

## Safe medication practice: attitudes of medical students about to begin their intern year

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**OBJECTIVES** Interns are expected to prescribe effectively and safely. This study aimed to assess medical students' perceptions of their readiness to prescribe, associated risks and outcome if involved in an error, as well as their perceptions of available support.

**METHODS** We carried out a survey of 101 students prior to their intern year using a structured questionnaire. An indication of agreement with 21 closed statements was sought. Thematic clusters were identified by factor analysis.

**RESULTS** Most students (84) felt they would be able to prescribe for most simple complaints and complete discharge prescriptions (81). In high-risk situations, fewer students felt comfortable with prescribing: only 54 felt sufficiently confident to prescribe warfarin and 66 felt confident enough to order i.v. fluids. Many felt support such as guidelines was available (87) and that, if in doubt, they could clarify instructions and seek advice. Students were aware of errors occurring within the medication system; however, most (99) believed that the medicines they prescribed would be safely administered. There was a mixed perception of medication errors: 40 felt that their prescribing errors would not be dealt with constructively and 79 indicated that a culture existed at their hospitals where clinicians would be blamed if they made a prescribing error.

**CONCLUSIONS** At the end of medical school education and prior to assuming responsibility for

prescribing, students felt unprepared and perceived that negative outcomes would result if they were involved in errors. These findings indicate that much more work is needed to prepare doctors to prescribe safely, improve the safety of prescribing systems and address the issue of blame.

**KEYWORDS** \*attitude of health personnel; \*perception; physician's practice patterns; \*internship and residency; Queensland; medication errors; clinical competence/standards.

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### INTRODUCTION

Prescribing errors occur frequently and have significant potential for harm.<sup>1</sup> Medical students feel unprepared to prescribe<sup>2,3</sup> and report unsafe prescribing behaviours.<sup>2</sup> Errors occur because of individual and system failings, and students need to be aware of errors when beginning their intern year.<sup>4</sup> Factors that positively influence prescribing include teaching, guidelines and supportive medical, nursing and pharmacy staff.<sup>3</sup> Interventions reported to reduce errors include: increased pharmacology education; standardised prescribing systems; decision support, and development of a safety culture.<sup>1,2,5</sup>

This report describes final year students' perceptions of their ability to prescribe, the support available for prescribing, the risks involved, and the outcome of prescribing errors. These findings should guide the development of education and system changes.

### METHODS

The study was conducted at two teaching hospitals in Brisbane, Australia in 2003, 6 weeks before the start of the intern year.

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## Overview

### What is already known on this subject

Medical graduates are expected to prescribe safely. Little is known about students' perceptions and understanding of medications management and safe prescribing.

### What this study adds

This study describes students' views about medicines management and prescribing and about their perceived abilities, and their awareness of errors and outcomes. Students felt unprepared to prescribe safely, but assumed the medicines they prescribed would be safely administered. A culture of blame was perceived to exist.

### Suggestions for further research

Much more needs to be done to prepare doctors to prescribe safely and to change the prescribing system and culture.

Further research is required to evaluate the effects of education and system changes on medication errors.

A 6-point Likert scale questionnaire (Table 1) was developed following a literature review, focus groups and a pilot study carried out with 15 interns the previous year. There was an acceptable correlation between variables (Cronbach's  $\alpha = 0.73$ ).

An indication of agreement with 21 closed statements in the following 4 thematic clusters was sought:

- 1 perceived ability to prescribe safely;
- 2 expectation of available support for prescribing;
- 3 awareness of the types and frequencies of medication errors, and
- 4 perceived outcomes of prescribing errors.

A factor analysis was undertaken to determine if students' responses bore out the themes outlined above.

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## RESULTS

Surveys were completed by 101 students (Table 1). A factor analysis identified that response themes

reflected the 4 thematic clusters identified in the questionnaire development (Table 1). The prescribing cluster was split into generic and high-risk prescribing. Error awareness and support for prescribing formed a separate cluster, as did communication regarding prescribing and errors. Six statements did not correlate well with the clusters but were included because they provided insight into error awareness.

