



## Original Article

## Perceptions of intensive care triage in Australia and New Zealand in 2009 and 2023

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## A B S T R A C T

**Objective:** Intensive care (ICU) beds are scarce and decision-making regarding admission is complex and multi-factorial. This study aimed to characterise differences in admission decision making between Australia and New Zealand and compare to previous data to establish changes over time.

**Design:** Online Survey.

**Setting and Participants:** An online survey was distributed to Australian and New Zealand intensive care doctors measuring triage behaviours in the last week and responses to ICU triage scenarios.

**Main Outcome Measures:** Perceived ICU admission behaviours.

**Results:** 103 responses were obtained, 83(80.6%) from Australia and 97 (94.2%) from specialist intensivists. The median number of triage decisions and patients declined were 6-10 and 1-5 respectively. No difference was noted in the role of ICU bed capacity in decision making between Australia and New Zealand. Compared to Australian intensivists, New Zealand intensivists were less likely to admit a patient: with relapsed acute myeloid leukaemia (AML) and acute respiratory distress syndrome (ARDS)( $p=0.03$ ), with persistent vegetative state and community acquired ( $p=0.02$ ) or iatrogenic ( $p=0.03$ ) pneumonia. Compared to respondents in 2009 ( $n=238$ ), 2023 respondents were more likely to admit a patient: with a severe intracranial bleed who may become braindead ( $p=0.005$ ), with relapsed AML and ARDS ( $p=0.02$ ), with stroke for palliative care ( $p<0.001$ ); and less likely to admit a patient with persistent vegetative state and iatrogenic pneumonia ( $p=0.03$ ). In a multivariable analysis, respondents from Australian compared to New Zealand and from 2023 compared to 2009 were more likely to indicate they would admit patients to the ICU in the scenarios described ( $p<0.001$  for both comparisons).

**Conclusions:** Our study suggests that New Zealand intensivists may apply more restrictive ICU admission criteria than Australian intensivists. Changes in attitudes to admission since 2009 may reflect increased awareness of the importance of facilitating organ donation and the role of ICU as providers of palliative care.

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## 1. Introduction

As intensive care unit (ICU) beds are scarce, appropriate allocation of beds is important to ensure limited health care resources are used wisely. Decisions regarding admission to the ICU are complex, and while guidelines and triage tools exist,<sup>1,2</sup> decisions are primarily made on a case-by-case basis by treating clinicians without reference to such tools. Previous studies have described a variety of factors affecting decisions about admission or refusal to the ICU<sup>3–5</sup>

and availability of beds has been noted as a frequent reason for admission refusal.<sup>6</sup>

In 2022, Australia had approximately nine beds per 100,000 population<sup>7</sup> and New Zealand had four per 100,000.<sup>8</sup> While the number of beds per capita in Australia had not substantially changed since 2006, the number had fallen in New Zealand from 5.5 per 100,000.<sup>9</sup> Notably, since these data were published there has been significant investment in ICU in both countries which may have altered these numbers. Moreover, significant differences exist between New Zealand and Australia in terms of private ICU bed availability and other healthcare resources which may affect ICU triage decisions. A 2009 survey describing ICU triage decisions by Australian and New Zealand ICU doctors showed that New Zealand clinicians were more selective in their admissions to the ICU than

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**Table 1**  
Triage scenarios.

1. A previously well 50-year-old woman with an intracerebral haemorrhage that the neurologist describes as “non-survivable” who you feel may progress to brain death in the next 48 h (Non-survivable ICH, may become brain dead)
2. A 30-year-old female with relapsed acute myeloid leukaemia following a bone marrow transplant who has ARDS and who you believe will imminently require intubation. (Relapsed AML with ARDS)
3. A 30-year-old male with pneumonia requiring ventilation who has been in a persistent vegetative state for the past five years following a severe traumatic brain injury. (Pneumonia in patient in PVS)
4. A 30-year-old male with pneumonia requiring ventilation who has been in a persistent vegetative state for the past five years following a severe traumatic brain injury who has developed aspiration pneumonia due to malposition of a feeding tube in the right main bronchus. (Iatrogenic pneumonia in patient in PVS)
5. A 70-year-old male with an infective exacerbation of COPD who has a documented FEV1 of 0.9L (30 % predicted) and has failed to improve despite non-invasive ventilation for 6 h in the emergency department. He lives at home but requires help with showering, shopping and meals. (Exacerbation of COPD with borderline functional status)
6. A 95-year-old man with no previous medical history who the anaesthetist, despite appropriate attempts, has been unable to extubate due to drowsiness and hypoventilation following a laparoscopic hernia repair. (Elderly patient unable to extubate)
7. An elderly patient with a massive stroke who has been intubated in a crowded emergency department but is now to be extubated and palliated. (Elderly stroke patient to be palliated)

Abbreviations: ARDS: acute respiratory distress syndrome; ICH: intracerebral haemorrhage; PVS: persistent vegetative state COPD: chronic obstructive pulmonary disease, FEV1: Forced expiratory volume in 1 s. Brief descriptions of scenarios are provided in parentheses.

their Australian counterparts.<sup>10</sup> Since then, the effects of the COVID-19 pandemic have shown the importance of ICU triage and, its impact, combined with changes in bed availability may have altered clinicians practice in triage decisions.

We hypothesised that triage practice in Australia and New Zealand may have changed since 2009 and sought to quantify this. Further, we aimed to gather data on factors leading to decisions to decline ICU admission.

**Table 2**  
Demographic data of respondents.

Variable n (%)	2023 respondents (N = 103)	2009 respondents (N = 238)
Location of respondents		
New Zealand	20(19.4)	47(19.7)
Australian Capital Territory	1(1.0)	2(0.8)
Victoria	21(20.4)	46(19.3)
New South Wales	17(16.5)	49(20.6)
Queensland	25(24.3)	37(15.5)
South Australia	6(5.8)	23(9.7)
Northern Territory	4(3.9)	6(2.5)
Western Australia	9(8.7)	20(8.4)
Tasmania	0	3(1.3)
Other	0	5(2.1)
Respondent Experience		
Trainee	6(5.8)	129(54.7)
Specialist with <5 years experience	20(19.4)	35(14.8)
Specialist with 6–10 years experience	12 (11.7)	24(10.2)
Specialist with >10 years experience	20 (19.4)	48(20.3)
Specialist with >15 years experience	45 (43.7)	
Nature of Practice		
Tertiary or quaternary adult/mixed ICU (Level 3)	68(66.0)	167(70.5)
Other urban or regional adult/mixed ICU (Level 2)	16(15.5)	23(9.7)
Rural ICU (Level 1–2)	4(3.9)	7(3.0)
Paediatric ICU (PICU)	9(8.7)	12(5.1)
Private ICU	6(5.8)	28(11.8)
Not currently working in an ICU	0	37(15.6)
Additional qualifications		
FANZCA	22(21.4)	47(19.7)
FACEM	10(9.7)	19(8.0)
FRACP	24(23.3)	38(16.0)
Other	12(11.7)	0

