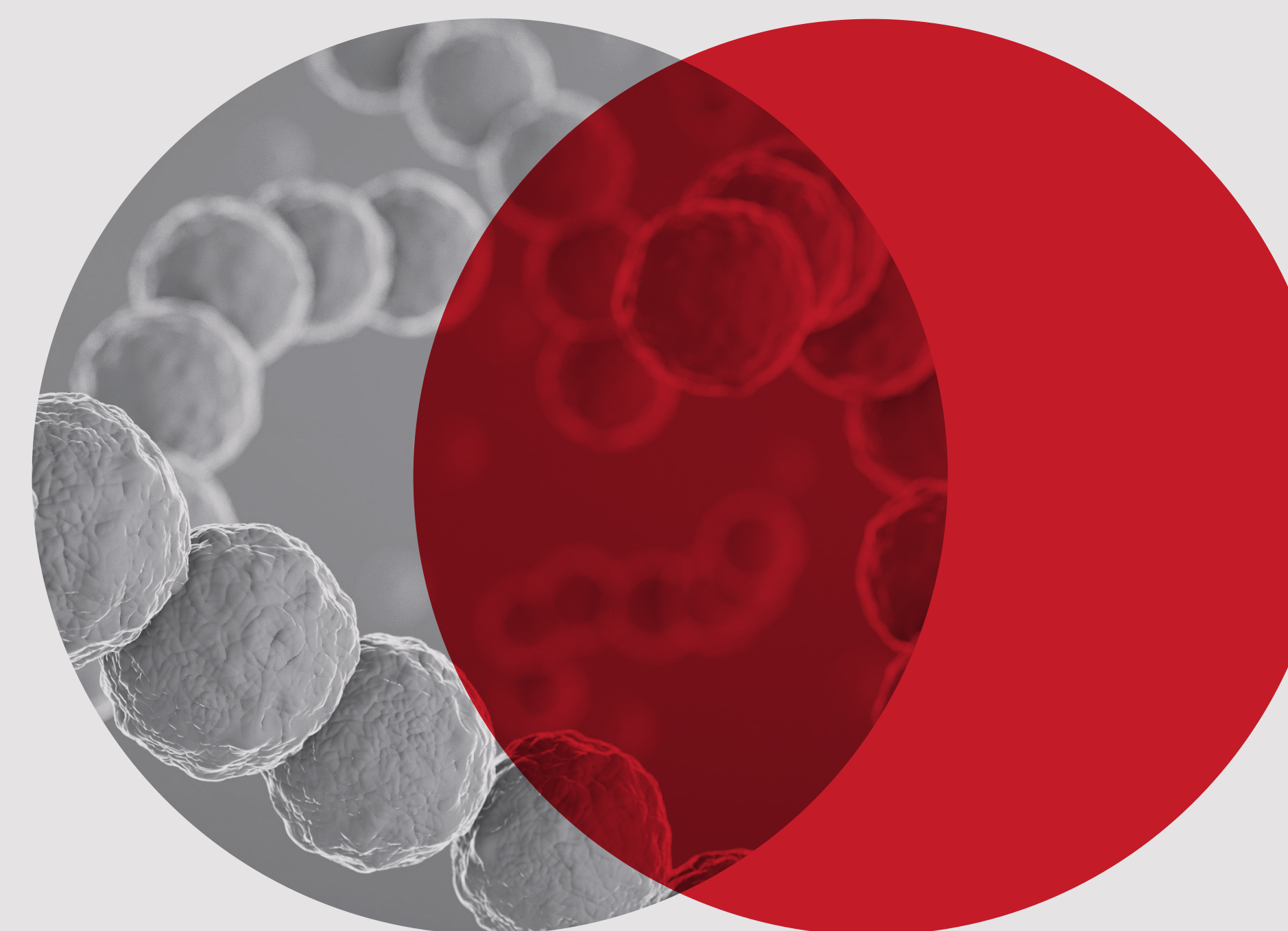# Inconsistencies in Reporting Anti-Streptolysin O: A Five Year Review

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Introduction

Anti-streptolysin O (ASO) is an antibody produced in response to the streptolysin O toxin produced by Group A streptococcus (GAS) bacteria. GAS is responsible for most sore throat infections that are generally self-limiting but in some cases, if left untreated, may result in post-streptococcal complications such as rheumatic fever and glomerulonephritis. Diagnostic reporting of ASO results is based on clinical cut-offs with reference to population studies. A rise in ASO is indicative of a preceding GAS infection, however, in some instances only a single ASO measurement may be available and its timing in relation to a possible infection is unknown.[1]
The Royal College of Pathologists of Australasia Quality Assurance Programs (RCPAQAP) has a Streptococcus serology module which includes reporting ASO both quantitatively (IU/mL) and qualitatively (significant / non-significant) linked to an associated clinical scenario. RCPAQAP undertook a 5 year retrospective review of the program data to identify any trends in performance and reporting of ASO.

