

# Exploring university education variation: A quantitative survey of Australian and Aotearoa New Zealand undergraduate paramedical electrocardiology content

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## Background

Three patient deaths in the UK have been attributed to paramedic misinterpretation of electrocardiograms (ECGs) and linked to inconsistent undergraduate education.<sup>1,2,3</sup> A 2025 report stated that ‘there is confusion about the level of specialist knowledge paramedics may be expected to have... There is no formal national requirement setting out if, how and to what standard 12-lead ECG competency should be assessed.’<sup>1 p. 4</sup> Perhaps more starkly, in 2024 an Australian paramedicine course coordinator stated ‘I don’t know what the hell we’re supposed to be teaching them?’<sup>4 p. 12</sup> In Australian and Aotearoa New Zealand, 18 universities are authorised to deliver entry-to-practice bachelor’s degrees in paramedicine. Although national bodies set broad professional capabilities for registration, they do not prescribe specific curricula. Such curricular autonomy risks inconsistency – and potentially consequential patient harm.

## Aims

This study determined the degree of overlap in electrocardiology content across university programs, including the depth to which key topics are taught and assessed. Electrocardiology was used as an exemplar to explore the extent of educational variation resulting from the absence of a minimum defined curriculum.

## Method

A taxonomy of 377 possible electrocardiograph topics was developed and pretested in five stages over ten months. Participants could select a topic as ‘Assessed’, ‘Practiced’, ‘Theory Only’, or ‘Not Taught’, or opt out. Between January and April 2025, the electrocardiology unit coordinator at each of the 18 accredited universities in Australian and Aotearoa New Zealand was invited to participate. Data were analysed using the Jaccard coefficient, with an *a priori* threshold of 70% set to indicate a sufficient level of overlap. Free text responses from educators on their viewpoints on educational consistency were collected and underwent content analysis.

## Results

Fourteen institutions (78% response rate) completed the survey. Across 91 university pair comparisons, the median Jaccard coefficient was 52%, with a range of under 1% to 90% and interquartile range of 48% to 60%, illustrated in Figures 1 and 2. Of 377 topics, 15 (4%) were taught the same across all participant universities. A further 114 topics (30%) were taught to differing depth at all universities, while 248 (66%) topics were taught at only some universities and not at others. Table 1 shows examples of responses. Educators expressed uncertainty about curricula, with one stating: ‘At the moment, it’s hard to know if we are teaching too much or not enough’, while another stated ‘There should be a standardised minimally accepted practice level for ECGs in paramedicine in Australia.’

