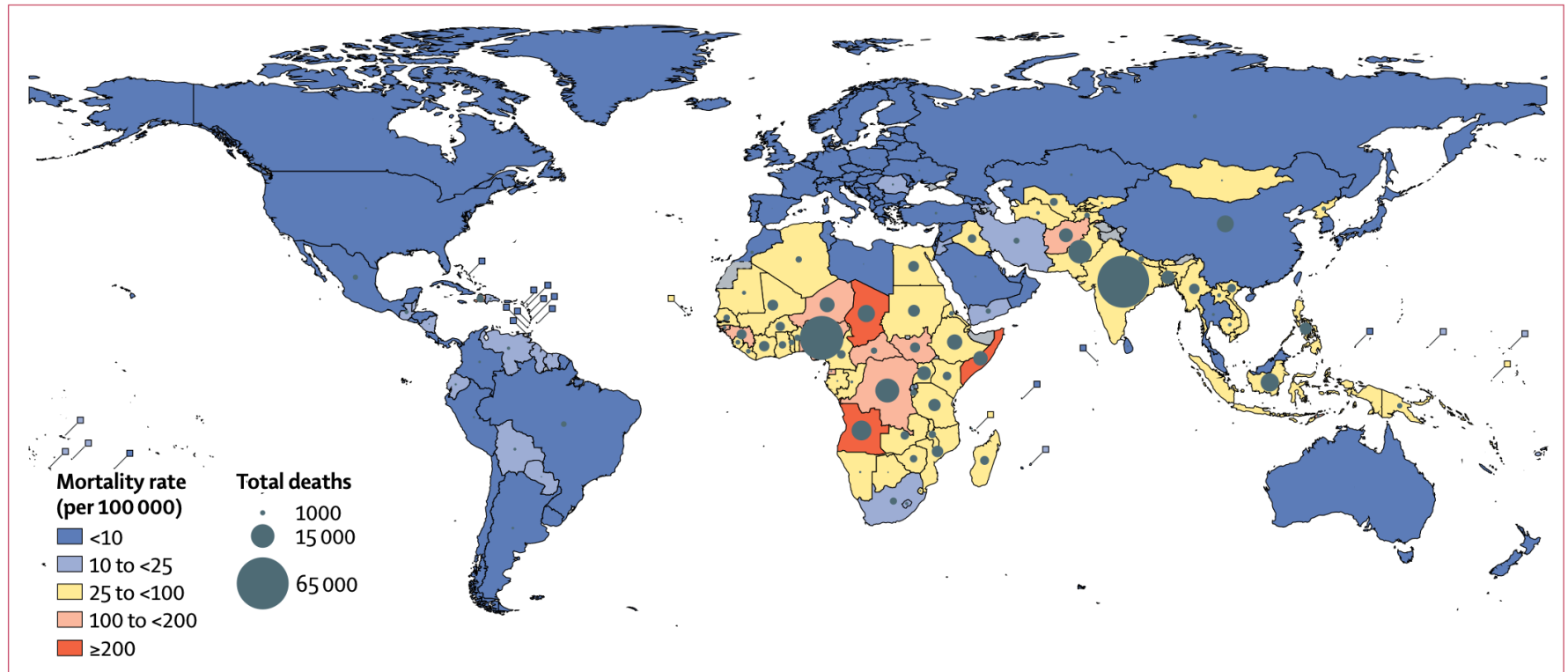


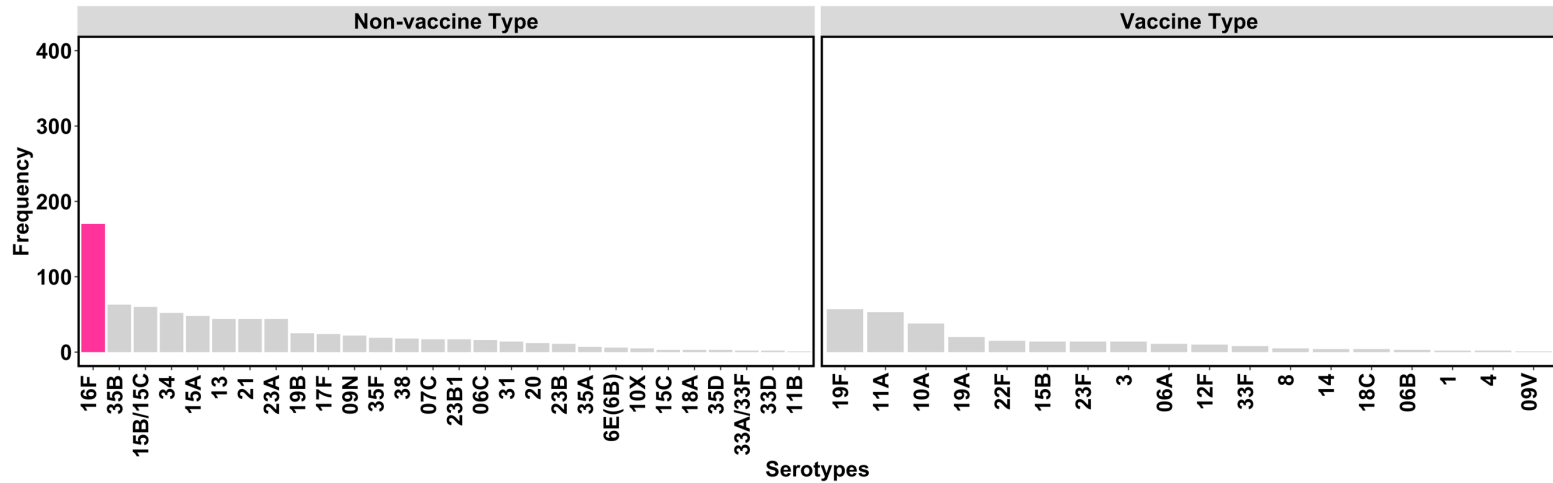
Evidence of virulence and resistance in *Streptococcus pneumoniae* serotype 16F lineages

