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Do anaesthetists believe their teaching is evidence-based?

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Do anaesthetists believe their teaching is evidence-based?

Abstract

Background: Knowledge translation (KT) and evidence-based practice are widely referenced in clinical medicine, with parallel calls for clinical teaching to better reflect best educational practice. How clinical teachers use medical education theory and evidence is largely unknown. Aims: To explore anaesthetists' attitudes to clinical teaching and medical education theory and evidence: whether they use it, what sources they access and attitudes to possible barriers to its use. Methods: Data were collected from anaesthetists via on-line questionnaire. Results: 364 anaesthetists (19% response rate) completed the questionnaire. Respondents preferentially approach colleagues and access short courses or workshops to improve their teaching. Twenty-eight percent reported consciously using medical education theory or evidence often or regularly, with 24% having never done so; 52% have never accessed any medical education article; and only 21% have read an article from a medical education journal. Lack of available time due to clinical commitments was the major barrier identified to greater use of medical education evidence and theory. Conclusion: A "knowledge-practice gap" does appear to exist in anaesthesia teaching in spite of the improved medical education evidence base. KT methodology may provide a guide to improving clinician engagement with medical education.

Disciplines

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Abstract

Background: Knowledge translation and evidence-based practice are widely referenced in clinical medicine, with parallel calls for clinical teaching to better reflect best educational practice. How clinical teachers use medical education theory and evidence is largely unknown.

Aims: To explore anaesthetists' attitudes to clinical teaching and medical education theory and evidence: whether they use it, what sources they access, and attitudes to possible barriers to its use.

Methods: Data were collected from anaesthetists via on-line questionnaire.

Results: 364 anaesthetists (19% response rate) completed the questionnaire. Respondents preferentially approach colleagues and access short courses or workshops to improve their teaching. 28% reported consciously using medical education theory or evidence often or regularly, with 24% having never done so. 52% have never accessed any medical education article, and only 21% have read an article from a medical education journal. Lack of available time due to clinical commitments was the major barrier identified to greater use of medical education evidence and theory.

Conclusion: A 'knowledge-practice gap' does appear to exist in anaesthesia teaching in spite of the improved medical education evidence base. Knowledge translation methodology may provide a guide to improving clinician engagement with medical education.

Introduction

Evidence-based medicine (EBM) is firmly established in the healthcare landscape, with clinicians encouraged to incorporate as much evidence as possible into their practice. Systematic attempts have been made to find and summarise the available evidence to facilitate this, most noticeably the Cochrane

collaboration. Teaching of EBM has become a standard part of both undergraduate and postgraduate curricula.

It is 15 years since the British Medical Journal editorialised that evidence-based teaching was required in medicine (Peterson 1999). Although there has been debate concerning health professional education (HPE) research quality and a recognition that further “theory-driven evidence” is required (Durning et al. 2012), there has been continued growth in HPE research in parallel with the increased production of evidence in clinical medicine. This growth in knowledge has been accompanied by increasing efforts at knowledge synthesis, such as the publication of new texts (Swanwick 2010; Dornan et al. 2011) and systematic reviews, in particular the Best Evidence in Medical Education (BEME) reviews in Medical Teacher (Harden 1999). These developments have improved the accessibility of medical education knowledge, prompting the claim:

“Evidence shaped practice and policy flourishes when there is access to evidence and know-how about using it.” (Hammick 2012)

A related phenomenon to EBM is knowledge translation (KT). KT describes the interaction between the generation of knowledge and its implementation (Graham et al. 2006). It has been defined as:

“A dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of (patients), provide more effective health services and products and strengthen the health care system.” (Canadian Institutes of Health Research 2012)

KT can be viewed as an extension of EBM, but the underlying perspective differs. In KT, the underlying assumption is that researchers, or knowledge producers, generate knowledge they believe will help patient care and then seek to have clinicians implement it. In contrast, in EBM, the underlying assumption is that clinicians, or knowledge users, recognise a problem in patient care and seek evidence from the knowledge generated by researchers to help determine how best to resolve it

KT has assumed greater importance with the realisation that a 'knowledge-practice gap' may persist in spite of evidence synthesis and dissemination, and the ubiquity of training in EBM. That is, patients continue to receive care which differs from that recommended even when the validity of the evidence is acknowledged and clinician awareness is high (Lang et al. 2007; Graham et al. 2007). KT aims to move beyond knowledge production to discover what factors facilitate and impede implementation and how they can be manipulated to maximise patient care (Graham et al. 2006).