Method

Two specimens are issued every survey and for this review we compared specimens where the clinical details provided were identical. From 2013 to 2017 there were 6 survey specimens (with varying levels of ASO) where the clinical notes stated "symptomatic 15-year-old patient". Statistical analysis only included data sets where participants returned results for all 6 specimens (258 sets of data from 43 laboratories). Quantitative and qualitative results were analysed against the cut-off values provided by each laboratory. Participating laboratories are assessed based on a consensus result of ≥ 80% of qualitative data. The remaining results were listed as "out of consensus".

Results

Overall, a consensus of 94% was achieved for 5 out of 6 specimens where 3 specimens had a consensus result of "non-significant" and 2 were "significant". The remaining (6%) out of consensus results were due to a variety of errors (Figure 1). The main inconsistency noted was incorrect interpretation of the results when compared to the nominated cut-off value.

Figure 1. Investigation of out of consensus results.
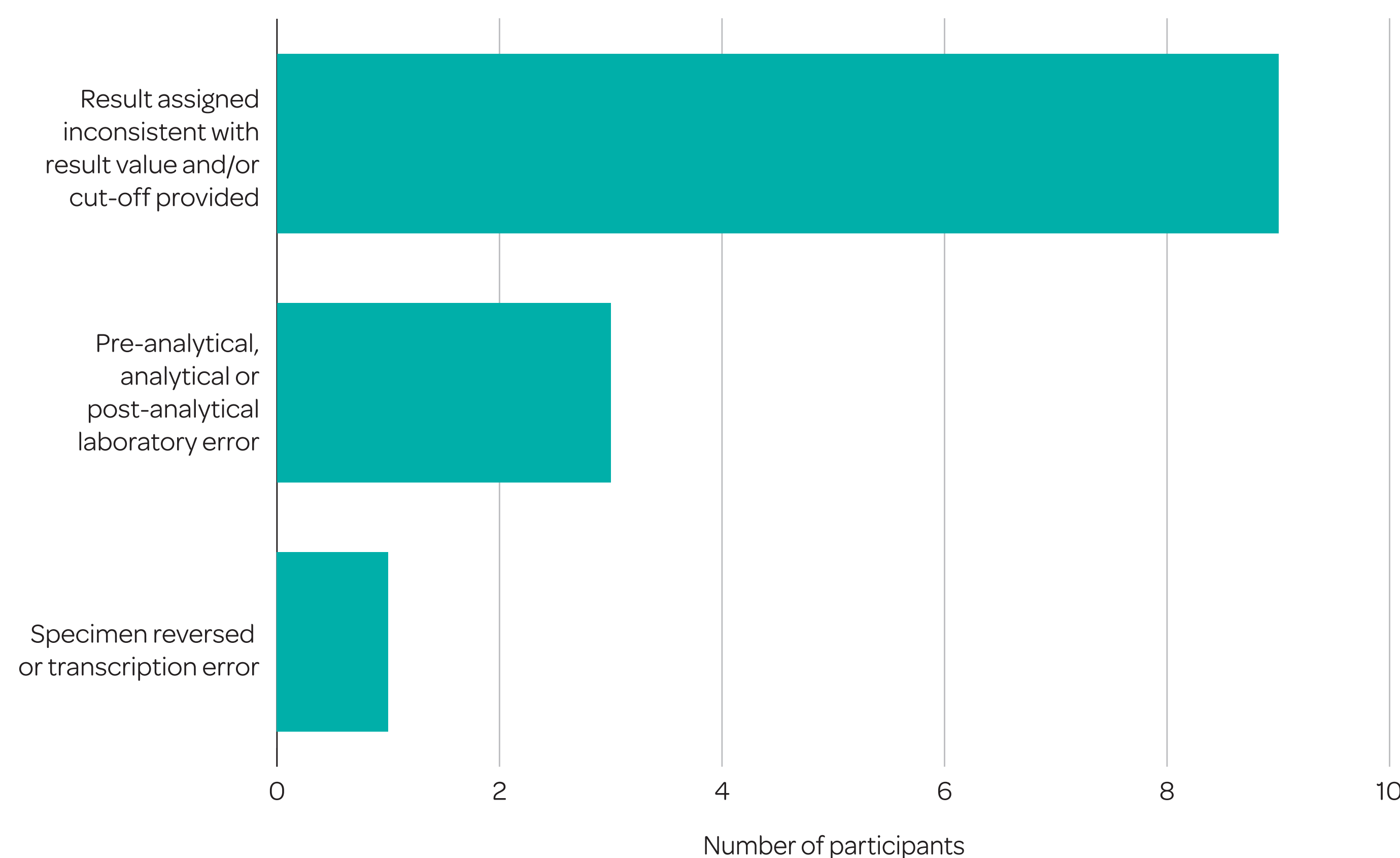
No consensus was achieved for 1 of the 6 specimens. In this survey the specimen had an ASO value close to 200 IU/mL which is the most commonly used cut-off value. However, a wide variation in cut-off values that are being reported by laboratories both between and within different test kit user groups was noted (Figure 2).

