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Procedural skills of first-year postgraduate doctors at Auckland District Health Board, New Zealand

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Abstract

Aims To determine whether the current skills list for postgraduate year 1 (PGY1) training in New Zealand is appropriate and an accurate reflection of the experience gained in this year.

Methods PGY1 doctors at Auckland District Health Board were surveyed about their experience with 86 skills at the beginning and at the end of their first postgraduate year; 28 of these skills were from the Medical Council of New Zealand's (MCNZ) 'Indicative List of Skills' for PGY1.

Results The response rate was 79% for the first survey and 66% for the follow-up. By the end of the PGY1 year, all doctors had performed 21% of the skills listed by the MCNZ, compared to 4% at the beginning of the year. Thirty-nine percent of the skills defined as important to achieve during PGY1 by the MCNZ had been performed by less than half our sample at the end of their PGY1 training.

Conclusions There is a significant discrepancy between the skills expected of graduates at the end of PGY1 (as indicated by the MCNZ) and those attained.

The Medical Council of New Zealand (MCNZ) is responsible, through its education committee and hospital-based intern supervisors, for the educational experience of doctors in their first postgraduate year (PGY1).

While there is currently no prescribed set of clinical skills that must be attained and accredited during this time, the MCNZ does publish an 'Indicative List of Skills'[1] designed to, "ensure they [PGY1 doctors] achieve an appropriate breadth of experience during the year".

In 2002, a Danish study[2] asked pre-registration house officers (PRHOs), the equivalent of PGY1, to rate themselves in 210 practical clinical skills that had been identified previously using a Delphi technique.[3,4] Using this method, an expert panel assessed a range of clinical skills and identified, by consensus, the expected level of competence of medical graduates at time of graduation. With a response rate in the survey of 80%, it was discovered that none of the PRHO respondents met the minimum level for all the skills, with only 8% meeting the minimum requirements for at least 90%. On average, the respondents met the minimum level of competence as defined by the expert panel for only 74% of the skills.[2]

In this study, we surveyed a group of junior doctors at the beginning and the end of their first postgraduate year to gauge their experience with a pre-defined set of skills, paying particular attention to the sub-set contained in the "Indicative List of Skills" published by the MCNZ.

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Methods

Study population—Auckland District Health Board (ADHB) is the largest public healthcare provider in New Zealand, providing regional services for approximately 415,000 people along with some national specialty services. There are more than 7500 staff including approximately 500 resident medical officers and nearly 3000 nurses.[5]

In November 2002, incoming postgraduate year 1 (PGY1) doctors about to start work at ADHB were surveyed at their orientation session and the survey was repeated at the end of their PGY1 year (November 2003).

Questionnaire—The survey comprised 134 questions relating to personal experience and expertise with various clinical skills, including procedural and communication skills (86 questions) as well as management of common conditions (48 questions). Participants were asked to rate their experience or confidence with each skill on a five or six-point scale (Table 1). A score of '3' or more identified clinical experience with the skill and was defined as 'sufficient performance' for the purposes of comparison. Demographic data were collected and there were no personal identifiers on the questionnaires.

Table 1. Survey rating scale

Clinical Skills		Management Skills	
0	Never heard of procedure/skill	**0**	Never seen a patient with this condition
1	Know the principle	**1**	Have met a patient with this condition but not managed the condition
2	Observed, or done on a model	**2**	Have had a patient on our team with this condition but not managed it independently
3	Done with supervision/assistance	**3**	Have managed this condition independently
4	Have done independently	**4**	Feel very comfortable/experienced managing this condition
5	Very comfortable with this skill – mastered		

Questions for the survey were drawn from the skill set used in the Danish study,[2] and the MCNZ Indicative List of Skills.[1] Only results from the questions relating to the MCNZ Indicative List of Skills are reported here.

Statistical methods—Results are reported as mean plus or minus standard deviation unless otherwise specified. Differences in MCNZ skill levels were compared using an unpaired t-test as there was no identifier available to match the pre-PGY1 and post-PGY1 questionnaires. All analysis was performed on SAS statistical software and a p-value less than 0.05 was considered statistically significant.

Results

Thirty-eight PGY1 house officers started at ADHB in November 2002. Of the 36 questionnaires distributed (two eligible participants did not attend orientation), 30 were completed and returned (79% overall response rate). Of the 30 doctors who originally completed the survey, 25 completed the repeat in November 2003, with 5 doctors lost to follow-up. Reasons for attrition included rotation away from ADHB and non-attendance at the scheduled feedback session.