Figure 1:  
Distribution of Jaccard coefficients

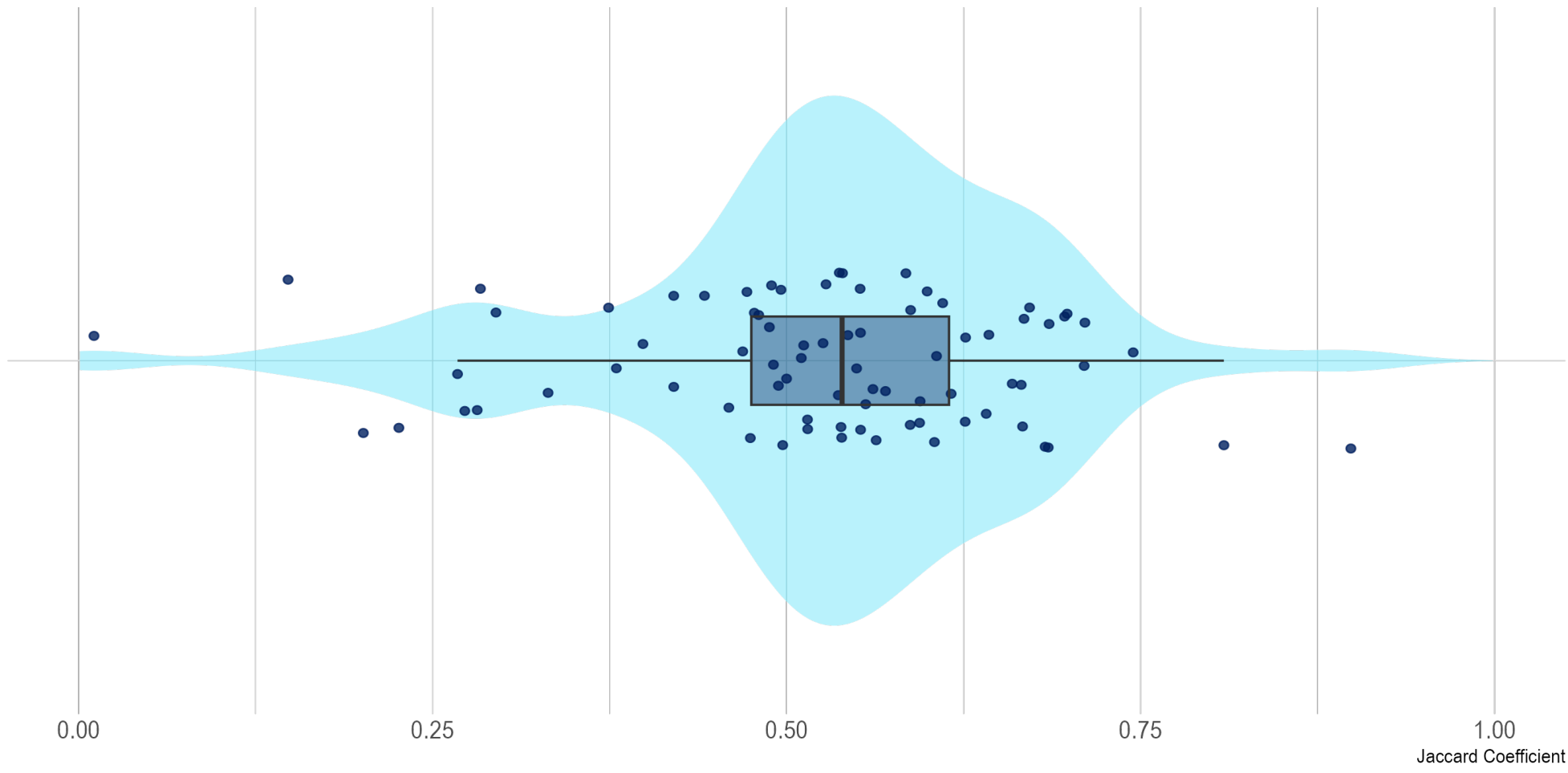


Figure 2:  
Heatmap of Jaccard coefficients for each pair of Universities

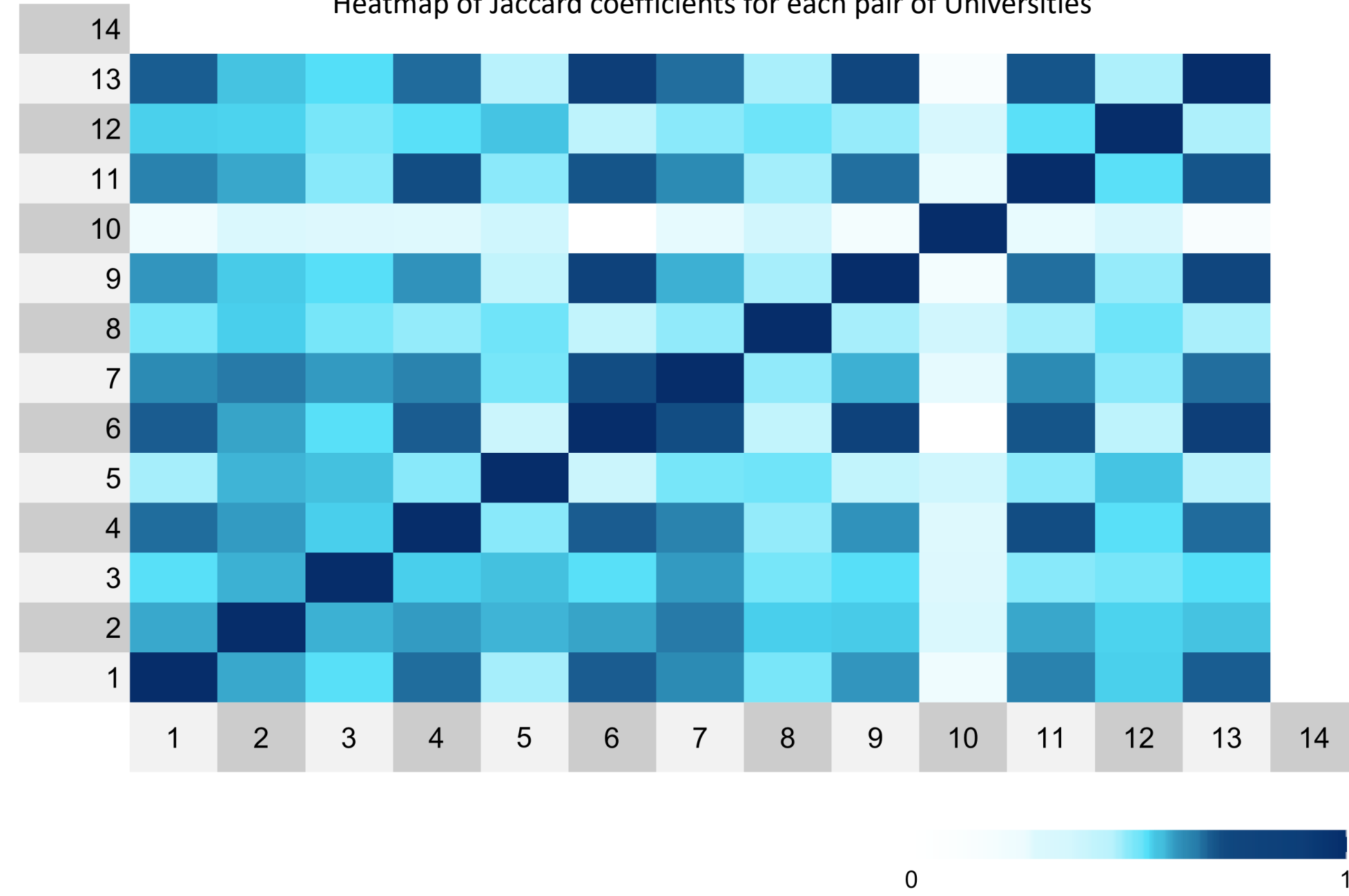


Table 1:  
Example of responses, using the ‘ACOMI – STEMI Equivalents’ responses

	Reciprocal changes only - posterior or isolated RVMI	Left main coronary artery occlusion	New left bundle brach block	New left bundle - Smith-modified Sgarbossa	Wellens - Type A	Wellens - Type B	de Winter	Aslanger
University 1	Theory only	Theory only	Theory only	Not taught	Theory only	Not taught	Theory only	Not taught
University 2	Practiced	Unsure / taught elsewhere	Practiced	Assessed	Practiced	Practiced	Unsure / taught elsewhere	Unsure / taught elsewhere
University 3	Not taught	Not taught	Not taught	Not taught	Not taught	Not taught	Not taught	Not taught
University 4	Assessed	Not taught	Not taught	Not taught	Assessed	Assessed	Assessed	Not taught
University 5	Theory only	Theory only	Theory only	Theory only	Theory only	Theory only	Theory only	Theory only
University 6	Not taught	Not taught	Not taught	Not taught	Not taught	Not taught	Not taught	Not taught
University 7	Assessed	Assessed	Assessed	Assessed	Unsure / taught elsewhere	Unsure / taught elsewhere	Unsure / taught elsewhere	Unsure / taught elsewhere
University 8	Assessed	Theory only	Not taught	Assessed	Not taught	Not taught	Not taught	Not taught