Dr. Jolynne Mokaya
Postdoctoral Fellow
Bentley's group

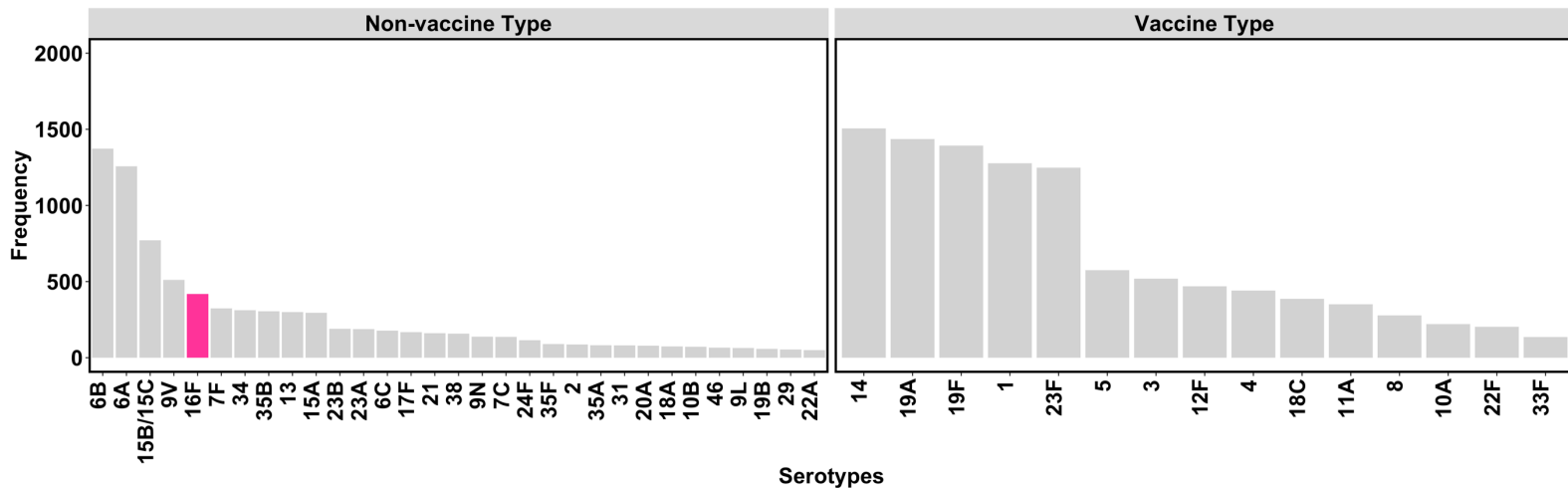
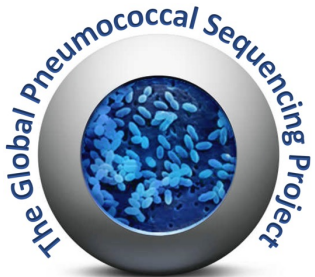
Pneumococcus disease is still a global health challenge...



Serotype 16F



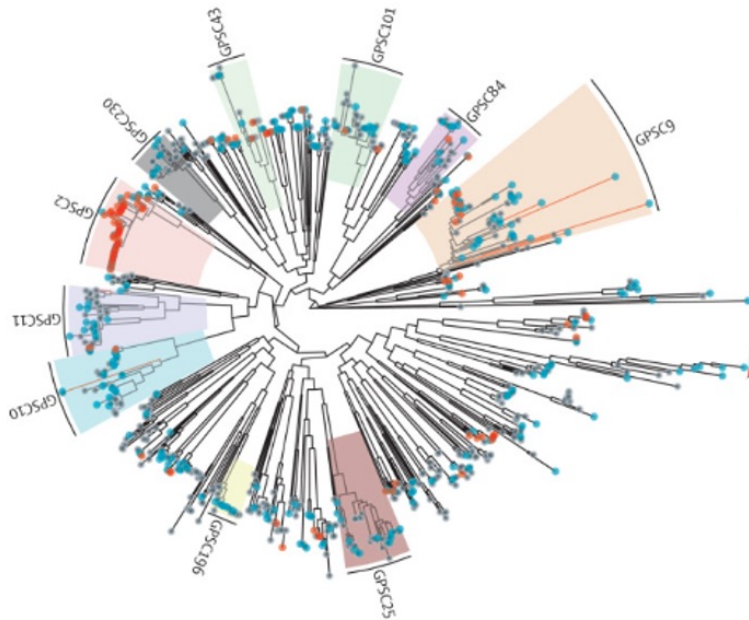
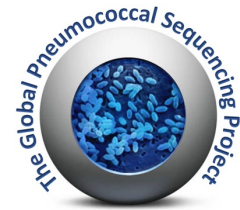
Fully vaccinated infants from Drakenstein community in South Africa



