

# Analysis of performance and predictors of success in the final fellowship examination of the College of Intensive Care Medicine

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The fellowship examination of the College of Intensive Care Medicine (CICM) is the exit exam for intensive care medicine specialty training in Australia and New Zealand. The exam has evolved since it was first set in 1979. It is complementary to the training program and is set according to best evidence.

The exam is sat during advanced training and after completion of at least 12 months of core intensive care training (during the 3 years of advanced training). Successful completion of the primary exam of the CICM, or one of the other approved primary exams from other Australasian colleges, is a prerequisite to be eligible to sit for the CICM fellowship exam. For international medical graduates (IMGs), recognition of some of the postgraduate exams held overseas has allowed individualised exemptions from an Australian primary exam.

The format of the fellowship exam is as follows:

- a written section (30% of the mark) comprising two papers, each containing 15 short-answer questions. Candidates are required to obtain a minimum mark in this section before being invited to attend the clinical and oral sections of the examination
- a clinical section: (30% of the mark) comprising two 20-minute hot cases (patients in an intensive care unit)
- a cross-table viva voce section (40% of the mark) comprising eight 10-minute stations.

The exam is not an instrument to control numbers of ICU consultants for workforce planning.<sup>1,2</sup> The exam is criterion-referenced, based on the input of the entire examination panel. To pass the fellowship exam, candidates must secure an overall mark of 50% and individually pass two of the three sections (written, clinical and viva voce). Failure in more than one section or a bad performance in the clinical section (<40% in the clinical section) results in an overall fail, irrespective of the total mark secured.

A curriculum review was an opportunity to review the fellowship exam, analyse the performance of candidates and identify factors that predict success.

Recently, the cohort sizes presenting to the fellowship exam have increased, predominantly due to an increase in the number of IMGs. Previous publications have reported differential success rates for IMGs compared with local graduates in other specialties.<sup>3</sup> We decided to evaluate the CICM fellowship exam with the aims of identifying factors

## ABSTRACT

**Objectives:** To analyse the performance and predictors of success in the final fellowship examination of the College of Intensive Care Medicine (CICM), and to compare the outcomes of international medical graduates (IMGs) attempting the CICM fellowship exam with those of local trainees, defined as those from Australia, New Zealand and Hong Kong (ANZ–HK). To compare the performance of IMGs from countries with comparable health care systems (CHS) with those from other countries (non-CHS).

**Design, setting and participants:** Analysis of six exam presentations collected prospectively between 2009 and 2011.

**Main outcome measures:** Pass rates in the final fellowship exam.

**Results:** Between 2009 and 2011, 233 candidates presented to the exam 334 times, and 73% were IMGs. ANZ–HK trainees performed better at the exam (79% v 46%,  $P < 0.0001$ ). IMG trainees from CHS performed better than trainees from non-CHS (60% v 40%,  $P < 0.01$ ). Any candidate completing an ANZ primary exam performed better than non-ANZ primary candidates (74% v 41%,  $P < 0.0001$ ). IMG candidates successful at a postgraduate exam from a CHS country performed better than candidates from a non-CHS country (56% v 34%,  $P = 0.005$ ). The success rate of IMGs improved to 64% after obtaining an ANZ primary. Candidates taking the exam while working in an intensive care unit had a pass rate of 57% compared with 48% of candidates working in non-ICU posts ( $P = 0.23$ ). This was not statistically significant.

**Conclusions:** A significant proportion of candidates appearing for the CICM fellowship examination are IMGs. Pass rates for trainees who have graduated from the ANZ–HK systems have a higher success rate in the fellowship examination. IMGs from a CHS country, or those who completed an ANZ primary have a much higher success rate compared with other IMGs.

Crit Care Resusc 2015; 17: 47–50

which may predict success for all candidates in the final fellowship exam, and analysing the success rates of the IMGs and comparing them with those of local trainees.

**Table 1. Distribution of country of primary medical qualification**

Country	Candidates	Presentations	Mean presentations per candidate
Indian subcontinent	83	136	1.64
Australia*	56	67	1.2
United Kingdom and Ireland**	39	51	1.31
Western Europe**	15	24	1.6
New Zealand*	14	18	1.29
Eastern Europe	7	8	1.14
Africa	6	10	1.67
Hong Kong*	5	6	1.2
South-East Asia**	4	7	1.75
Pacific countries	2	4	2
North America**	1	1	1
Middle East	1	2	2

\* Considered together as ANZ–HK trainees. \*\* Includes countries regarded as having comparable health systems, as in Australian and New Zealand medical council guidelines for medical practitioner registration.