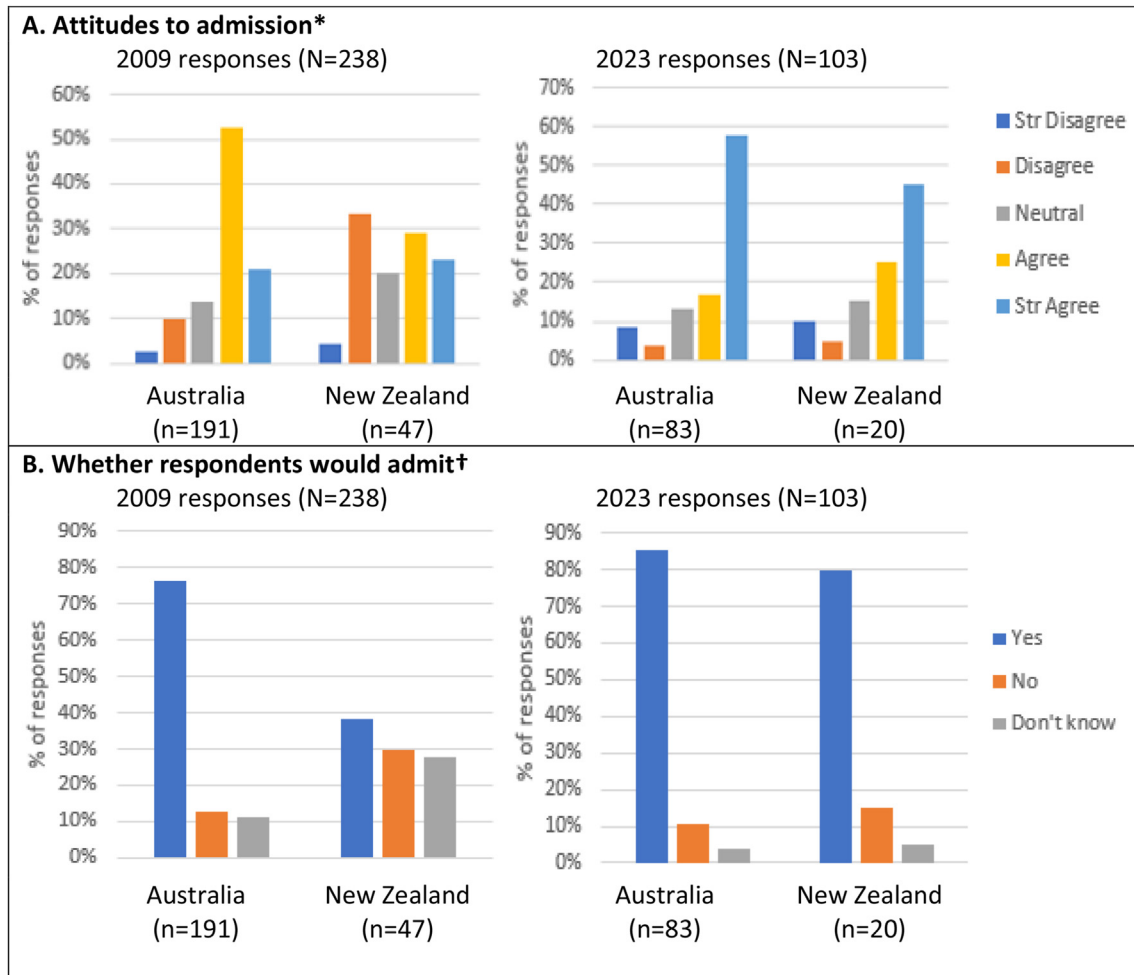
## 2. Methods

We conducted an online survey of intensive care clinicians and intensive care trainees in Australia and Zealand. The sample was gathered via the Australian and New Zealand Intensive Care Society Clinical Trials Group (ANZICS CTG) mailing list. The invitation to complete the survey was extended to ICU specialists and trainees on the ANZICS CTG mailing list via email on the 11th April 2023 and the survey closed on the 5th May.

Survey questions were presented via the Google Forms online platform (Google, USA) and responses were exported to Microsoft

**Table 3**  
Responses regarding triage decisions made in the last week by respondents.

Variable n (%)	Responses
Does respondent make triage decisions?	
Yes	99 (96.1)
No	4 (3.9)
Number of triage decisions in last 7 days	
0	7 (7.1)
1–5	26 (26.3)
6–10	39 (39.4)
11–15	15 (15.2)
16–20	6 (6.1)
21–25	1 (1.0)
Greater than 25	5 (5.1)
Number of patients declined in last 7 days	
0	23 (23.2)
1–5	68 (68.7)
6–10	4 (4.0)
11–15	2 (2.0)
16–20	1 (1.0)
21–25	1 (1.0)
If respondent declined a patient, did they review them personally?	
Always	4 (4.0)
Often	30 (30.3)
Sometimes	36 (36.4)
Never	9 (9.1)
Not applicable	16 (16.2)
Did ICU bed capacity contribute to decisions to decline patients?	
Yes	31 (31.3)
No	52 (52.5)
Not applicable	16 (16.2)
Other factors affecting triage decisions	
Patient's ability to benefit from ICU care	75 (75.6)
Reversibility of patient's pathology	64 (64.6)
Patient age	29 (29.3)
Patient co-morbidity	60 (60.6)
Patient functional status	67 (67.7)
Other	2 (2.0)
Not applicable	16 (16.2)



\* There was no statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P=0.25$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who agreed or strongly agreed with admission ( $P=0.58$ ).

† Comparing responses from 2009 and 2023 there was no statistically significant difference in proportion of respondents who would admit in this scenario ( $P=0.07$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who would admit ( $P=0.83$ ).

**Fig. 1.** Scenario 1: **A.** Responses to the question 'Do you agree with ICU admission for the patient: A previously well 50-year-old woman with an intracerebral haemorrhage that the neurologist describes as "non-survivable" who you feel may progress to brain death in the next 48 h?' And, **B.** whether respondents would admit the patient.

