

Increase in invasive Streptococcus pyogenes infections

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Global increase in iGAS

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Increased incidence of scarlet fever and invasive Group A Streptococcus infection - multi-country

15 December 2022



Increase in invasive Group A streptococcal infections among children in Europe, including fatalities

Joint statement by WHO Regional Office for Europe and the European Centre for Disease Control & Prevention

Copenhagen & Stockholm, 12 December 2022

nature

WHY IS STREP A SURGING — AND HOW WORRIED ARE SCIENTISTS?

The tragic deaths of 16 children in England and an unusual rise in cases have put researchers on alert.

NEWS EXPLAINER | 09 December 2022

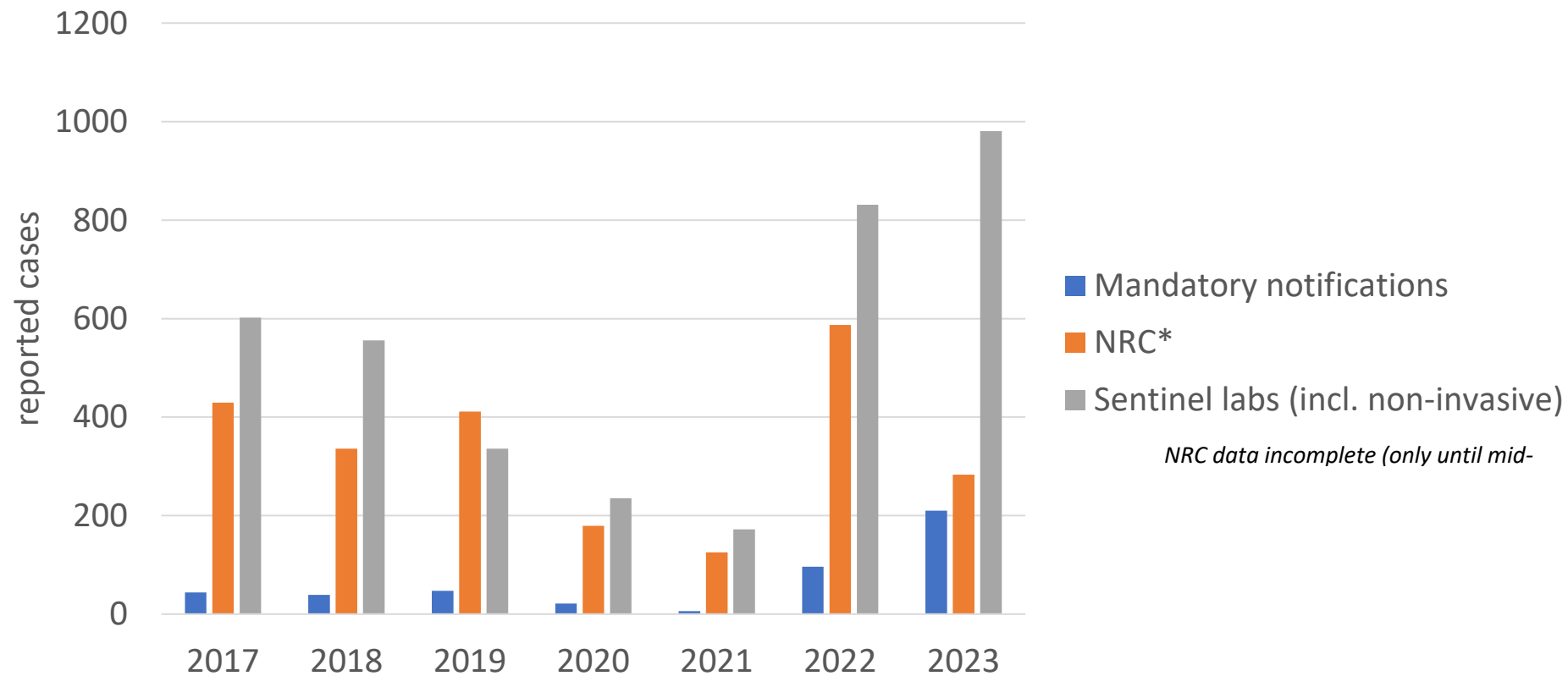
Increase in Invasive Group A Strep Infections, 2022–2023

[Español \(Spanish\)](#) | [Print](#)

