



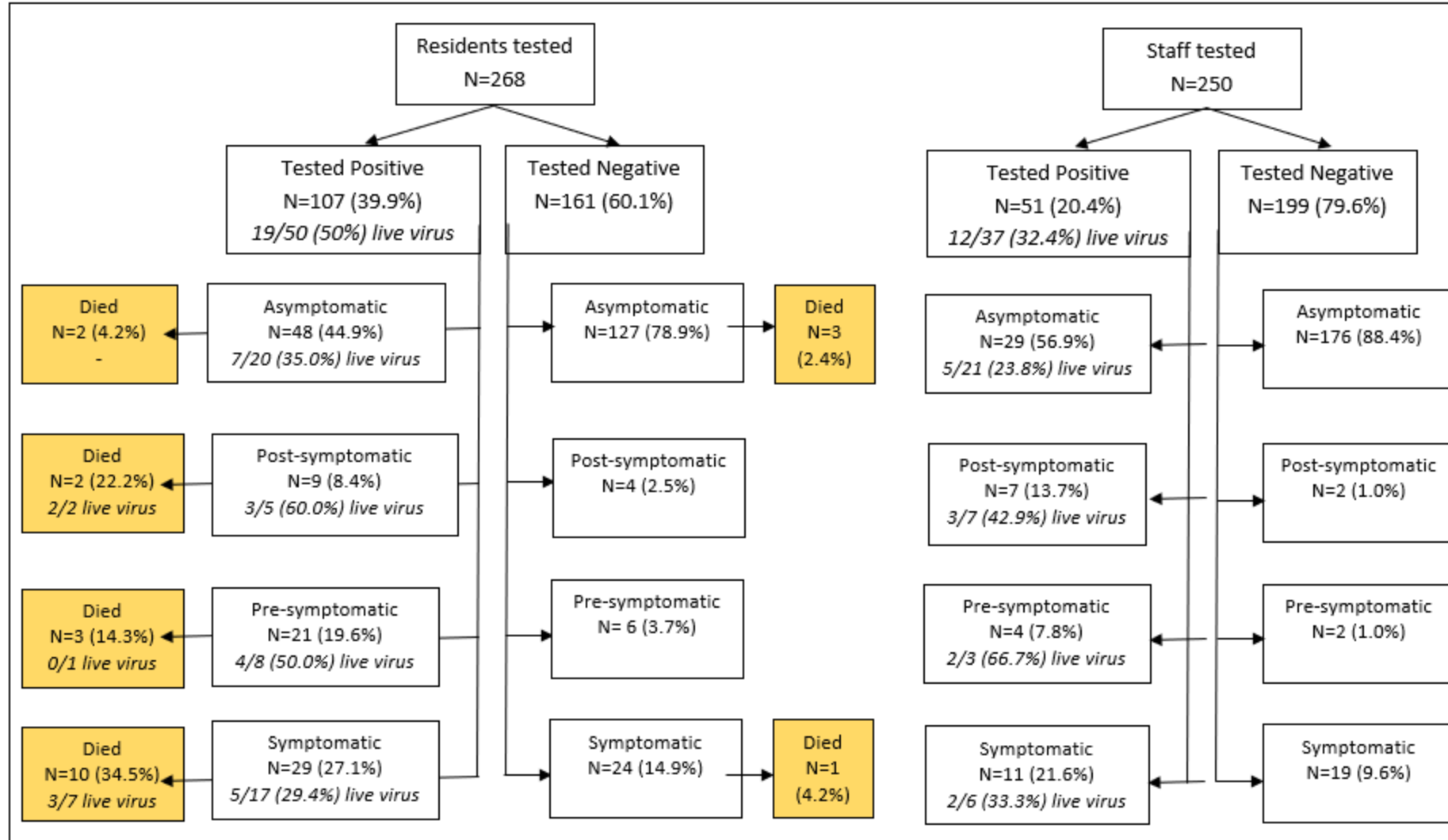
Public Health
England

Easter 6 Care Home Investigations: Part 2 : Serology

Maria Zambon

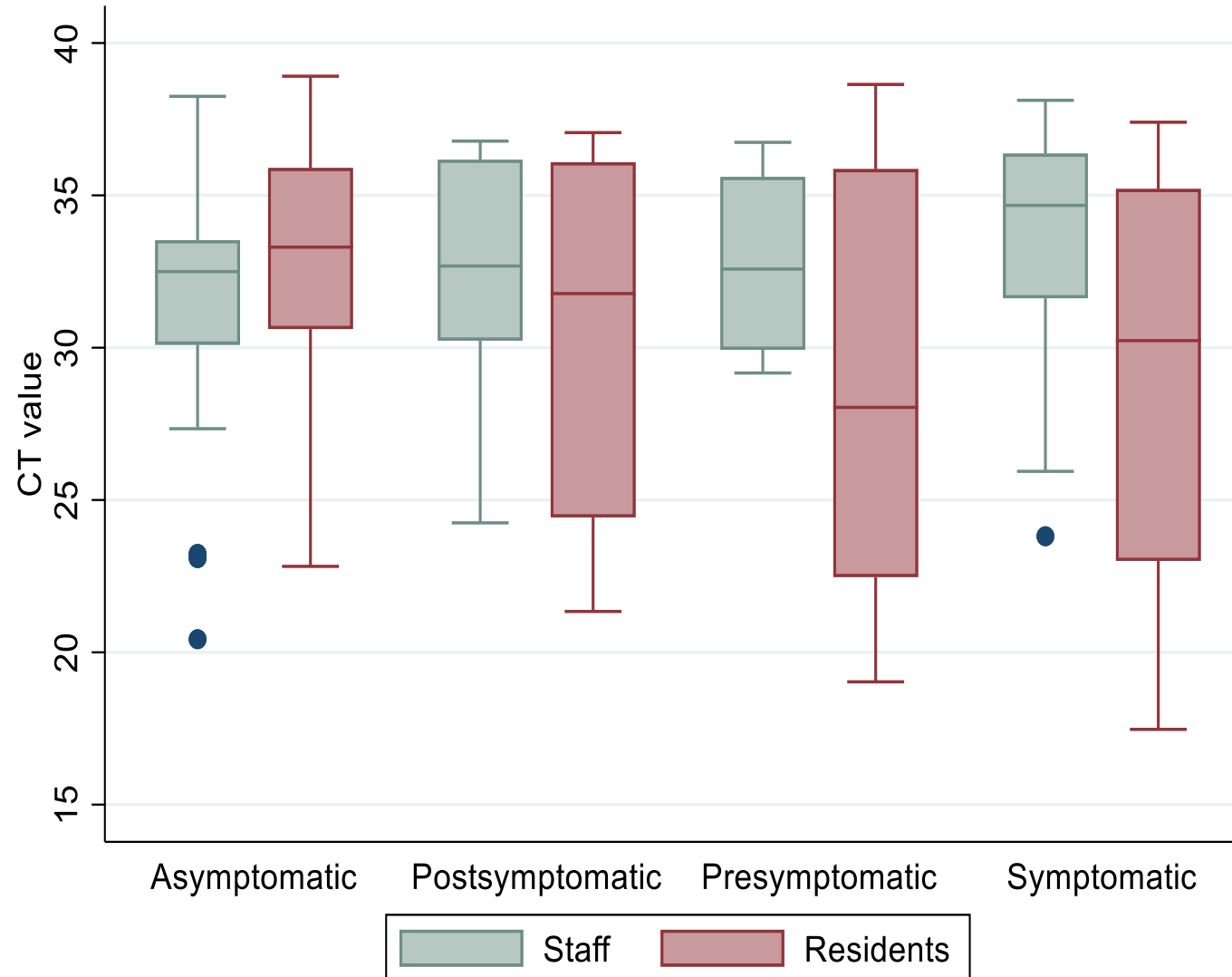
SARS-CoV-2 positivity, symptoms, live virus isolation and deaths in residents and staff across six London care homes experiencing a COVID-19 outbreak during April 2020