There is no reason to think that HPE is different to clinical practice in this respect. There is in all likelihood a parallel gap between available educational knowledge, on the one hand, and the practice of clinical teachers on the other (Reeves et al. 2013). While it would be comforting to think that teaching in HPE is more evidence-based now than it was in 1999 due to the improved production of evidence, we do not actually know.

Clinicians are already for the most part cognisant of the theories that underpin the generation of knowledge that supports their clinical practice. In contrast, many clinical teachers have not received training in how to teach, are relatively ignorant of educational theory, and often do not recognise the importance of theory guiding practice in this area (Kaufman 2003; Bould et al. 2012). Educational theory is important in directing research and the knowledge generated by this research has relevance in generating both greater understanding and also providing evidence for improved practice (Hodges & Kuper 2012).

Our context of anaesthesia training in Australia and New Zealand is hospital-based with no direct university involvement, and is supervised by our professional college, the Australian and New Zealand College of Anaesthetists (ANZCA) in 170 hospitals spread throughout the two countries. With less linkage to universities, faculty development opportunities for clinical teachers may be more limited in comparison to North America and Europe.

The aim of this study was to investigate if anaesthesia teaching in Australia and New Zealand is evidence-based or whether there is, in fact, an evidence-practice gap. Such a gap would suggest an underlying problem with knowledge translation in the practice of medical education in anaesthesia.

Our research questions were:

- What are the attitudes of anaesthetists to their clinical teaching?
- Do anaesthetists look for educational theory and evidence to guide their teaching?
- If yes, where do they get it and what do they use?
- What are the attitudes of anaesthetists to possible barriers to the use of educational theory and evidence?

Methods

Sampling and data collection

Literature review did not identify any relevant previous surveys. Using the question development principles described by Dillman et al. (2009), questions were developed in four key areas:

1. Extent of involvement in teaching
2. Attitude to current teaching performance
3. Extent to which currently access medical education knowledge
4. Attitude to potential barriers to the use of medical education knowledge

Questions used 5 point Likert scales, yes/no, multiple choice or open-ended responses as appropriate.

The questionnaire was piloted locally for acceptability and modified based on the feedback received, resulting in a list of 25 questions that took less than 10 minutes to complete.

After approval from the Human Research Ethics Committee of Monash Health, an email invitation was sent to a randomly selected sample (n = 950) of ANZCA Fellows and to members (n = 981, duplicates excluded) of the ANZCA Medical Education Special Interest Group (SIG) in order to maximise the

probability of reaching clinical teachers. This gave a total sample of 1931, approximately 42% of the population (ANZCA, personal communication).

The survey was administered electronically using Formdesk (<http://www.formdesk.com>) and responses were anonymous. A reminder email was sent after 4 weeks to maximise response rate.

Data analysis

All quantitative analyses were performed using SPSS 21.0. Descriptive statistics were calculated for all closed response questions. Comparisons used Chi-square, Kruskal-Wallis and Mann-Whitney *U* tests, with corrected significance set at $p < 0.05$.

Results

There were 364 responses, an initial response rate of 19%. 17 respondents reported a minimal role in teaching. As the proportion of ANZCA Fellows involved in teaching has been reported as 78% (ANZCA, 2010), this represents an effective response rate of 23%. Although SIG members had more anaesthesia experience ($\chi^2 = 29.4$, $p < 0.001$), the response rate and characteristics of the two subgroups were similar (Table 1), hence subsequent analysis was performed on the entire sample. Compared to the population of ANZCA Fellows, our respondents had significantly more anaesthetic experience ($\chi^2 = 49.86$, $p < 0.001$) and were more likely to be female ($\chi^2 = 20.30$, $p < 0.001$) (Table 1).

Anaesthetists' attitudes to clinical teaching

Reported respondent satisfaction with their own teaching performance was neither high nor low, with a mean of 3.2, where 3 was neutral. There was marked enthusiasm for improving teaching, with a mean of 4.1, and 82% of responses either 'agree' or 'strongly agree'. Self-assessed teaching performance was generally rated lower or similar to clinical performance, with a mean of 2.5, with 45% rating their teaching performance inferior. One-to-one teaching was the most common form of teaching reported, reflecting the high frequency of direct trainee supervision in anaesthesia. Respondents' current teaching

modalities, and those they want to access medical education knowledge to improve, are shown in figure 1.