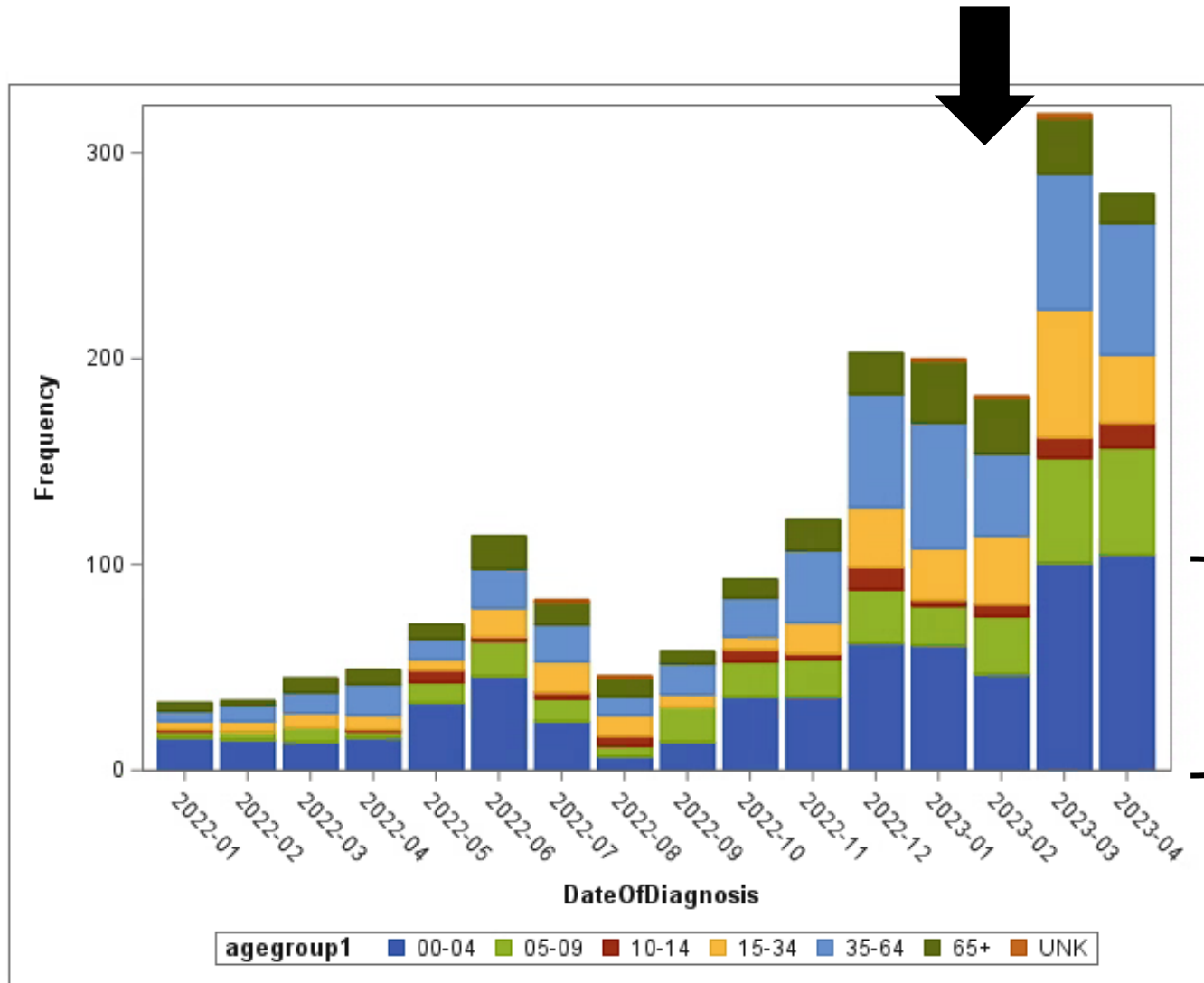
Findings: COVID-19 pandemic's impact on group A strep infections

During the COVID-19 pandemic, severe infections caused by group A Streptococcus (group A strep) bacteria decreased by around 25% in the United States compared to the years right before the pandemic. These severe infections, called [invasive group A strep \(iGAS\) infections](#), were especially low in children.

Belgian situation



Belgian situation - iGAS by age group



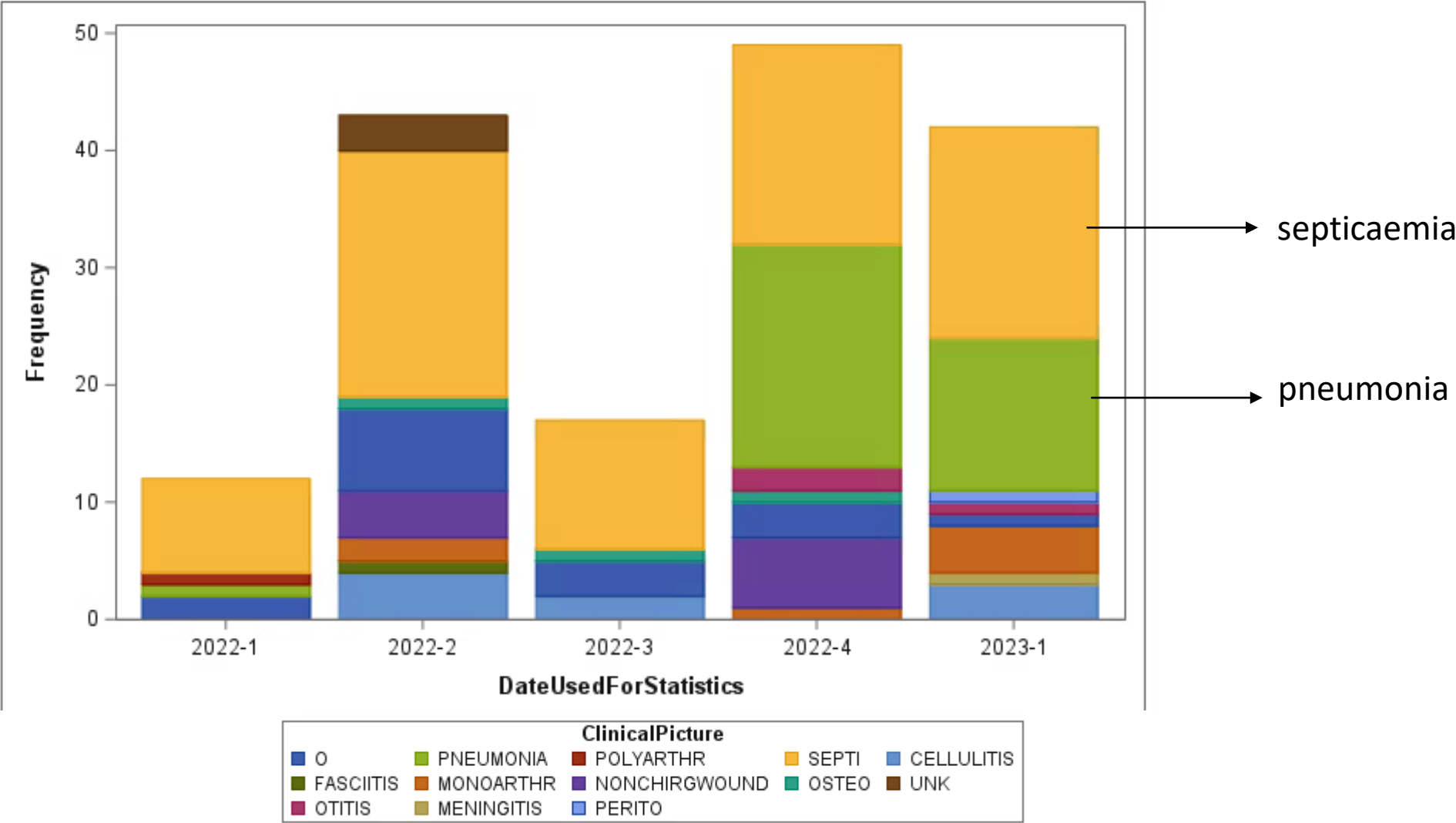
Seasonality : earlier than usual (starting in October)