Original Investigation

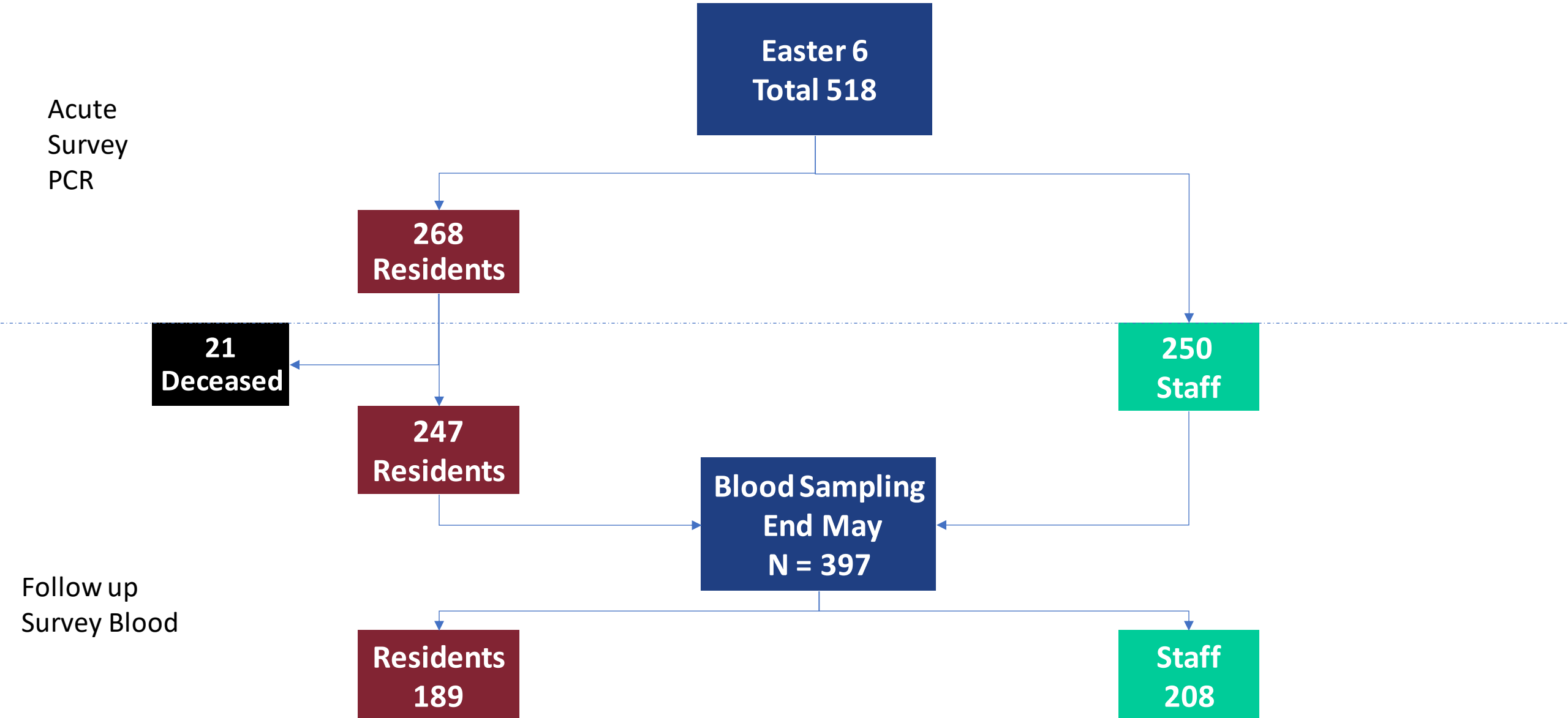


Cycle Threshold values for care home residents and staff

Key take home : no differences between groups in virus load



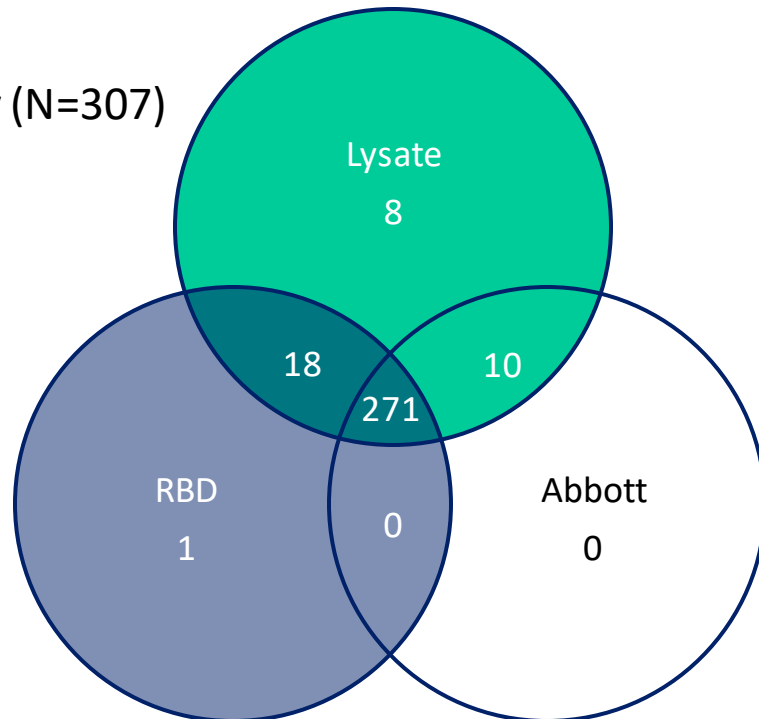
Care Homes Serology



Serology comparisons – 3 different assays used

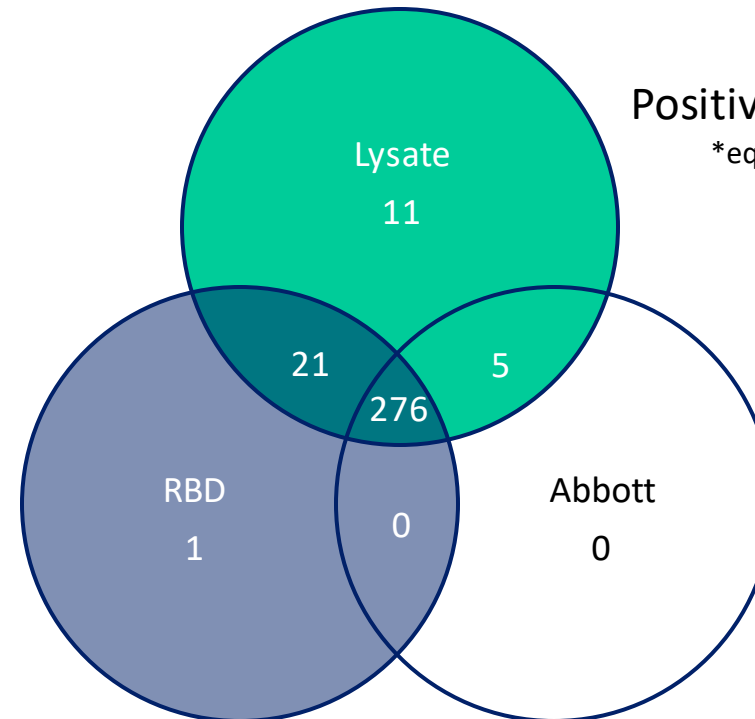
	Native Viral Antigen Infected cell proteins (lysate)	Recombinant S Receptor Binding Domain (RBD)	Recombinant N (Abbott)