Use of educational theory and evidence

Ninety-two percent of respondents reported that they had sought advice from better-qualified colleagues to support their teaching, with 24% doing this often or regularly. Sessions on medical education at anaesthesia conferences had been attended by 77%, though only 22% attended often or regularly. Almost half had attended short courses and workshops while 10% were enrolled in or had completed a university qualification (Figure 2).

When asked directly if they had consciously used medical education evidence and theory, 24% reported they had not while 28% used it often or regularly. The 76% who reported they had used evidence and theory were asked which medical education journals they had accessed to assist with their teaching technique. Fifty-two percent reported they had not accessed a medical education journal or read a medical education article in other journals. Of the remaining 48%, just over half had only accessed medical education articles in anaesthesia or general medical journals, and just under half had additionally accessed medical education journals.

Barriers to use of medical education theory and evidence

The perceived importance of potential impediments to the use of medical education theory and evidence is illustrated in figure 3. The most highly rated impediment was a lack of time given other clinical duties.

Subgroup analysis

We speculated that recent graduates may be more engaged in teaching and use of evidence and so compared recently graduated anaesthetists with those who had practiced for longer. The only significant difference was a higher interest in improving teaching for those with <5 years of practice compared to all groups with more than ten years' experience. Similarly, respondents who reported a greater exposure to

trainees might be considered more likely to be interested in applying medical education theory but analysis based on this did not find any significant difference between groups.

Subgroups indicative of a greater engagement with medical education theory and evidence might be expected to differ from those with less engagement. We looked for any difference between those who had accessed journals and those who had not to explore this further. The group who had accessed education literature was significantly more satisfied with their teaching performance, rated it more highly and were more interested in improvement. They also were significantly less likely to find medical education theory and evidence unnecessary, difficult to understand, or impractical.

Analysis of free text

Respondents highlighted many of the issues anticipated by the questions on barriers to accessing medical education theory and evidence, but in addition identified a number of other issues, including a perceived lack of application to apprenticeship teaching, lack of direction from ANZCA and a lack of interested peers and role models (Table 2).

Discussion

The response rate is lower than the 30% which is typical of internet surveys (Sheehan 2001, Shih & Fan 2008), even after adjusting for anaesthetists not involved in clinical teaching. Although our respondents represent 8% of anaesthetists in Australia and New Zealand, which would be a large enough sample to generalise to the population, the low response rate introduces the possibility of non-responder bias (Dillman 2009). In comparison with the population, our sample contains more experienced clinicians and more females. One acknowledged reason for non-response is a perceived lack of salience for recipients (Sheehan 2001, Dillman 2009). It is probable that respondents over-represent clinician interest in clinical teaching and use of medical education knowledge rather than the reverse.

In an ideal world, Hammick's hopeful assertion quoted above would be true: providing information would be enough to lead to evidence-based practice. There are multiple examples where educationalists have synthesised the literature into a more approachable form and placed it where clinicians could find it, either in the general medical or anaesthesia literature. For anaesthetists in Australia and New Zealand, a review in the Medical Journal of Australia highlighted key elements of evidence-based teaching (Conn et al. 2012), and in the anaesthesia literature, a review of the implications of recent developments in educational theory and evidence for teaching in anaesthesia has recently been published (Bould et al. 2012) .

Unfortunately, approximately half our clinical teachers reported not having read an educational article in the literature. This is indicative of a surprisingly low penetration of medical education theory and evidence into our community of clinical teachers. As we have not measured actual practice, we cannot rule out the possibility that teachers have unwittingly using evidence-based teaching. It is possible that the educational impact of short courses and workshops will have had some effect. Nevertheless, we think our results confirm the truth of the following assertion from Bould et al. (2012):

“Many clinicians in teaching hospitals have received no formal training in how to teach and base their teaching methodology on intuition and their own learning experiences.”

Similarly, the BEME collaboration and other efforts to provide high quality synthesis of the literature for medical teachers do not appear to have had a direct impact in our context.

As far as we are aware, this is the first application of knowledge translation theory to medical education within a postgraduate specialty. Based on our results, the hypothesised medical education 'knowledge-practice gap' is a reality, and the production and synthesis of medical education theory and evidence have not yet adequately addressed the issue.

Application of Knowledge Translation methodology

The 'knowledge to action' framework has been proposed as a theory-based guide for knowledge translation interventions (Graham et al. 2006). In this framework, efforts to produce and synthesise knowledge tailored to the needs of clinicians engaged in teaching are a necessary requirement. However, additional practice-based interventions are required to support uptake and sustain the use of evidence-based practice. These interventions must be based upon investigation of the factors facilitating or impairing implementation efforts.