Children < 5 years

Belgian situation – clinical manifestations



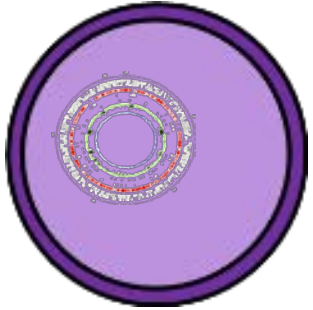
Children < 5 years



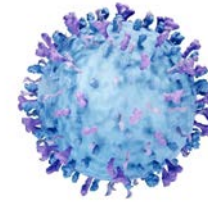
Current increase of iGAS : why ?



New strains ?



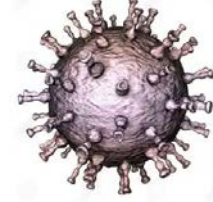
***Respiratory viruses co- and/or super-infections ?
Change in environment ?***



RSV

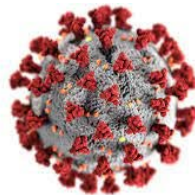


Influenza



Chicken-pox

Lack of built immunity due to pandemic?

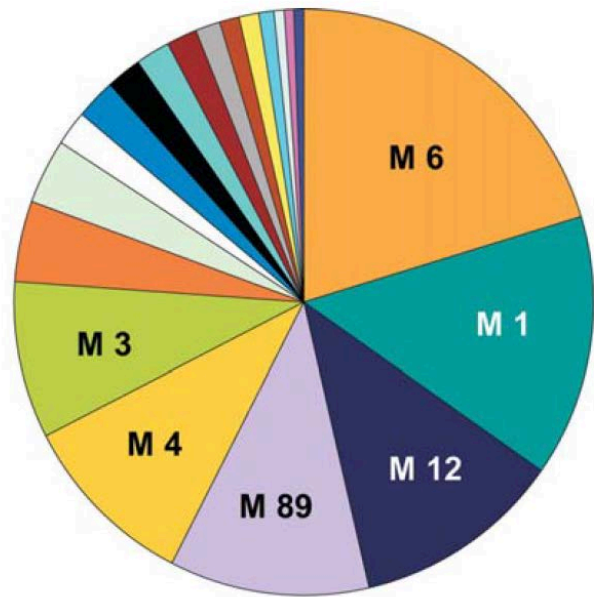


Covid-19

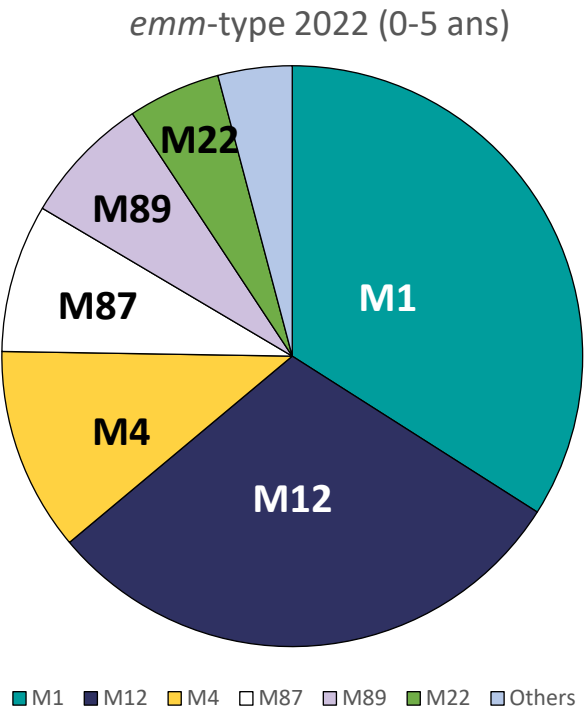
Current increase of iGAS : strains ?



The usual suspects...



Brussels
Smeesters, Plos One, 2006



Current increase of iGAS : new strains ?



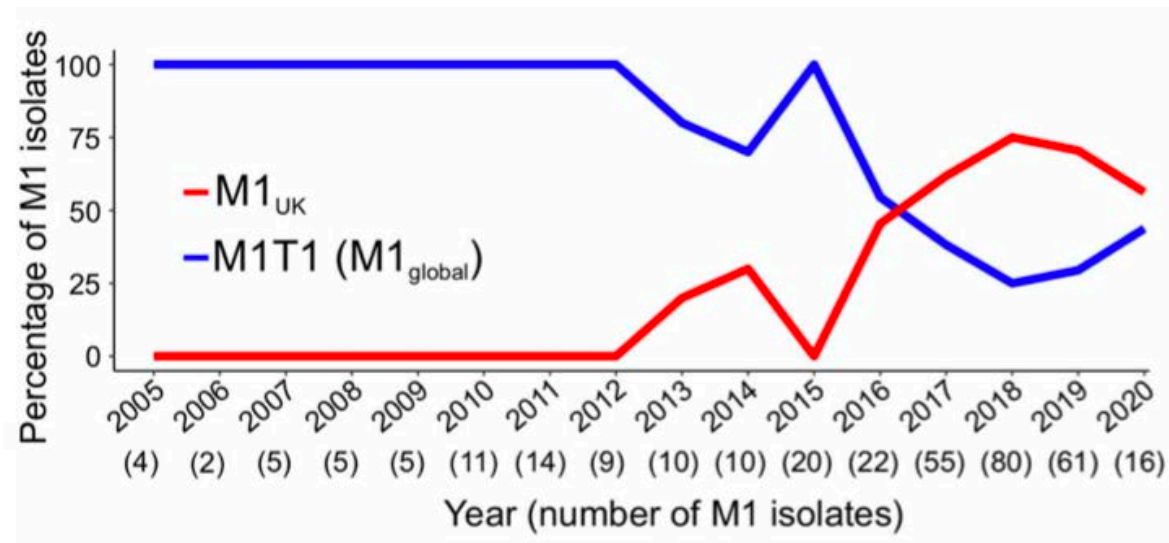
The usual suspects... yes BUT new lineages...

