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EDUCATION AND TRAINING

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Intern underperformance is detected more frequently in emergency medicine rotations

Narelle Aram,[1] Victoria Brazil,[1,2] Lorna Davin[1,3] and Jaimi Greenslade[1,4,5]
[1]Department of Emergency Medicine, Royal Brisbane and Women's Hospital, Brisbane, Queensland, Australia, [2]Faculty of Health Science and Medicine, Bond University, Gold Coast, Queensland, Australia, [3]Centre for Medical Education Research and Scholarship, University of Queensland School of Medicine, Brisbane, Queensland, Australia, [4]School of Public Health, Queensland University of Technology, Brisbane, Queensland, Australia, and [5]School of Medicine, The University of Queensland, Brisbane, Queensland, Australia

Abstract

Objective: To determine the frequency and nature of intern underperformance as documented on in-training assessment forms.

Methods: A retrospective review of intern assessment forms from a 2 year period (2009–2010) was conducted at a tertiary referral hospital in Brisbane, Queensland. The frequency of interns assessed as 'requiring substantial assistance' and/or 'requires further development' on mid- or end-of-term assessment forms was determined. Forms were analysed by the clinical rotation, time of year and domain(s) of clinical practice in which underperformance was documented.

Results: During 2009 and 2010 the overall documented incidence of intern underperformance was 2.4% (95% CI 1.5–3.9%). Clinical rotation in emergency medicine detected significantly more underperformance compared with other rotations ($P < 0.01$). Interns predominantly had difficulty with 'clinical judgment and decision-making skills', 'time management skills' and 'teamwork and colleagues' (62.5%, 55% and 32.5% of underperforming assessments, respectively). Time of the year did not affect frequency of underperformance. A proportion of 13.4% (95% CI 9.2–19.0%) of interns working at the institution over the study period received at least one assessment in which underperformance was documented. Seventy-six per cent of those interns who had underperformance identified by mid-term assessment successfully completed the term following remediation.

Conclusion: The prevalence of underperformance among interns is low, although higher than previously suggested. Emergency medicine detects relatively more interns in difficulty than other rotations.

Key words: *assessment, emergency medicine, intern, medical education.*

Correspondence: Dr Victoria Brazil, Department of Emergency Medicine, Royal Brisbane and Women's Hospital, Butterfield Street, Herston, Qld 4029, Australia. Email: victoria.brazil@gmail.com

Narelle Aram, MBBS (Hons), FACEM, BSc (Biomedical), Advanced Trainee; Victoria Brazil, MBBS, FACEM, MBA, Senior Staff Specialist, Associate Professor; Lorna Davin, BAppSc, MA, GCertAdultEd, Medical Education Officer, PhD Candidate; Jaimi Greenslade, BPsych (Hons), PhD, Research Officer, Associate Professor, Senior Lecturer.

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CRITERIA	Requires substantial assistance	Requires further development	Consistent with level of appointment	Performance better than expected	Performance exceptional	N/A Not observed
CLINICAL ***Knowledge base.*** Demonstrates adequate knowledge of basic and clinical sciences.						
Clinical skills. Elicits and records accurate, complete history and clinical examination findings.						
Clinical judgement/decision making skills. Applies knowledge base and clinical findings in organising, synthetising and acting on information.						
Emergency skills. Acts effectively, and when appropriate acknowledges own limitations and seeks help.						
Procedural skills. Performs procedures competently.						
COMMUNICATION ***Patient and Family.*** Interacts effectively and sensitively with patients and families/care givers.						
Medical Records/Clinical Documentation. Provides clear, comprehensive and accurate records.						
PERSONAL AND PROFESSIONAL ***Professional Responsibility.*** Demonstrates, appropriate attitudes and behaviours, including punctuality, reliability, honesty and self-care.						
Teaching. Demonstrates commitment to learning, reflective thinking, and teaching others.						
Time management skills. Organises and prioritises tasks to be undertaken.						
Teamwork and colleagues. Works and communicates effectively within a team.						

RBWH defines underperformance as any tick in the grey area

Figure 1. Adapted from Postgraduate Medical Council of Queensland.[11] RBWH, Royal Brisbane and Women's Hospital.

Introduction

The identification and remediation of poorly performing interns is important to assist in their progress towards general registration, and to assure public confidence in the efficiency and safety of the care they provide.

