

NAP5 Baseline Survey in Ireland



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HEADLINE

28.1 We issued a questionnaire to every consultant anaesthetist in each of the 46 Public hospitals in Ireland (represented by 41 Local Co-ordinators). The survey ascertained the number of new cases of accidental awareness during general anaesthesia (AAGA) becoming known to them, for patients under their care or supervision for a calendar year, as well as their career experience. Consultants from all hospitals responded, with an individual response rate of 87% (299 anaesthetists). There were eight new cases of accidental awareness that became known to consultants in 2011; an estimated incidence of 1:23,366. Two of the eight cases (25%) occurred at or after induction of anaesthesia but before surgery, four cases (50%) occurred during surgery, and two cases (25%) occurred after surgery was complete but before full emergence. Four cases were associated with pain or distress (50%), one after an experience at induction and three after experiences during surgery. There were no formal complaints or legal actions that arose in 2011 related to awareness. Depth of anaesthesia (DOA) monitoring was reported available in 33 (80%) of departments, while 184 (62%) of consultants used such monitoring, of which 18 (6%) used it routinely. None of the 46 hospitals had a policy to prevent or manage AAGA. Similar to the results of a larger survey in the United Kingdom, the disparity between incidence of awareness as known to anaesthetists and that reported in trials warrants explanation. Also similar is the dearth of policies to prevent or manage awareness. Compared with United Kingdom practice, there appears greater use of depth of anaesthesia monitoring in Ireland, though this is still infrequent.

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BACKGROUND

28.2 NAP5 is a partnership between the Association of Anaesthetists of Great Britain and Ireland (AAGBI) and the Royal College of Anaesthetists (RCoA) and, through the involvement of the AAGBI, also covers Ireland. Although there are some similarities in content of training and a common language, the health service structure is very different in Ireland. We therefore wished to know if the incidence of AAGA reported to anaesthetists was as low in Ireland as it appeared to be in the UK. We also wished to ascertain if clinical practice in relation to DOA monitoring differed.

28.3 No similar survey of AAGA has been conducted in Ireland.

METHODS

28.4 The NAP5 project in Ireland received approval from the Department of Health and was endorsed by the Health Service Executive (HSE) National Quality and Patient Safety Directorate. The Department of Health’s Bioethics Office categorized the project as a clinical audit rather than research and as such did not require research ethics approval.

28.5 A Local Co-ordinator (LC) was established in each of the 41 anaesthetic departments that cover 46 public hospitals with surgical services. The LC distributed a survey form (Figure 28.1) to all consultant anaesthetists in their hospital. Each LC collated responses and populated a second summary form which was returned to the NAP5 team. Compared with the UK survey, there were some differences in design and terminology. Irish consultants often conduct sessions in more than one hospital, so were asked only to complete a form for the hospital/department where they have the majority of their sessions. The survey also determined the number of non-consultant hospital doctors (NCHD) in each anaesthetic department. NCHD is a term used for all non-consultant doctors in the health system in Ireland (training and non-training posts), that require immediate, local or distant supervision by a consultant.

28.6 Briefly, the questionnaires asked about the number of consultant staff and their years of experience as seniors; about the number of new cases of AAGA that became known to them (under their direct care or the care of those they supervised) during 2011 (and some relevant case details) as well as during their career as a consultant in Ireland; about the availability and use of DOA monitoring; and whether the hospital had policies for prevention or management of AAGA. LCs could contact the NAP5-Ireland Clinical Lead or the National Co-ordinator for further advice (which was also provided via the NAP5 website at www.nationalauditprojects.org.uk/NAP5_home) and in turn, the Clinical Lead or National Co-ordinator could contact the LC for clarification of data entries.

28.7 Since there was no hypothesis test, there were no statistical comparisons, but continuous data were described as median (IQR [range]) and categorical data with 95% confidence limits for binomial or Poisson distributions, as appropriate. Where

illustrative, the goodness of fit of the data to a Poisson distribution was estimated by the least squares regression of actual vs. modelled data.