University 9	Practiced	Not taught	Assessed	Practiced	Practiced	Practiced	Practiced	Not taught
University 10	Assessed	Assessed	Assessed	Theory only	Theory only	Theory only	Assessed	Theory only
University 11	Not taught	Not taught	Theory only	Not taught	Theory only	Not taught	Not taught	Not taught
University 12	Theory only	Theory only	Theory only	Theory only	Assessed	Theory only	Theory only	Not taught
University 13	Not taught	Practiced	Practiced	Practiced	Practiced	Practiced	Practiced	Not taught
University 14	Assessed	Assessed	Assessed	Assessed	Theory only	Theory only	Theory only	Unsure / taught elsewhere

## Recommendations

1. A Delphi process involving the Australasian Council of Paramedicine Deans, the Council of Ambulance Authorities, and the Australasian College of Paramedics, and employers (from ambulance, emergency departments, urgent care centres, general practice clinics, and beyond) should be undertaken to establish the minimum required curriculum in electrocardiology for Australian entry-to-practice paramedicine programs.
2. Key stakeholders including employers, universities, and government departments should utilise the study dataset to understand graduate capabilities and in turn identify priorities for education and training.
3. Minimum standards should be developed for core areas of paramedicine within entry-to-practice programs to ensure consistency and quality across the sector.