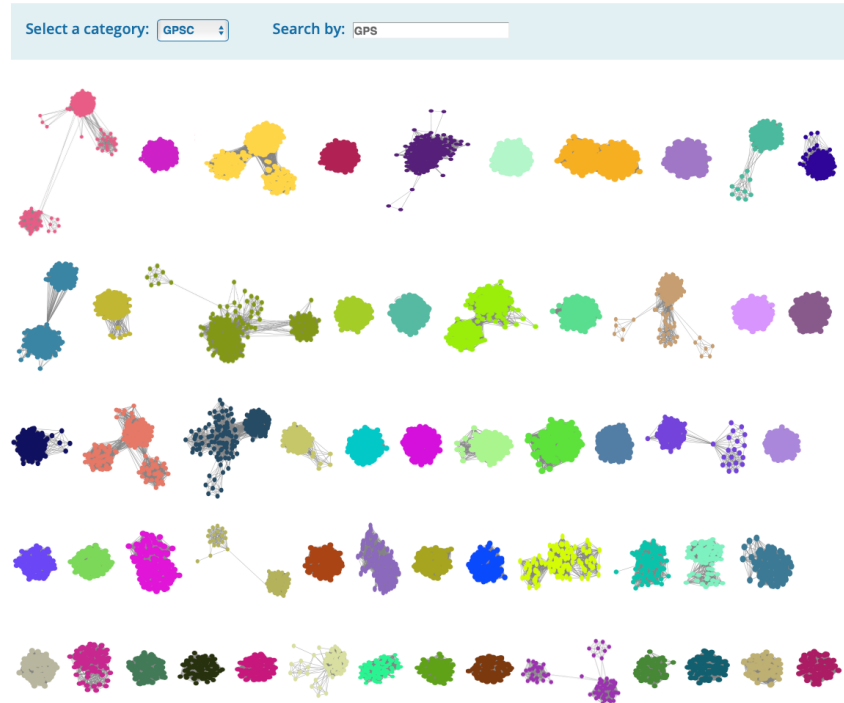
1. Which lineages are associated with 16F?
2. How are these lineages distributed on a global scale?
3. Should we be worried about 16F lineages?
4. Do these lineages have any clinical/public health relevance?

Questions

Lineages [Global pneumococcus sequencing clusters (GPSCs)]