RESULTS

28.8 Table 28.1 shows the estimated numbers of consultant anaesthetic staff in public hospitals in Ireland, and the generally high proportions responding. The response rate was 100% of departments and 87% of consultants. It also shows the estimated number of NCHDs in Ireland. Median responses per centre were 100%, but in two hospitals where three consultants held the majority of their sessions, only one replied, and in one hospital where seven consultants held the majority of their sessions, only one replied, yielding a rather wide range.



Table 28.1. Estimated numbers of consultants (and NCHDs) and response rates from 41 Local Co-ordinators responsible for the Irish public hospitals (100% response rate). Data reported as median (interquartile range [range]). Note that NCHDs were not asked to respond to the survey

	Consultants		NCHDs
Totals	Total (n = 342)	Responding (n = 299; 87.4%)	Total (n = 430)
Numbers/ centre	6 (4-13 [1-23])	5 (3-9 [1-23])	7 (5-12 [0 - 33])
Response rate/centre (%)		100 (84-100 [14-100])	

Figure 28.1. Survey form distributed by LCs in Ireland to each consultant

NATIONAL AUDIT PROJECT 5
Accidental Awareness during General Anaesthesia

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FORM 1

NAP5 BASELINE SURVEY OF AWARENESS IN IRELAND– INDIVIDUAL QUESTIONNAIRE – PLEASE RETURN THIS TO YOUR NAP5 LOCAL CO-ORDINATOR

NAP5 is a major project of the RCOA and AAGBI - your response is very important. Please provide the answers to these brief questions.

1. Over approximately this last year 2011, roughly how many instances of accidental awareness during anaesthesia* have you personally had to deal with for patients under your care?

* by accidental awareness we mean any instance of recall of intraoperative events during general anaesthesia, induction or emergence that occurred with administration of anaesthesia under your care or care of someone you were supervising

2a. What was the approx age range of these instances?

Approx age	0-15	16-24	25-44	45-64	>65
Number					

2b. How many of these were reports volunteered by the patient vs ascertained only on questioning?

Approx age	0-15	16-24	25-44	45-64	>65
Number volunteered					
Ascertained on questioning					

2c. How many of these were brief periods of awareness before surgery (eg, due to difficult intubation, syringe swaps, drugs given in wrong order, etc), awareness of intra-operative events, or awareness of events only on emergence?

Approx age	0-15	16-24	25-44	45-64	>65
Recall of events during induction and before surgery					
Recall of events during surgery					
Aware after surgery and before full emergence					

d. How many of these cases of awareness also involved physical pain or psychological hurt?

Approx age	0-15	16-24	25-44	45-64	>65
Number					

e. How many of these reports led or is leading to a formal complaint to the Trust or litigation?

Approx age	0-15	16-24	25-44	45-64	>65
Formal complaint					
Litigation					

3. Do you use any depth of anaesthesia monitors and if so, which?

	BIS	AEP	SSEPs	Entropy	Narcotrend	Isolated forearm	Other
Routinely							
Selected cases							
Never							

4. Approximately how many cases of accidental awareness occurring directly under your care (including supervising a trainee) as consultant during your practice in Ireland have you experienced?:

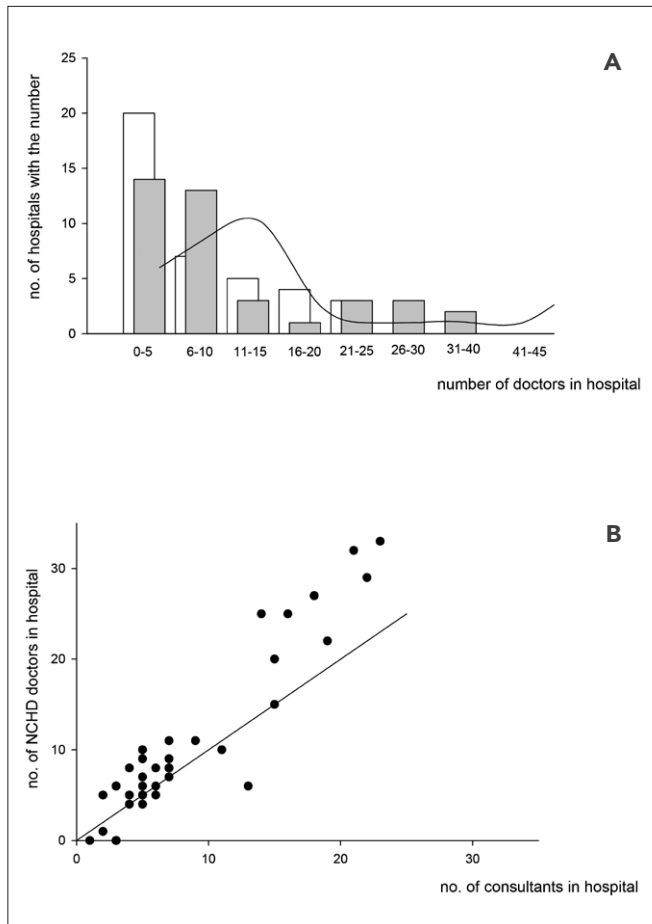
Yrs of anaesthesia practice (as consultant, including locum)	yrs
Total no. of cases of accidental awareness	n=

PLEASE RETURN THIS TO YOUR NAP5 LOCAL CO-ORDINATOR

Fifth National Audit Project of the Royal College of Anaesthetists and Association of Anaesthetists of Great Britain and Ireland:
Accidental Awareness during General Anaesthesia

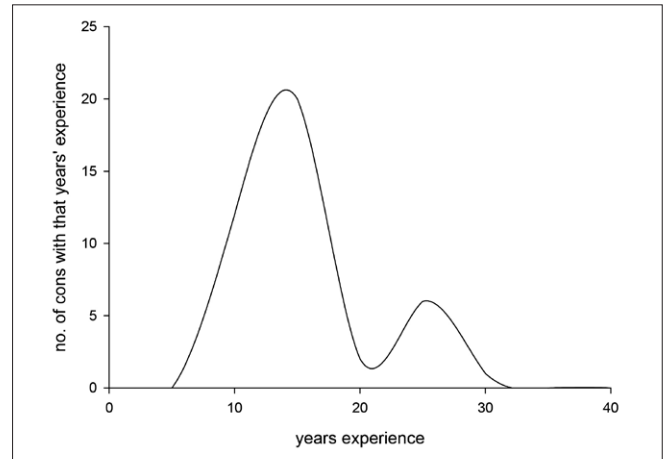
28.9 Figure 28.2 shows the demography of staffing across anaesthesia departments. Many hospitals in Ireland are relatively small. The majority of hospitals (29; 70%) consist of <10 consultants with the majority of their sessions in that hospital. No hospital has >30 consultant anaesthetists with the majority of their sessions in that hospital. In three-quarters of the hospitals (31, 75%), the number of NCHDs equals or exceeds the number of consultants with the majority of their sessions in that hospital. In three-quarters of the hospitals (31, 75%), the number of NCHDs equals or exceeds the number of consultants with the majority of their sessions in that hospital (Fig. 28.2B).

Figure 28.2. Demography of staffing. Panel (a): histogram of the number of consultants with most sessions at a given hospital (white bars) and non-consultant hospital doctors (NCHDs) (shaded bars) and total number of anaesthetists (line) by hospital. Panel (b): numbers of NCHDs vs consultants by hospital (the line is the line of identity; note there are some overlapping points)



28.10 Figure 28.3 shows the distribution of mean years of experience of consultants across the hospitals, showing a bimodal distribution with one peak at a mean of ~15 years, and a second peak at mean ~25 years' experience. Notwithstanding less than full time individuals and details of job plans, the crude sum of years' experience as a consultant of those responding to the survey was 3,685 years.