Positive	307/394 (77.9%)	292/396 (73.7%)	282/396 (71.2%)
Equivocal	6/394 (1.5%)	8/396 (2.0%)	
Negative	81/394 (20.6%)	96/396 (24.2%)	114/396 (28.8%)

Positive only (N=307)



Positive or equivocal* (N=313)

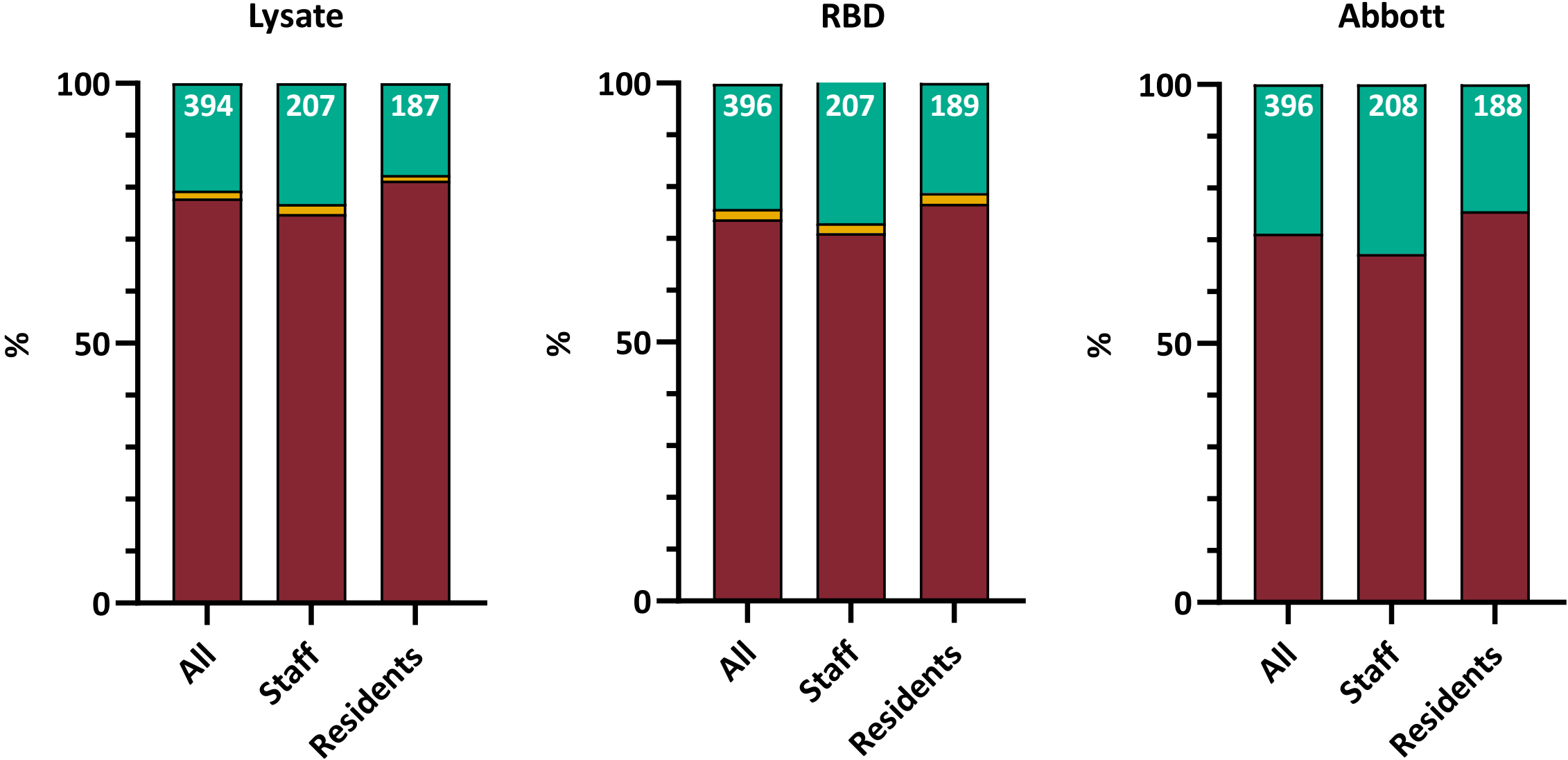
*equivocal on virus lysate or RBD



N= 397 tested on any assay
 N=394 tested on all assays
 N=396 tested on Abbott
 N=396 tested on RBD