Kandasamy et al 2022. The Lancet Microbes



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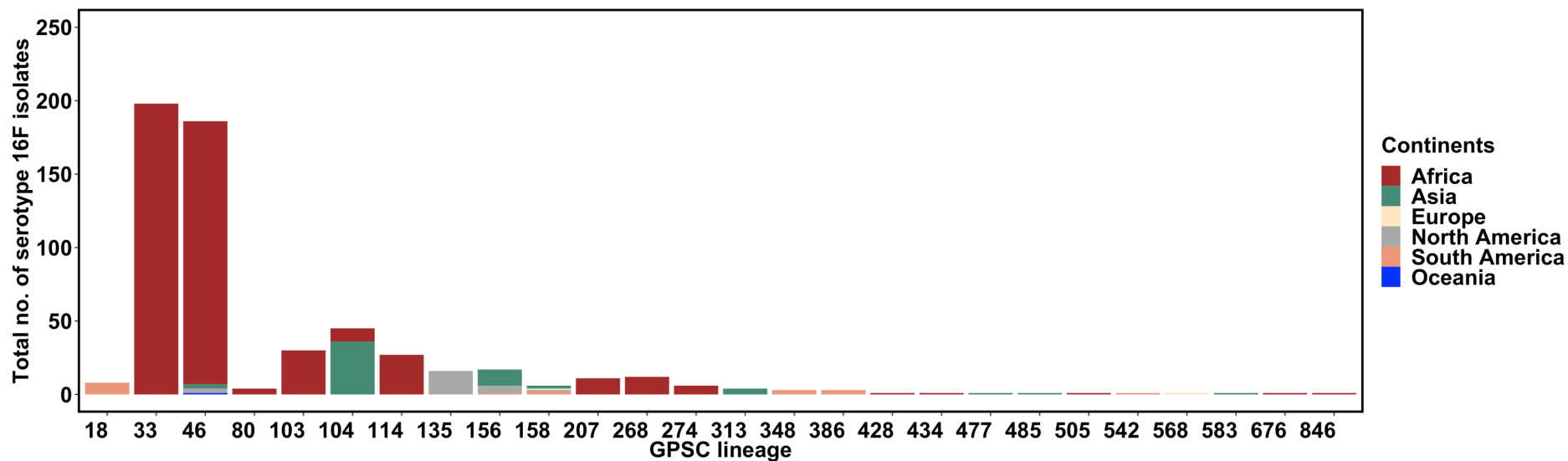
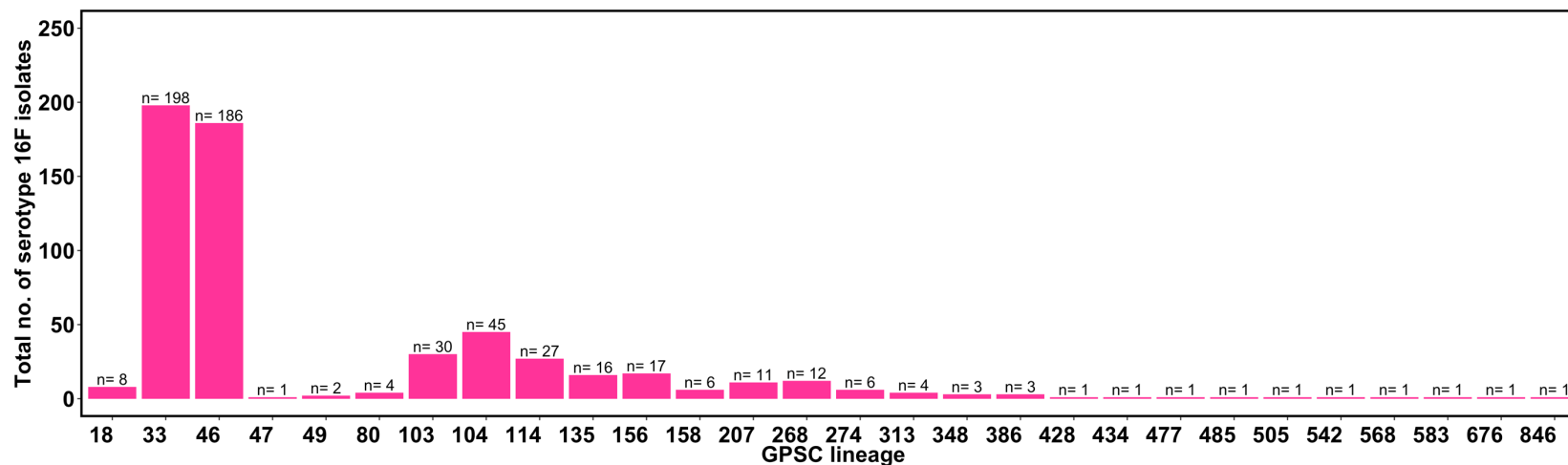
EBioMedicine
Published by THE LANCET

International genomic definition of pneumococcal lineages, to contextualise disease, antibiotic resistance and vaccine impact

Rebecca A. Gladstone^{a*,1}, Stephanie W. Lo^{a,1}, John A. Lees^b, Nicholas J. Croucher^c, Andries J. van Tonder^a, Jukka Corander^{a,d}, Andrew J. Page^a, Pekka Marttinen^e, Leon J. Bentley^a, Theresa J. Ochoa^f, Pak Leung Ho^g, Mignon du Plessis^h, Jennifer E. Cornickⁱ, Brenda Kwambana-Adams^{j,k}, Rachel Benisty^l, Susan A. Nzenze^{m,n}, Shabir A. Madhi^{m,n}, Paulina A. Hawkins^o, Dean B. Everett^p, Martin Antonio^{q,d}, Ron Dagan^l, Keith P. Klugman^o, Anne von Gottberg^h, Lesley McGee^r, Robert F. Breiman^{o,s}, Stephen D. Bentley^a,
The Global Pneumococcal Sequencing Consortium²