Figure 28.3. Distribution of mean years' experience of consultants across hospitals



28.11 There were eight new cases of AAGA reported to anaesthetists for the year 2011 (Table 28.2). Half were young or middle-aged adults (25-44 years) and half >45 years. Five cases were volunteered by patients and three established through direct questioning by staff. Two cases related to experiences of AAGA at or soon after anaesthetic induction but before surgery commenced, four during surgery and two after completion of surgery but before full emergence. Thus, the combined total for experiences during induction and emergence (i.e. the 'dynamic phases' of anaesthesia) was equal to those experiences during surgery (the 'steady state phase'). Half the patients suffered pain or distress as part of their experience, three during surgery and one for an experience at or soon after induction. The consultants who responded to the survey did not know of any formal complaints or legal proceedings taken during 2011.

Table 28.2. Reports of AAGA and their characteristics

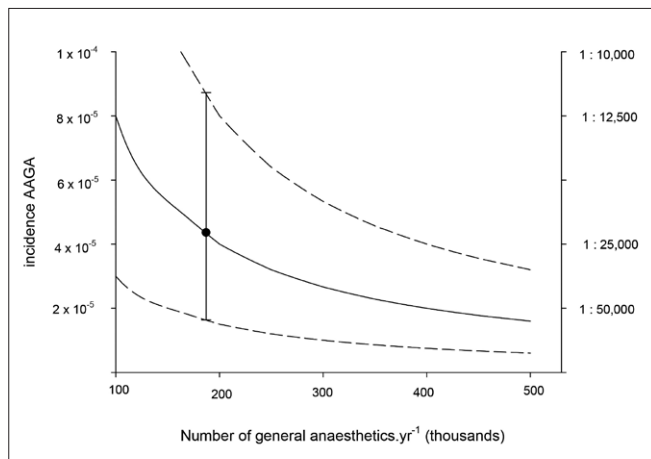
Age range; yrs	How ascertained	Phase of anaesthesia/surgery in which awareness occurred	Pain or distress?
25-44	Volunteered	Surgery	Yes
25-44	Volunteered	Surgery	Yes
25-44	Questioning	After surgery, before full recovery	No
25-44	Volunteered	Surgery	No
45-64	Volunteered	Surgery	Yes
45-64	Volunteered	Induction	Yes
45-64	Questioning	After surgery, before full recovery	No
>65	Questioning	Induction	No

28.12 Using a denominator for the number of general anaesthetics administered in public hospitals in Ireland in one year of 187,000 (rounded to the nearest 100 and obtained from a contemporaneous Irish NAP5 Activity Survey – (see Chapter 29), we can estimate an incidence of AAGA that becomes known to anaesthetists for the year 2011: one case for every 23,366 general anaesthetics (Table 28.3). Even if our method of estimating denominator is inaccurate, Figure 28.4 shows how that the calculated incidence will vary little across a wide range of denominator values.

Table 28.3. Number and incidence of reports of AAGA in 2011 by various descriptors. The binomial and Poisson estimates are almost identical; the Poisson are presented. The denominator used in the calculations is taken from the Anaesthetic Activity Survey in Ireland data of 187,000 adjusted for the non-response rate

Descriptor	Incidence
Cases of AAGA	8 (3 – 16)
Incidence per general anaesthetic	0.0043% (0.0016 – 0.0086%)
Cases : anaesthetic	1: 23,375 (1: 11,628 - 1: 62,500)
Cases per consultant per yr	1: 37 (1: 19 – 1: 86)

Figure 28.4. The influence of denominator (number of general anaesthetics administered annually) on the estimated mean incidence of AAGA (with 95% Poisson CI, dotted lines), given our data of eight instances of AAGA in one year. The incidences are shown as absolute values (left y-axis) and as ratios (right y-axis). The point represents the value assuming the Anaesthetic Activity Survey in Ireland [9] estimate of denominator is correct (error bars = 95% Poisson CI for the point estimate)



