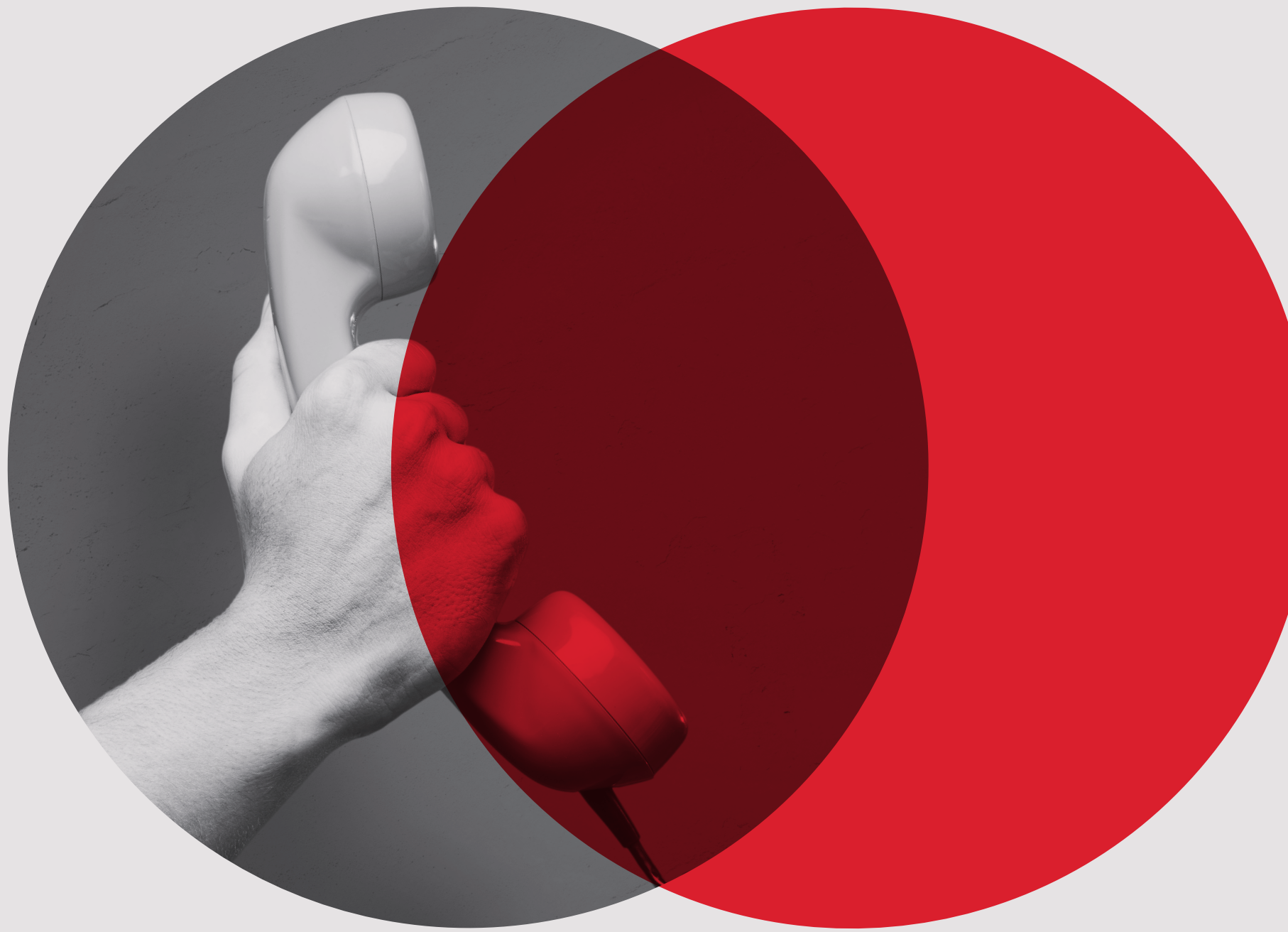


Results from 2019 Critical Calcium Results audit

Rizzi de Leon¹, Que Lam², Stephanie Gay¹

¹ Royal College of Pathologists of Australasia Quality Assurance Programs – KIMMS program, Sydney, Australia;
² Austin Pathology, Heidelberg, Victoria
² Centre of Health Systems and Safety Research, Australian Institute of Health Innovation, Macquarie University NSW