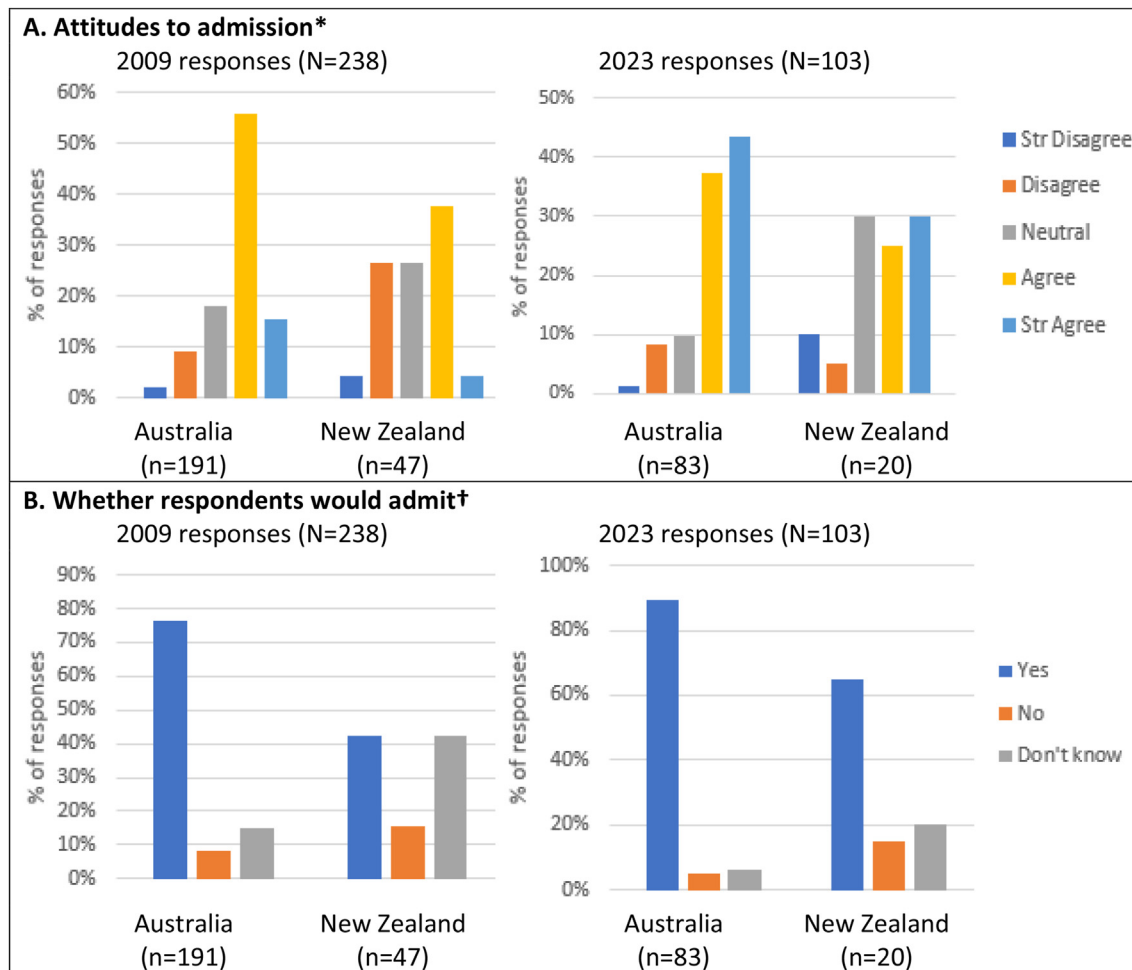
Excel for analysis. Prior to distribution, the survey was tested by intensive care specialists from a single ICU to improve clarity and usability.

The survey was designed to gather demographic information about the participants and their practice, and information regarding recent triage practice. It also assessed attitudes to specific triage scenarios. The survey questions are shown in Appendix 1 (online at [cicm.org.au/journal.php](http://cicm.org.au/journal.php)).

Respondents were asked if they were involved in triage decision making and, if so, the frequency of refusal was assessed and information on factors contributing to these decisions was gathered. Specifically, the role of ICU capacity as a factor was addressed. All respondents were asked to consider various triage scenarios. These scenarios, which were same as those used when this survey was

conducted 14 years ago,<sup>10</sup> are shown in Table 1. Respondents were asked to consider (a) on a 5-point Likert scale, how appropriate intensive care admission would be in each scenario and (b) whether they would admit this patient to their ICU. Respondents were asked to assume this patient would occupy their last available ICU bed.

We compared responses to the current survey to the 238 responses obtained in the 2009 survey.<sup>10</sup> Data were analysed using the R statistical package.<sup>11</sup> The Chi-squared test was used for differences between groups. We conducted a multivariable analysis for whether respondents indicated they would admit patients or not using generalised linear mixed effects models with a binomial distribution and a logit link to facilitate odds ratios (95%CI) considering all available covariates. Each respondent was incorporated as a random effect. To further investigate heterogeneity



\* There was no statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P=0.06$ ); in the current (2023) survey, the proportion of Australian respondents who agreed or strongly agreed with admission was statistically significantly higher than the proportion of New Zealand respondents who agreed or strongly agreed with admission ( $P=0.03$ ).

† Comparing responses from 2009 and 2023 there was a statistically significant increase in proportion of respondents who would admit in this scenario ( $P=0.02$ ); in the current (2023) survey, Australian respondents were statistically significantly more likely to say they would admit a patient in this scenario than New Zealand respondents ( $P=0.03$ ).

Fig. 2. Scenario 2: A. Responses to the question 'A 30-year-old female with relapsed acute myeloid leukaemia following a bone marrow transplant who has ARDS and who you believe will imminently require intubation?' And, B, whether respondents would admit the patient.

within each of the scenarios we fitted interactions between significant variables. Significance was at the 5 % level for all statistical tests.

