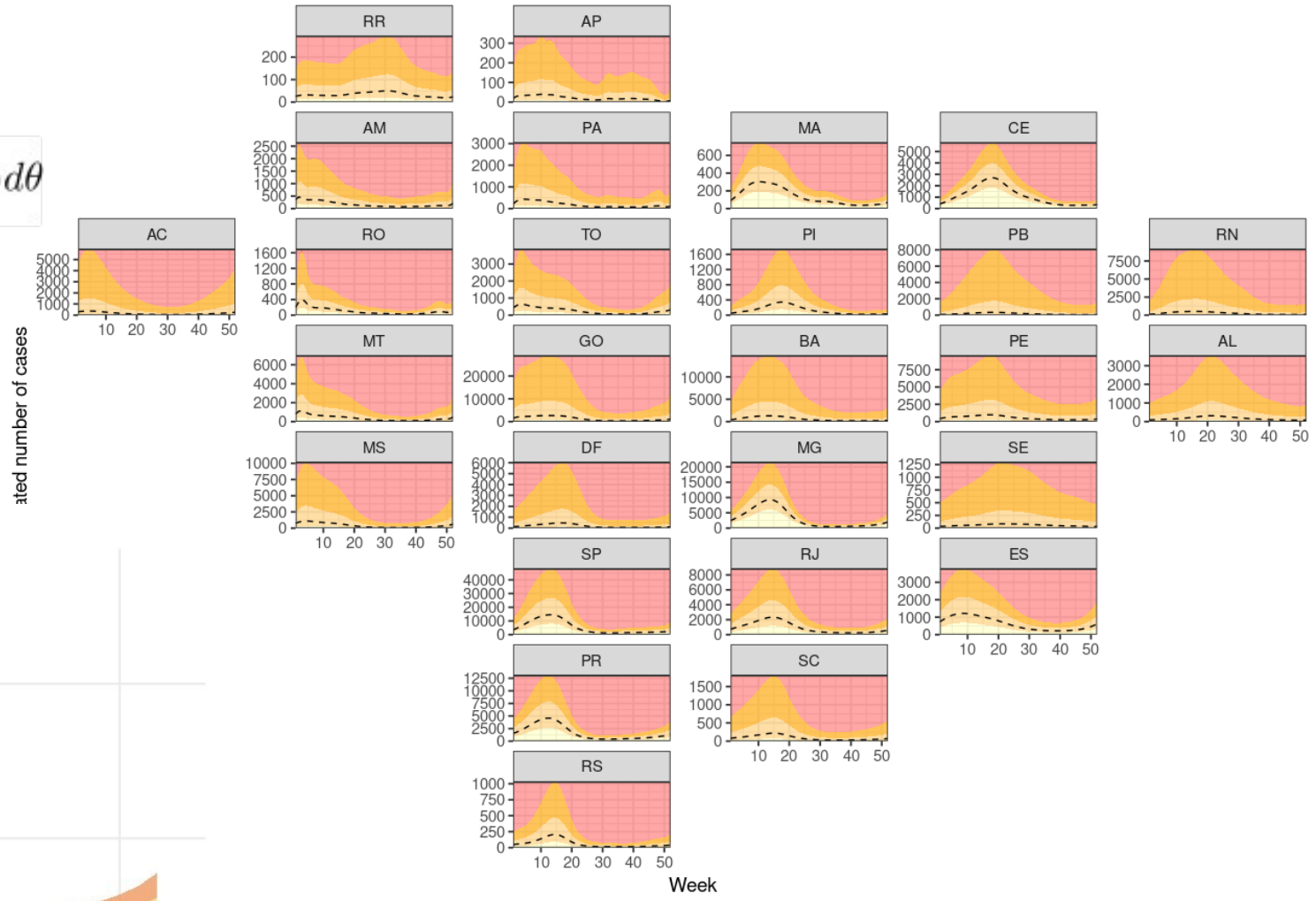


Model-based MEM-like expected season projections

Posterior predictive distribution

$$p(y^{2024}_{r,1:52} \mid y^{2015:2023}_{r,1:52}) = \int_{\theta} p(y^{2024}_{r,1:52} \mid \theta) p(\theta \mid y^{2015:2023}_{r,1:52}) d\theta$$





Thank you!

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marcelo.gomes@fiocruz.br

- Claudia T Codeço

claudia.codeco@fiocruz.br