**Table 2. Examination results, by year, age and sex**

Parameter	Total	Passed (%)*
Calendar year		
2009	116	63 (54.3%)
2010	110	62 (56.4%)
2011	108	61 (56.5%)
Trainee age (years)		
30–39	223	145 (66%)
40–49	93	37 (40%)
> 50	18	4 (24%)
Men	257	144 (56%)
Women	77	42 (54%)

\* Pass could be at first or subsequent attempts.

## Methods

### Participants

Six sittings of the exam between 2009 and 2011 were reviewed. The data were collated from the CICM databases to generate the following information: demographics of the candidates, country of basic medical qualification, the primary exam undertaken, the age and number of years since graduation at the time of presentation to the final

fellowship exam, the clinical term the candidate was undertaking at the time of presentation (ICU or non-ICU [including medicine or anaesthesia]) and, if ICU, the level of ICU at the time of presentation.<sup>4</sup> Candidate names were de-identified and a unique identifier code was used to track multiple attempts at the exam. The study was approved by the board of the CICM.

### Statistics

Categorical variables were compared using the  $\chi^2$  test or the Fisher exact test, as appropriate.  $P < 0.05$  was taken as statistically significant, and  $P$  values were not adjusted for multiple comparisons.

### Results

Between 2009 and 2011, 233 candidates presented to the exam 334 times (some candidates presenting more than once). Twenty-seven per cent of trainees obtained their basic medical degree from Australia, New Zealand or Hong Kong (ANZ–HK), and 73% were non-ANZ–HK trainees. The distribution of the country of basic medical qualification of the candidates is shown in Table 1. The overall results over the 3 years are shown in Table 2. Seventy-seven per cent of trainees were men, and the mean age of the trainees at presentation was 38 years (range, 30–55 years) (Table 2).

### Analysis of factors influencing success in the exam

#### *Country of basic medical degree*

ANZ–HK trainees performed significantly better at the exam with 79% passing the exam in the first or subsequent attempts, compared with 46% for the non-ANZ–HK trainees ( $P < 0.0001$ ). Of the non-ANZ–HK trainees, those who obtained their basic medical degree from countries which the Australian Medical Council and the New Zealand Medical Council deem to have comparable health systems (CHS), for the purpose of medical registration in Australia and New Zealand, had a pass rate of 60%, compared with 40% for trainees from other (non-CHS) countries ( $P = 0.004$ ) (Table 3).

#### *Primary exam*

Candidates who had completed an ANZ primary exam (CICM, Australian and New Zealand College of Anaesthetists [ANZCA], Australasian College for Emergency Medicine [ACEM], Royal Australian College of Physicians [RACP] or Royal Australasian College of Surgeons [RACS]) had a pass rate of 74% compared with 41% for candidates who had completed a non-ANZ primary exam ( $P < 0.0001$ ). The pass rates in the fellowship exam with Australasian primary exams were as follows: CICM 87%, ANZCA 83%, ACEM 65%, RACP 100% and RACS 22% (Table 3).

**Table 3. Factors influencing examination success**

Factor	Total	Passed (%)
Country of primary medical qualification		
ANZ–HK	91	72 (79%)*
Non-ANZ–HK	243	114 (47%)
Non-ANZ–HK from CHS	78	47 (60%)†
Non-ANZ–HK from non-CHS	165	67 (41%)
Primary exam		
ANZ primary	147	109 (74%)‡
Non-ANZ primary	187	77 (41%)
ANZ primary		
RACP	21	21 (100%)
CICM	8	7 (87%)
ANZCA	46	38 (83%)
ACEM	63	41 (65%)
RACS	9	2 (22%)
IMGs without ANZ primary		
CHS	61	34 (56%)§
Non-CHS	121	41 (34%)
IMGs with ANZ primary		
CHS with ANZ primary	17	13 (76%)
Non-CHS with ANZ primary	44	26 (59%)
Either HS but ANZ primary	61	39 (64%)
Place of work at time of exam		
ICU	282	161 (57%)¶
C6 unit <sup>§</sup>	7	3 (43%)**
C12 unit <sup>§</sup>	32	16 (51%)††
C24 unit <sup>§</sup>	243	142 (58%)
Non-ICU	52	25 (48%)