It has been suggested that interns lack clinical and decision-making skills,[1] and report they are inadequately prepared for their first year of practice.[2–4] Despite this, documentation of underperformance among interns appears to be rare. A New South Wales review of more than 3000 resident assessments, including 1727 interns, showed more than 98% were successful in their overall in-training assessment,[5] prompting suggestions that this assessment process was 'pointless'.[6] Assessment and feedback to underperforming doctors can be a daunting and difficult process for supervisors.[7,8] Interns often feel they receive inadequate feedback,[9] and therefore might have limited insight into their observed performance.[10] Supervisors are reluctant to give negative feedback or to assess interns as lacking competence.[8]

At the Royal Brisbane and Women's Hospital (RBWH; Brisbane, Australia), interns are assessed during supervised clinical practice. A clinical supervisor(s) observes the intern performance over a 5–12 week clinical rotation or 'term'. Assessment outcomes are documented using the *RMO Assessment Form* and *Assessment Guidelines* provided by the Postgraduate Medical Council of Queensland (PMCQ) (Fig. 1).[11,12]

This instrument is structured to assess performance in the three broad domains of the Australian Curriculum Framework for Junior Doctors (ACFJD)[13] – clinical management, communication and professionalism.

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Structured mid- and end-term in-training assessment forms are completed by the clinical supervisor(s). Those with identified learning needs at mid-term assessment, defined as 'requires substantial assistance' or 'requires further development', are required to develop an Improving Performance Action Plan (IPAP) in conjunction with their supervisor(s).

There is no formal training or credentialing process required by the Medical Board of Australia (MBA) or the PMCQ for senior doctors to function as clinical supervisors for interns. In practice, these supervisors are generally specialists or specialists-in-training (registrars) with variable interest or expertise in junior doctor teaching and assessment. As a result, there might be significant variability in the quality of teaching and assessment practice between states, institutions and clinical rotations. There is variable educational support for clinical supervisors, with some institutions having dedicated Medical Education Officers (MEOs) to assist in assessment and remediation processes. There is no national database of intern assessment results from which benchmarking data might be drawn. The Confederation of Postgraduate Medical Councils (CPMEC) has made efforts in recent years to formalise training for assessors, including national assessment tools.[14]

Satisfactory completion of compulsory terms in medicine, surgery and emergency medicine (EM) is required by Australian interns. With increasing numbers of medical graduates, the requirements for internship, including the need for an EM term, are under review by the MBA.[15] The requirement for 10 weeks in EM has become a 'training bottleneck',[16,17] as most states have limited capacity to safely absorb large numbers of additional interns into busy EDs. Some states have offered innovative solutions to this capacity challenge.[18] However, there is considerable pressure to replace the EM rotation with 8 weeks in 'emergency medical care', which might include selected general practice environments.[15]

There is a paucity of published information from Australian teaching hospitals as to those clinical rotations or domains of practice in which underperformance is most likely to be identified.

In this study we aimed to identify:

- The overall frequency of intern underperformance at a tertiary referral hospital
- The clinical rotations that are more likely to identify underperforming interns
- The assessment domain(s) in which interns appear to be having the most difficulty
- Whether remediation techniques instituted at mid-term result in successful performance by end-term assessment

Methods

Design, setting and data collection

The study was conducted at the RBWH, a 720-bed tertiary referral hospital in Queensland, which currently trains 95 interns each year.

Data were collected from the Medical Education and Training Service and the Medical Staff Support Unit on the total number of interns and rotations undertaken at the RBWH over a 2 year period (2009–2010).

A retrospective review of mid- and end-term intern assessment forms over the study period was performed. Intern assessments were manually reviewed and those with documented underperformance were further examined.

The clinical supervisors who completed the assessment forms were specialists or registrars who directly supervised the interns' work and learning in that clinical rotation. Hence, for most rotations the interns' in-training assessment was based on the judgment of one or two senior clinicians. In the EM rotation, forms were completed based on the synthesis of input from 20–30 supervising registrars and specialists who met twice per term to discuss the performance of each intern. This difference in process was based on the work practice in EM, where shift work results in interns being observed by multiple senior medical staff over the term. For all rotations, clinical supervisors were supported by a MEO employed to assist with the education, assessment and remediation of junior doctors at this institution.

For the purposes of this study, underperformance was defined as any assessment domain being marked as 'requires substantial assistance' or 'requires further development'.

Further data collected from assessment forms that met underperformance criteria included the clinical rotation, time of year (terms 1–5), mid-term or end-term, and domain(s) in which underperformance was documented.

