

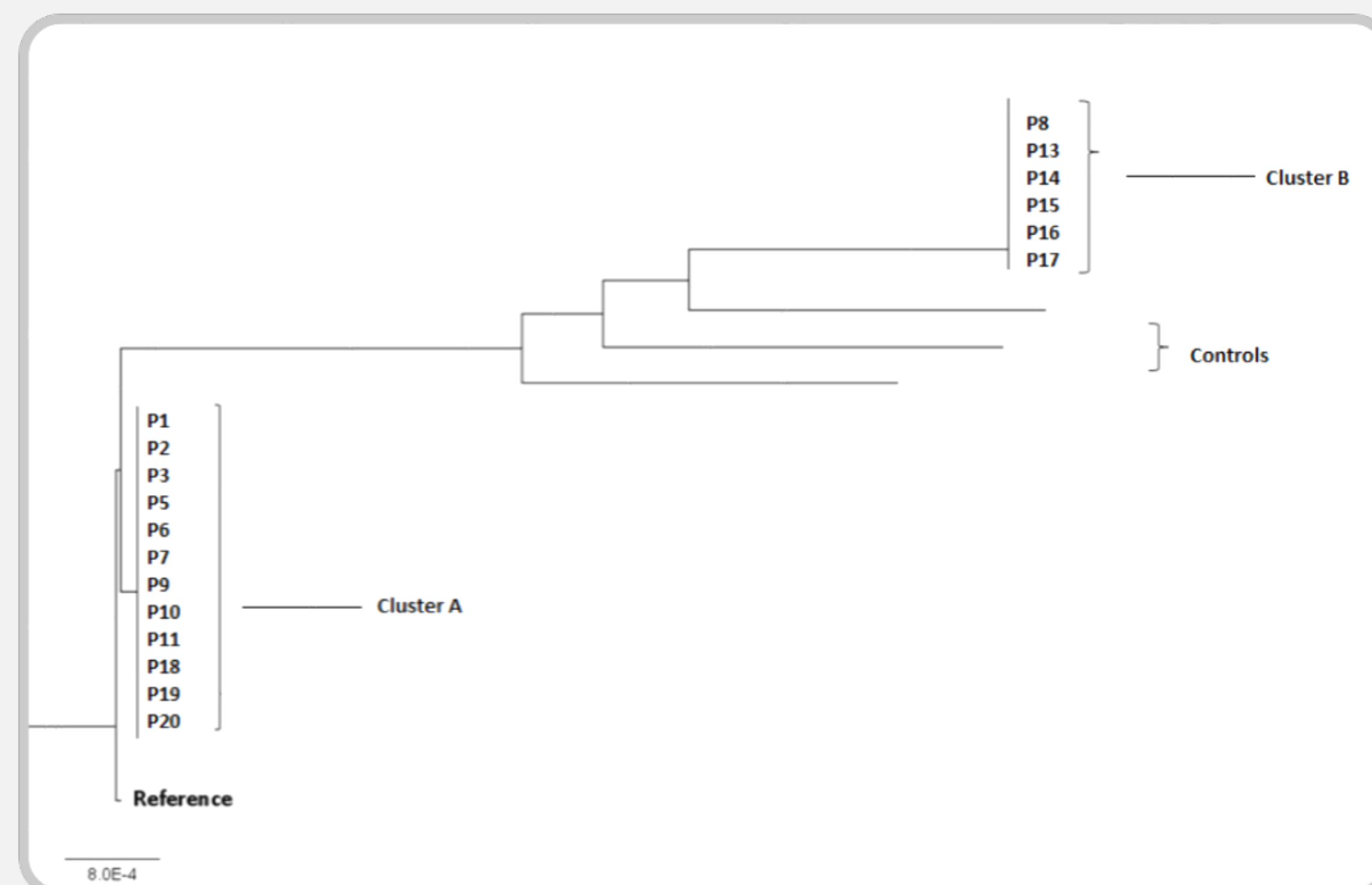
Background

- Transmission of methicillin-resistant *Staphylococcus aureus* (MRSA) in neonatal intensive care units (NICU) is of concern due to the vulnerability of the population
- This report follows transmission of MRSA in a NICU at a large tertiary hospital in British Columbia between December 2021 and July 2022

Methods

- All Fraser Health NICU admissions are tested for MRSA with a subsequent test 14 days post-admission
- After initial cases identified at this site, weekly prevalence testing was initiated across the NICU along with comprehensive infection control measures
- All positive specimens were submitted to the provincial reference laboratory for whole genome sequencing (WGS) to supplement epidemiological investigation
- WGS analysis consisted of multi-locus sequence typing (MLST) and core genome SNP profiling