Previously identified barriers to participation in faculty development aimed at improving teaching may be of relevance, and these include:

- inadequate time due to work volume
- lack of conviction that the evidence is sound
- logistical issues
- lack of remuneration or recognition
- poor relationship with the education provider (Skeff et al. 1997; Steinert et al. 2008; Steinert et al. 2010)

Our results are consistent. In particular, inadequate time is most strongly perceived by our respondents as a barrier to accessing medical education evidence. Rather than questioning the quality of medical education evidence, most respondents were unsure of the evidence quality. This is understandable given the lack of exposure reported. It is encouraging that many respondents were interested in improving their teaching, recognised it was a special skill and thought their past learning in teaching insufficient to their needs, as these provide motivators for engagement with any intervention to address this need. Positive outcomes of participation in faculty development that can be emphasised to doctors include collegiality and personal and professional growth (Steinert et al. 2010).

Planning KT interventions must take into account a key result of our study; the frequency with which clinical teachers approach colleagues for advice. Unfortunately, with the low penetrance of medical education literacy into the teaching community, there is a risk that the advice currently provided is not evidence-based either. Similarly, the quality and content of education workshops and short courses is of great import when this is the primary method clinical teachers are using to improve their skills.

Recommendations for interventions to improve engagement in faculty development

Utilising the knowledge to action framework, we have identified a gap, and begun to discover the barriers and motivators of knowledge utilisation and desired behaviour change. There is a need to elucidate these factors further. The identification and synthesis of information can also be advanced. Reviews such as those highlighted above provide a base, but further refinement of information relevant to the particular learning context of our clinical teachers to ensure alignment with the structure and outcomes of our curriculum design is required.

It is interesting that attenders of faculty development efforts have reported overcoming the same barriers to participation as those reported by non-attenders (Steinert et al. 2010). Strategies, therefore, need to be aimed at both decreasing barriers and building motivation to overcome them. Possible strategies are outlined in Table 3

These interventions would also address the need to build the relationship between the clinical teacher and the educational provider identified as supporting adoption of faculty development initiatives (Skeff et al. 1997) and the perceived lack of direction from ANZCA reported in our results. In addition to these interventions aimed at encouraging participation, which would fit a traditional continuing professional development (CPD) or faculty development strategy, specific KT interventions ought to focus on the system in which participants work. They include force functions, social influence, and reminders (Sargeant et al. 2011) (Table 3).

Force functions would be difficult to apply in current postgraduate training systems in Australian and New Zealand anaesthesia as they are essentially reliant on a voluntary workforce of dispersed clinical teachers. Incorporating a CPD requirement for anaesthetists to participate in activities aimed at improving clinical teaching could be considered as CPD requirements are directly impacted by ANZCA. In the long term, advocacy with health administrators and government at a policy level for incorporation of clinical teaching into performance standards would be advantageous. Incorporating measures of teaching performance and educational scholarship into remuneration and promotion decisions in the clinical setting, where they are currently of little import, might have a significant impact on the profile of clinical teaching (Willcox 2011).

Conclusion

Our results indicate a medical education 'knowledge-practice gap' does exist in anaesthesia in spite of the increased provision of medical education theory and evidence in an accessible form. It is likely that the teaching community in anaesthesia in Australia and New Zealand is not unique and that other teachers in health professional education are similarly disengaged from medical education knowledge. Knowledge translation provides a framework for developing further interventions to extend and potentially increase the effectiveness of current continuing professional development efforts in this area.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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Table 1

Demographic characteristics of respondents and population

	Fellow		SIG		Total		Population	
	n	(%)	n	(%)	n	(%)	n	(%)
Respondents	175	(48)	189	(52)	364	(100)	4618	(100)
Time held FANZCA (yr)								
< 5	43	(25)	15	(8)	58	(16)	1324	(29)
< 10	34	(19)	28	(15)	62	(17)	983	(21)
< 15	33	(19)	28	(15)	61	(17)	703	(15)
< 20	18	(10)	31	(16)	49	(13)	467	(10)
> 20	47	(27)	87	(46)	134	(37)	1133	(25)
Gender								
Male	109	(62)	111	(59)	220	(60)	3306	(72)
Female	66	(38)	78	(41)	144	(40)	1312	(28)
Geography*								
Metropolitan	146	(83)	161	(85)	307	(84)	3237	(81)
Regional	29	(17)	28	(15)	57	(16)	776	(19)
Proportion of time exposed to trainees (%)								
0	20	(11)	19	(10)	39	(11)		
25	35	(20)	25	(13)	60	(16)		
50	23	(13)	26	(14)	49	(13)		
75	35	(20)	37	(20)	72	(20)		
100	62	(35)	82	(43)	144	(40)		