Brief Report:

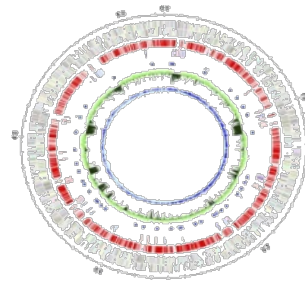
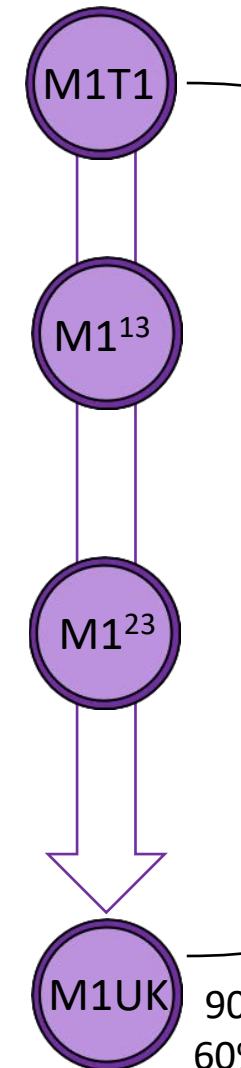
Tricontinental detection of *Streptococcus pyogenes*

M1_{UK}: A call for wider research and active surveillance.

Ana Vieira^{1,2}, Valerie WC Soo¹, Ho Kwong Li^{1,2}, Xiangyun Zhi^{1,2}, Lucy Reeves¹, Kristin K. Huse^{1,2},
Kai Yi Mok¹, Oscar Cowen¹, Elita Jauneikaite^{3,4}, Juliana Coelho^{3,5}, Shiranee Sriskandan^{1,2,3}



Davies et al., 2023



90% of M1 isolates in iGAS (England)
60% of M1 isolates in iGAS (Australia)

Current increase of iGAS : new strains ?

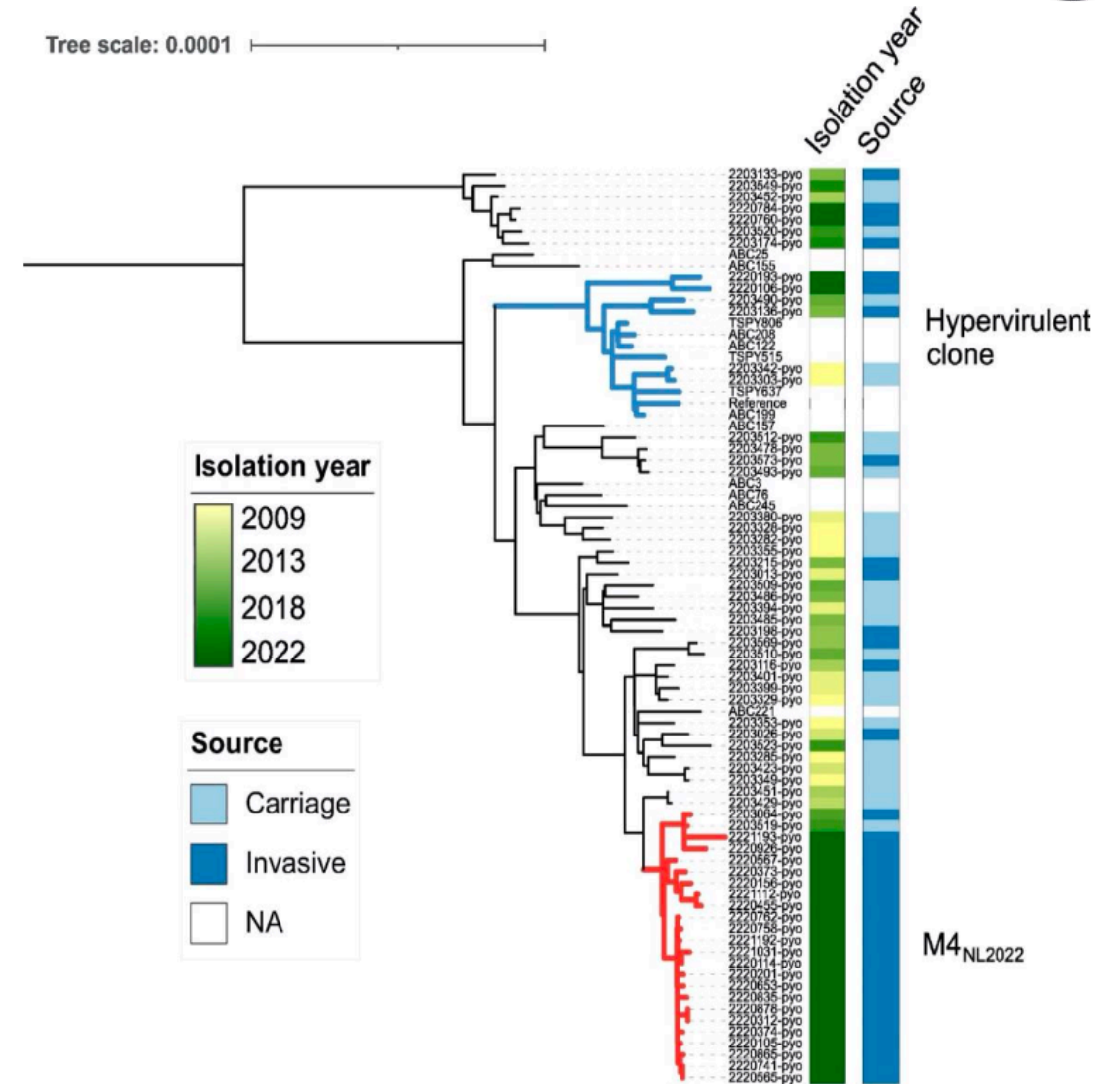


The usual suspects... yes BUT new lineages...