### 3. Results

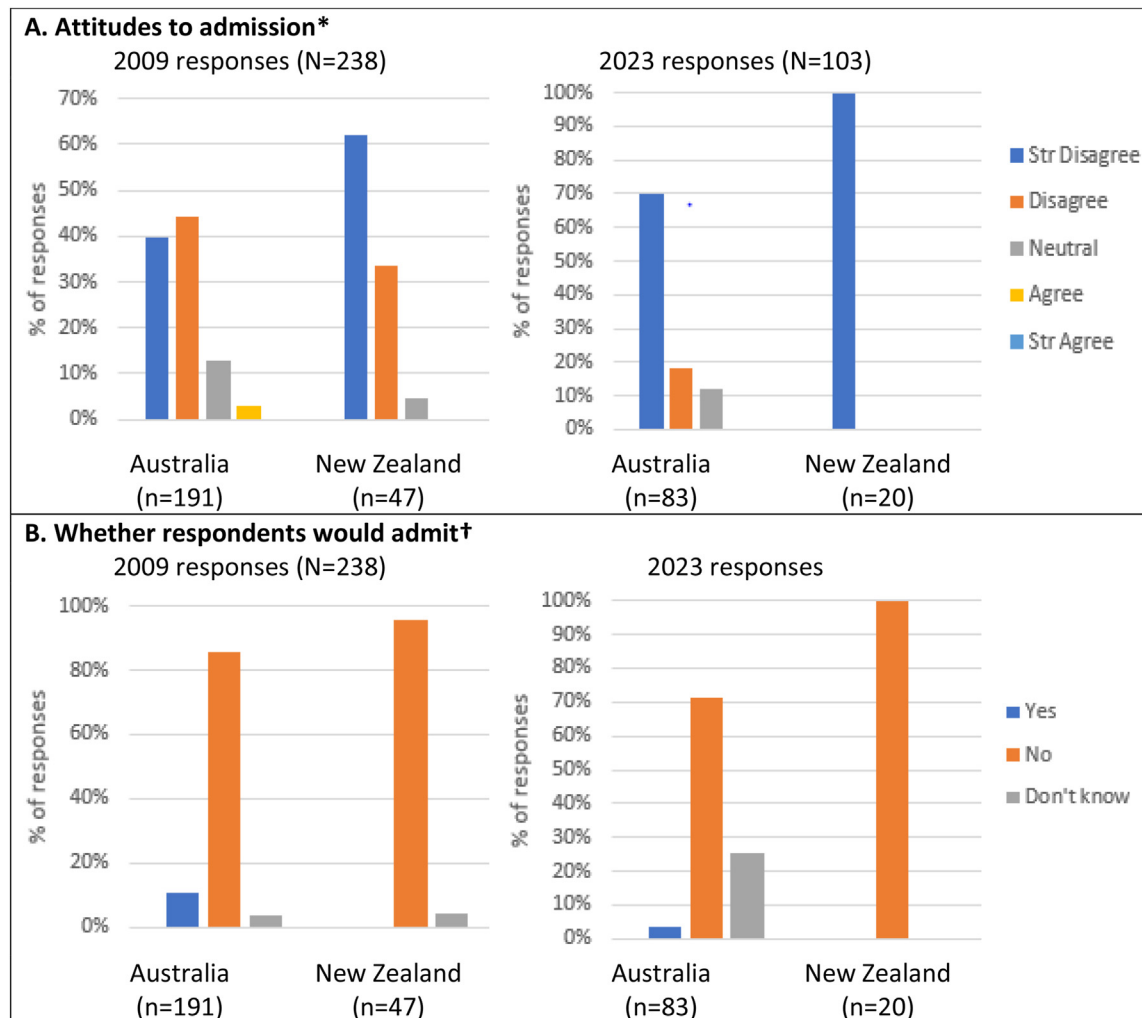
There were 103 responses to the survey. Of these, 83 (80.6 %) respondents were employed in Australia and 97 (94.2 %) were specialists in Intensive Care Medicine. Demographic data on the 2023 respondents is presented in Table 2, alongside data gathered in 2009.<sup>10</sup>

A total of 99 of 103 (96 %) respondents personally made decisions regarding intensive care triage and information was gathered regarding the decisions made in the last week. The median number of triage decisions made was 6–10 and the median number

of patients declined was 1–5. Among those who had declined a patient in the last week ( $n = 83$ ), there was no significant difference in the contribution of ICU bed capacity to decision making between Australian and New Zealand respondents ( $X^2$  statistic = 2.819,  $p = 0.09$ ). Data regarding triage decisions and factors contributing to these is presented in Table 3.

Responses to triage scenarios were compared between NZ and Australia with significant differences noted between groups in Scenarios 2, 3 and 4 ( $p < 0.05$ ). There were significant differences between the two time periods in attitudes toward admission in scenarios 4, 5, 6 and 7, and differences in rates of admission in scenarios 1, 2, 4 and 7. Data describing survey responses to each scenario in 2009 and 2023 are shown in Figs. 1–7.

Scenario 1 described a patient with severe neurological injury who may progress to brain death. In the 2023 data, agreement with



\* There was no statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P=0.10$ ); in the current (2023) survey, a Chi-square statistic for the proportion of Australian vs. New Zealand respondents who agreed or strongly agreed with admission could not be calculated as no respondents agreed/strongly agreed with admission

† From 2009 until 2023 there was no statistically significant difference in proportion of respondents who would admit in this scenario ( $P=0.21$ ); in the current (2023) survey, Australian respondents were statistically significantly more likely to say they would admit a patient in this scenario than New Zealand respondents ( $P=0.02$ )

**Fig. 3.** Scenario 3: **A.** Responses to the question 'Do you agree with ICU admission for the patient: A 30-year-old male with pneumonia requiring ventilation who has been in a persistent vegetative state for the past five years following a severe traumatic brain injury?' And, **B.** whether respondents would admit the patient.

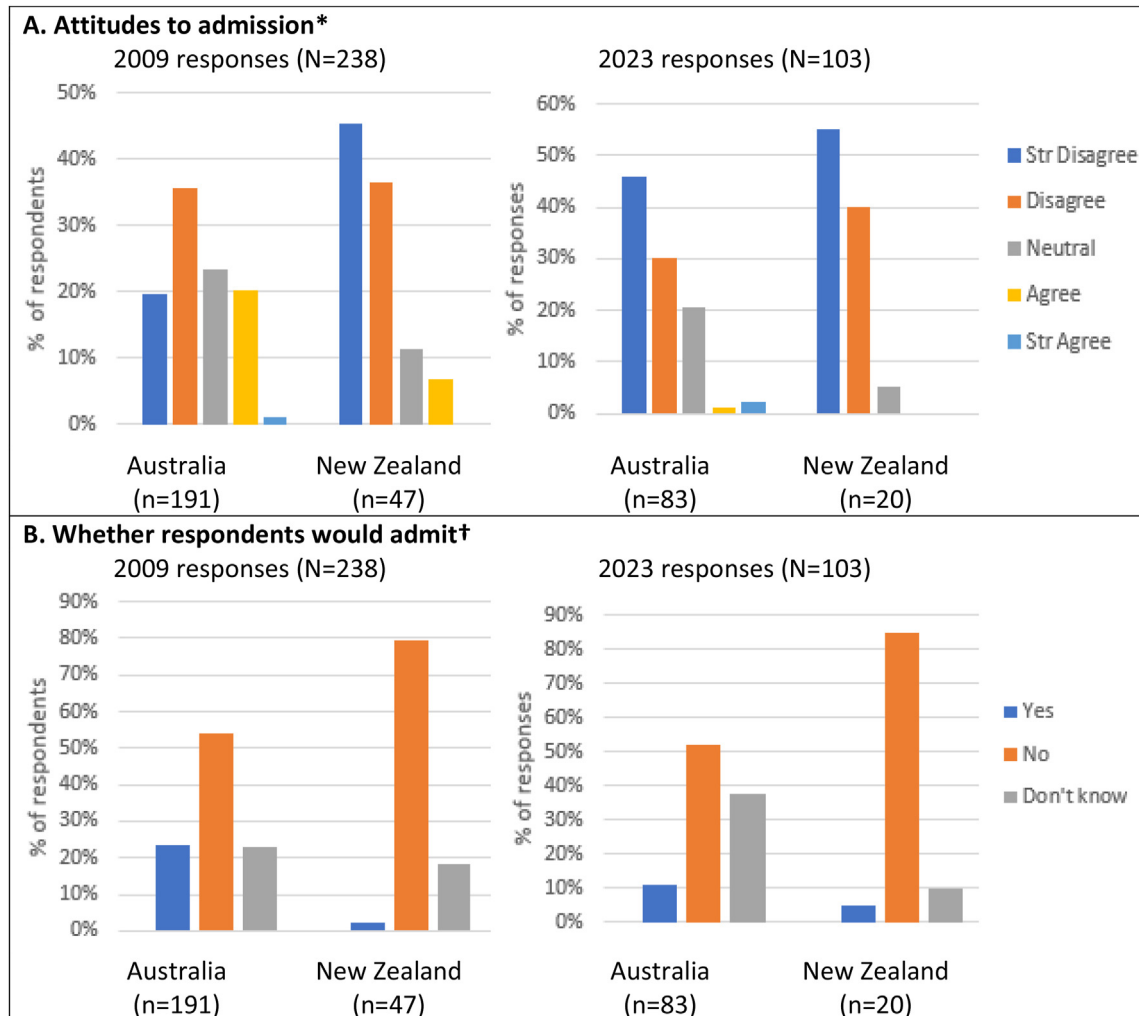
admission was similar across groups with 74.7 % of Australian respondents and 68 % of New Zealand respondent agreeing or strongly agreeing with admission ( $p = 0.58$ ). 85.5 % and 75 % of Australian and New Zealand respondents would admit the patient, respectively ( $p = 0.83$ ). Compared with the previous data, respondents in 2009 were less likely to admit this patient (67.9 % vs 84.5 % for 2009 and 2023, respectively,  $p = 0.005$ ) but had similar attitudes to admission (67.5 % vs 73.8 % for 2009 and 2023, respectively agree/strongly agree,  $p = 0.25$ ).