*Population geography figures are for Australia only

Table 2

Themes from free-text comments regarding barriers to use of medical education evidence and theory

<u>Theme/subtheme</u>	<u>Illustrative quotes</u>
Ignorance	<ul style="list-style-type: none"> • I still feel that in very many aspects I'm in the 'unconscious incompetent' stage - how do I progress when I don't know what I don't know? • People are not aware of the idea of being taught how to teach
Nature of evidence	
Dull	<ul style="list-style-type: none"> • Theory alone is often too dry to keep my interest long enough for me to take on board
Impractical	<ul style="list-style-type: none"> • There is a preponderance of non-clinician academic staff "telling folk what they ought to be doing" in medical education without necessarily taking the time to evaluate or understand the clinical context
Irrelevant	<ul style="list-style-type: none"> • I am not really sure how much relevance this sort of theory has to old fashioned apprenticeship type training
Poor quality	<ul style="list-style-type: none"> • Just a lot of fluff • Find the literature too self-confirming.
Difficult to understand	<ul style="list-style-type: none"> • Has a lot of 'education jargon' in it and makes for heavy reading • Most medics trained in sciences, not humanities. Different culture.
Lack of direction from ANZCA	<ul style="list-style-type: none"> • Lack of educational leadership from ANZCA driving or espousing a theory to use.
Lack of opportunity	
Time	<ul style="list-style-type: none"> • There is a lack of protected time and service provision imperatives are by far the main issues.
Inertia	<ul style="list-style-type: none"> • It's hard to change old habits and learn new ones!
Low priority	<ul style="list-style-type: none"> • I have never made it a high enough priority to understand the theory
Lack of support	<ul style="list-style-type: none"> • At my institution there is no encouragement to be trained to be teachers. • Financial sacrifice
Isolation	
Lack of interested peers/ role models	<ul style="list-style-type: none"> • I don't have much of an 'educationalist' type of support network around to bounce ideas off etc - I really appreciate when I find someone with whom I can do this, otherwise I think about and try out ideas on my own.

Difficulty accessing literature

- Medical education journals and literature are not particularly easy to access through our hospital library
-

Table 3

Interventions to improve medical education knowledge translation

Traditional CPD Strategies	Examples
Increase recognition for teachers	<ul style="list-style-type: none"> • Designate ‘clinician teacher’ and ‘clinician educator’ roles (Bould et al. 2012) • Institute awards celebrating teaching and educational scholarship.
Increase support for clinical teachers	<ul style="list-style-type: none"> • Establish an ‘Academy of Educators’ as a community of practice, facilitating role-modelling, mentorship and collaboration (Sherbino et al. 2010; Willcox 2011; Royal Australasian College of Surgeons 2014)
Ensure courses align with the learning principles and frameworks outlined in the curriculum	<ul style="list-style-type: none"> • Provide resources and educational support to course organisers. • Build links to bridge enthusiastic short-course participants to university postgraduate courses.
Maximise ease of access	<ul style="list-style-type: none"> • Explore the efficacy of online delivery of courses in overcoming scheduling and location issues (Cook & Steinert 2013)
KT Strategies	Examples
Force functions	<ul style="list-style-type: none"> • CPD requirement for clinical teacher education • Including clinical teaching in performance standards and remuneration decisions
Social influence	<ul style="list-style-type: none"> • Linking teacher education to patient-safety and quality improvement initiatives
Reminders	<ul style="list-style-type: none"> • Cognitive aids to structure informal and formal teaching • Workplace-based assessment forms structured to encourage desired behaviours