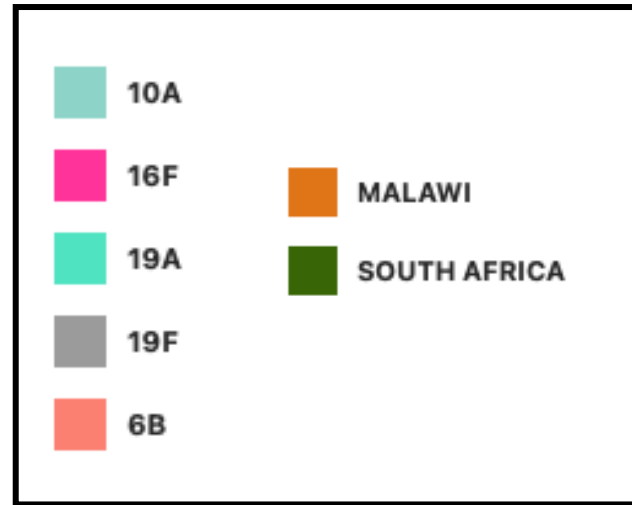
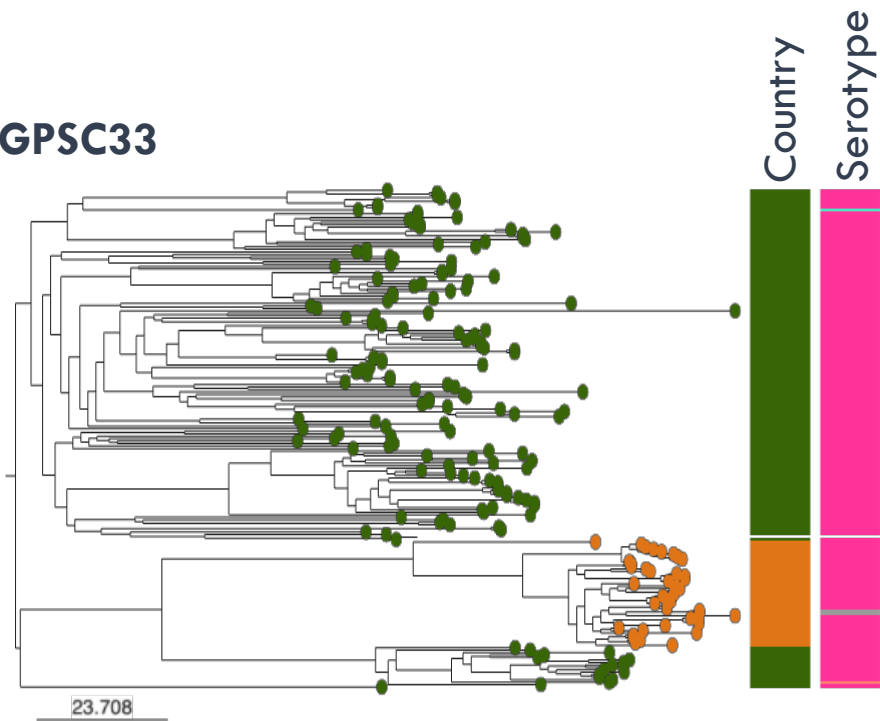


Lineages are associated with serotype 16F and their global distribution

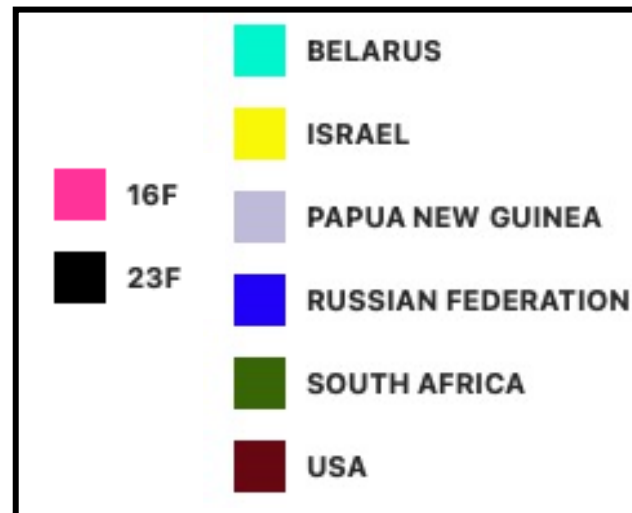
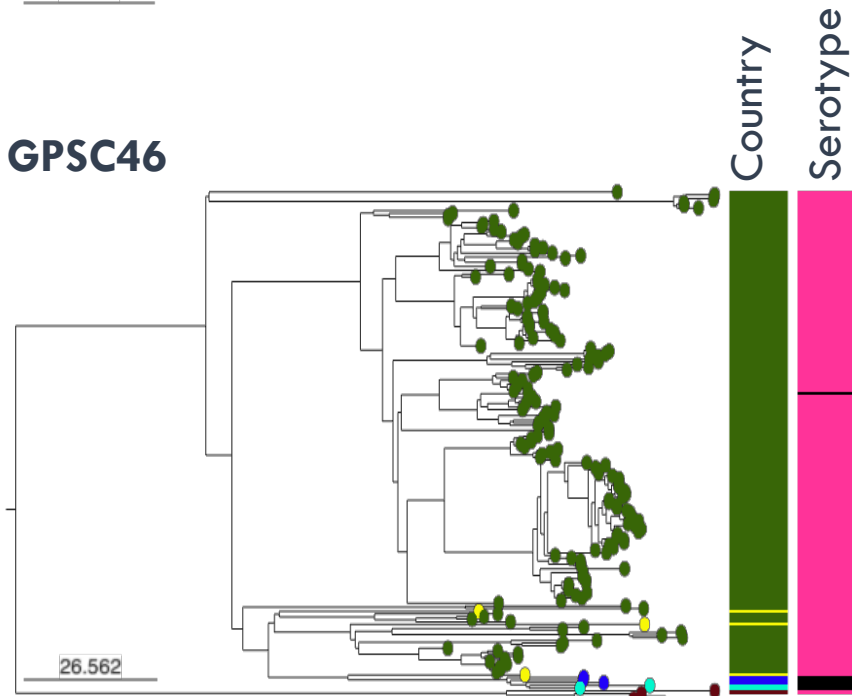