Free-text comments in the feedback section of the form were also recorded, together with the remediation plan documented in the associated IPAP.

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Statistical analysis

The frequency of underperformance among interns was computed using conventional descriptive statistics. Confidence intervals for the number of interns who had a documented episode of underperformance were computed using confidence interval analysis (Version 2 University of Southampton). To calculate confidence intervals for the overall episodes of underperformance, we conducted an intercept only logistic regression, which allowed for correlation within individuals. Logistic regression analyses were conducted using SPSS (Version 19, SPSS Inc., Chicago, IL, USA).

Logistic regression analysis was also conducted to identify whether a specific rotation was a predictor of underperformance. The correlation within individuals and the year was accounted for in such analyses. Because of the small numbers of underperforming interns in each rotation, we only incorporated those rotations where there were five or more episodes of underperformance identified. Thus, the rotation variable was categorised as EM, general medicine or other.

Ethics

Ethics approval was obtained from the RBWH Human Research Ethics Committee for Low and Negligible Risk Research. The project conforms to the provisions of the Declaration of Helsinki in 1995.

Results

There were 189 interns who were employed at the RBWH over the study period. Assessment information from two interns was excluded because of incomplete data. From the remaining 187 interns, 1611 assessment forms were available. This represented 96.1% of potential forms completed.

Twenty-five (13.4%, 95% CI 9.2–19.0%) interns had a documented episode of underperformance. The majority of these interns (17) only had one episode of underperformance. There were two interns who had greater than four episodes (Fig. 2). The overall frequency of underperformance recorded on assessment forms was 41 of 1611 forms (2.4%, 95% CI 1.5–3.9% forms).

Nearly half (20/41) of the episodes of underperformance were identified in the EM rotation. There were eight episodes in general medicine, and the remaining episodes of underperformance were in a variety of other clinical rotations (Table 1). Logistic regression analyses indicated that detection of underperformance was 3.8

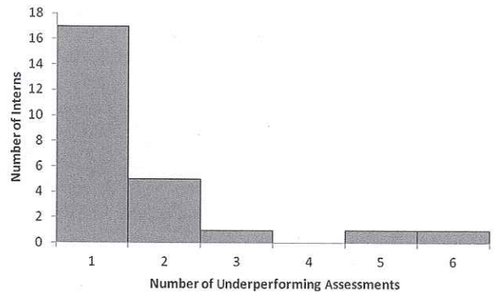

Figure 2. Number of underperformance episodes by intern.

(95% CI 1.92–7.45, $P < 0.01$) times more likely in the emergency rotation compared with other rotations. Documentation of underperformance did not significantly differ in general medicine compared with other rotations (OR = 1.54, 95% CI 0.61–4.12, $P = 0.35$).

The domains of practice in which underperformance was most frequently documented included 'clinical judgment and decision-making skills', 'time management skills' and 'teamwork and colleagues' (62.5%, 55% and 32.5% of underperforming assessments, respectively) (Fig. 3). In EM, where relatively more underperforming interns were detected, the same pattern was observed, but with the addition of 'professional responsibility' (32.5%).

Of those interns who were documented as underperforming at mid-term (formative) assessment, 76% (19/25) had improved by end-term (summative) assessment. Of those who continued to have unsatisfactory performance at end-term, 83.3% (5/6) were in EM.

The time of the year did not appear to affect identification of intern underperformance (Fig. 4).

Written comments in the feedback section of the assessment forms described a range of issues. Common themes that emerged included the perceived lack of clinical knowledge and an inability to synthesise findings, reflected in the following comments made by supervising clinicians:

difficulty in recognising the sicker patient

struggling to put together a coherent impression and plan

Assessors also perceived reluctance from some interns to ask for assistance. Comments suggest this might reflect the individual intern's confidence levels, with both under- and overconfidence impacting on their willingness to seek support. Within this group there

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Table 1. Underperformance episodes by clinical rotation

	Rotation							
	Emerg.	Medicine	Mental health	Ortho.	Surg.	O&G	Other†	Total
No underperformance	342	352	106	98	289	85	298	1570
Underperformance	20 (5.5%)	8 (2.2%)	0	2 (2.0%)	2 (0.7%)	1 (1.1%)	8 (2.6%)	41 (2.5%)
Total	362	360	106	100	291	86	306	1611

†*'Other' includes nearly 30 additional non-core rotations undertaken by some interns, for example, radiology, palliative medicine, anaesthetics.*