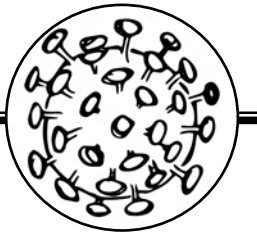
Novel *emm4* lineage associated with an upsurge in invasive group A streptococcal disease in the Netherlands, 2022

Boas C.L. van der Putten¹, Wendy C. Bril-Keijzers, Lidewij W. Rümke, Stefan M.T. Vestjens, Linda A.M.

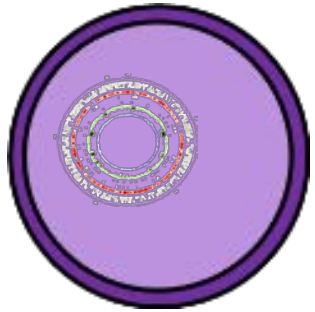
Koster, Marloes Willemsen², Bart J.M. Vlamincx, Brechje de Gier, Nina M. van Sorge²



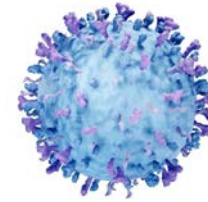
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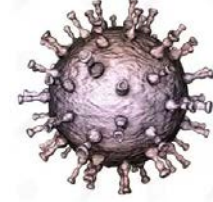
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Change in environment ?***



RSV

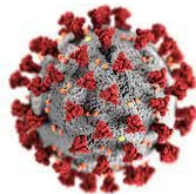


Influenza



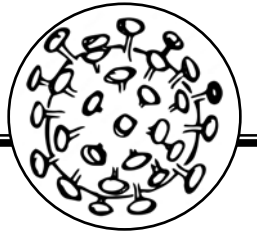
Chicken-pox

Lack of built immunity due to COVID-19 pandemic?



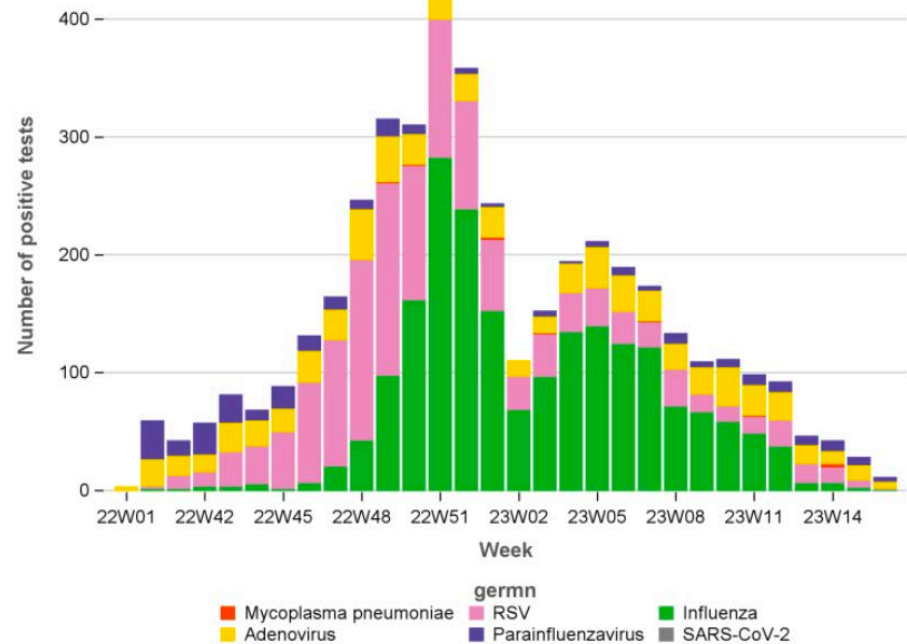
Covid-19

Current increase of iGAS : linked to viral infections ?



Respiratory viruses co- and/or super-infections ?

Kinderen / Enfants / Children (0-14y)

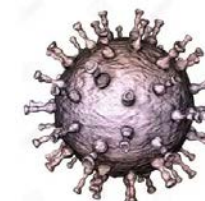


RSV

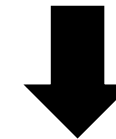
Known Risk Factor of iGAS



Influenza



Chicken-pox

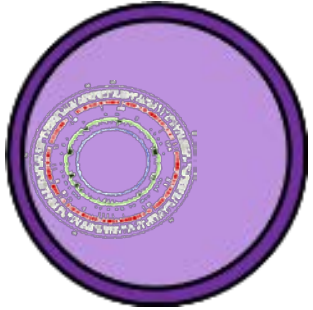


Infected skin lesions leads to NF, bacteraemia and/or SSTS
Decrease since chicken pox vaccination

Current increase of iGAS : why ?



New strains ?



Respiratory viruses co- and/or super-infections ?