Scenario 2 described a patient with relapsed AML and ARDS. Australian respondents were more likely to both agree or strongly agree with admission (80.7 % vs 57.9 % for Australian and New Zealand respondents, respectively,  $p = 0.03$ ) and admit this patient (89.2 % vs 60 % for Australian and New Zealand respondents, respectively,  $p = 0.008$ ) compared with New Zealand respondents.

Respondents from 2009 agreed with admission at a similar rate (65.5 % vs 75.7 % for 2009 and 2023, respectively,  $p = 0.06$ ) but were less likely to admit the patient and were more likely to be unsure (69.6 % vs 84.4 % and 19.8 % vs 8.7 % for 2009 and 2023, respectively,  $p = 0.02$ ).

Scenario 3 and 4 described the same 30-year-old patient in a persistent vegetative state with pneumonia with scenario 4 giving an iatrogenic cause for this. Both Australian and New Zealand respondents disagreed with admission in scenario 3 (0 % agree or strongly agree), however Australian respondents were more likely to admit the patient or be unsure (3.6 % vs 0 % and 25.3 % vs 0 % for Australian and New Zealand respondents, respectively,  $p = 0.02$ ). When the cause was iatrogenic, again both groups disagreed with admission (3.6 % vs 0 % agree or strongly agree,  $p = 0.40$ ) but Australian respondents were more likely to admit the patient or be





\* There was a statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P < 0.001$ ); in the current (2023) survey, there was no significant difference in the proportion of Australian vs. New Zealand respondents who agreed or strongly agreed with admission ( $P = 0.40$ )

† Comparing responses from 2009 and 2023 there was a statistically significant decrease in proportion of respondents who would admit in this scenario ( $P = 0.03$ ); in the current (2023) survey, Australian respondents were statistically significantly more likely to say they would admit a patient in this scenario than New Zealand respondents ( $P = 0.03$ )

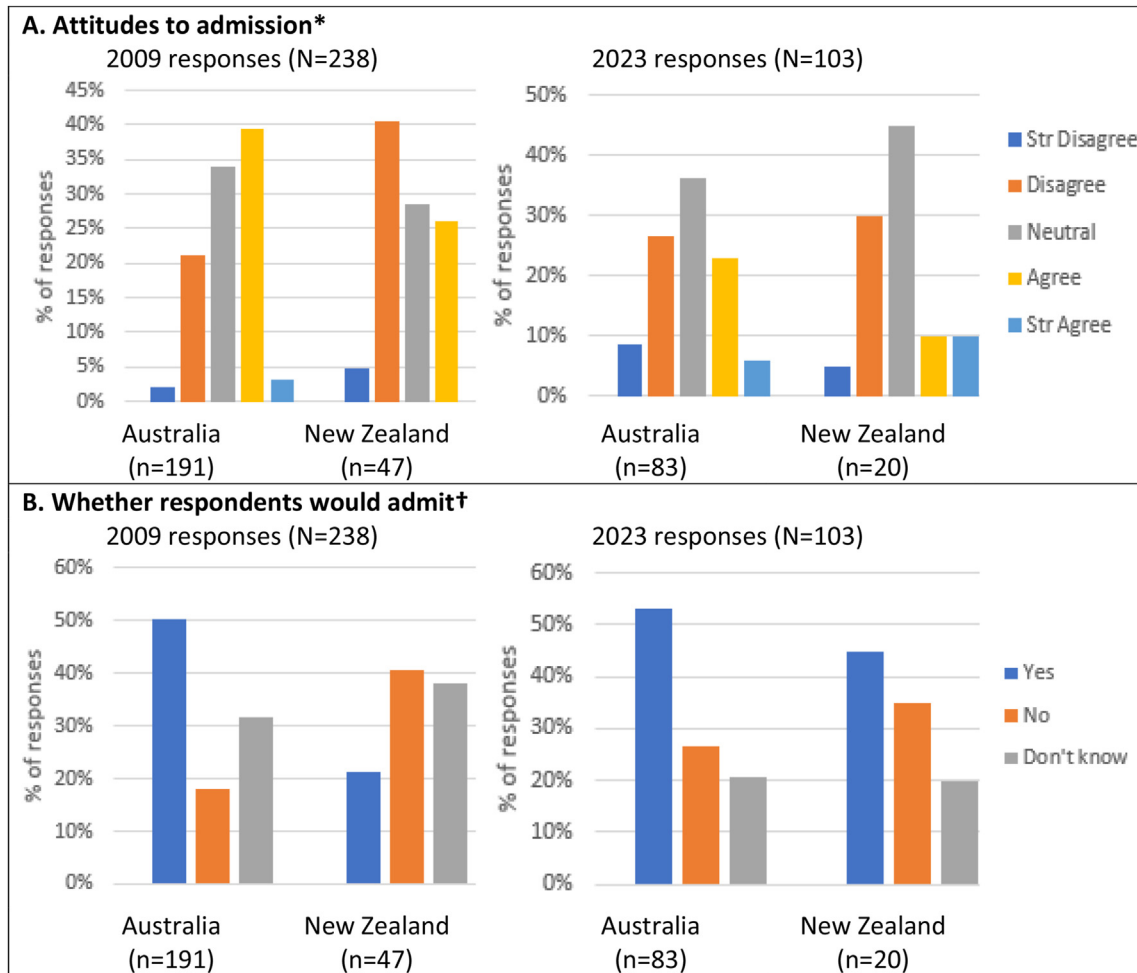
**Fig. 4.** Scenario 4: **A.** Responses to the question 'Do you agree with ICU admission for the patient: A 30-year-old male with pneumonia requiring ventilation who has been in a persistent vegetative state for the past five years following a severe traumatic brain injury who has developed aspiration pneumonia due to malposition of a feeding tube in the right main bronchus?' And, **B.** whether respondents would admit the patient.