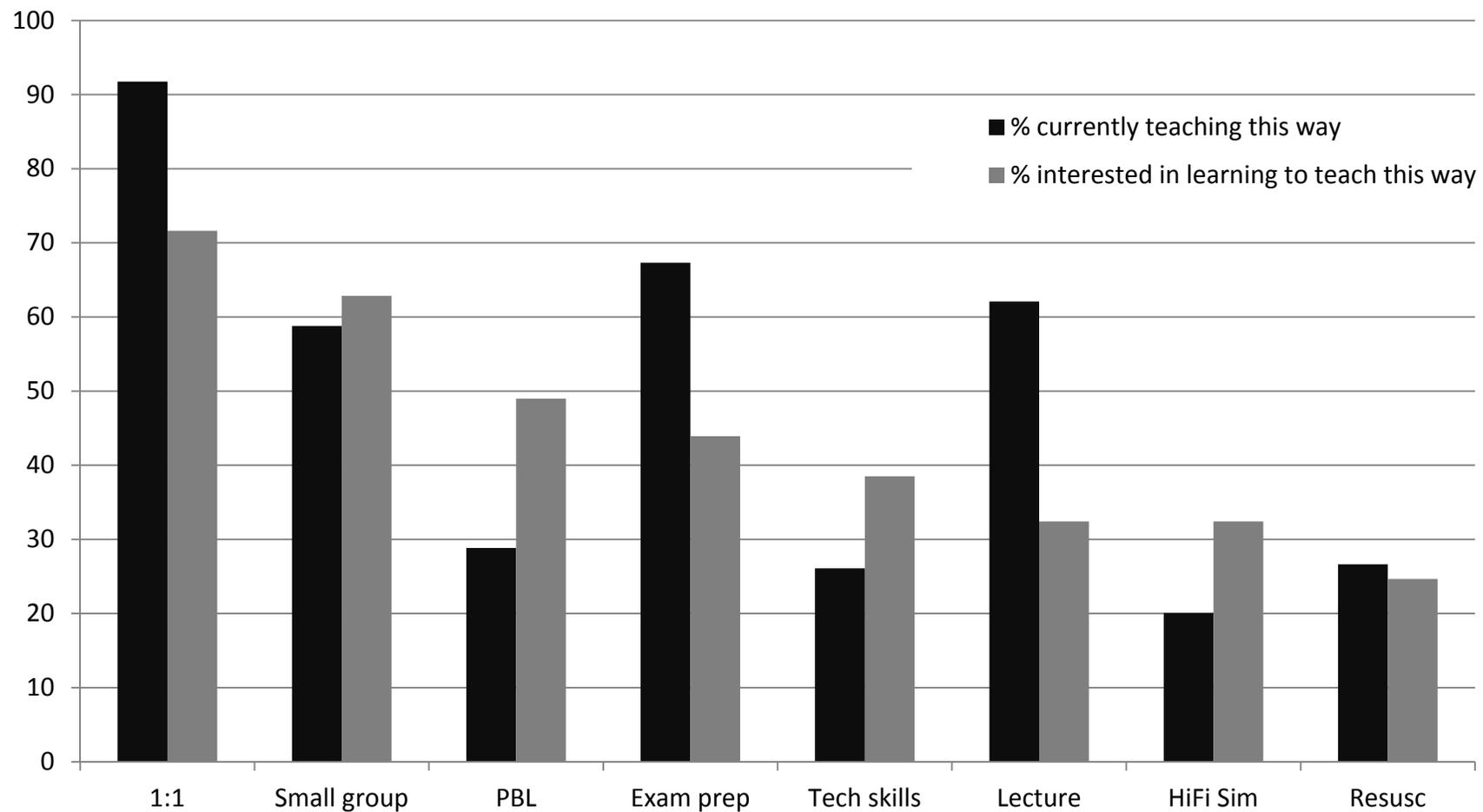
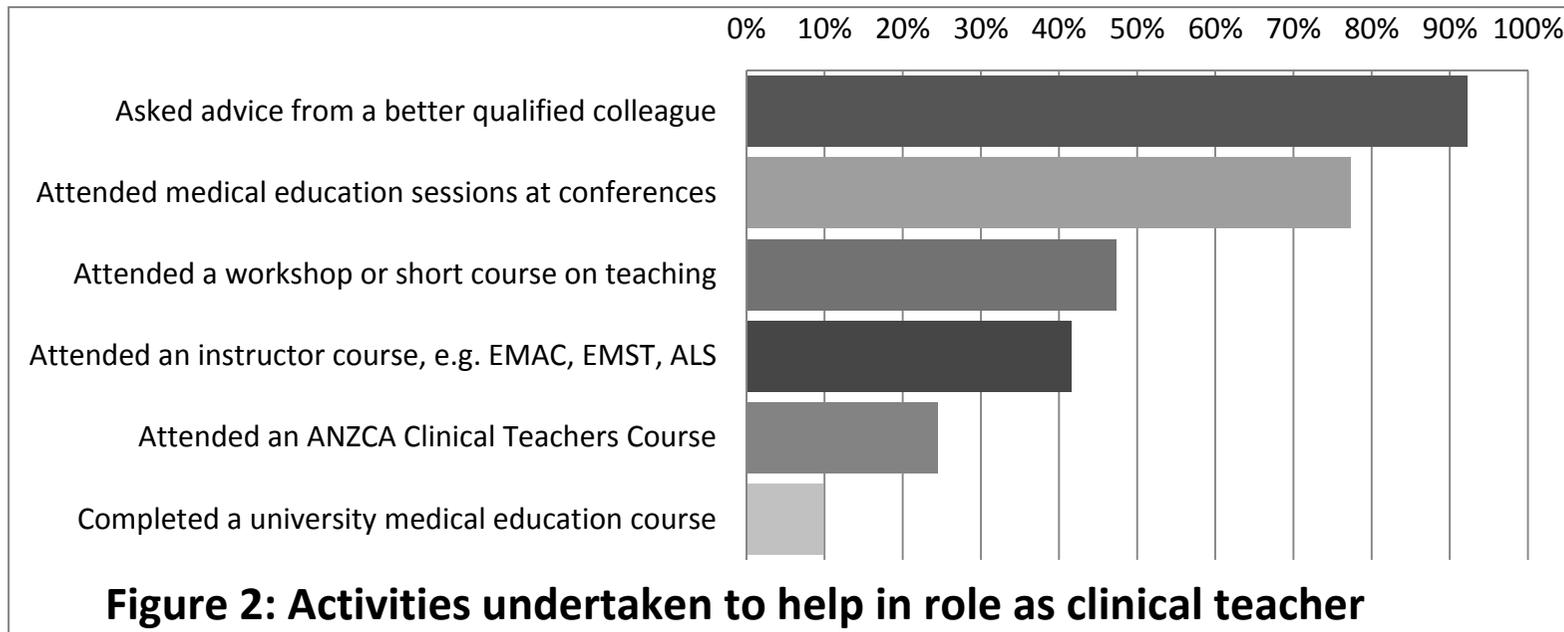