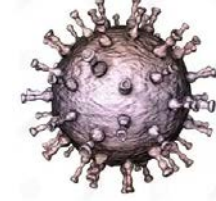
Covid-19



RSV



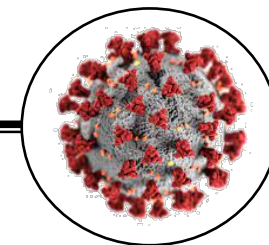
Influenza



Chicken-pox

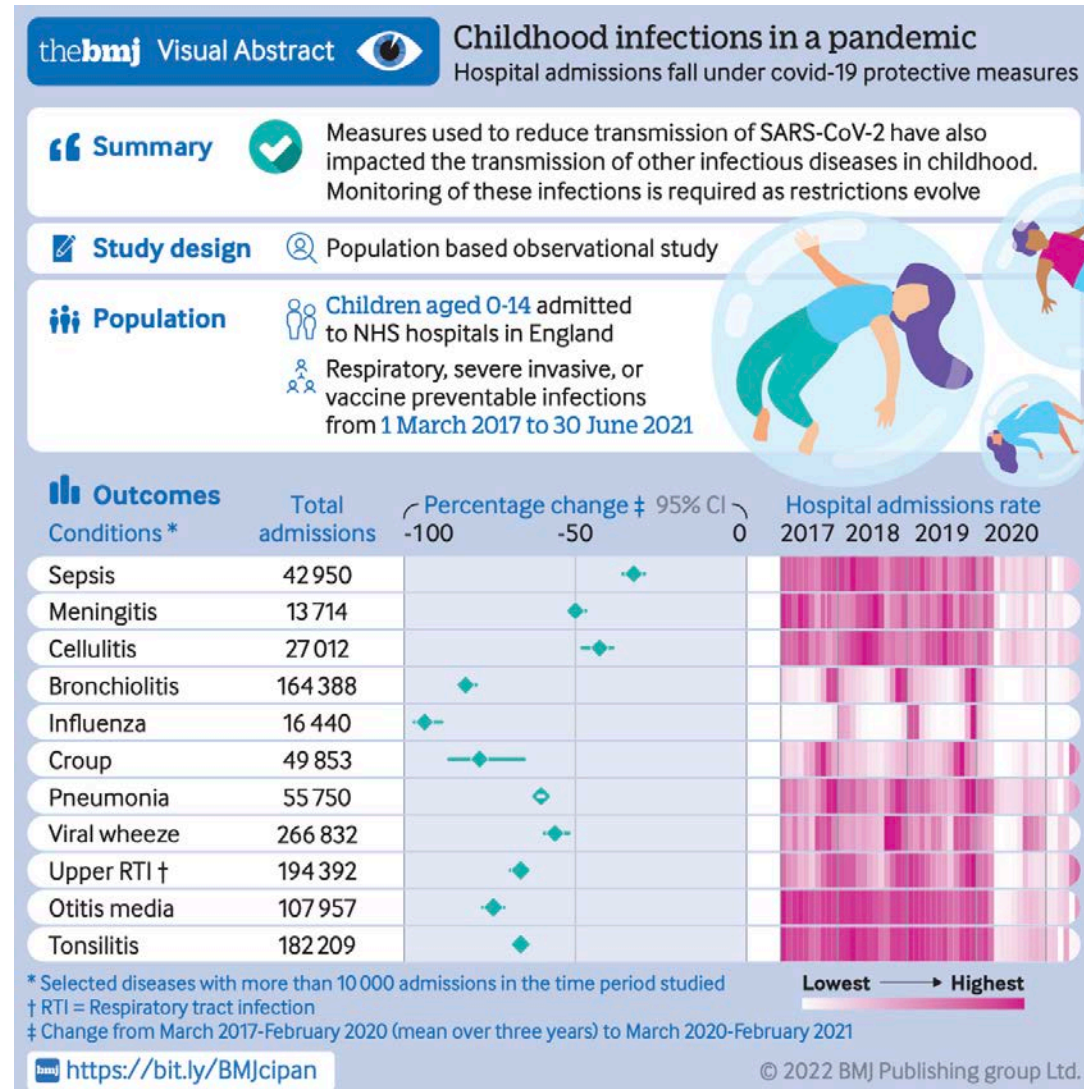
Y *Lack of built immunity due to pandemic?*

Current increase of iGAS : lack of exposure ?

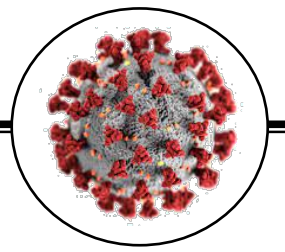


Indirect effects of the covid-19 pandemic on childhood infection in England: population based observational study

Seilesh Kadambari,^{1,2} Raphael Goldacre,³ Eva Morris,³ Michael J Goldacre,³ Andrew J Pollard^{1,2}