The variety of cut-off values reported by laboratories over a 5 year period for the same clinical details, "symptomatic 15 year old patient", are shown (Figure 3). 21 of 258 (8%) results were returned without the participant providing a cut-off value.

It has been noted that some manufacturer's may provide a cut-off based upon their own studies of the 'upper limit of normal' (ULN) but also recommend that individual laboratories should confirm their own cut-off values based on age and their local patient population.

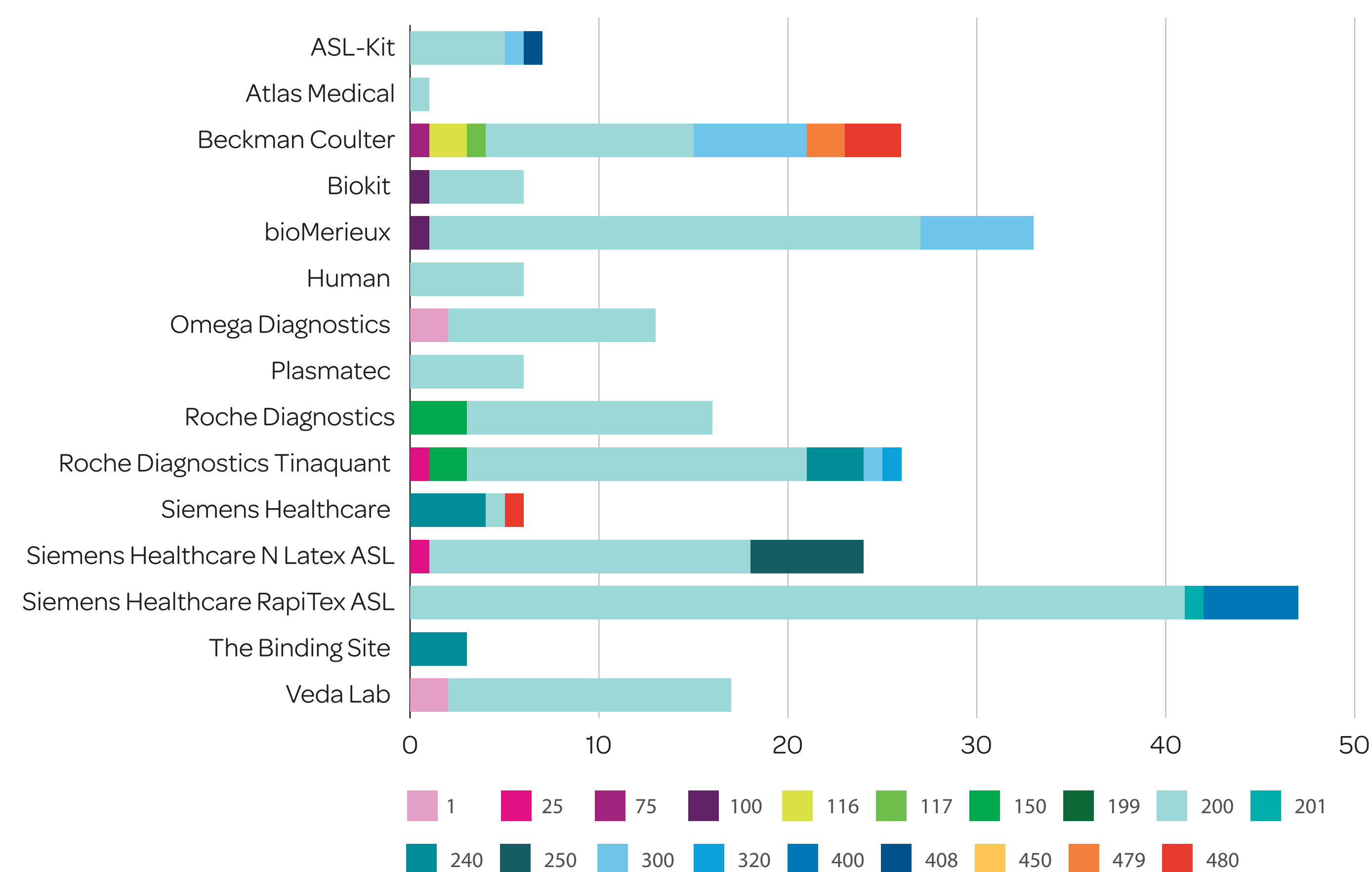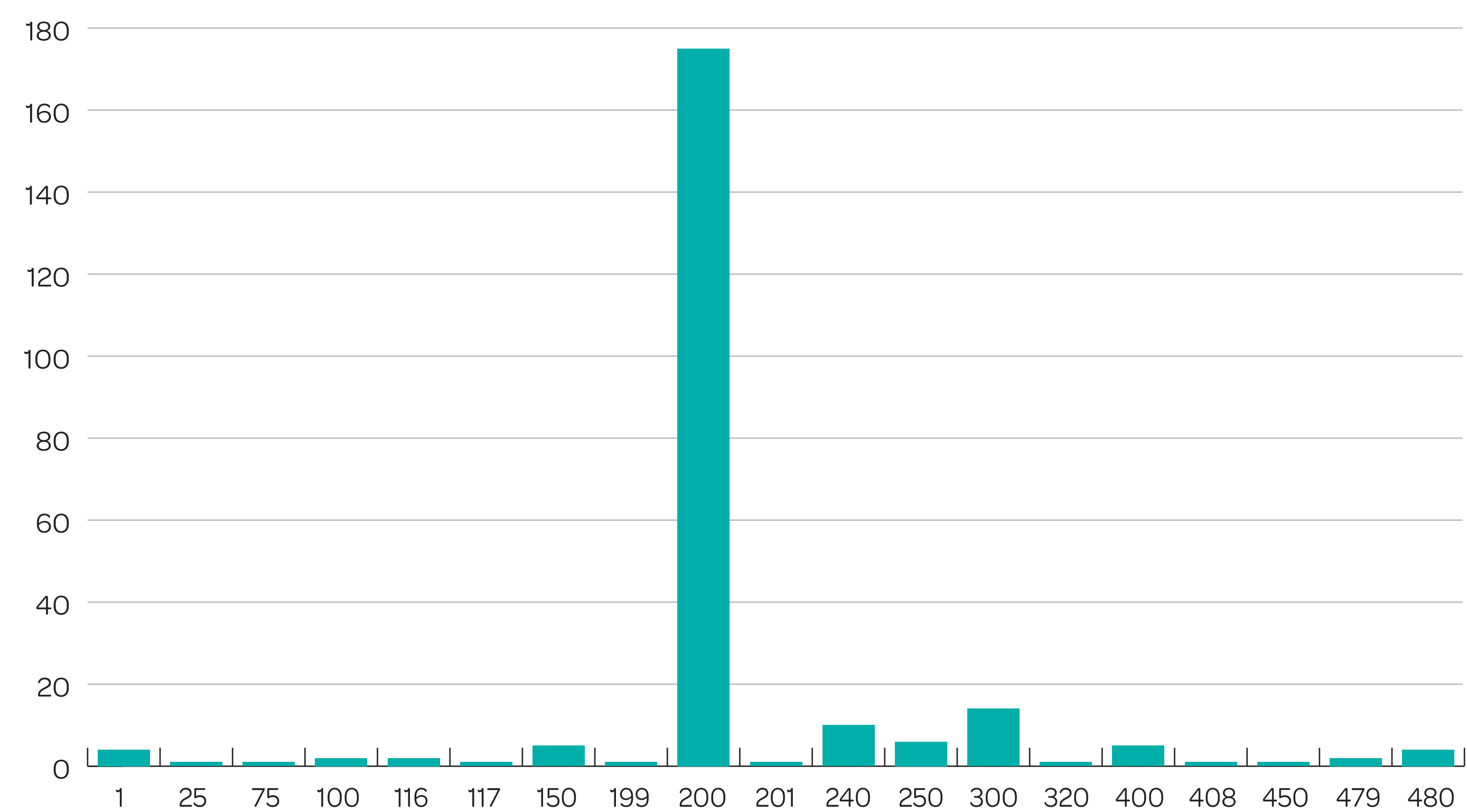**Figure 2.** Cut-off values (IU/mL) reported per user group.

Figure 3. Range of cut-off values reported.

Discussion

Studies have shown that the upper limit of normal (ULN) values are similar in temperate and tropical settings with respect to age-specific reference ranges.[2,3,4,5,6] It would be useful to be able to further categorise cut-off data based on whether a laboratory has used any manufacturer provided cut-off value or ULN derived from their own population studies.

As well as the inconsistencies in interpreting results, the spread of cut off values both between and within methods is of concern.

Conclusion

Participants provided a variety of cut-off values for the same clinical notes over the 5 year study period. This poses the question on how clinical cut-off values are being determined and reviewed to ensure consistent results are being provided to clinicians. The variation in cut-off values highlights a lack of standardisation in this area and the need for the pathology profession to act on harmonising reporting practices.

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