unsure (10.8 % vs 5.0 % and 37.35 % vs 10.0 % for Australian and New Zealand respondents, respectively,  $p = 0.025$ ). Respondents from 2009 and the 2023 survey agreed with admission (2.6 % vs 0 % for 2009 and 2023, respectively,  $p = 0.10$ ) and admitted the patient (3.8 % vs 2.9 % for 2009 and 2023, respectively,  $p = 0.21$ ) at similar rates in Scenario 3. However, respondents in 2009 were more likely to both agree with admission (18.5 % vs 2.9 % for 2009 and 2023, respectively,  $p < 0.001$ ) and admit the patient (19.0 % vs 9.7 % for 2009 and 2023, respectively,  $p = 0.03$ ) in Scenario 4.

Scenario 5 described a 70-year-old man with COPD requiring some assistance at home. Both Australian and New Zealand respondents generally disagreed with admission (28 % vs 21 % agree/strongly agree, for Australian and New Zealand respondents, respectively,  $p = 0.49$ ) but would generally admit the patient (53 %

vs 45 % for Australian and New Zealand respondents, respectively,  $p = 0.65$ ) at similar rates. Compared with previous data, 2023 respondents were less likely to agree with admission (27.2 % vs 39.6 % for 2009 and 2023 respectively,  $p = 0.03$ ), however both groups admitted the patient at a similar rate (51.5 % vs 43.4 % for 2009 and 2023, respectively,  $p = 0.07$ ).

Scenario 6 described an elderly patient who was unable to be extubated at the end of an elective operation. Both Australian and New Zealand respondents agreed with admission (79.5 % and 68.4 % for Australian and New Zealand respondents, respectively  $p = 0.30$ ) and would admit the patient at similar rates (92.8 vs 90 % for Australian and New Zealand respondents, respectively,  $p = 0.78$ ). Respondents in 2009 were more likely to agree or strongly agree with admission (93.2 % vs 77.7 % for 2009 and 2023,



\* There was a statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P=0.03$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who agreed or strongly agreed with admission ( $P=0.49$ ).

† Comparing responses from 2009 and 2023 there was a statistically significant decrease in proportion of respondents who would admit in this scenario ( $P=0.03$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who would admit ( $P=0.66$ ).

**Fig. 5.** Scenario 5: **A.** Responses to the question 'Do you agree with ICU admission for the patient: A 70-year-old male with an infective exacerbation of COPD who has a documented FEV1 of 0.9 L (30 % predicted) and has failed to improve despite non-invasive ventilation for 6 h in the emergency department. He lives at home but requires help with showering, shopping and meals?' And, **B.** whether respondents would admit the patient.

respectively,  $p < 0.001$ ), but both groups admitted the patient at similar rates (92.8 % vs 93.2 % for 2009 and 2023, respectively,  $p = 0.99$ ).

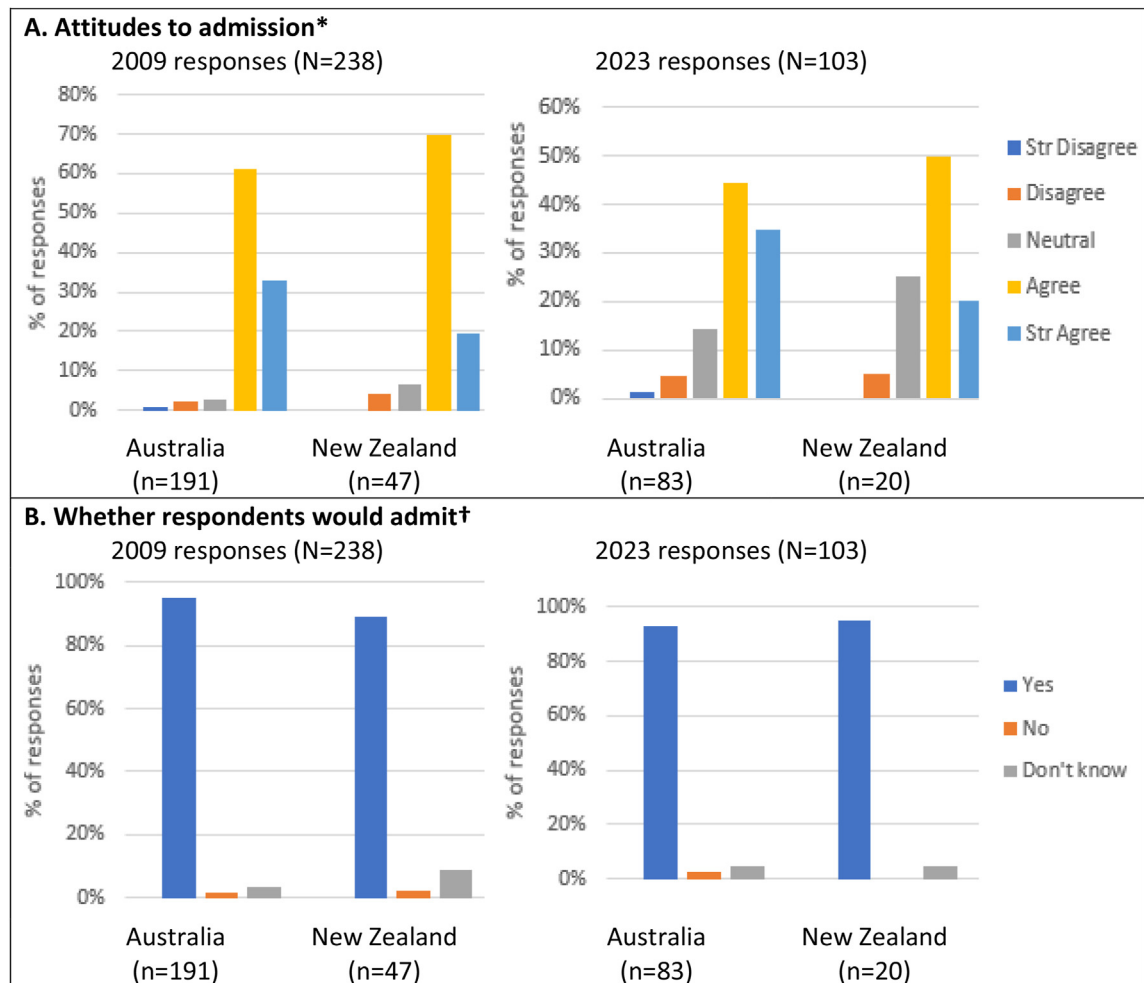
Scenario 7 described a patient with a severe stroke in a crowded emergency department who was to be extubated and palliated. 2023 respondents from Australia and New Zealand agreed/strongly agreed with admission at similar rates (22.9 % vs 21.1 % for Australian and New Zealand respondents, respectively,  $p = 0.86$ ) and would admit the patient at similar rates (33.7 % vs 50.0 % for Australian and New Zealand respondents, respectively,  $p = 0.17$ ). Compared with respondents in 2009, 2023 respondents were more likely to agree with admission (22.3 % vs 12.9 % for 2009 and 2023, respectively,  $p = 0.03$ ) and admit this patient (37.9 % vs 13.1 % for 2009 and 2023, respectively,  $p < 0.001$ ).