Due to ambiguity in the rating scale, the 48 questions relating to management skills were unable to be meaningfully evaluated. The sub-set of skills (28) that relate to the indicative list of skills published by the MCNZ are reported. Table 2 summarises the characteristics of the study population.

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Table 2. Participant summary data (% of sample)

Variable	Pre – PGY1 Survey	Post – PGY1 Survey
Number of respondents	30	25
Age range (years)	22–30	23–31
Medical school		
University of Auckland	60%	76%
University of Otago	40%	24%
Gender		
Female	63%	60%
Male	37%	40%

Table 3. MCNZ indicative list of skills

Procedure	Pre-PGY1 Mean±SD	Post-PGY1 Mean±SD	Difference	P value
Insertion of an IV cannula	4.4±0.56	4.9±0.30	+0.5	0.001
Venepuncture	4.4±0.68	4.9±0.30	+0.5	0.005
Bladder catheterisation – male	3.8±0.77	4.6±0.60	+0.8	0.001
Arterial puncture	4.0±0.76	4.6±0.51	+0.6	0.007
Infiltration of local anaesthetic	3.4±0.89	4.1±1.15	+0.7	0.022
Simple wound suturing	3.7±0.98	4.1±0.85	+0.4	0.128
Assessment of level of consciousness (GCS)	3.1±0.92	4.1±0.51	+1.0	0.001
Intramuscular injection	3.6±0.90	3.8±1.17	+0.2	0.405
Speculum exam of vagina & cervix	3.9±0.80	3.8±0.91	-0.1	0.543
Bimanual palpation of adnexae	3.7±0.78	3.6±0.89	-0.1	0.446
Cervical smear	3.6±0.89	3.4±1.16	-0.2	0.560
Removal of corneal foreign body	2.2±0.94	3.3±1.48	+1.1	0.005
Detection of fetal heart sounds	3.6±0.77	3.3±0.73	-0.3	0.229
Applying a bandage/strapping	3.0±1.00	3.2±1.18	+0.2	0.507
Applying plaster to a fracture	2.6±0.89	3.0±0.95	+0.4	0.165
Endotracheal intubation	2.9±0.50	3.0±0.60	+0.1	0.524
Bladder catheterisation – female	3.1±1.22	2.9±1.64	-0.2	0.571
Placing a nasogastric tube	2.4±1.10	2.8±1.44	+0.4	0.255
Drain an abscess	2.3±1.08	2.7±1.02	-0.4	0.189
Joint aspiration	2.0±0.85	2.6±1.24	+0.6	0.051
Chest drain insertion	1.8±0.75	2.5±0.81	+0.7	0.003
Nasal packing	1.7±0.84	2.4±1.12	+0.7	0.008
Closed reduction of a fracture	2.2±0.71	2.3±1.10	+0.1	0.737
Application of traction	1.9±0.82	2.2±0.99	+0.3	0.332
Reduction of a joint dislocation	2.1±0.73	2.2±0.98	+0.1	0.812
Application of a cervical collar	2.3±0.60	2.1±1.10	-0.2	0.494
Removal of foreign body from ear	2.1±0.88	2.1±1.00	-	0.873
Resuscitation of a newborn	2.2±0.89	1.8±0.68	-0.4	0.096

Results reported as mean± standard deviation. Scores range from 1.7 to 4.9 where a score of 3 or more indicates clinical experience with the procedure (refer to Table 1). GCS=Glasgow Coma Score.

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Table 4. Percentage of participants who reported performing the named skill in clinical practice (identified as those rating the skill as 3 or greater, refer Table 1)

Variable	Pre-PGY1 n=30	Post-PGY1 n=25
Emergency		
Application of a cervical collar	30%	25%
Endotracheal intubation	83%	81%
Surgery		
Simple wound suturing	90%	100%
Chest drain insertion	17%	43%
Drain an abscess	47%	57%
Obstetrics and Gynaecology		
Cervical smear	90%	86%
Resuscitation of a newborn	37%	14%
Speculum exam of vagina & cervix	100%	95%
Bimanual palpation of adnexae	97%	85%
Detection of fetal heart sounds	93%	90%
Musculoskeletal		
Joint aspiration	23%	43%
Applying a bandage/strapping	77%	81%
Closed reduction of a fracture	30%	43%
Applying plaster to a fracture	53%	81%
Reduction of a joint dislocation	33%	43%
Application of traction	21%	35%
Other		
Arterial puncture	93%	100%
Venepuncture	97%	100%
Insertion of an IV cannula	100%	100%
Intramuscular injection	90%	90%
Infiltration of local anaesthetic	83%	90%
Assessment of level of consciousness (GCS)	77%	100%
Nasal packing	10%	43%
Placing a nasogastric tube	37%	43%
Bladder catheterisation		
Male	93%	100%
Female	67%	43%
Removal of corneal foreign body	37%	65%
Removal of foreign body from ear	24%	24%