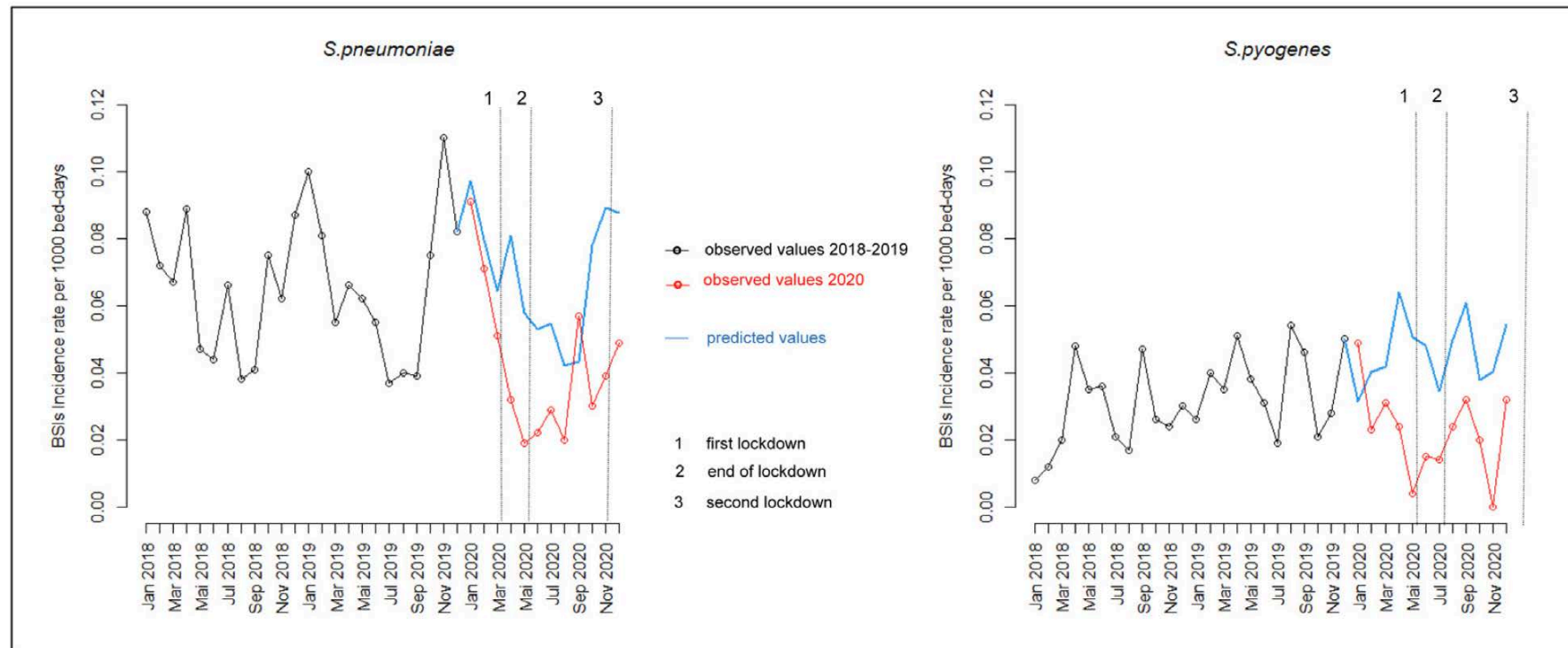


Current increase of iGAS : lack of exposure ?



Decrease of hospital- and community-acquired bloodstream infections due to *Streptococcus pneumoniae* and *Streptococcus pyogenes* during the first year of the COVID-19 pandemic: A time-series analysis in Paris region

Rishma Amarsy PharmD^{a,*}, Sandra Fournier MD^b, David Trystram MD^c, Catherine Monteil PhD^b, Xavier Raynaud PhD^d, Vincent Jarlier MD^e, Jérôme Robert MD^e, on behalf of la Collégiale de Bactériologie-Virologie-Hygiène de l'Assistance Publique-Hôpitaux de Paris



Conclusions and pending questions

New strains ? A single virulent clone is not the major driven of the increase but more investigation is needed to understand the virulence/fitness characteristic of the circulating strain

Lack of exposure : lower immunity to GAS in the population due to delayed initial exposure is possible but need to be proven

Change in the environment ? Influenza and RSV infections are decreasing but not iGAS (but 'classical seasonality' until April).

Probably multifactorial



Smeesters Pierre

Deneubourg Geoffrey

Schiavolin Lionel

Lakhloufi Dalila

Delforge Valérie

Botquin Gwenaelle

Widomski Cyprien

Laho Delphine

Bruyns Corentin

De Crombrughe Gabrielle Steinmetz Jenny

Vandenvoorde Aurelie

Mark Walker



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

Andrew Steer
Joshua Osowicki



Mark Davies



THANKS TO...