Most students (94) agreed that they would be able to prescribe for most 'simple' complaints, and complete discharge prescriptions (82). Two-thirds (66) felt they would be able to order i.v. fluids without seeking help and 70 expressed confidence in safely managing postoperative electrolytes. Fewer felt confident in specific high-risk situations, particularly in warfarin prescribing (54) and management of a patient with diabetes (55), and 74 believed that initiating anti-coagulation would be too great a responsibility.

Although a third of respondents thought their registrars would not provide instruction on day-to-day prescribing, 99 said that they would clarify instructions on how to prescribe new medication and 97 agreed that they would consult a pharmacist if unsure. Almost all students (87) expected to have guidelines available for the majority of their prescribing.

Regarding awareness of errors, 86 agreed that the current error rate was unacceptable. Just over half the students (57) perceived that nurses 'made more than a few errors' when administering medications and 61 thought that a nurse would contact them if they prescribed a drug to a patient with a previous adverse drug reaction (ADR) to a similar drug. However, almost all the respondents (99) also said they felt nurses would be able to safely administer the drugs they prescribed and 91 expected to be contacted each time they made a mistake. When asked about errors involving other medical staff, 68 said they would not trust the accuracy of medication histories taken in the emergency department and 58 agreed that most previous ADRs are not identified on admission.

Over half the respondents (60) thought that if they were involved with an error that might harm a patient, their mistake would be dealt with constructively. However, 79 respondents indicated that they thought a culture of blame still existed at their intern site.

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## DISCUSSION

This study provides insight into medical students' perceptions of prescribing and medicines manage-

Table 1 Trainee interns' responses to the questionnaire in four thematic clusters (sample size = 101)

Statements	Strongly disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)	Median score (range)
<i>General prescribing ability: thematic cluster</i>							
I will be able to competently prescribe for most simple complaints ( <i>n</i> = 101)	0	5	2	32	55	7	5 (2–6)
I will be able to complete discharge prescriptions for all my patients when they go home ( <i>n</i> = 100)	0	5	13	38	35	9	4 (2–6)
I will be able to adequately order i.v. fluids without having to seek help ( <i>n</i> = 101)	1	8	26	39	24	3	4 (1–6)
I will be able to manage most diabetes patients post-surgery ( <i>n</i> = 100)	2	15	28	43	12	0	4 (1–5)
In my surgical term I am confident that I will manage postoperative electrolyte changes safely in most cases* ( <i>n</i> = 100)	1	6	23	51	19	0	4 (1–5)
<i>Prescribing in high-risk areas: thematic cluster</i>							
I will always clarify instructions on how to prescribe a new medication if asked to start it by my registrar ( <i>n</i> = 101)	0	0	2	16	53	30	5 (3–6)
I am confident I will safely prescribe warfarin to most patients ( <i>n</i> = 99)	4	15	26	39	14	1	4 (1–6)
Initiating full anticoagulation will be too great a responsibility for me when I start as an intern <sup>†</sup> ( <i>n</i> = 100)	0	7	19	28	34	12	4 (2–6)
<i>Awareness of errors and prescribing support: thematic cluster</i>							
Guidelines will be available when I am prescribing the majority of medications* ( <i>n</i> = 101)	0	4	10	36	43	8	5 (2–6)
I will consult a pharmacist if I am unsure how to prescribe a specific medication <sup>†</sup> ( <i>n</i> = 101)	0	2	2	18	42	37	5 (2–6)