Increases in the perceived level of experience were observed in 19 (68%) of 28 skills from the MCNZ indicative list however only nine of these increases reached statistical significance (Table 3). There were decreases in the perceived level of experience in eight skills but none with statistical significance, and seven of these were skills

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associated with Obstetrics and Gynaecology which are not offered during PGY1 at ADHB (Table 3).

By the end of the PGY1 year, 100% of doctors had performed in practice only 6 of 28 (21%) of the skills listed by the MCNZ, compared to 1 of 28 at the beginning of the year (Table 4).

The number of skills performed by at least 50% of the doctors did not change significantly over the year (16 at the beginning, 17 at the end). Put another way, 11 out of 28 skills (39%) defined as important to achieve during PGY1 by the MCNZ, had been performed in practice by less than half our sample at the end of their PGY1 year.

Discussion

Our study found that experience with most procedural skills deemed important by the Medical Council of New Zealand does not increase significantly during a doctor's first postgraduate year working in a major tertiary hospital. In addition, there is a significant discrepancy between the skills expected of graduates at the end of PGY1 (as indicated by the MCNZ) and those attained. Furthermore, most of the skills expected of PGY1 doctors are present in the medical school curricula and it is interesting to note that of the 28 skills discussed, just one had been performed by all the respondents at the time of their graduation.

Obstetric & gynaecology runs are not currently offered at PGY1 level at ADHB, while paediatrics is only available to two people. This explains, in part, the relative lack of experience demonstrated in these disciplines and, despite skills from these disciplines being included in the MCNZ's indicative list, general registration is still granted without this experience. Given that the survey asked about experience, as opposed to competence or confidence, the reported decline in experience with these skills can be ignored. This is supported by the lack of statistical significance associated with this decline.

Internationally, the historical trend has been to not prescribe minimum skill sets, although many comparable countries (that have previously issued 'indicative' lists similar to the MCNZ) are currently moving to greater regulation. In Australia, individual states have produced various suggested skill sets,[6] while in the United Kingdom, the revision of the New Doctor sets out "outcomes" rather than "experience" that must be achieved prior to gaining full registration.[7] In addition, the recently instituted, two-year "Foundation Programme" in the United Kingdom lists 41 key competencies that will be assessed during the programme.[8]

The general theme of our results (i.e. that PGY1 doctors generally do not meet defined core competencies) is supported by the international literature with conclusions like "newly qualified doctors do not feel prepared for PRHO duties and objectively are not competent in basic clinical skills",[9] and "students…skills are deficient at the time of graduation"[10] being commonplace.

A South African study which tested 58 recent graduates in a seven station OSCE found that average scores across all 7 stations was just 67.5% and that the candidates were "unduly optimistic" about their competence [11]. In a UK study, Smith et al found knowledge of acute care to be "unsatisfactory" amongst recent graduates and called on medical schools to "urgently incorporate training about common aspects of generic

acute care in their curricula".[12] Another study from the UK that tested PRHOs against a 17 station OSCE of core clinical skills, concluded that "PRHOs may have deficiencies in basic clinical skills at the time they enter the medical register".[13] Furthermore, a larger study of 122 medical students and 84 PRHOs (that asked about experience with 8 core skills) found that most of the skills had only been performed a few times at qualification and less than half of the PRHOs questioned could recall further postgraduate training in any of them.[14]

What is encouraging, however, are findings such as those of a 1999 study that found that early postgraduate trainees in a Sydney teaching hospital did in fact acquire high levels of confidence and experience in most skill areas after 2 years of training noting that "the first postgraduate year is particularly significant for the development of clinical skills".[15] It is important to note, however, that experience and confidence have been found not to equate to observed competence.[13,16]

Our study is limited by the small sample size and by the unfortunate attrition of five participants between the two surveys. Furthermore, our study looked at self-perceptions of experience which, as outline above, have been previously shown to bear little correlation to observed competence.