HÔPITAL UNIVERSITAIRE
DE BRUXELLES
ACADEMISCH ZIEKENHUIS
BRUSSEL



Infectiologie péd

Sarah Jourdain

Céline Mignon

Jennifer Moortgat

Sophie Cahen

Jim Dale



Martina Sanderson-Smith

Ailish Cleary

David De Oliveira

Emma Proctor



Partho Ghosh

Cosmo Buffalo

Sophia Hirakis



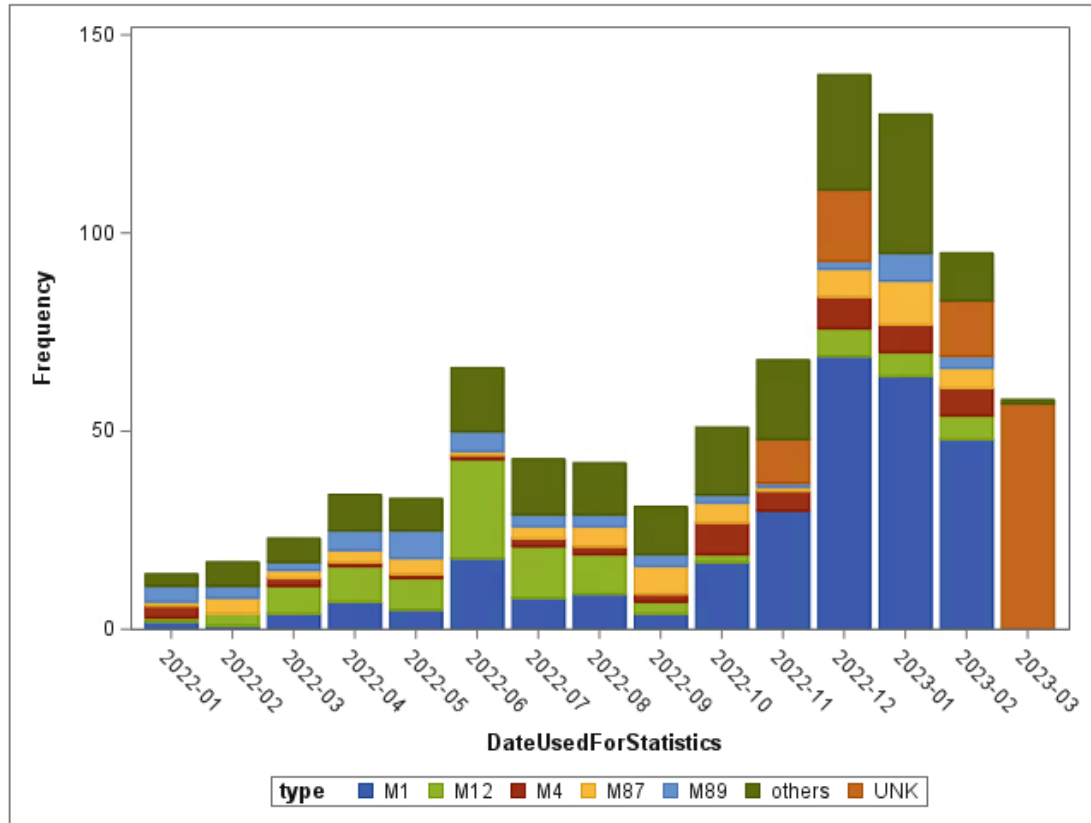
Chris Van Beneden
Bernard Beall



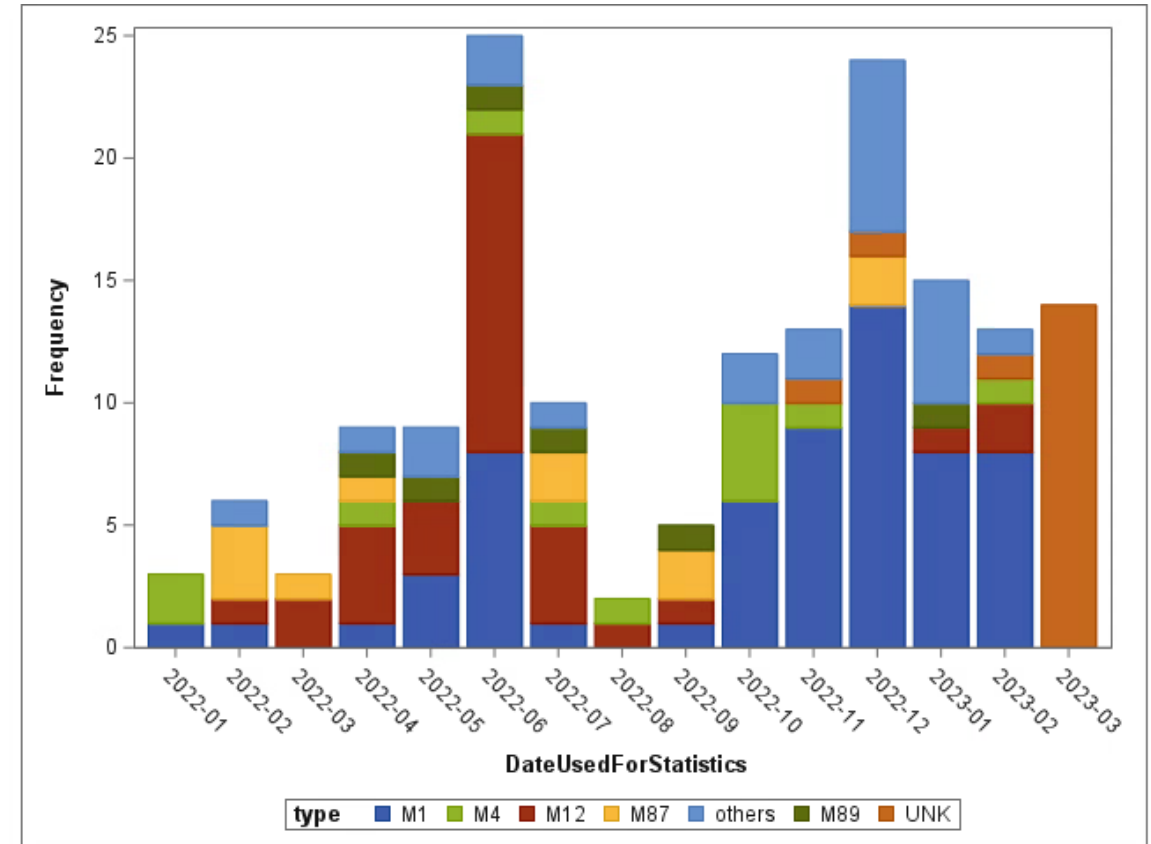
Belgian situation – which strains ?



All age group

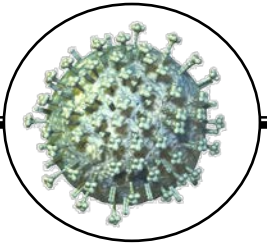


Children < 5 years



Mainly M1 and M12

Current increase of iGAS : linked to viral infections ?



- Clinical observations indicate that a number of iGAS diseases are associated with influenza (A and B)

(Zakikhany *et al.*, 2011, Paola *et al.*, 2011, Tasher *et al.*, 2011, Darenberg *et al.*, 2013; abei *et al.*, 2010, Allard *et al.*, 2012,...)

- Vaccination against *Influenza* protect against iGAS (Lee *et al.*, 2008)

But HOW ?

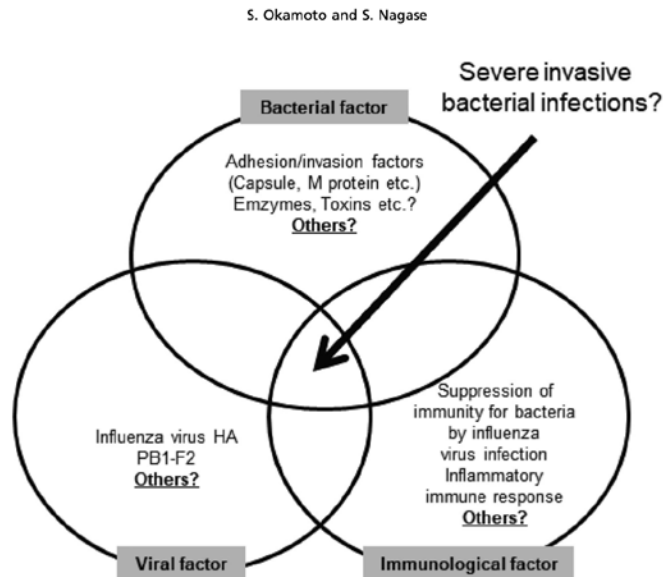


Fig. 1. Hypothetical causes of invasive GAS or other bacterial infections mediated by superinfection with influenza virus and bacteria. Invasive GAS or other bacterial infections by superinfection with influenza virus and bacteria is thought to develop by interaction of bacterial, viral and immunological factors. Because few factors in bacteria, viruses or the host immune system have as yet been identified, we speculate that many other unknown factors are associated with invasive GAS infections by superinfection.

