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The State of UK anaesthesia: a survey of National Health Service activity in 2013

M. R. J. Sury[1,2], J. H. M. G. Palmer[3], T. M. Cook[4,5]* and J. J. Pandit[6]

[1] Great Ormond Street Hospital NHS Foundation Trust, London WC1N 3JH, UK
[2] Portex Unit of Anaesthesia, Institute of Child Health, University College London, London WC1N 1EH, UK
[3] Salford Royal Hospital, Salford M6 8HD, UK
[4] Department of Anaesthesia and Intensive Care Medicine, Royal United Hospital, Bath, UK
[5] National Audit Projects, Royal College of Anaesthetists, UK
[6] Nuffield Department of Anaesthetics, Oxford University Hospitals NHS Trust, Oxford, UK

* Corresponding author. E-mail: timcook007@gmail.com

Editor's key points

- The importance of this survey lies in describing anaesthetic activity at national level in the UK.
- A 100% response rate is commendable.
- The UK anaesthesia is mainly led by consultants, and is safe.
- Importantly, these unique data will be valuable to service planners, and serve as baseline to many further projects.

Background. Details of current UK anaesthetic practice are unknown and were needed for interpretation of reports of accidental awareness during general anaesthesia (GA) within the Fifth National Audit Project.

Methods. We surveyed NHS anaesthetic activity to determine numbers of patients managed by anaesthetists and details of 'who, when, what, and where': activity included GA, local anaesthesia, sedation, or patients managed awake. Anaesthetists in NHS hospitals collected data on all patients for 2 days. Scaling enabled estimation of annual activity.

Results. Hospital response rate was 100% with 20 400 returns. The median return rate within departments was 98% (inter-quartile range 0.95–1). Annual numbers (% of total) of general anaesthetics, sedation, and awake cases were 2 766 600 (76.9%), 308 800 (8.6%), and 523 100 (14.5%), respectively. A consultant or career grade anaesthetist was present in more than 87% of cases. Emergency cases accounted for 23.1% of workload, 75% of which were undertaken out of hours. Specialties with the largest workload were orthopaedics/trauma (22.1%), general surgery (16.1%), and gynaecology (9.6%): 6.2% of cases were non-surgical. The survey data describe: who anaesthetized patients according to time of day, urgency, and ASA grade; when anaesthesia took place by day and by weekday; the distribution of patient types, techniques, and monitoring; where patients were anaesthetized. Nine patients out of 15 460 receiving GA died intraoperatively.

Conclusions. Anaesthesia in the UK is currently predominantly a consultant-delivered service. The low mortality rate supports the safety of UK anaesthetic care. The survey data should be valuable for planning and monitoring anaesthesia services.

Keywords: airway; anaesthesia; audit; level of consciousness; monitoring; sedation; technique

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The Fifth National Audit Project (NAP5) of the Royal College of Anaesthetists and Association of Anaesthetists of Great Britain and Ireland (AAGBI) is a large-scale service evaluation of reports of accidental awareness during general anaesthesia (AAGA). The main focus of the NAP5 project was the collection of new patient reports of AAGA over 1 yr in the UK, and separately in Ireland.[1] This registry provides a numerator. In order to estimate the incidence of reports of AAGA, the denominator number of general anaesthetics administered was needed. Moreover, to best interpret the AAGA reports, an analysis of current anaesthetic practices was required.

There are several potentially useful sources of estimates of anaesthesia-related activity available. In England and Wales, national data are collected by Hospital Episode Statistics (HES),[2 3] but these lack detail of whether or not anaesthesia was involved.[3] The number of procedures lasting >30 min has been estimated by the National Institute of Health and Clinical Excellence (NICE), using HES data, to be just over 2 million yr^{-1}.[4] HES data also have details of anaesthesia for maternity services; there were an estimated 671 255 deliveries in NHS hospitals (in England) in 2012–3 (92% of all births);[5] of which, a little less than two-thirds (63%) required anaesthetic intervention.[6]

In 2008, the census phase of the NAP4 project estimated the number of general anaesthetics administered over a 2 week period.[7] Data were collected locally and then pooled centrally. The number of general anaesthetics per year was estimated to be just under 3 million (2 872 600).[7] Although the NAP4 census

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had data on airway management, it did not provide details of anaesthetic practices or patient characteristics which would be pertinent to NAP5. NAP5 reports came from patients undergoing a wide range of techniques of anaesthesia care and we needed more detail to help interpret the reports rather than simply an estimation of the total number of general anaesthetics.