28.13 These data mean that just one consultant anaesthetist out of ~37 will know of a new case each year (Table 28.3).

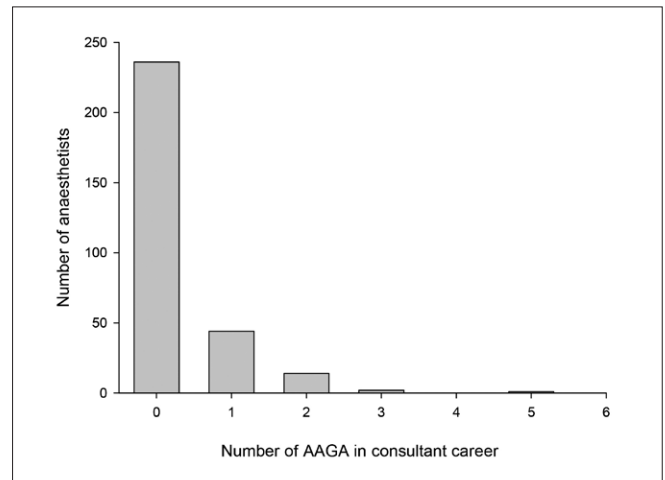
28.14 The collective career knowledge of AAGA cases personally experienced by consultant anaesthetists is shown in Table 28.4 and the distributions in

Figure 28.5. This seems broadly consistent with the experience for 2011, with the likelihood that an individual consultant anaesthetist will have personal experience of an AAGA event just once every ~46 years of their career (i.e. possibly never in their working lives; Table 28.4). The vast majority have never had direct experience of a case for which they were responsible, but one respondent reported having experience of five cases (Fig. 28.5).

Table 28.4. Number of cases of AAGA known to staff over their consultant careers and incidence (total years of service 3,685). The binomial and Poisson estimates are almost identical; the binomials are presented. Incidence is presented by various descriptors

Descriptor	Incidence
Cases; n	82 (65 - 102)
Incidence; cases/consultant per year	0.022 (0.018 - 0.028)
Cases: years of consultant practice	1: 45.5 (1:35.7 - 1:55.6)

Figure 28.5. Distribution of the number of cases of AAGA, known to consultants in their career. The spread of values is median (IQR [range] 0 (0–0 [0–5]), and the data can be fitted by a Poisson distribution with covariance $r^2 > 0.997$



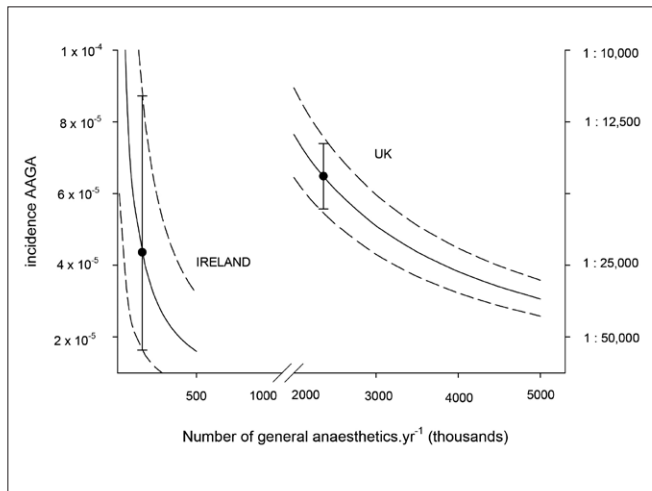
28.15 The access to and use of DOA monitoring is shown in Table 28.5. The majority of Irish hospitals possess DOA monitoring, and almost two-thirds of anaesthetists use it either routinely or in selected cases, with almost 7% using it routinely. The Bispectral Index appears by far the most frequently used, with about two-thirds of those who use any DOA monitoring employing this technique.