ANZ = Australia–New Zealand. HK = Hong Kong. CHS = comparable health care systems. RACP = Royal Australian College of Physicians. CICM = College of Intensive Care Medicine. ANZCA = Australian and New Zealand College of Anaesthetists. ACEM = Australasian College for Emergency Medicine. RACS = Royal Australasian College of Surgeons. IMG = international medical graduates. HS = health system. ICU = intensive care unit. \*  $P < 0.0001$  Compares pass rates of candidates with primary medical qualifications from ANZ–HK countries with those from non-ANZ–HK countries. †  $P < 0.01$  Compares pass rates of candidates with primary medical qualifications from non-ANZ–HK countries with CHS to those from non-ANZ–HK countries with different health systems (non-CHS). ‡  $P < 0.0001$  Compares pass rates between candidates who have an ANZ primary with those who do not. §  $P < 0.005$  Compares pass rates in IMGs, not possessing an ANZ primary, from CHS and non-CHS countries. ¶  $P = 0.23$  Compares candidates appearing for the exam from ICU posts with non-ICU posts. \*\*  $P = 0.41$  Compares candidates appearing for the exam from C6 ICUs with C24 ICUs. ††  $P = 0.36$  Compares candidates appearing for the exam from C12 ICUs with C24 ICUs.

IMG candidates who were successful at a postgraduate exam from a CHS country had a 56% chance of passing the CICM fellowship exam compared with 34% from a non-CHS country ( $P = 0.005$ ). IMG candidates with an ANZ

primary had a success rate of 64% at the exam. This improvement in performance was seen in candidates from CHS (76%) and non-CHS (59%) systems.

Candidates appearing for the exam via the overseas trained specialist (OTS) pathway had a 50% pass rate with no differences between CHS and non-CHS countries.

#### *Clinical term at the time of presentation to exam*

Candidates presenting for the exam while working in an ICU had a pass rate of 57% compared with 48% of candidates working in non-ICU posts ( $P = 0.23$ ). Within the ICUs, the pass rate was higher (58%) in candidates working in a C24<sup>4,5</sup> unit, although this was not statistically significant (Table 3).

#### Discussion

A high proportion of candidates presenting for the CICM fellowship exam are IMGs. Candidates with a basic medical qualification from ANZ–HK performed significantly better than IMGs. This has been seen in other specialties and reflects familiarity with the exam processes and assessment methods in Australia.<sup>3,6,7</sup> A survey of ANZCA IMGs attributed this performance to a lack of effective study, lack of study time and isolation from other candidates. Other published attributable factors include geographical isolation, variability in knowledge, insufficient orientation and difficulties with communication.<sup>3,7</sup>

Similar trends are observed with other postgraduate exams. Data from the RACGP exam suggests improved performance among candidates who undergo a formal training program in general practice rather than a period of self-training and general practice experience.<sup>6</sup> Analysis of data from the United Kingdom Royal College of Anaesthetists primary exam showed that candidates from the UK, Australia, New Zealand, South Africa and Zimbabwe performed better than those from Egypt, Iraq, Ireland or Pakistan.<sup>8</sup> Reports from the United States suggest that graduates of medical schools outside the US achieve certification over a longer time than local graduates.<sup>9</sup> Some data suggest that male students underperform in medical exams.<sup>10</sup> There are differences in pass rates among students who belong to ethnic minorities.<sup>11,12</sup> These differences may be explained in part on the basis of cultural and language similarities easing transition into a foreign working environment, lack of familiarity with local systems, and differences in access to educational resources and social support. Cultural similarities and opportunities to improve medical education, language and communication play a vital role in settling into a foreign workforce and could explain the higher exam success rate for candidates from countries with health care systems comparable with Australia.

## BRIEF REPORTS

The improved success at the exam if attempted during an ICU term, especially from a C24 unit, may be due to exposure to a more varied casemix and better opportunities for group study. Tutorials and case presentations with CICM examiners would also be contributory. The relatively low success rate among OTSs was surprising but probably reflects non-familiarity with the exam system as well as a longer time since previous exams.

There are limitations to our evaluation as it is over a restricted time frame (3 years). Although the CICM fellowship exam is well calibrated and standardised with good quality control, assessment methods used in exams have inherent limitations.

Our study identified that a large proportion of the candidates presenting for the CICM fellowship exam are IMGs, and emphasises the difficulties faced by these candidates. A survey to identify problems faced by them during their training would be a logical follow-up to this study. Our study also has implications for provision of adequate training opportunities and resources, especially for IMGs. The new curriculum of the CICM came into force in January 2014 with significant changes to the entry requirements to sit the fellowship exam. This study will need to be repeated after the new curriculum has had a run-in period to assess the impact of the new regulations on the success rates in the fellowship exam.

### Competing interests

None declared.

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