Seroconversion in staff and residents

- Negative
- Equivocal
- Positive



Acute Survey: PCR

>28 days

Follow-up: serology

**Easter 6 PCR
N= 518**

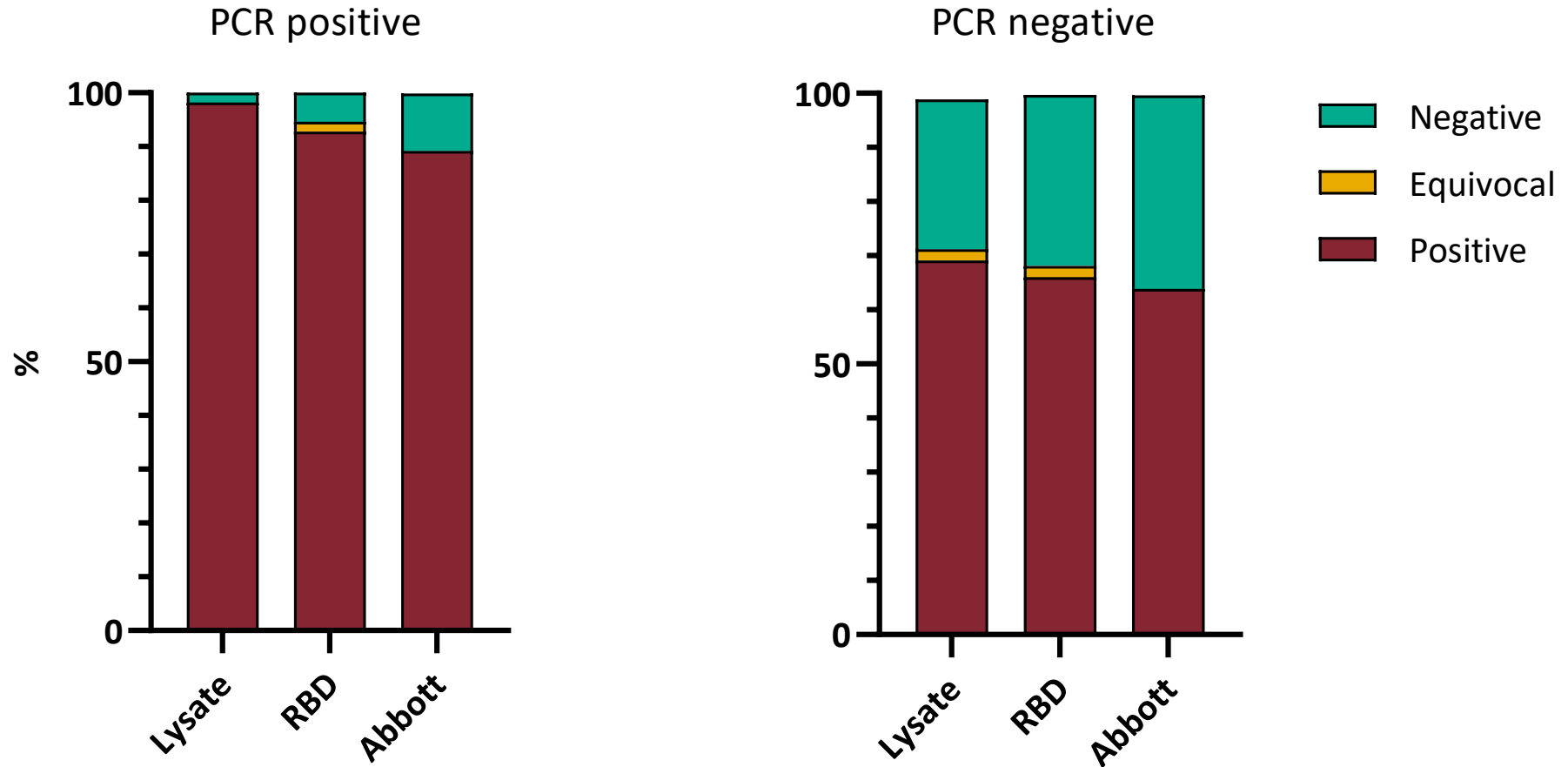
**Blood Sampling
End May
N = 397**

**PCR positive
112**

**PCR negative
285**

	Lysate	RBD	Arch
Positive	110 (98.2%)	104 (92.8%)	100 (89.2%)
Equivocal	0	2 (1.8%)	-
Negative	2 (1.8%)	6 (5.4%)	12 (10.7%)

	Lysate	RBD	Arch
Positive	197 (69.1%)	188 (66.0%)	182 (63.9%)
Equivocal	6 (2.1%)	6 (2.1%)	-
Negative	79 (27.7%)	90 (31.6%)	102 (35.7%)



- Nearly all PCR positive seroconvert by most sensitive assay
- Seroconversion underestimated by commercial assay
- High percentage of PCR negative seroconvert in outbreak setting