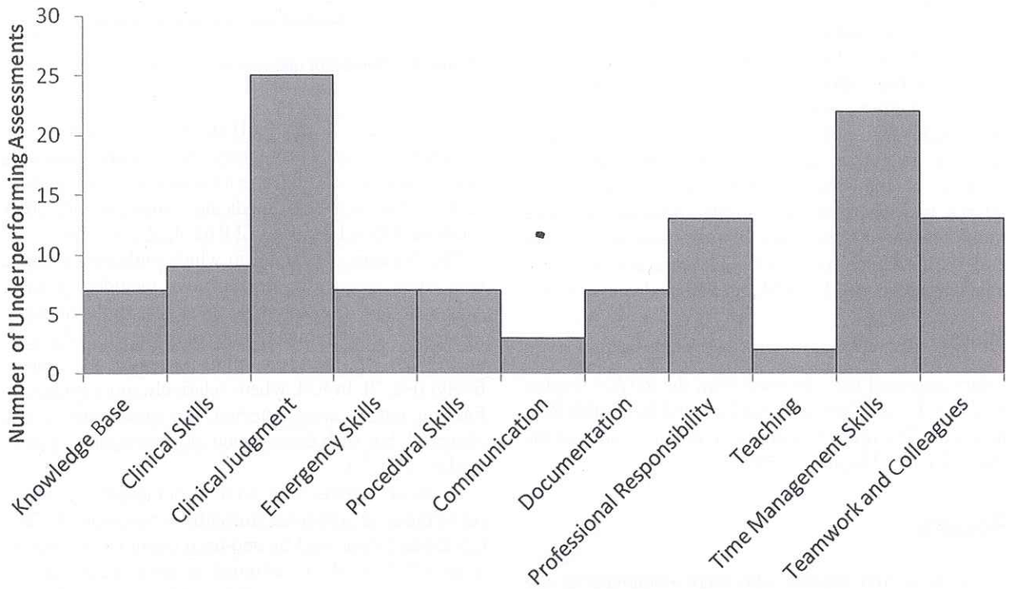

Figure 3. Frequency of underperformance by assessment domain.

also appeared to be a number of interns who were not receptive to feedback from their colleagues.

can seem resistant to input from seniors and takes redirection poorly when it differs from their own opinion

needs to work on professionalism, being self-motivated rather than requiring prompting from supervisors, using work time in an appropriate manner

Time management was also identified as an issue, with many underperforming interns being slow in discussing cases early with their supervisor(s). Inadequate documentation and communication were frequently noted.

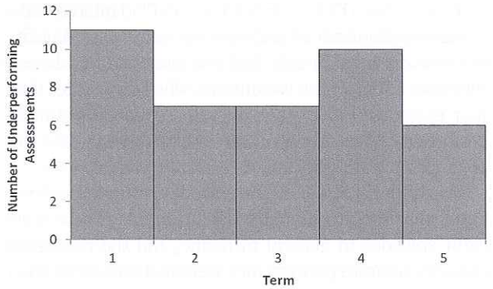

Figure 4. Frequency of underperformance by time of year.

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slow when seeing patient

fails to discuss patients with supervisors early in the course of their presentation

trouble prioritising and organising the day

Improving Performance Action Plans formulated for remediation of these issues described a range of strategies. These centred around issues that traversed key learning domains as follows:

- Clinical knowledge – familiarising self with the clinical rotation and the knowledge content required
- Communication and clinical judgment – early and frequent feedback to supervisor(s)
- Time management, teaching (reflective learning) – reflecting on one's ideas/plans/notes before speaking with supervisor(s)
- Time management and professionalism – attending intern education sessions
- Time management and clinical judgment – planning and prioritising tasks with supervisor(s)
- Professionalism, teaching and teamwork – respecting and constructively discussing feedback from colleagues

Discussion

Documented underperformance among Australian interns appears to be low. This study has demonstrated that it might be more frequent than previously reported,[5] with more than one in eight interns having at least one episode of documented underperformance. The increased documentation of unsatisfactory performance at the study institution might be due to a number of factors, including variation in assessment (and assessor) practice, the extent of educational support for assessors or the actual performance of the intern cohort. A higher frequency of underperformance might be interpreted negatively: a poorer quality of medical graduates, or greater difficulties encountered by interns because of their rising numbers and diluted supervision. An alternative interpretation is that the assessment process for our study cohort was more rigorous than for previously reported cohorts.[5] The study institution's involvement of professional educators (MEOs) and the educational experience of clinical supervisors working in a large teaching hospital that has accommodated interns for many years might support this interpretation.