Notwithstanding the small absolute numbers, our study does represent the experience of the majority of PGY1 medical staff at ADHB with 79% (30 out of 38) completing the original survey and 66% (25 of 38) the follow-up. Experience with most skills surveyed did not increase during the first postgraduate year, and a significant proportion (11 of 28) of the skills identified by the MCNZ had been performed by less than half the respondents.

Taking our findings in the context of the international literature raises a number of questions. Are the skills being tested an accurate reflection of the role of the PGY1 doctor? If so, why are they not being achieved and should adequate competence with some or all of these skills be required to be demonstrated before General Registration is granted? If not, are there deficiencies with the PGY1 experience, or is the list of skills inappropriate?

We would contend that the answer is likely to be a combination of the above. Regarding the appropriateness of the lists, some authors have argued that the most important skills a doctor can possess are the tools to identify seriously ill patients, something the traditionally prescribed skill sets tend to ignore.[17,18] Furthermore, some skills, such as cannulation and phlebotomy, are being increasingly taken over by other health professionals, thus decreasing the exposure of new medical graduates. Finally, there are some important skills, such as endotracheal intubation, that a PGY1 doctor is unlikely to perform, but which are important nonetheless.

As previously mentioned, the MCNZ "Indicative List of Skills" is not prescriptive and General Registration is granted on the basis of satisfactory completion of four, 3-month rotations in a New Zealand hospital. The lack of a prescribed standard of what constitutes acceptable procedural experience poses difficulties for those responsible for skills education programmes at both undergraduate and graduate level, those consultants charged with supervision and assessment, as well as for new graduate doctors themselves.

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Given the discrepancy observed between the reported experience of PGY1 house officers at ADHB and the indicative list of skills published by the MCNZ, the growing body of medical literature that echo these findings, and the moves toward greater regulation in comparable Western countries, these authors propose the establishment of an internationally agreed, assessed curriculum for PGY1 that would need to be satisfactorily completed prior to gaining general registration.

Furthermore, given the changing medicolegal environment and the increasing demand for public accountability, a more systematic approach to ensure junior doctors are adequately trained to provide safe, competent care is fast becoming a necessity. Such a programme would require the introduction of more formal, competence-based education into the PGY1 year and a necessary shift in focus from the service dominated working model that exists currently. Proposed suggestions for achieving this include: limiting the number of patients house officers manage at one time; relieving junior doctors of "non-educational chores"; improving educational content; and easing "emotional stresses".[19]

Various models exist for the standardising of such assessments, but two that are commonly discussed in the literature are the use of standardised patients,[20–23] and a method of clinical skills assessment developed by the American Board of Internal Medicine known as the mini-CEX.[24,25] In addition to the use of the mini-CEX, the UK Foundation Programme is employing three other assessment techniques: 'Direct Observation of Procedural Skills' (DOPS), 'Case-based Discussion' (CbD), and 'Multi-Source Feedback' (MSF), a form of 360 degree feedback.[8] It is beyond the scope of this paper to comment on the relative merits of each of these methods, but it is worth considering that the institution of any internationally agreed, assessed curriculum would also require agreement on appropriate methods of testing.

Other options that have been suggested to be beneficial in improving graduate doctors' skills are an extended, specific orientation period,[9,26] and greater integration between undergraduate and graduate education programmes [27]. In New Zealand, a strength of our system is the trainee intern year which provides some degree of integration between medical school and pre-vocational training, although there is a need for greater collaboration on appropriate skills, and methods of teaching and assessment, between medical schools, PGY1 & 2 programme providers, and vocational colleges.

In New Zealand, the 'Indicative List of Skills' published by the MCNZ is currently the most authoritative guide to the expected competencies of recently graduated doctors. This paper has highlighted significant discrepancies between the skills listed and those attained, and we call on the MCNZ to review this list, in consultation with all stakeholders and in light of international developments, both to improve the guidance given to new graduate doctors and their educators, and to ensure that the skills are appropriate prior to any move to greater prescription of competencies in this country.