Acute Survey: PCR

>28 days

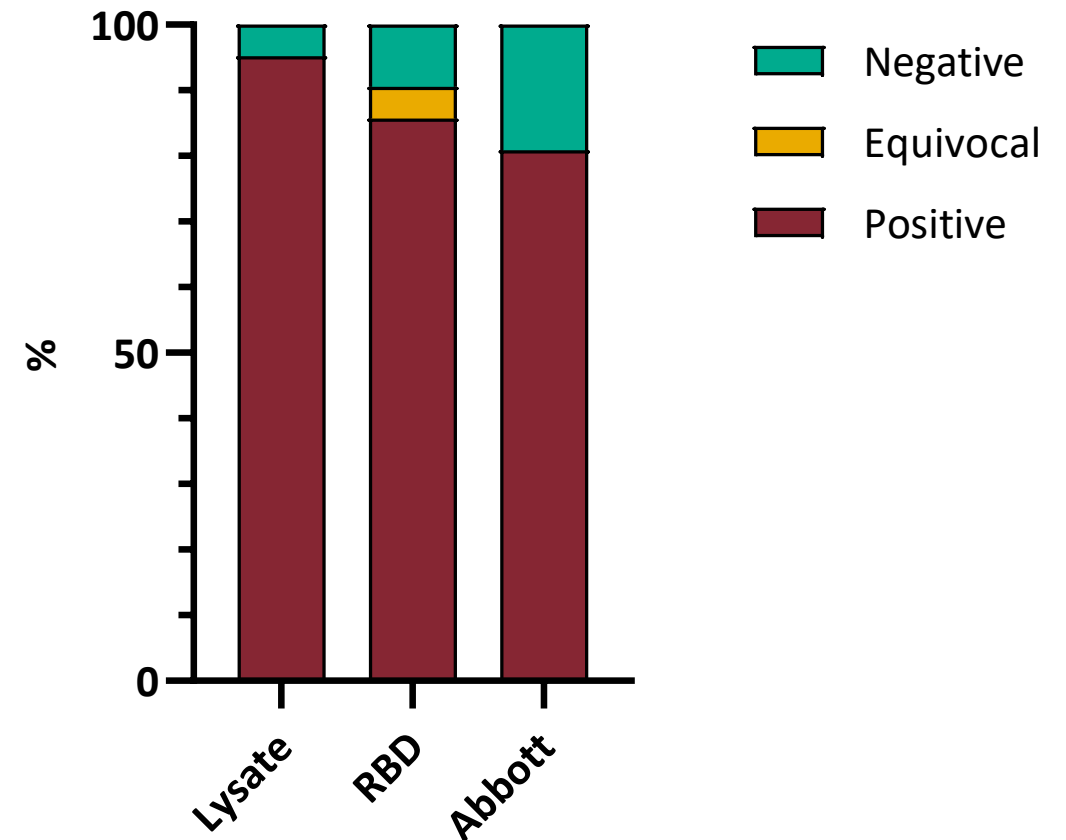
Follow-up: serology

**Easter 6
Virus isolation
N=87**

**Blood Sampling
End May
N=64**

**Virus isolate +
21**

	Lysate	RBD	Arch
Positive	20	18	17
Equivocal	0	1	-
Negative	1	2	4



Convalescent serology
N = 397

Symptomatic*
98

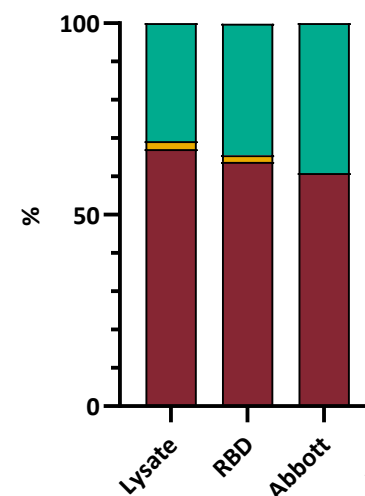
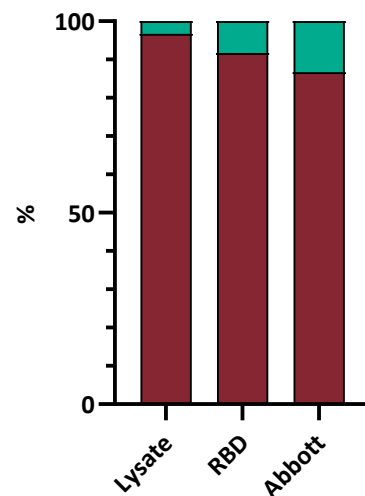
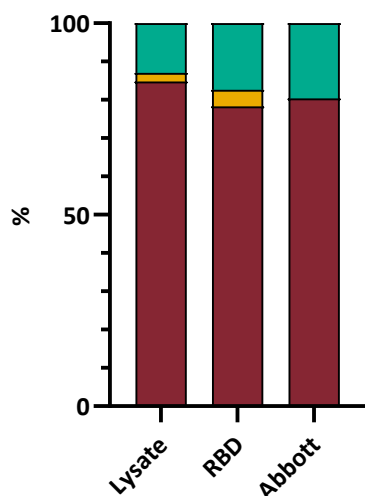
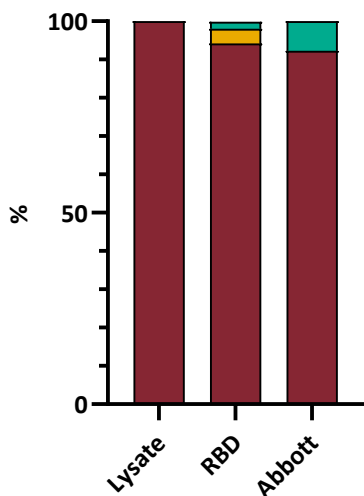
Asymptomatic
299

PCR positive
52

PCR negative
46

PCR positive
60

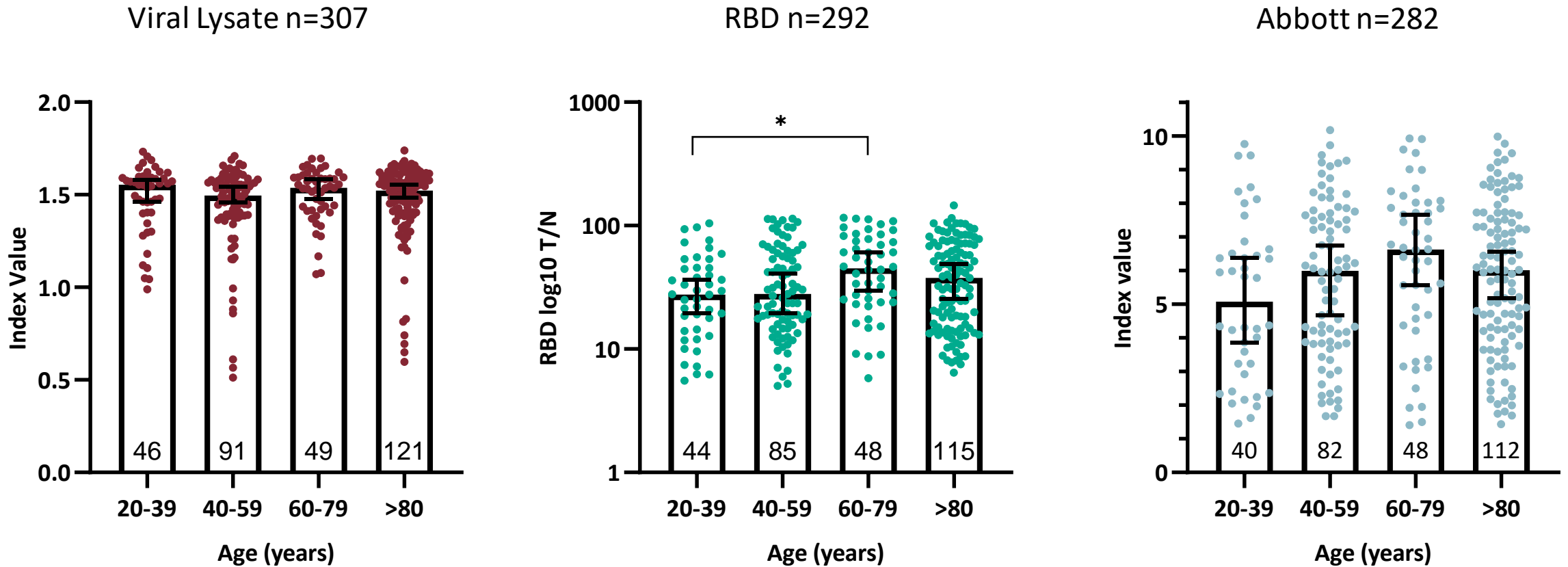
PCR negative
239



Legend:
Negative (teal)
Equivocal (yellow)
Positive (dark red)