Table 1 Continued

Statements	Strongly disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)	Median score (range)
I would not trust the accuracy of the medication history taken in emergency departments <sup>†</sup> ( <i>n</i> = 100)	0	11	21	26	38	4	4 (2–6)
If I make a mistake when prescribing a drug, it is probably my fault <sup>†</sup> ( <i>n</i> = 99)	0	3	9	39	45	3	4 (2–6)
The frequency of errors that occur in medicines management is unacceptable <sup>†</sup> ( <i>n</i> = 99)	1	3	9	44	36	6	4 (1–6)
Most ADRs are not identified on admission <sup>†</sup> ( <i>n</i> = 100)	0	11	31	34	22	2	4 (2–6)
Nurses will be able to safely administer my prescriptions <sup>†</sup> ( <i>n</i> = 101)	0	2	0	21	73	5	5 (2–6)
<i>Communication regarding prescribing and errors: thematic cluster</i>							
Registrars will give me instructions for most of my day-to-day prescribing ( <i>n</i> = 100)	1	11	24	38	26	0	4 (1–5)
Nurses make few mistakes when they administer medications ( <i>n</i> = 101)	3	22	32	25	18	1	3 (1–6)
Nurses will call me if I prescribe a drug to a patient with a previous allergy to the same drug class <sup>†</sup> ( <i>n</i> = 100)	0	18	21	35	24	2	4 (2–6)
I expect to be contacted each time I make a prescribing mistake <sup>†</sup> ( <i>n</i> = 101)	0	4	6	26	40	25	5 (2–6)
Serious prescribing errors that may harm a patient are dealt with in a constructive manner ( <i>n</i> = 100)	2	16	22	29	26	5	4 (1–6)
The blame culture no longer exists if a colleague makes a mistake ( <i>n</i> = 96)	8	28	43	15	2	0	3 (1–5)

\* Also associated with prescribing in high-risk thematic cluster.

<sup>†</sup> Independent variable, not included in thematic cluster as a result of factor analysis.

ADR = adverse drug reaction

ment issues they are likely to face during internship. The findings confirm that these students' perceptions are similar to those of students on other medical courses, in that most felt unprepared to prescribe in common and specific scenarios.<sup>1,3,5</sup> A lack of knowledge and skills is reported to result from inadequate training in drug selection, dosing and prescription generation, which, combined with error-prone systems, leads to errors.<sup>1,3,5</sup>

Our results suggest that medical school education provided students with some awareness of errors in history taking, medication prescribing and administration. Less than half perceived that nurses made 'few' mistakes, whereas a third believed that nurses would not identify a specified ADR prescribing error. Strangely, however, the majority believed that nurses would safely administer nearly all their own orders, even if the students themselves lacked confidence in making decisions and prescribing.

Our results support the findings of other authors<sup>2,3,5</sup> in that they indicate that interns expect nurses and pharmacists to contact them should they make a prescribing error, and, by so doing, to act as a safety barrier to error. A lack of understanding of human error theory and of the complexity of the medication system may underpin the misconception that intern prescribing will be safely administered and that it is other doctors, nurses and pharmacists who make mistakes.<sup>4</sup>

Effective communication between medical, nursing and pharmacy staff is important for safe prescribing and ongoing training.<sup>3,5</sup> Our results suggest that students expect to be given instructions, will seek clarification where they are uncertain and expect to be contacted if they make mistakes. The perception of many students that their prescribing errors will not be dealt with constructively may indicate a system-wide problem of a blame culture. Students fear they will be blamed for mistakes, particularly if patients are harmed.<sup>5</sup> System-wide changes to the culture of prescribing, led by senior staff, along with implementation of safer prescribing systems and practical prescribing education, can all have a significant impact on prescribing practice.<sup>2,3,5</sup>

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## CONCLUSIONS

Medical students felt unprepared to assume responsibility for prescribing in their intern year. They were aware that the medication system is error prone but

were under the misapprehension that potentially harmful prescriptions would be safely administered. Students felt that errors made in their intern year might not be dealt with constructively. These results indicate that much more needs to be done to prepare doctors to prescribe safely, improve the safety of the prescribing system and address the issues associated with the perceived existence of a culture of blame.

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## REFERENCES

- 1 Aronson JK. A prescription for better prescribing. *Br J Clin Pharmacol* 2006;**61** (5):487–91.
- 2 Garbutt JM, Highstein G, Jeffe D, Dunagan W, Fraser VF. Safe medication prescribing: training and experience of medical students and house staff at a large teaching hospital. *Acad Med* 2005;**80** (6):594–9.
- 3 Pearson S-A, Rolfe I, Smith T. Factors influencing prescribing: an intern's perspective. *Med Educ* 2002;**36** (8):781–7.
- 4 Reason J. Beyond the organisational accident: the need for 'error wisdom' on the frontline. *Qual Saf Health Care* 2004;**13**(Suppl 2):28–33.
- 5 Barber N, Rawlins M, Dean Franklin B. Reducing prescribing error: competence, control, and culture. *Qual Saf Health Care* 2003;**12** (Suppl 1):29–32.

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