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References:

1. Medical Council of New Zealand. Education, training and supervison for new doctors. Wellington: Medical Council of New Zealand; 2003.
2. Moercke AM, Eika B. What are the clinical skills levels of newly graduated physicians? Self-assessment study of an intended curriculum identified by a Delphi process. Med Educ. 2002;36:472–8.
3. Moercke AM, Eika B. [Practical clinical skills in medical education 1–undergraduate education. A Delphi survey]. Ugeskr Laeger. 2001;163:3616–20.
4. Moercke AM, Eika B. [Practical clinical skills in medical education 2–internship. A Delphi survey]. Ugeskr Laeger. 2001;163:3621–5.
5. Auckland District Health Board. [Website]. Auckland: Auckland District Health Board; 2005 [cited 21 June 2005]. Available online. URL: http://www.adhb.govt.nz/ Accessed February 2006.
6. Postgraduate Medical Council of South Australia. A guide to the educational objectives of junior medical officer training in South Australia Adelaide: Postgraduate Medical Council of South Australia; 2004 [cited 10 August 2005]. Available online. URL: http://www.ceptsa.org.au/publications/edobjectives.htm Accessed February 2006.
7. General Medical Council. The New Doctor: Recommendations on General Clinical Training London: General Medical Council; 2005 [updated January 2005; cited 8 August 2005]. Available online. URL: http://www.gmc-uk.org/med_ed/default.htm Accessed February 2006
8. Modernising Medical Careers. The Foundation Programme London: National Health Service; 2005 [cited 8 September 2005]. Available online. URL: http://www.mmc.nhs.uk/pages/foundation/about Accessed February 2006
9. Evans DE, Wood DF, Roberts CM. The effect of an extended hospital induction on perceived confidence and assessed clinical skills of newly qualified pre-registration house officers. Med Educ. 2004;38:998–1001.
10. Chan-Yan C, Gillies JH, Ruedy J, et al. Clinical skills of medical residents: a review of physical examination. CMAJ. 1988;139:629–32.
11. Burch VC, Nash RC, Zabow T, et al. A structured assessment of newly qualified medical graduates. Med Educ. 2005;39:723–31.
12. Smith GB, Poplett N. Knowledge of aspects of acute care in trainee doctors. Postgrad Med J. 2002;78:335–8.
13. Fox RA, Ingham Clark CL, Scotland AD, et al. A study of pre-registration house officers' clinical skills. Med Educ. 2000;34:1007–12.
14. Goodfellow PB, Claydon P. Students sitting medical finals—ready to be house officers? J R Soc Med. 2001;94:516–20.
15. Marel GM, Lyon PM, Barnsley L, et al. Clinical skills in early postgraduate medical trainees: patterns of acquisition of confidence and experience among junior doctors in a university teaching hospital. Med Educ 2000;34:1013–5.
16. Barnsley L, Lyon PM, Ralston SJ, et al. Clinical skills in junior medical officers: a comparison of self-reported confidence and observed competence. Med Educ. 2004;38:358–67.
17. Jolobe OM. Knowledge of aspects of acute care in trainee doctors. Postgrad Med J. 2002;78:697; author reply at p697.

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18. Subbe CP, Kruger M, Rutherford P, et al. Validation of a modified Early Warning Score in medical admissions. QJM. 2001;94:521–6.
19. Ludmerer K, Johns M. Reforming Graduate Medical Education. JAMA. 2005;294:1083–7.
20. Chalabian J, Dunnington G. Standardized patients: a new method to assess the clinical skills of physicians. Best Pract Benchmark Healthc. 1997;2:174–7.
21. Pangaro LN, Worth-Dickstein H, Macmillan MK, et al. Performance of "standardized examinees" in a standardized-patient examination of clinical skills. Acad Med. 1997;72:1008–11.
22. Wettach GR. A standardized patient enrolled in medical school considers the national clinical skills examination. Acad Med. 2003;78:1240–2.
23. Stillman PL, Wang Y, Ouyang Q, et al. Teaching and assessing clinical skills: a competency-based programme in China. Med Educ. 1997;31:33–40.
24. Kogan JR, Bellini LM, Shea JA. Implementation of the mini-CEX to evaluate medical students' clinical skills. Acad Med. 2002;77:1156–7.
25. Norcini JJ, Blank LL, Duffy FD, et al. The mini-CEX: a method for assessing clinical skills. Ann Intern Med. 2003;138:476–81.
26. Nielsen PE, Holland RH, Foglia LM. Evaluation of a clinical skills orientation program for residents. Am J Obstet Gynecol. 2003;189:858–60.
27. Prince KJAH, Boshuizen HPA, van der Vleuten CPM, et al. Students' opinions about their preparation for clinical practice. Med Educ. 2005;39:704–12.

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