Figure 1. Phylogenetic Tree of MRSA WGS Clusters



Results

Figure 2. Epidemic Curve of MRSA Cases by Cluster Group

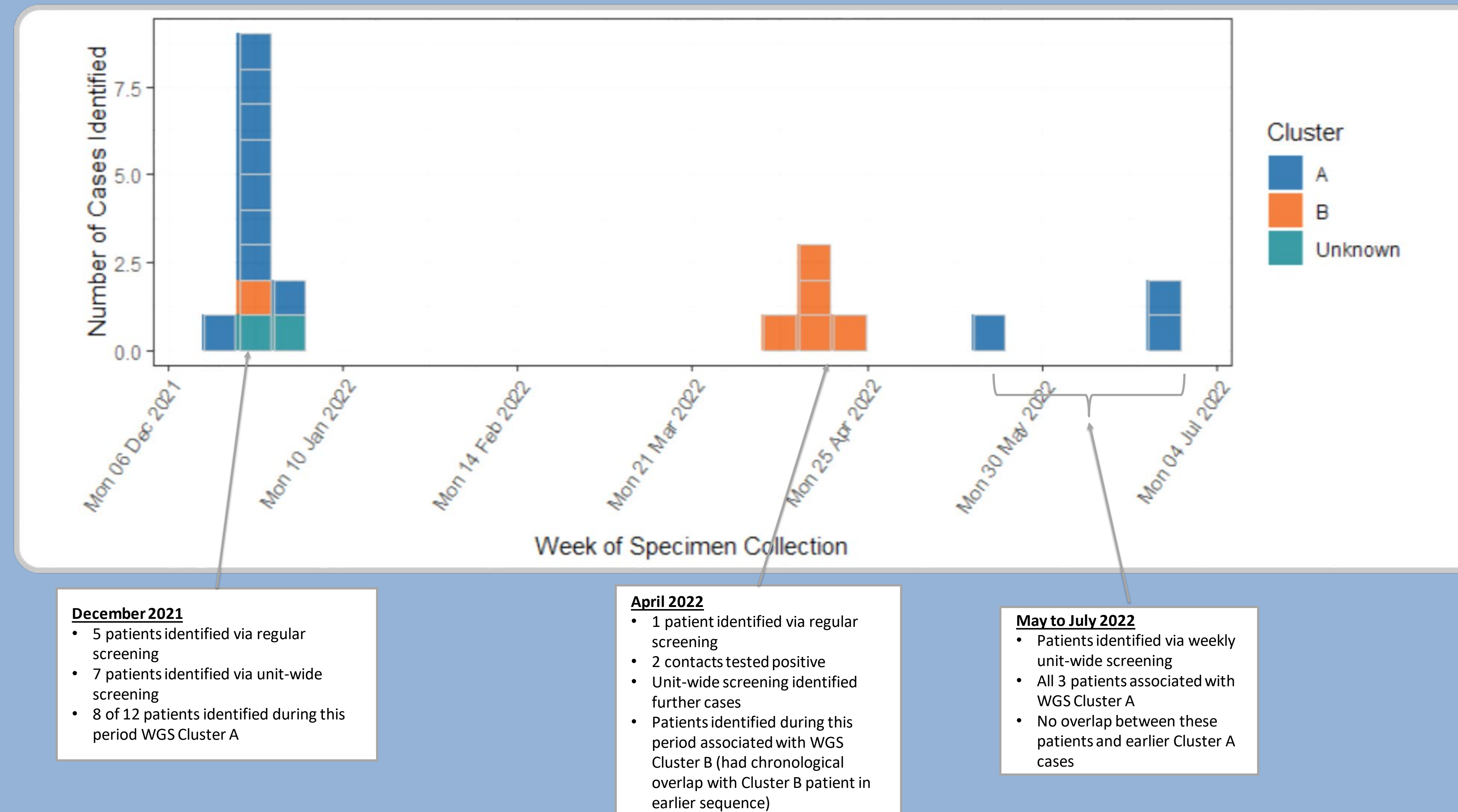


Figure 3. Patient Timeline with Specimen Collection Date by Cluster Group

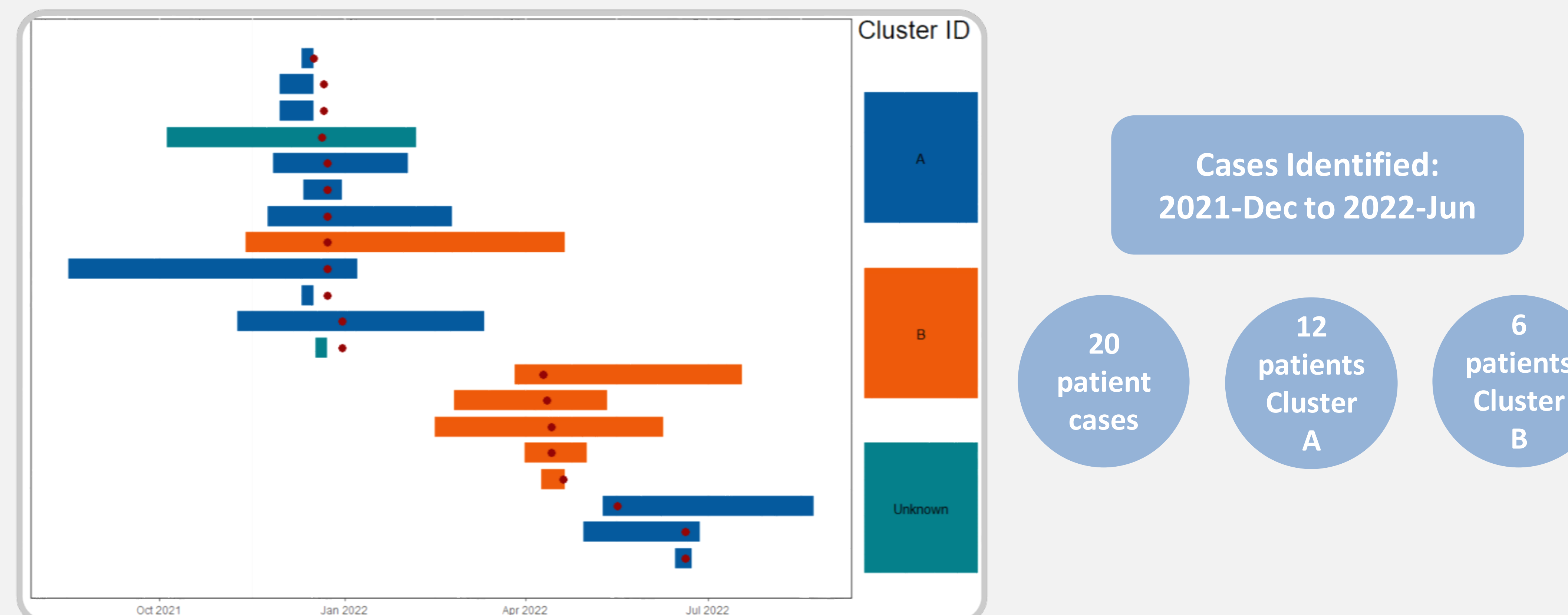


Table 1. Patient line list

	NICU Admission	Positive Specimen	Days Admitted Before Positive	Case Type	WGS Cluster
Patient 1	2021-Dec-11	2021-Dec-17	6	Colonization	A
Patient 2	2021-Nov-30	2021-Dec-22	22	Colonization	A
Patient 3	2021-Nov-30	2021-Dec-22	22	Colonization	A
Patient 4	2021-Oct-05	2021-Dec-21	77	Colonization	Unknown
Patient 5	2021-Nov-27	2021-Dec-24	27	Colonization	A
Patient 6	2021-Dec-12	2021-Dec-24	12	Colonization	A
Patient 7	2021-Nov-24	2021-Dec-24	30	Colonization	A
Patient 8	2021-Nov-13	2021-Dec-24	41	Colonization	B
Patient 9	2021-Aug-17	2021-Dec-24	129	Colonization	A
Patient 10	2021-Dec-11	2021-Dec-24	13	Colonization	A
Patient 11	2021-Nov-09	2021-Dec-31	52	Colonization	A
Patient 12	2021-Dec-18	2021-Dec-31	13	Colonization	Unknown
Patient 13	2022-Mar-27	2022-Apr-10	14	Colonization	B
Patient 14	2022-Feb-25	2022-Apr-12	46	Colonization	B
Patient 15	2022-Feb-15	2022-Apr-14	58	Colonization	B
Patient 16	2022-Apr-01	2022-Apr-14	13	Colonization	B
Patient 17	2022-Apr-09	2022-Apr-20	11	Colonization	B
Patient 18	2022-May-10	2022-May-17	7	Infection	A
Patient 19	2022-Apr-30	2022-Jun-20	51	Colonization	A
Patient 20	2022-Jun-15	2022-Jun-20	5	Colonization	A

Discussion & Conclusions

- WGS can be a powerful tool when used in conjunction with epidemiological data to understand transmission patterns of MRSA strains detected in the NICU
- In this investigation, we were able to genetically and epidemiologically link cases that clustered within Cluster A and Cluster B, with the exception of Cluster A cases that were detected in May and June 2022, which have no clear epidemiological link
- Further investigation into Cluster A is required to identify other potential sources of transmission
- These data highlight the importance of enhanced Infection Prevention and Control practices in NICUs

We gratefully acknowledge our acute care IPC practitioners, IPC regional team, Medical Microbiologists, clinicians and operational teams who supported the investigation and management of this cluster.