28.16 No public hospital in Ireland reported a policy to prevent or manage AAGA.

DISCUSSION

28.17 The results of this Irish survey require interpreting in the light of our recent, similar survey in the UK (Chapter 26). The incidence of new cases of AAGA that becomes known to Irish consultant anaesthetists of ~1:23 000 seems comparable, even a little lower, to that in the UK (~1:15 000), but the wider confidence intervals for the Irish estimate are due to the smaller denominator (Figure 28.6) and encompass the UK estimates. In other words, the incidence of AAGA known to anaesthetists in Ireland is unlikely to be commoner than 1:10,000, and of similar rarity to the rate reported in the UK. The estimated career incidence per year of consultant practice is almost identical to the UK estimate of one case every 36–47 years, underlining the similarity of the data (Chapter 26).

Figure 28.6. The Irish and UK data plotted on the same axes (data taken from Chapter 26). The graph shows the relative influence of the denominator value of the number of general anaesthetics administered annually on the estimated mean incidence of AAGA ($\pm 95\%$ Poisson CI), given the instances of AAGA obtained in the two nations, respectively. The incidences are shown as absolute values (left y-axis) and as ratios (right y-axis)



28.18 There were too few cases of AAGA to examine detailed sub-correlations with age, phase of anaesthesia, etc. Nonetheless, two national surveys from different countries now consistently show that estimates using anaesthetists' knowledge of cases are very much lower indeed than estimates obtained from direct questioning in prospective trials (~1–2:1,000), the reasons for which are discussed in Chapter 26 and elsewhere. These broadly relate to possible patient, organisational or methodological factors. Patient factors include such severe psychological trauma that there is a reluctance even to discuss, let alone report the experience. Or, conversely it might be the case that the experience is felt by patients to be so trivial that they omit or forget to report it. Organisational factors include deficiencies in hospital reporting systems or the fact that anaesthetists rarely see patients in outpatient clinics post-operatively, where a report of AAGA might be made. Methodological factors include the different nature of the studies undertaken to produce an 'incidence'.

28.19 One notable feature is the very large difference in size of the anaesthetic communities to which the surveys were directed. A total of just 342 consultant anaesthetists in public hospitals in Ireland (population 4,588,252 in the 2011 census (Central Statistics Office, 2011) is dwarfed by 8,672 consultants and SAS anaesthetists in the NHS hospitals in the UK (population 63,200,000 in the 2011 census, (Office of National Statistics, 2011). The number of senior anaesthetists in Irish public hospitals per head of population is half that for the UK (1:13,415 vs. 1:7,287). See also Chapter 5, Methods for discussion of this.

28.20 Expressed differently, the ratio of public hospital senior anaesthetist per 100,000 population in Ireland and the UK is ~7.45 and ~13.7 respectively.

Table 28.5 Access to and use of depth of anaesthesia (DOA) monitoring. Data are numbers or (%). BIS = bispectral index; EP = evoked potential monitoring; IFT = isolated forearm technique

Centres with DOA	Anaesthetists using DOA monitoring in selected cases and routinely	Anaesthetists using DOA monitoring in selected cases	Anaesthetists using DOA monitoring routinely	Type of DOA monitor used (as % of those using DOA monitors)					
				BIS	Entropy	EP	Narcotrend	IFT	Other
33/41 (80.5%)	184/299 (61.5%)	164/299 (54.8%)	20/299 (6.7%)	126/184 (68.5%)	42/184 (22.8%)	15/184 (8.2%)	1/184 (0.5%)	0/184 (0.0%)	0/184 (0.0%)

This is in part due to the inclusion as seniors of the staff and associate specialist (SAS) and career grade anaesthetists, working in UK NHS hospitals as well as the small independent hospital sector in the UK. The number of public hospital consultants in Ireland identified in this survey correlates well with the estimate of 336 consultant posts, supplied by the Health Service Executive (HSE) to the College of Anaesthetists of Ireland in September 2012 during manpower planning (College of Anaesthetists of Ireland, 2013).