In the multivariable analysis we found that Australian respondents were more likely to say they would admit patients than

New Zealand respondents (adjusted odds ratio 2.93, 95%CI 2.07–4.14,  $P < 0.0001$ ), 2023 respondents were more likely to say they would admit patients than 2009 respondents (adjusted odds ratio 2.40, 95%CI 1.68–3.44,  $P < 0.0001$ ), and that specialists were less likely to say they would admit patients than trainees (adjusted odds ratio 0.62, 95%CI 0.44–0.86,  $P < 0.004$ ) (Table 4). Scenario number was also a significant predictor of whether respondents would admit patients (Table 4). The relationship between 'would admit' and scenario differed significantly ( $P < 0.001$ ) according to country, survey, year and whether respondents were specialists or trainees (Table 5).

#### 4. Discussion

This study explored intensivists' self-reported practices regarding admission decision making and triage across Australasia.



\* There was a statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P < 0.001$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who agreed or strongly agreed with admission ( $P = 0.30$ ).

† Comparing responses from 2009 and 2023 there was no statistically significant decrease in proportion of respondents who would admit in this scenario ( $P = 0.99$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who would admit ( $P = 0.78$ ).

**Fig. 6.** Scenario 6: **A.** Responses to the question 'Do you agree with ICU admission for the patient: A 95-year-old man with no previous medical history who the anaesthetist, despite appropriate attempts, has been unable to extubate due to drowsiness and hypoventilation following a laparoscopic hernia repair?' And, **B.** whether respondents would admit the patient.

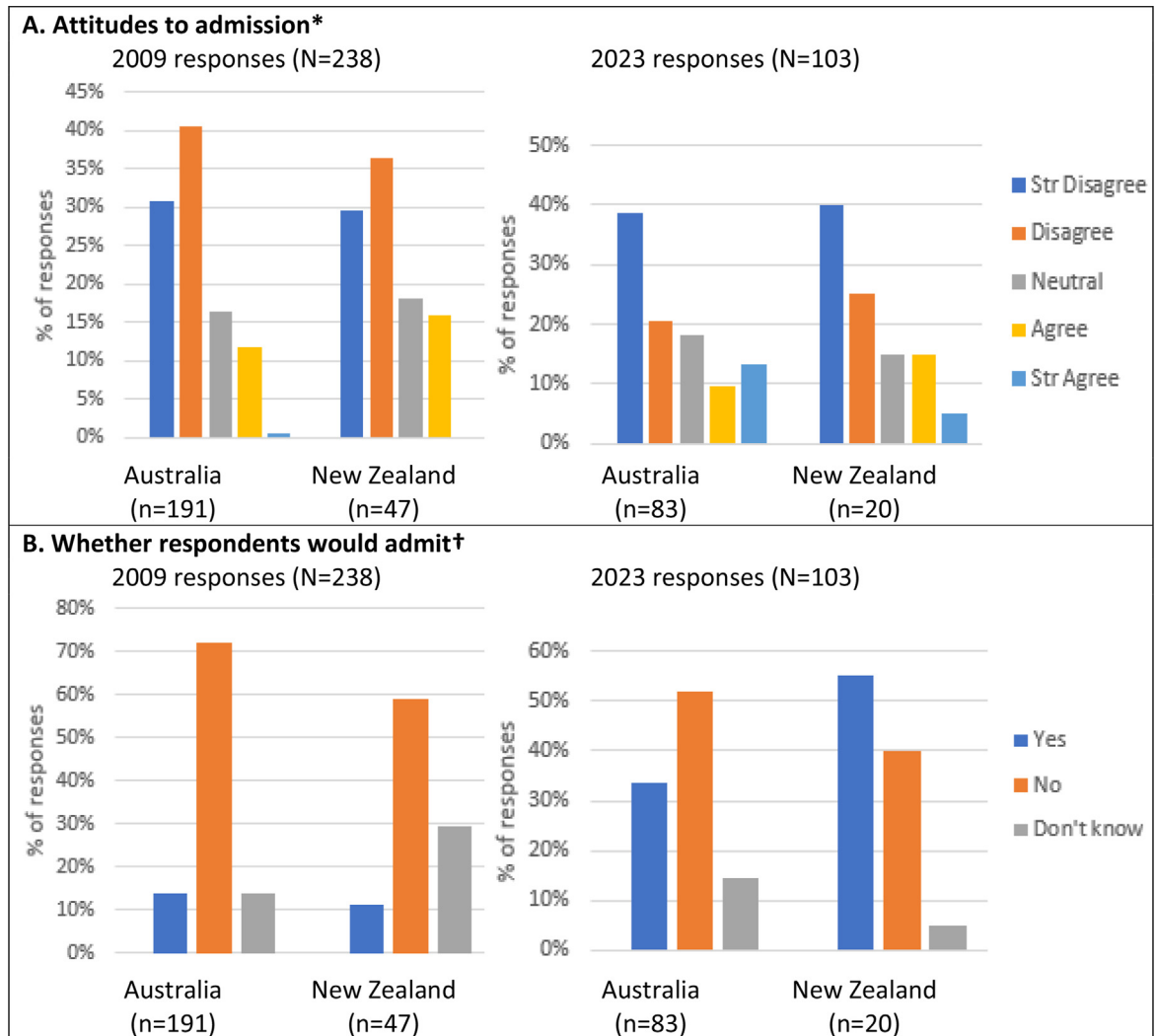
We compared 2023 self-reported practices between New Zealand and Australia, and changes in self-reported practice over a 14-year period. We found that New Zealand clinicians are more restrictive regarding admission criteria than their Australian counterparts. We also observed a number of differences in attitudes to specific triage scenarios over time.

When asked about recent practices, New Zealand and Australian clinicians stated ICU bed capacity affected decision making at similar rates. Given marked differences in ICU bed numbers,<sup>7,8</sup> this may reflect different patterns of referrals and volume of elective operations affecting bed availability for acute admissions. The most common reasons to decline patients related to their potential benefit from ICU care, the reversibility of pathology, and patient-related factors (co-morbidities and functional baseline). These are major factors in decision making internationally<sup>3,5</sup> and suggest

similar triage rationales in a diverse range of intensive care settings. Notably patient age does not appear to be a major factor (30 % of refusals), a finding consistent with high admission rates for the elderly patient following general anaesthesia in both the 2023 and 2009 data.