Introduction

The RCPA/AACB High Risk Results Working Party have recommended that “the laboratory should have procedures involving its users in maintaining and monitoring the outcomes of its high risk result management procedures (1). The RCPAQAP Key Incident Monitoring and Management System (KIMMS) is a Quality Assurance Program that currently monitors other pre- and post- analytical parameters (haemolysed samples, wrong-blood-in-tube). A pilot survey was established to determine whether a program could assist laboratories in determining and monitoring useful KPIs for High Risk Results.

Method

Laboratories were invited to participate in an electronic survey consisting of 14 questions. Serum calcium was chosen as the subject analyte for the pilot as it was an analyte known to be common on many alert lists. Participants were asked to retrospectively review their calcium results for the time period: 01 Jan 2019 to 31 Jan 2019.

Laboratories were classified according to whether they were ‘hospital’ or mainly ‘non-hospital’ based and according to their location: Australian state, territory or New Zealand.

Results

Upper and lower Calcium limits

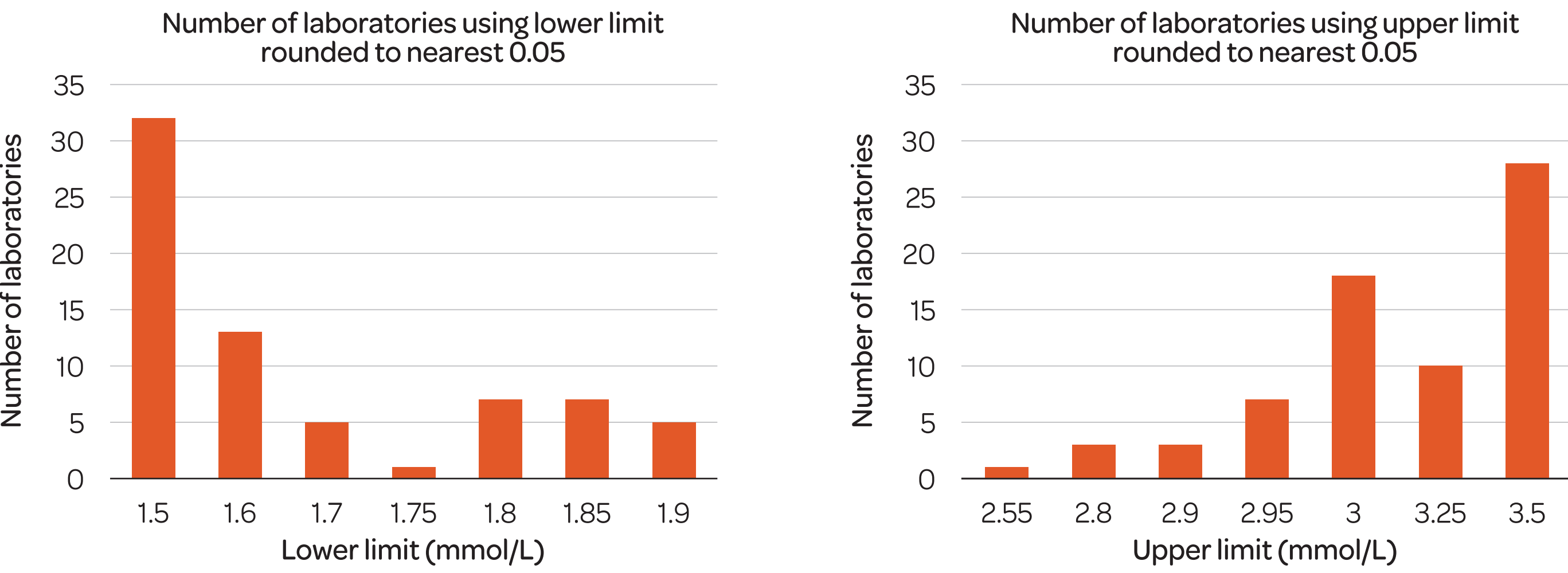
70 participants responded, all of whom had a critical calcium alert limit. Results were received from both Hospital (n=40) and non-hospital laboratories (n=30) and from all States and Territories of Australia and from New Zealand. There was no significant differences between Albumin adjusted or Total calcium alert thresholds.