Serotype 16F lineages

GPSC33

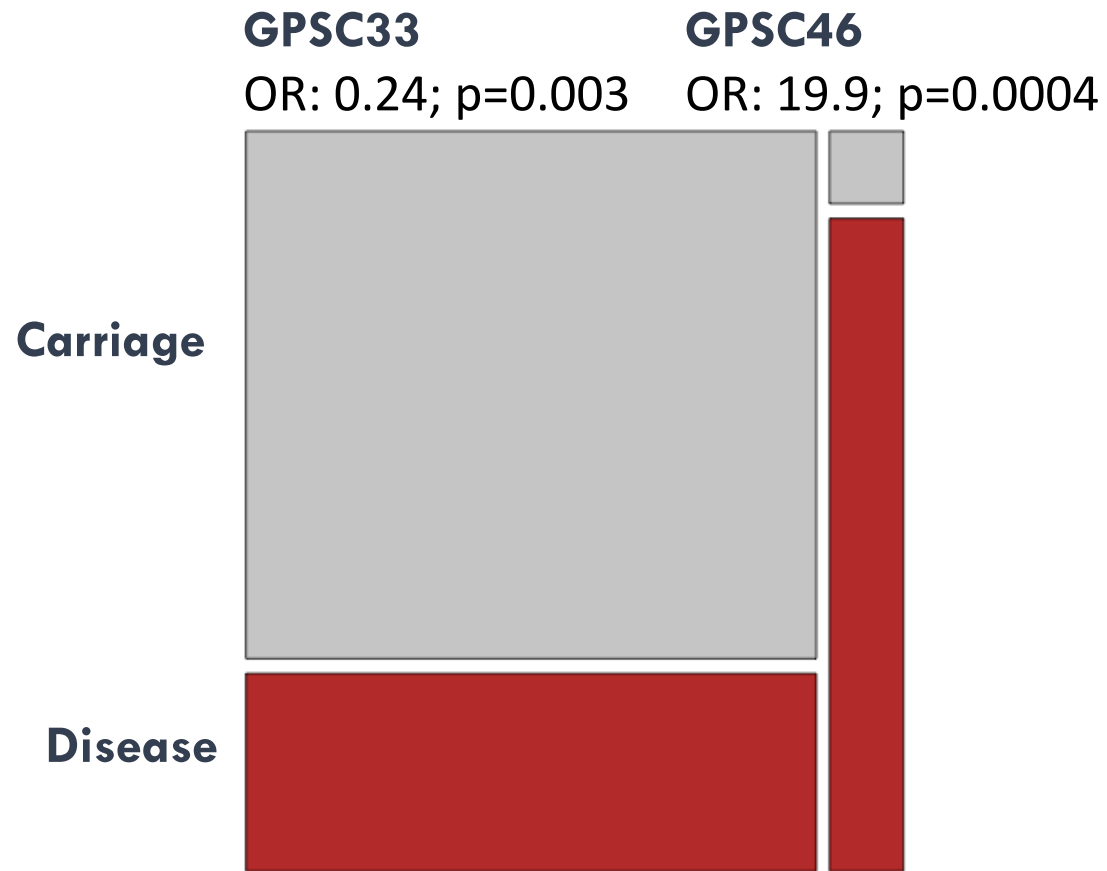


GPSC46



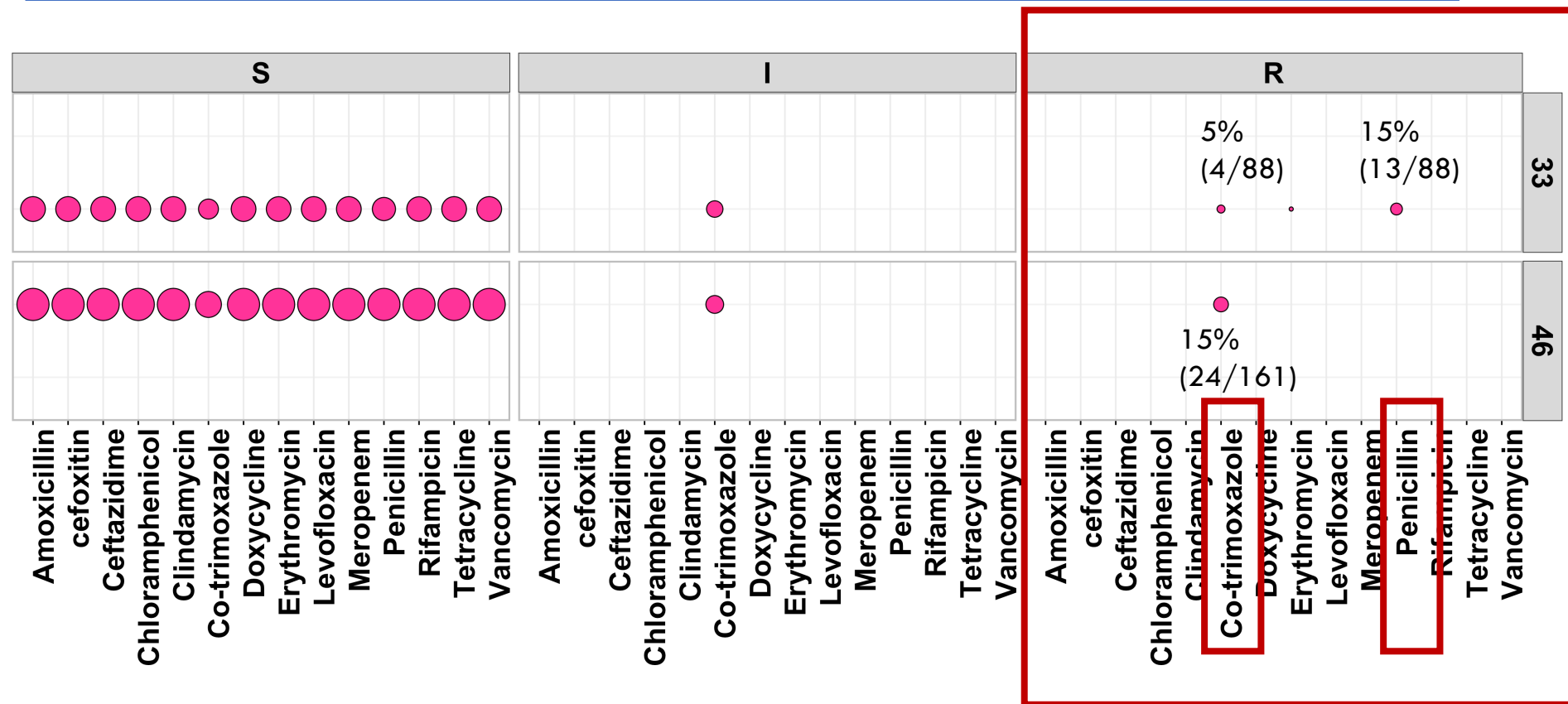
Should we be worried about 16F lineages?

- South Africa
- Age <7 years
- Difference in proportion of disease vs carriage