*symptomatic at any time

Age group analysis: distribution of positives



Bars indicate median and 95% CI. Numbers on bars indicate N positive by assay in each age range indicated

Statistical analysis with Kruskal-Wallis with Dunn's multiple comparisons test. Significance where indicated: * = $p < 0.05$

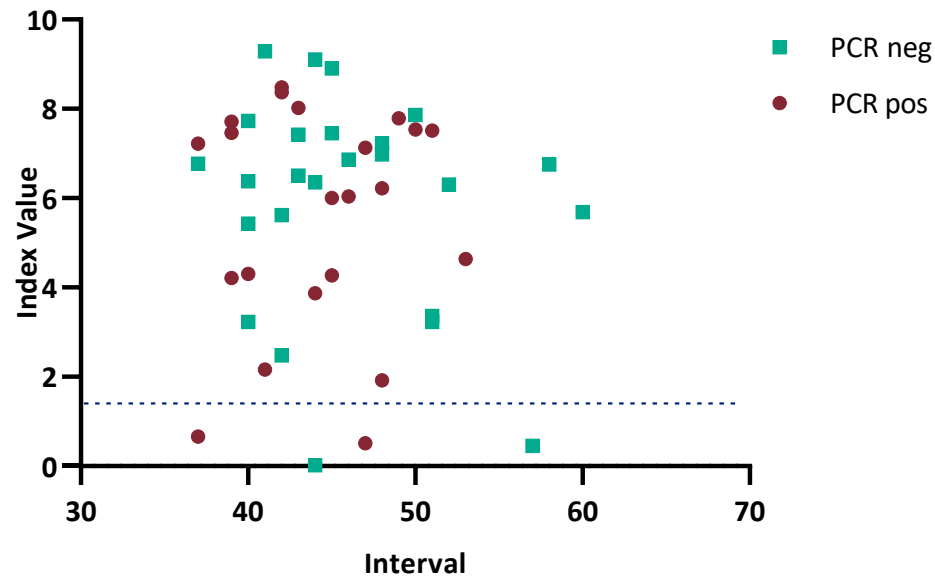
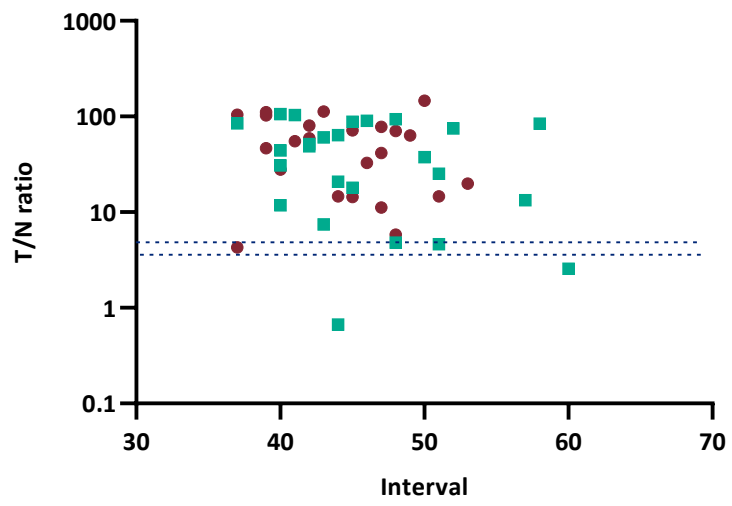
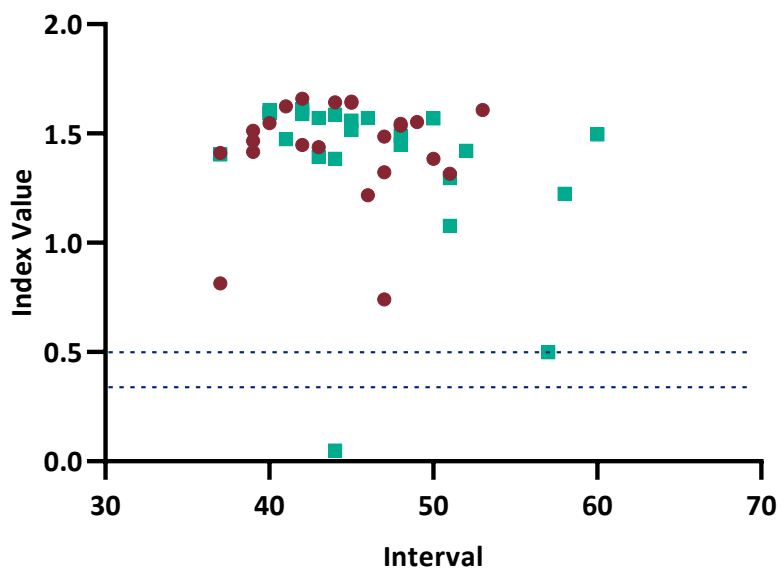
Symptomatic individuals