Table 1. Upper and lower Critical Calcium limits, 2012 (2) vs 2019.

	2012 (mmol/L)	2019 (mmol/L)	2012 (mmol/L)	2019 (mmol/L)
	Albumin Adjusted Calcium		Total Calcium	
Lower limit median	1.75	1.50	1.78	1.69
Lower limit range	1.50–2.00	1.49–1.90	1.50–2.10	1.49–1.90
Upper limit median	3.00	3.26	3.00	3.00
Upper limit range	2.80–3.50	2.55–3.51	2.60–3.50	2.90–3.10

When grouped into levels rounded to nearest 0.05mmol/L, there were 7 different upper and lower limits (Figure 1). The majority of laboratories favoured a lower low threshold and a higher high threshold. There was no difference observed between hospital and non-hospital based laboratories or between locations.

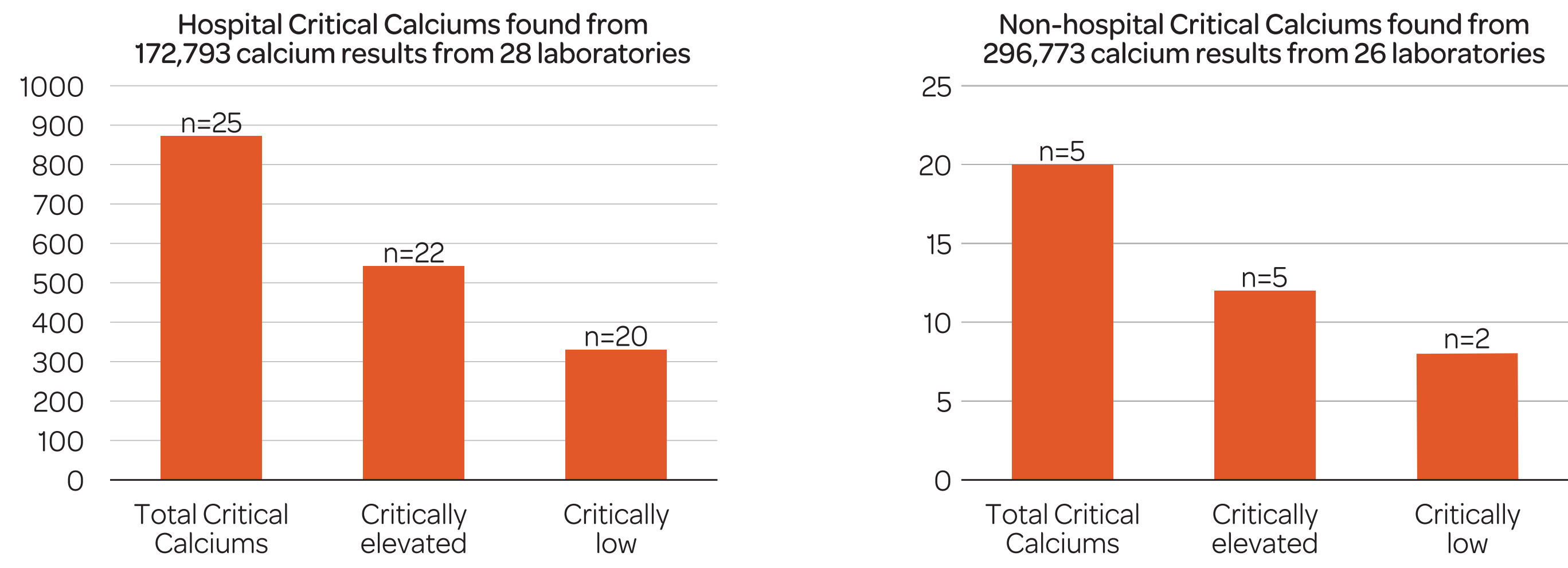
Figure 1. Grouped upper and lower Critical Calcium results thresholds.