- 28.21 A separate estimate by the College (using the Professional Competence Scheme database) at the same time, identified 379 consultants practicing in public hospitals and a further 64 solely in private practice. Even taking into account this larger estimate and including those who work solely in private practice, the number of consultants per head of population (1: 10,357) remains lower than for the UK.
- 28.22 The 430 NCHDs reported to work in the public hospitals by this survey also correlates well with the College's 2012 manpower assessment of 464 NCHD staff (also from the Competence Scheme database). The small difference of 34 might reflect those in full time research as well as those completing fellowships abroad. Of note: the public hospital anaesthetic consultant to anaesthetic NCHD ratio of 1.26 and the consultant to 100,000 population ratio of 7.45, estimated by this survey, falls well short of the recommendations set in the Report of the National Taskforce on Medical Staffing (Department of Health, 2003) of 0.61 and 11 respectively. This raises concerns and challenges for anaesthetic training and service delivery in Ireland.
- 28.23 This manpower data, coupled with data on activity presented in Chapter 29 might provide opportunity for a more detailed analysis of anaesthetic service issues.
- 28.24 Another striking contrast between the UK and Irish datasets is the adoption of DOA monitoring. Whereas in the UK, more than one-third (39%) of hospitals possess no DOA monitoring and only a quarter of anaesthetists ever use this technology (Chapter 26), in Ireland 80% of hospitals have access to DOA monitoring and the majority of anaesthetists (62%) use it at some time as part of their practice. (Also discussed in Chapter 27 and 29 regarding UK and Irish Activity surveys).
- 28.25 The relative proportions using BIS and Entropy are broadly similar (~75% and 69% for BIS vs. ~17% and 23% for Entropy in UK and Ireland, respectively) and perhaps the only minor, but intriguing difference

is that whereas 14 (0.7%) practitioners use the isolated forearm technique in the UK (Chapter 26), it is not used at all in Ireland. We can speculate on the causes of these differences. The smaller size of each Irish anaesthetic department (a median of just 6 vs. 27 for the UK (Chapter 26) may lead to greater standardisation such that practice is more homogenous. Fewer monitors are therefore also needed in each hospital for usage to be high as a proportion of theatres/anaesthetists. It is possible that Irish anaesthetists regard AAGA as a more serious problem, to be tackled with greater use of DOA monitoring.

- 28.26 However, this interpretation is not consistent with the finding that no Irish hospital reported having a policy to prevent or manage AAGA.
- 28.27 In summary this survey provides important information on staffing and demography of anaesthetic departments in the Republic of Ireland. The annual and career incidence of AAGA that becomes known to anaesthetists is very similar to the incidence calculated using similar methodology in the UK (Chapter 26). This incidence is, however, much lower than reported in prospective trials that use direct patient questioning, and this large disparity warrants further research and explanation.

REFERENCES

- Central Statistics Office. *Population Estimate for the Republic of Ireland 2011*. Available from www.cso.ie/QuickTables/GetQuickTables.aspx?FileName=CNA15.asp&TableName=Population+by+Age+2011&StatisticalProduct=DB_CN (accessed 26 October 2013).
- College of Anaesthetists of Ireland. *Providing Quality, Safe and Comprehensive Anaesthesia Services in Ireland: A review of Manpower Challenges*. 2013. Available from www.anaesthesia.ie/index.php/news-list/235-medical-manpower (accessed 19 February 2014).
- Department of Health. *Report of the National Task Force on Medical Staffing (Hanley Report)*. 2003. Available from www.lenus.ie/hse/bitstream/10147/46569/1/1680.pdf (accessed 15 February 2014).
- Office of National Statistics. *Population Estimates for the United Kingdom, 2011 Census*. Available from www.ons.gov.uk/ons/rel/census/2011-census/population-and-household-estimates-for-the-united-kingdom/index.html (accessed 12 July 2014).
- Office of National Statistics. *Population Estimates for the United Kingdom, 2011 Census*. Available from www.ons.gov.uk/ons/rel/census/2011-census/population-and-household-estimates-for-the-united-kingdom/index.html (accessed 12 July 2014).