performed between the most and least disease-causing serotype 16F lineage



GPSC33 is associated with carriage and GPSC46 is associated with disease

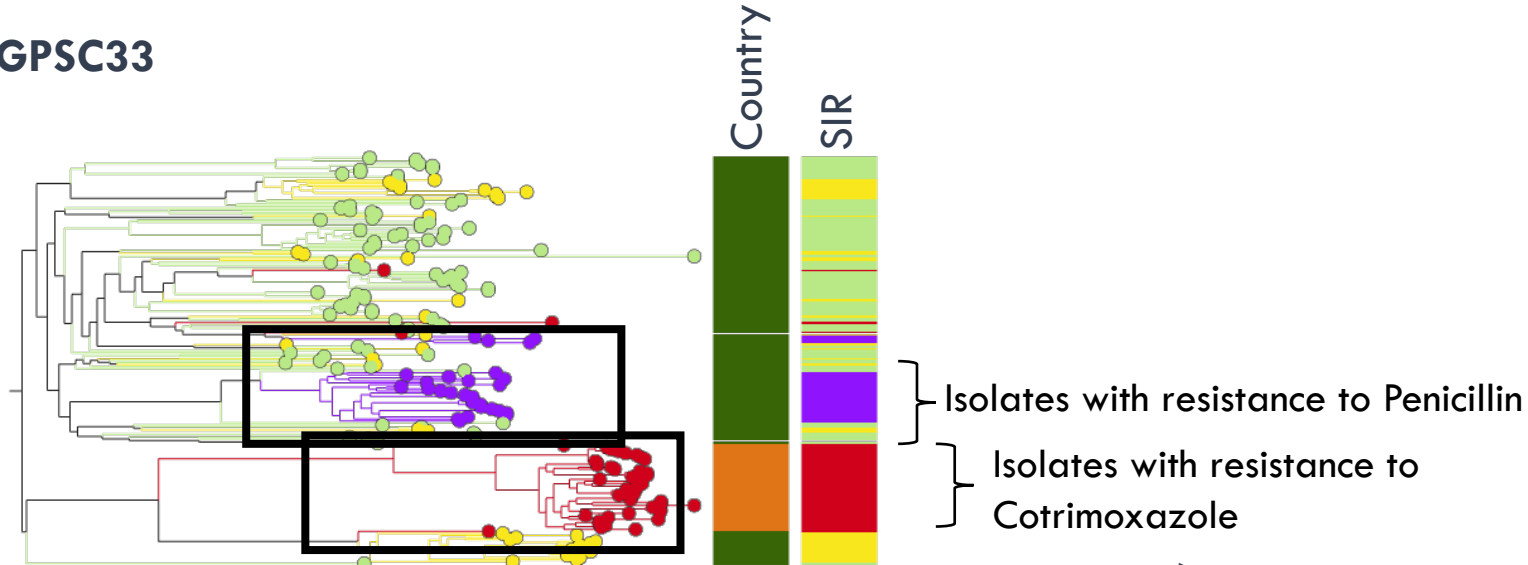
Do these lineages have any clinical/public health relevance?