Total number Calcium results and Critical Calcium results

In the nominated time period, almost 500,000 calcium results were reported collectively by these laboratories. Hospital laboratories accounted for 37% of the total results produced but 98% of the Critical calcium results (Figure 2). In all locations, the majority of critical results from inpatients (Table 2).

Figure 2. Number of Critical Calcium results obtained during January, 2019.



References

- 1 Consensus Statement for the management AND communication of High Risk Laboratory Results. Campbell, C et al. Clin Biochem Rev 2015, 36(3): 97-105
- 2 Towards harmonisation of critical laboratory result management – review of the literature and survey of Australian practices. Campbell C, Horvath A. Clin Biochem Rev 2012,33:149-60

Table 2. Critical Calcium results by source and state.

Hospital Laboratory	Inpatient (%)	Outpatient (%)	Community (%)
Hospital Laboratories			
Australian Capital Territory	90	10	
New South Wales	91	8	1
Northern Territory	100		
Queensland	95	5	
South Australia			
Tasmania	65	30	5
Victoria	77	12	11
Western Australia			
New Zealand	58	22	21
Non-Hospital Laboratories			
New South Wales			100
Queensland	40	20	40

Notification

Notification occurred in 56% of high risk calcium results in hospital laboratories and in 83% for non-hospital based laboratories. Table 3 shows the reasons identified for non-notification. These results represent 45% (389) of the initial 872 Critical Calcium results obtained by reporting laboratories for January 2019. Of the 52 not attempted due to non-conformance, only 16 reasons were given:

- Community patients – unable to contact referrers (1)
- Patients discharged and unable to contact primary care Dr (2)
- Mix up between staff as to whether result had already been phoned (1)
- Previous history of hypercalcaemia or history of ESRF (6)
- Failure to follow procedure (6)

Table 3. Results of notification to referrers of Critical Calcium results.

Notification	Hospital (n=19)	Non-hospital (n=4)
Successful	217 (56%)	5 (83%)
Unsuccessful		1 (17%)
Not attempted due to lab rules	114 (30%)	
Not attempted – non-conformance	52 (14%)	

Table 4. Average notification time and the range of notification times for Critical Calcium.

Average Notification Time	Range of Notification Times	Number of Critical Calcium Results
0	0–1	20
1	0–9	19
3	1–5	4
8	4–51	19
8	2–90	23
12	0–58	12
26	17–56	9
56	44–68	3
86	14–158	4

Discussion

The strength of our findings would have been improved with participation from a larger number of laboratories. The pilot survey demonstrated that useful information could be collected from laboratories for the purpose of quality assurance. Questions needed to be focused on information easily obtainable from laboratories as participant numbers fell when more manual extraction of data was required. Question design is crucial such as the phrasing of the question regarding the beginning of the upper and lower alert thresholds; it was suspected that an alert threshold of 3.00 mmol/L was sometimes reported as 3.00 and sometimes as 3.01.

Information such as alert thresholds used, rates of high risk results and the rate of unsuccessful notification were parameters identified as providing a “benchmark” for laboratories or a way of monitoring adherence to their procedures.

Conclusion

It is feasible that a modified version of the survey could be repeated with other analytes (including those outside biochemistry). Regular survey participation would provide participants a way to identify issues and monitor their procedures as well as providing valuable information of high risk results management across Australasia over time.