Figure 1. Relative frequency of teaching methods currently used and where further information is desired



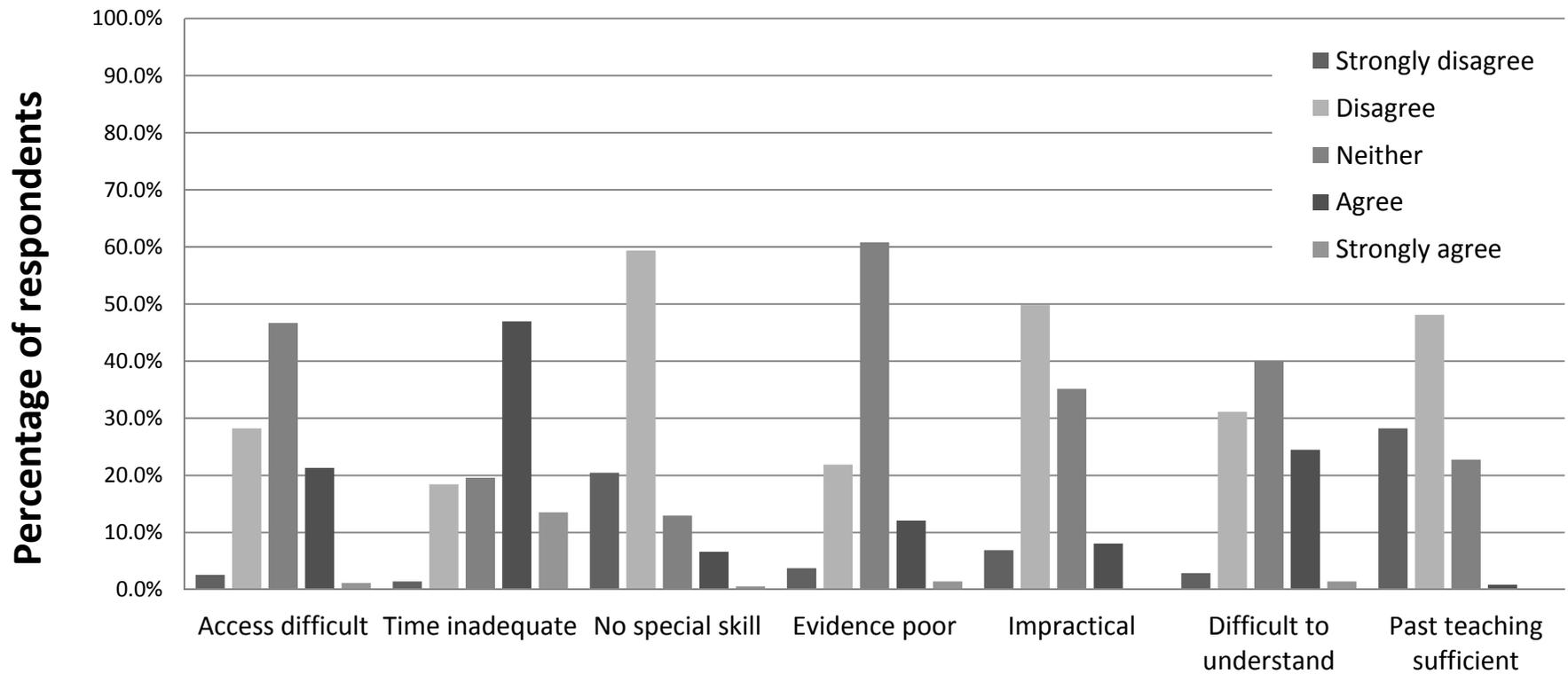


Figure 3. Potential barriers to use of education theory and evidence

Appendix 1: Survey Questions

- What sort of teaching do you do? (Select all that apply)
 - None
 - One to one in the clinical environment, e.g. in theatre or pre-admission clinic
 - Exam practice for ANZCA exams
 - Technical skills workshop, e.g. using part task trainer to teach CVC insertion
 - Resuscitation skills course or workshop, e.g. Advanced Life Support, ALS, EMST, APLS
 - Hi-fidelity Simulation-based teaching, e.g. ACRM, EMAC
 - Lecture/ powerpoint presentation
 - Interactive 'small group' teaching
 - Problem based learning
- Do you provide any other teaching to ANZCA trainees not described above? Please let us know:
- Which of the following activities have you undertaken to help you in your role as a clinical teacher?
 - Asked advice from a colleague with more educational expertise.
 - Attended medical education sessions at ANZCA ASM, ASA NSM, or MedEd SIG Meeting
 - Attended an ANZCA Clinical Teachers Course.
 - Attended workshops or short courses on teaching, for example: Teaching on the Run

- Attended an Instructor course, for example: EMAC or ALS Instructor Courses
 - Completed a university medical education course, for example: PG Cert in Med Ed, Masters of Health Professional Education
- Please describe any other activities you have undertaken to help you in your role as a clinical teacher:
- In your role as a clinical teacher, have you consciously used educational theory or evidence, from course material or medical education literature, in planning and delivering your teaching?
- Which medical education journals have you accessed to assist with your teaching technique (i.e. for information on HOW to teach, not what to teach)?
 - None
 - Education articles in anaesthetic or general medical journals, e.g. Anaesthesia and Intensive Care, Medical Journal of Australia, etc
 - Medical Education
 - Medical Teacher
 - Academic Medicine
 - Others
- Which other journals do you access?