Our finding that the EM rotation detected significantly more underperformance is important in the debate on the role of the EM term during internship. This finding might suggest that interns are poorly prepared for the clinical practice required in EM. It might be that the educational and/or assessment practice within the EM rotation, including assessment by multiple supervisors, might be more rigorous. Alternatively, it might be that the demands of an ED term are different in nature to other core terms, and interns are observed performing in ACFJD domains, which are less well observed in other rotations – for example, the communication skills required to make multiple referrals, or the clinical reasoning skills evident when interns might be the first medical practitioner to assess a patient.

The debate over the inclusion of the EM term in the MBA requirements for internship has focused on the clinical experience and patient casemix interns' experience in the rotation. However, the critical role of the EM term in detecting interns not ready for independent practice is also important. In our study cohort, the EM term was the 'acid test' for many interns.

Regardless of the clinical rotation, we found that underperforming interns struggled with 'clinical judgment and decision-making', 'time management skills' and 'teamwork and colleagues'. Similar themes have been demonstrated internationally.[19,20] We suggest this underlines the key transition functions of internship, the application and translation of knowledge to the clinical setting and culture, and the graduated increase in independent practice.

A very small number of interns had multiple documented episodes of underperformance. These doctors represent a disproportionate burden on supervisors and educators. Seven interns failed to satisfactorily complete terms, despite remediation strategies instituted when underperformance was documented at mid-term. These doctors might require intensive guidance and support regarding future vocational decisions.

Limitations

There were limitations with the study. Intern assessments studied were drawn from a single teaching hospital, and findings might not be generalisable to those at other institutions. As the number of interns increases dramatically across Australia, intern performance might be undergoing rapid change not sufficiently captured within 2 years of data. It was beyond the scope of this study to review intern education or remediation

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strategies in depth, or to examine long-term follow-up performance data on those interns with documented underperformance.

Conclusion

The prevalence of underperformance among interns is low, but higher than previously suggested. EM detects relatively more interns in difficulty than other rotations, and further research is required to determine what factors contribute to this assessment outcome. This finding is important in the debate on Medical Board requirements for internship. Ongoing collation and reporting of intern performance data should be an important quality assurance activity for teaching institutions, providing medical educators with a more comprehensive understanding of ways to build educational support and rigour.

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Author contributions

NA – study design, data collection and analysis, manuscript preparation. VB, LD and JG – study design, data analysis, manuscript preparation.

Competing interests

None declared.

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References

1. Wilson BE. Performance-based assessment of internal medicine interns: evaluation of baseline clinical and communication skills. *Acad. Med.* 2002; **77**: 1158.
2. Abuhusain H, Chotirmall SH, Hamid N, O'Neill SJ. Prepared for internship? *Ir. Med. J.* 2009; **102**: 82–4.
3. Kelly C, Noonan CL, Monagle JP. Preparedness for internship: a survey of new interns in a large Victorian health service. *Aust. Health Rev.* 2011; **35**: 146–51.
4. Hannon FB. A national medical education needs' assessment of interns and the development of an intern education and training programme. *Med. Educ.* 2000; **34**: 275–84.
5. Bingham CM, Crampton R. A review of prevocational medical trainee assessment in New South Wales. *Med. J. Aust.* 2011; **195**: 410–12.
6. Katelaris AG, Jorm CM. Improved assessment needed for young doctors [editor's choice]. *Med. J. Aust.* 2011; **195**: 369.
7. Greenburg DL, Durning SJ, Cohen DL *et al.* Identifying medical students likely to exhibit poor professionalism and knowledge during internship. *J. Gen. Intern. Med.* 2007; **22**: 1711–17.
8. Watling CJ, Kenyon CF, Schulz V *et al.* An exploration of faculty perspectives on the in-training evaluation of residents. *Acad. Med.* 2010; **85**: 1157–62.
9. Finucane P, O'Dowd T. Working and training as an intern: a national survey of Irish interns. *Med. Teach.* 2005; **27**: 107–13.
10. 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.
11. Postgraduate Medical Council of Queensland [website]. Junior Doctor Assessment Form. Available from URL: http://www.pmcq.com.au [Accessed August 2011].
12. Postgraduate Medical Council of Queensland [website]. Assessment Guidelines. Available from URL: http://www.pmcq.com.au/index.php/education-a-training/assessment-for-junior-doctors [Accessed December 2012].
13. Australian Curriculum Framework for Junior Doctors [website]. Available from URL: http://curriculum.cpmec.org.au/ [Accessed 26 October 2012].
14. Confederation of Postgraduate Medical Education Councils (CPMEC) [website]. National Assessment Tools. Available from URL: http://www.cpmec.org.au/Page/acf-resources [Accessed May 2012].
15. Medical Board of Australia [website]. Consultation paper on proposed registration standard for granting general registration as a medical practitioner to Australian and New Zealand medical graduates on completion of intern training. Available from URL: http://www.medicalboard.gov.au/News/Past-Consultations.aspx [Accessed January 2012].
16. Fox GJ, Arnold SJ. The rising tide of medical graduates: how will postgraduate training be affected? *Med. J. Aust.* 2008; **189**: 515–18.
17. Brazil V. Interns in the ED: the real challenges of increasing numbers. *Emerg. Med. Australas.* 2010; **22**: 97–9.
18. Brazil VA, Greenslade JH, Brown AF. Enhancing capacity for intern training in the emergency department: the MoLIE project. *Med. J. Aust.* 2011; **194**: 165–8.
19. Wilkinson TJ, Harris P. The transition out of medical school – a qualitative study of descriptions of borderline trainee interns. *Med. Educ.* 2002; **36**: 466–71.
20. Yao DC, Wright SM. National survey of internal medicine residency program directors regarding problem residents. *JAMA* 2000; **284**: 1099–104.