The National Enquiry into Perioperative Deaths (NCEPOD) surveyed the seniority of anaesthetists (and surgeons) and when operations were carried out; the so-called 'Who Operates When?' or 'WOW' studies. WOW1, in 1995/6,[8] took data from hospitals over randomly allocated 24 h periods, and WOW2 in 2002[9] collected data over a whole week. Ninety-seven per cent of NHS hospitals participated, but only surgical cases were included (cases in radiology suites, and all others outside operating theatres were excluded). No scaling factor was applied to calculate an annual workload, and details of anaesthesia management were not obtained.

In 1988, more than 500 volunteer anaesthetists recorded data from ~25 consecutive anaesthetics for a Survey of Anaesthetic Practice (SOAP), organized by the AAGBI.[10] Its output does not enable estimation of total workload, and no record of the surgical procedure was made, but it does contain data that estimate the proportion of patients who received specified anaesthetic techniques.

In the absence of relevant and recent data, a survey was designed to help interpret NAP5 AAGA reports. The survey aimed to not only determine the number of general and other anaesthetics conducted in the UK but also to provide detailed information about patient characteristics, the procedures they underwent, their management (including timing and seniority of the anaesthetist), the drugs and techniques used, and specifically for AAGA, the use of monitors of depth of anaesthesia (DOA).

Methods

All hospitals, Trusts, and Boards in the UK that took part in the NAP5 project were identified and represented by 267 local coordinators (LCs). Participating LCs coordinated a survey within their own hospital or hospital group on every patient who underwent a procedure under the care of an anaesthetist. Only NHS patients managed in NHS hospitals were included.

Anaesthesia activity was defined as any surgical, diagnostic, or interventional procedure where an anaesthetist (of any grade) was responsible for patient care. The type of care could be general anaesthesia (GA), sedation, local anaesthesia (LA), or with the patient awake and the anaesthetist providing monitoring only ('managed anaesthesia care'). It included GA or central neuraxial block for Caesarean section or assisted delivery and epidurals performed for labour pain relief, but it did not include sedation delivered by non-anaesthetists or specialist interventional pain procedures where the anaesthetist undertook both sedation and the procedure.

It included patients on the intensive care unit (ICU) in whom unconsciousness was induced or maintained for any surgical procedure whether in theatre (e.g. transferred for laparotomy), at the bedside (e.g. tracheostomy), or for a diagnostic or interventional procedure (e.g. CT scan), but it did not include ICU management with sedation. It also included emergency department (ED) cases such as cases of trauma where an anaesthetist secured the airway and transferred the patient to a site of a procedure (e.g. CT scan or operating theatre).

The data were captured on a paper questionnaire designed to be read automatically by 'optical character recognition' technology (DRS Data & Research Services plc, Milton Keynes, Buckinghamshire, UK). The questionnaire was made up of 30 questions on one side of A4 paper (Supplementary Fig. S1). Each question could be answered by choosing only one option from a list which included the options 'unknown' and 'other'. All LCs were asked to provide a 'return rate', that is, their estimate of the proportion of all cases which had been reported in their hospital(s).

The survey period chosen was Monday, September 9, 2013, to Monday, September 16, 2013. No bank holidays or school holidays fell between these dates. Data collection over a whole week was considered both too burdensome and too costly, and therefore, the activity during the week was sampled by randomizing each LC to two consecutive days within the chosen week. Specialist hospitals (Paediatric, Cardiothoracic, and Neurosurgery) were randomized separately to avoid unequal allocation of collection days.

A scaling factor was used to convert the number of forms returned from 2 days into the estimated number of cases for a whole year (annual workload). The scaling factor had three components: conversion of 2 days to a week (3.5), the number of working weeks in 2013 (50.59, see Supplementary Appendix), and the median return rate from LCs (0.98). The scaling factor was 180.68 [$=(3.5\times 50.59)/0.98$]. Annual caseload estimations were rounded to the nearest 100. All calculations were made using Microsoft Excel 2010 and the 'PivotTable' facility. In interpreting results, it is therefore notable that an estimated annual caseload of 200 or 400 represents one or two cases, respectively, and that, inevitably, such small numbers are less reliable than larger numbers.

Some responses were missing, and because question choices included 'other' or 'unknown', we combined all these uninterpretable answers (the sum of the missing, 'other', and 'unknown') and expressed them as a percentage. These uninterpretable answers were discarded when calculating proportional results, so all percentages quoted in results relate only to interpretable forms. For questions relating to GA (e.g. technique and monitoring), estimations of numbers and percentages were made only on forms indicating that GA was the prime mode of anaesthesia (i.e. answering 'GA' to Q9).

Results

Returns by LCs

All 267 LCs took part in the survey (100% response rate) and a total of 20 400 forms were returned. The median number of returned forms per LC was 60: 75% of LCs returned fewer than 100 forms (Supplementary Fig. S2). Three LCs reported that they had no cases in the reporting period. The median

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