Seroconversion by time interval from PCR test

Viral lysate

RBD

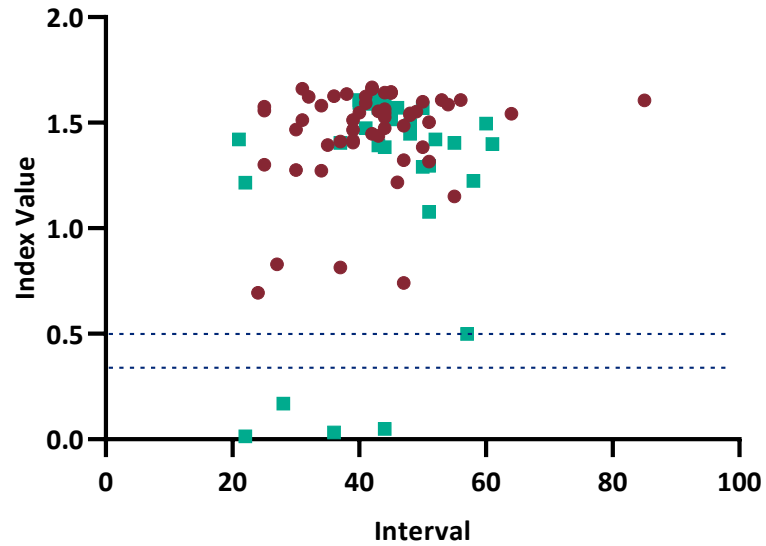
Abbott



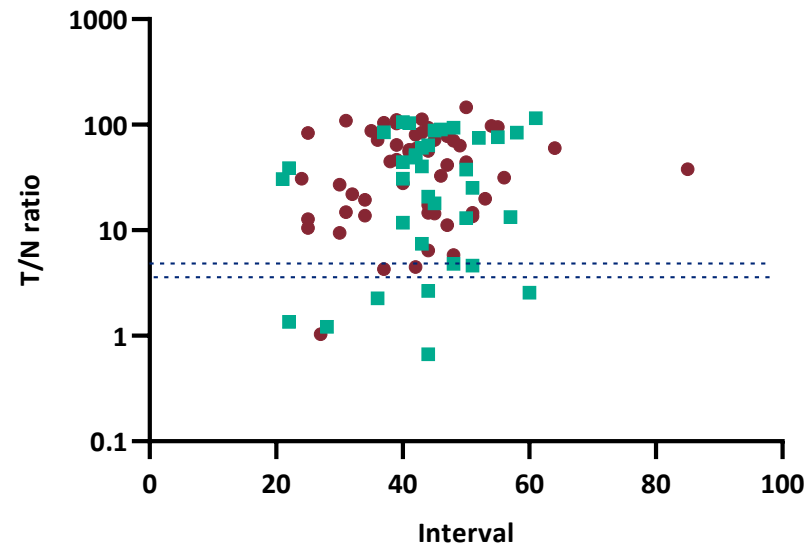
N=48 where onset date data available

Symptomatic : seroconversion from time of symptom onset

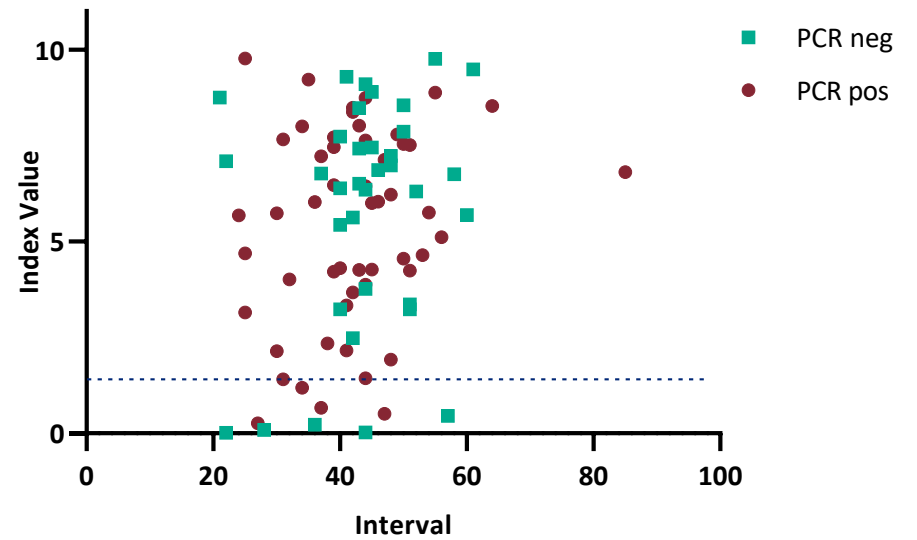
Viral lysate



RBD



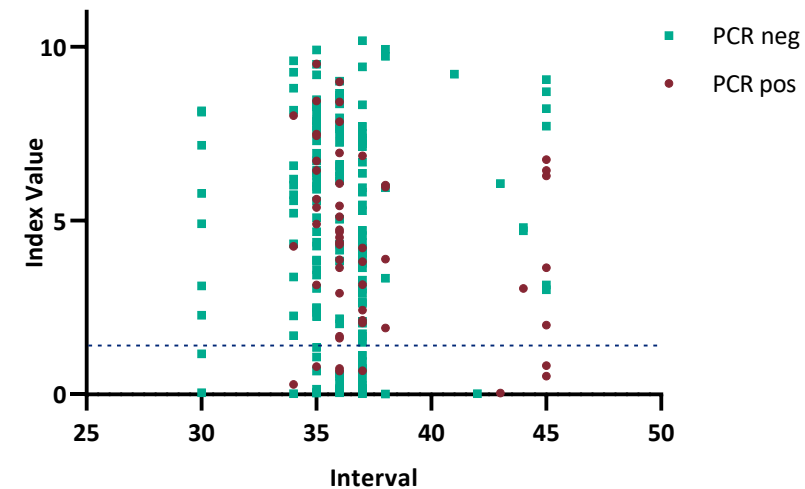
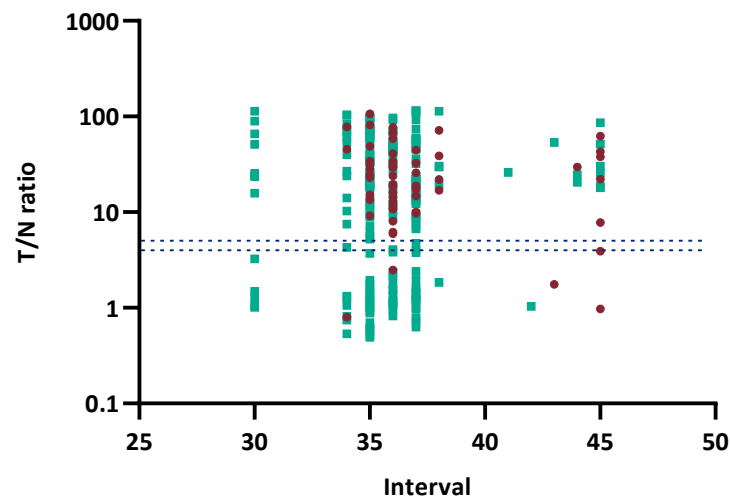
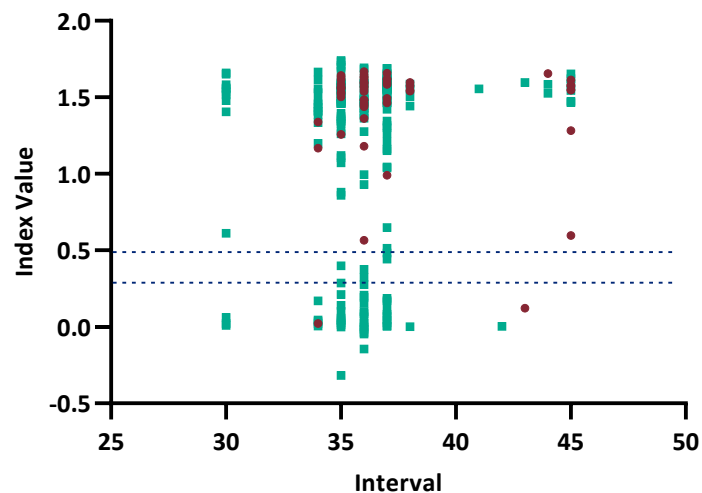
Abbott