- Penicillin 1st line Rx for pneumococcal Dx
- *S. Pneumo* strains with resistance to cotrimoxazole can induce bacterial cross-resistance to other classes of antibiotics and increase the risk of MDR – horizontal gene transfer
- Although GPSC33 is associated with carriage, 6/88 isolates with resistance to penicillin were collected from children with disease

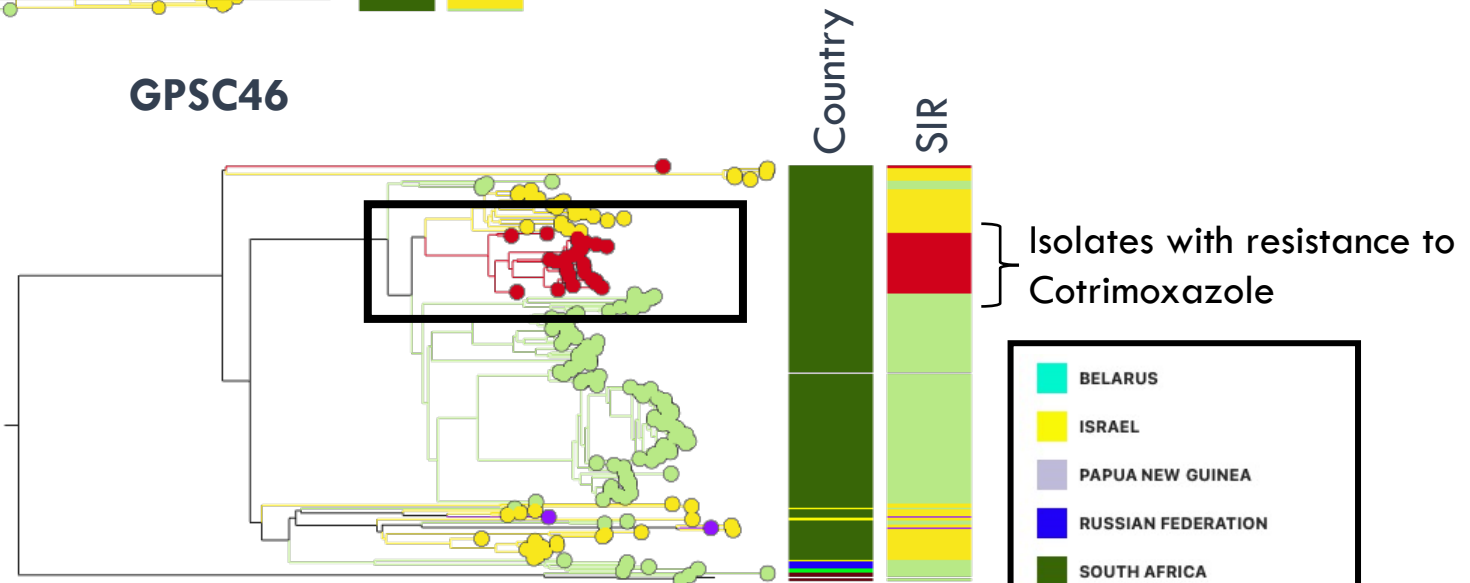
Do these lineages have any clinical/public health relevance?

GPSC33



MALAWI
SOUTH AFRICA

GPSC46



BELARUS
ISRAEL
PAPUA NEW GUINEA
RUSSIAN FEDERATION
SOUTH AFRICA
USA

Possibility of an emerging lineage that is resistant to either penicillin or cotrimoxazole?

Discussion

Summary

- Serotype 16F lineages are predominant in Southern Africa
- These lineages are associated with disease and carriage, and associated with resistance to Penicillin and Cotrimoxazole
- Possibility of an emerging lineage associated with resistance

Ongoing discussions

Continuous surveillance to determine long term impact of serotype 16F lineages (is this serotype problematic enough to be included in the future vaccines?)

Judicious use of antibiotics (some settings in SSA maybe difficult to protect populations from using sub-standard antibiotics due to limited resources)

Risk vs benefit of using Cotrimoxazole in HIV prophylaxis? – are Antiretroviral drugs effective enough to prevent opportunistic infections?

Acknowledgement

Kate C Mellor, Heather J Zar, Mark Nicol, Lesley McGee, Stephen D Bentley, Stephanie W Lo, Felix Dube, The Global Pneumococcal Sequencing Consortium.

Bentley's Group



BILL & MELINDA
GATES *foundation*