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PAEDIATRIC EMERGENCY MEDICINE

Triggers for head computed tomography following paediatric head injury: Comparison of physicians' reported practice and clinical decision rules

Francis D Lockie,[1] Sarah Dalton,[1] Ed Oakley[2,3,4] and Franz E Babl,[2,3,5] on behalf of the Paediatric Research in Emergency Departments International Collaborative (PREDICT)
[1]Emergency Department, The Children's Hospital at Westmead, Sydney, New South Wales, Australia, [2]Murdoch Childrens Research Institute, Melbourne, Victoria, Australia, [3]The Royal Children's Hospital, Melbourne, Victoria, Australia, [4]Department of Paediatrics, Monash University, Clayton, Victoria, Australia, and [5]Department of Paediatrics, The University of Melbourne, Melbourne, Victoria, Australia

Abstract

Objective: To compare head computed tomography (CT) triggers for paediatric head injury as reported by senior paediatric emergency physicians in Australia and New Zealand with triggers in published evidence-based clinical decision rules (CDRs).

Methods: A survey of CT triggers after head injury was distributed to senior emergency physicians at PREDICT (Paediatric Research in Emergency Departments International Collaborative) sites in Australia and New Zealand. Results were compared with recommendations for CT scans in CATCH, CHALICE and PECARN CDRs. Clinical practice guidelines (CPGs) from each site were also reviewed.

Results: The response rate was 93% (130/140). No published trigger for head CT was identified by 100% of survey participants and each CDR included several triggers not identified by many respondents. Abnormal examination findings, including depressed skull fracture and base of skull fracture, were most likely to prompt respondents to order a head CT (>90%). A concerning mechanism of injury, such as a fall greater than 3 feet or five stairs, triggered a CT response only in approximately 10% of respondents. Eight different head injury CPGs were used across the 13 PREDICT sites. These were highly variable between sites and CPGs were not explicitly based on published CDRs.

Conclusion: High-quality, published CDRs exist for head CT use after paediatric head injury. Physician-reported CT triggers differ from CDR-recommended triggers. The major published head injury CDRs should be prospectively validated in the Australasian setting before incorporating them into local practice and CPGs.

Key words: *clinical decision rule, clinical practice guideline, computed tomography, emergency department, paediatric head injury, research network.*

Correspondence: Dr Francis D Lockie, Emergency Department, Women's and Children's Hospital, Adelaide, SA 5006, Australia. Email: franlockie@gmail.com

Francis D Lockie, MBBS, BSc, MRCPCH, FRACP, Paediatric Emergency and Retrieval Physician; Sarah Dalton, BMed, MAppMgt (Hlth), FRACP, Paediatric Emergency Physician; Ed Oakley, MBBS, FACEM, Paediatric Emergency Physician; Franz E Babl, MD, MPH, FRACP, Paediatric Emergency Physician.

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