N=88 with symptom onset date data available

Interval calculated = Serum receipt date – symptom onset date

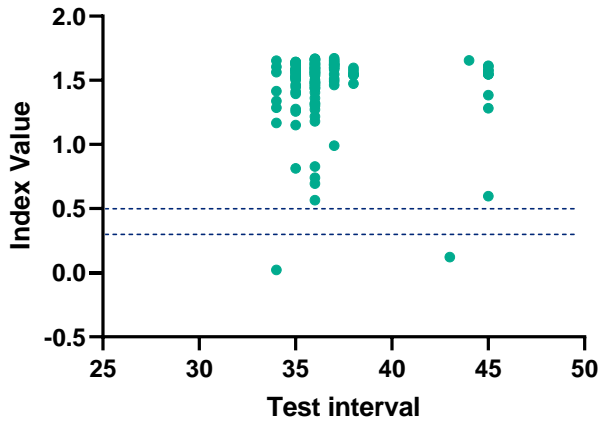
Asymptomatic throughout : interval from PCR test to blood sample



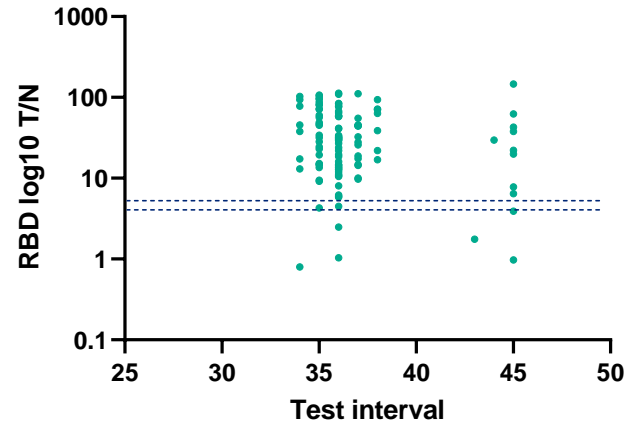
N= 291 with no symptoms documented at any time
Interval calculated = serum receipt date – PCR sample date

All results by test interval

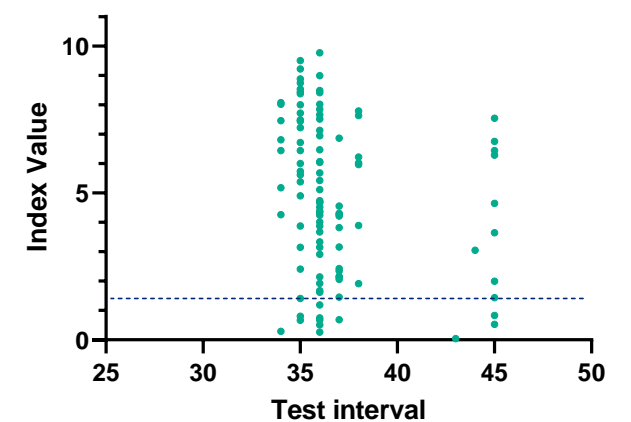
Viral lysate



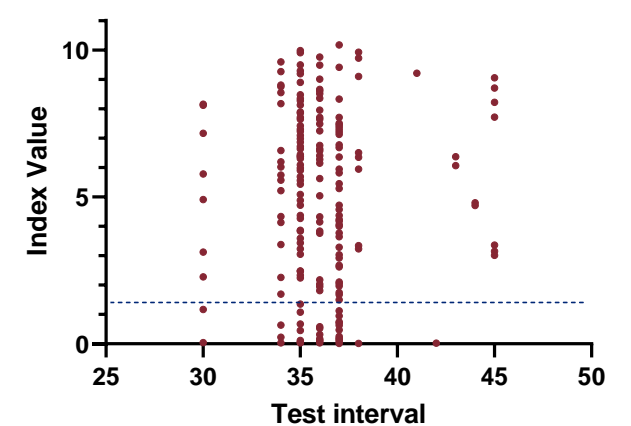
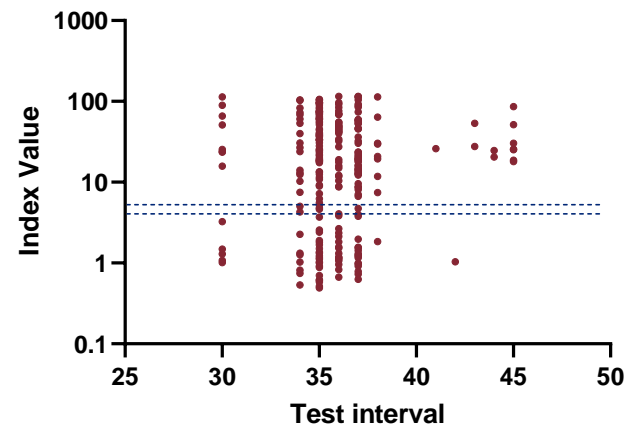
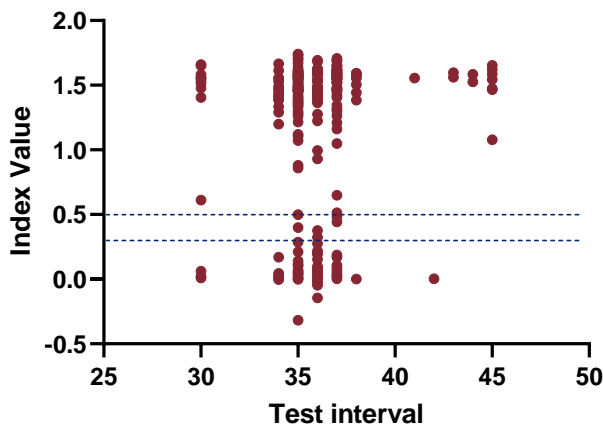
RBD



Abbott - N



PCR positive



PCR negative

Conclusions

- >98% PCR positive individuals seroconvert by most sensitive assay, irrespective of symptoms
- High percentage of PCR negative seroconvert **in outbreak setting**
- Seroconversion underestimated by commercial assay
- No clear differences in degree of serological response by age
- over short timescaleNo decline in serological response observed in symptomatic or asymptomatic groups
- No clear differences according to symptomatic or asymptomatics