- With respect to your current clinical teaching practice: (please choose the option that best describes how you feel regarding each statement)
 - Compared to my performance as a clinician, I would rate my performance as a teacher as
 - I am satisfied with my performance as a clinical teacher

- When I teach, I prefer to use an interactive teaching style- such as case-based teaching or problem based learning
- When I teach, I prefer to use a didactic teaching style- such as a lecture or powerpoint presentation
- I am interested in improving my teaching performance
- If you were to access up to date medical education knowledge and evidence to improve your teaching performance, which types of teaching would you focus on? (Select all that apply)
 - One to one in the clinical environment, e.g. in theatre or pre-admission clinic
 - Exam practice for ANZCA exams
 - Technical skills workshop, e.g. using part task trainer to teach CVC insertion
 - Resuscitation skills course or workshop, e.g. Advanced Life Support, ALS, EMST, APLS
 - Hi-fidelity Simulation-based teaching, e.g. ACRM, EMAC
 - Lecture/ powerpoint presentation
 - Interactive 'small group' teaching
 - Problem based learning
- Which type of teaching do you wish to improve (not described in the list above)? Please let us know:
- The following are reasons that could be given to explain why teachers in anaesthesia might make limited use of medical education theory and evidence in their teaching. Please indicate to what extent you agree with each:
 - Medical Education literature is difficult for clinicians to access

- There isn't enough time with my other responsibilities
- All anaesthetists can teach anaesthesia, it does not require any special skill
- The evidence in medical education is of poor quality
- Educational theory is not practically useful
- Medical Education literature is difficult for clinicians to understand
- Trainees prefer old-fashioned or didactic teaching anyway so there is no need
- Are there any other reasons that make it difficult to use medical education theory and evidence to inform your own clinical teaching practice?