New Zealand clinicians showed more restrictive admitting behaviours and notable differences were seen in the scenarios involving a patient with relapsed AML and two scenarios describing a patient with pneumonia in a persistent vegetative state. New Zealanders were more likely to decline admission in all three of these cases and a similar difference was noted in two of these cases in 2009.<sup>10</sup> This may represent cultural differences in the role of intensive care, as patient, family, and clinician expectations of what is appropriate for the patient may differ. A combination of societal expectations and the availability of private or public health care





\* There was a statistically significant difference between 2009 and 2023 in the proportion of respondents who agreed or strongly agreed with admission in this scenario ( $P=0.03$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who agreed or strongly agreed with admission ( $P=0.86$ ).

† Comparing responses from 2009 and 2023 there was a statistically significant increase in proportion of respondents who would admit in this scenario ( $P<0.001$ ); in the current (2023) survey, there was no statistically significant difference between the proportion of Australian vs. New Zealand respondents who would admit ( $P=0.17$ ).

**Fig. 7.** Scenario 7: **A.** Responses to the question 'Do you agree with ICU admission for the patient - An elderly patient with a massive stroke who has been intubated in a crowded emergency department but is now to be extubated and palliated?' and, **B.** whether respondents would admit the patient.

may drive the divergence between these groups. For some scenarios, the proportion of respondents who were 'disagreed' or 'strongly disagreed' with ICU admission was *higher* than the proportion of respondents who indicated they would admit the patient. The reason for this discrepancy is uncertain but it suggests decisions to admit are not always aligned with what clinicians consider appropriate.

In contrast to practices in 2009, this study showed an increased rate of admission in scenario one which described a patient likely to progress to brainstem death. This may be due to increased knowledge around organ donation and changes to practices over this period, which is consistent with previous work,<sup>12,13</sup> particularly in regard to donation after circulatory death.<sup>14</sup> Furthermore,

ANZICS guidelines suggest that admission solely for the purposes of organ donation is reasonable<sup>15</sup>

Similarly, scenario seven describes an intubated patient who was to be admitted specifically for palliative care. 2023 respondents were more likely to admit this patient to intensive care than 2009 respondents. There has been increased recognition of the role of intensivists as providers of palliative care which may have driven this change.<sup>12</sup> However, in the scenario regarding a patient in a persistent vegetative state, 2023 respondents were less likely to admit this patient than 2009 respondents. This change in behaviour may represent increased recognition of patients unlikely to experience any improvement in quality of life despite ICU care and costs associated with this.<sup>16</sup> In both scenarios neither patient will have a

**Table 4**  
Multivariable analysis of whether respondents indicated a patient would be admitted.

Variable	Adjusted odds ratio (95% CI)	P value
FRACP vs. not	0.79 (0.43–1.42)	0.42
FANZCA vs. not	0.8 (0.56–1.15)	0.24
FACEM vs. not	0.79 (0.48–1.29)	0.35
Works in a tertiary ICU vs. not.	1.04 (0.77–1.4)	0.79
Australian vs. New Zealander	2.93 (2.07–4.14)	< 0.0001
2023 vs. 2009	2.4 (1.68–3.44)	< 0.0001
Specialist vs. trainee	0.62 (0.44–0.86)	0.004
Scenario		< 0.0001
Scenario 1 vs. 7	13.06 (8.98–19)	
Scenario 2 vs. 7	13.96 (9.57–20.36)	
Scenario 3 vs. 7	0.13 (0.07–0.25)	
Scenario 4 vs. 7	0.73 (0.49–1.09)	
Scenario 5 vs. 7	3.62 (2.54–5.15)	
Scenario 6 vs. 7	70.66 (42.46–117.6)	

Abbreviations: ICU: intensive care unit; FACEM: Fellow of the Australasian College of Emergency Medicine; FANZCA: Fellow of the Australian and New Zealand College of Anaesthetists; FRACP: Fellow of the Royal Australasian College of Physicians.

**Table 5**  
Heterogeneity within each scenario ( $P < 0.001$ ) due to country, whether respondents were a specialist, and year.

Scenario	Country (Australia vs. New Zealand)	Specialist vs. trainee	2023 vs. 2009
1	3.64 (2.05–6.46)	1.07 (0.62–1.85)	2.66 (1.36–5.2)
2	5.05 (2.74–9.28)	0.25 (0.14–0.47)	4.75 (2.39–9.43)
3	n/a <sup>a</sup>	0.68 (0.18–2.58)	0.94 (0.20–4.35)
4	7.93 (1.87–33.71)	0.37 (0.18–0.74)	0.78 (0.33–1.82)
5	2.77 (1.53–5.00)	0.89 (0.54–1.48)	1.48 (0.87–2.52)
6	2.05 (0.84–4.97)	0.99 (0.39–2.49)	1.13 (0.41–3.09)
7	0.75 (0.38–1.47)	0.40 (0.19–0.85)	6.82 (3.28–14.17)

<sup>a</sup> Failure to converge as no New Zealand respondents would admit in scenario 3.

change in functional outcome in ICU, but if the patient is already intubated intensivists would have a more active role in palliative care.

This study used a cross sectional survey to review intensivist practice across Australasia, however, there are several limitations of this design. Due to method of distribution the exact response rate was unable to be determined, although we expect it to be approximately 30% in line with this type of sampling.<sup>17</sup> Therefore, it is probable that this sample is not representative of all intensivists across Australia. Notably, the proportion of senior clinicians responding to the survey was much higher, and proportion of trainees responding was much lower, than in the 2009 survey. However, in our multivariable analysis, differences in the proportions of respondents who would admit differed by epoch, when other factors were accounted for. Lastly, these scenarios were designed to capture relevant information and general themes without making the survey unwieldy and difficult for respondents to complete. Consequently, the scenarios may not have captured the nuances of real-life clinical scenarios where triage decisions are made. We acknowledge that variables relating to respondents including perceptions of societal expectations, distribution of ICU beds per population density, availability of high dependency beds in hospitals and socio-cultural factors were not collected. Such variables may confound the associations we have reported. Finally, as respondents were asked to assume the patient would occupy their last available ICU bed, the responses we obtained may be different than if the decision was being considered when multiple ICU beds were available.

## 5. Conclusions

In conclusion, these data suggest that New Zealand intensivists may apply more restrictive ICU admission criteria than Australian intensivists. Moreover, we have shown significant changes in attitudes to admission in certain scenarios over the last 13 years which may reflect increased awareness of the importance of facilitating organ donation and of the role of ICU as providers of palliative care. Repeating this survey at regular intervals in the future may provide a useful means to assessing perceptions of ICU triage decision making over time.

## Credit authorship contribution statement

All authors contributed equally to data gathering, analysis and manuscript production.

## Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ccrj.2023.10.001>.

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