11 The NAP7 Activity Survey: patient characteristics, anaesthetic workload and techniques in the UK

Andrew Kane Jasmeet Soar Richard Armstrong Emira Kursumovic

Matthew Davies Tim Cook

Key findings

- The Activity Survey data show increasing age, obesity and comorbidity trends leading to an increasingly complex perioperative workload.
- Of 416 NHS hospital sites invited to participate, 352 (85%) completed the Activity Survey and reported 24,172 cases of anaesthetic activity during November 2021.
- We estimated that the annual anaesthetic activity was 2.71 million cases at the time of the survey.
- Of total anaesthetic activity, 89% occurred during weekdays and 11% at weekends, 90% during daytime, 6% in evenings and 4% overnight.
- Weekend elective anaesthesia work represented 4% of total elective activity.
- In non-obstetric patients, between NAP5 (2013) and NAP7 (2021), the estimated median age of patients increased by 2.3 years from 50.5 years (IQR 28.4–69.1 years) to 52.8 years (IQR 32.1–69.2 years).
- In non-obstetric patients, the median body mass index (BMI) increased from 24.9 kg m^{-2} (IQR 21.5–29.5 kg m^{-2}) to 26.7 kg m^{-2} (22.3–31.7 kg m^{-2}).
- The proportion of patients who scored as ASA physical status 1 decreased from 37% in NAP5 to 24% in NAP7.
- The use of total intravenous anaesthesia increased from 8% of general anaesthesia cases to 26% between NAP5 and NAP7.
- Patients with confirmed COVID-19 accounted for only 149 (0.6%) of cases reported to the Activity Survey.

What we already know

Detailed contemporary knowledge of the characteristics of the surgical population, national anaesthetic workload, anaesthetic techniques and behaviours is essential to monitor productivity, inform policy and direct research themes. In the UK, the impact of COVID-19 on healthcare has been far reaching, including significant pressure on critical care infrastructure, staff and resources and concomitant reductions in operating activity during COVID-19 waves (Kursumovic 2021). Waiting lists have been rising for several years and the COVID pandemic has exacerbated this issue (Land Clark & Peacock 2022). Large-scale data about national anaesthetic practice and the overall surgical population are sparse in the UK and have been provided intermittently by the NAPs of the RCoA on a three- to four-yearly cycle (Sury 2014; Kemp 2018; Kane 2023).

Detailed methodology for this study can be found in Chapter 6 NAP7 Methods and the original publication in Anaesthesia (Kane 2022).

What we found

Activity reports

Of 416 NHS sites across 182 NHS trusts or boards across the UK invited to the study, 352 sites (85%) participated. From these sites, the NAP7 Activity Survey received 24,177 individual forms. Five cases were removed after screening for careless data because of a high suspicion of false data. Twelve forms were modified after being judged authentic but with an illogical mis-click. This process left 24,172 cases in the final database (Figure 11.1), equating to an estimated NHS annual caseload of 2.71 million (Appendix 11.1). In addition, independent hospitals reported 1900 cases, which are discussed separately in Chapter 14 Independent sector.

Workload

Of the total activity, 21,629 (89%) cases occurred during weekdays and 2543 (11%) during weekends (Figure 11.2) The daily activity of cases classified as urgent or immediate, according to the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) classification, was similar across the week. In contrast, between 2536 and 3116 elective procedures (day case and planned inpatient stay) were recorded daily during weekdays, with 408 on Saturday and 113 on Sunday. Weekend elective work represented 4% of the total elective activity. Of total anaesthetic activity, 90% occurred during the daytime (08:00–17.59), 6% during the evening (18:00–23:59) and 5% at night (00:00–07:59). Of the total activity by specialty, elective orthopaedic surgery, general surgery and orthopaedic trauma were the three largest by workload. During the evening, the greatest case load moved from orthopaedics to obstetrics, with this effect more pronounced overnight. During the evening, the greatest case load moved from orthopaedics to obstetrics, with this effect more pronounced overnight (Table 11.1, Figure 11.3).

Figure 11.1 Flow chart of cases in the NAP7 Activity Survey

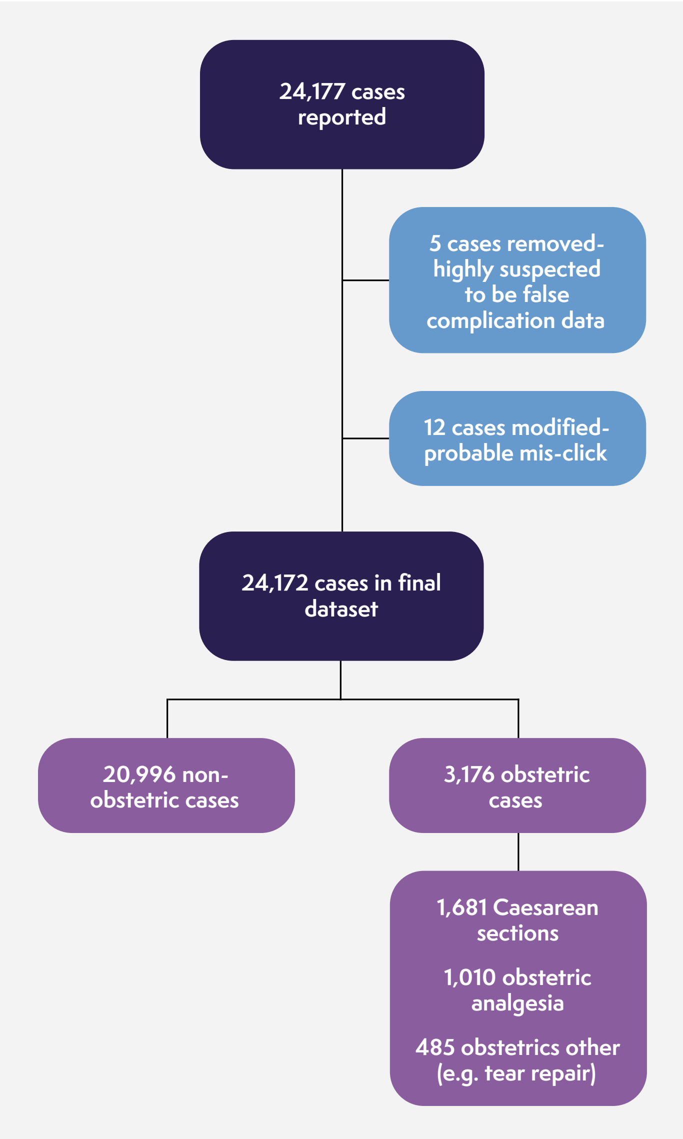


Table 11.1 Anaesthetic workload by time of day and National Confidential Enquiry into Patient Outcome and Death (NCEPOD) classification*

NCEPOD classification	Daytime (0800–1759)	Evening (1800–2359)	Night (0000–0759)	Total
Elective (day case)	9973	65	7	10045
Elective (planned inpatient stay)	4092	58	6	4156
Expedited	2828	159	41	3028
Urgent	2694	596	456	3746
Immediate	207	101	121	429
Not applicable†	1850	371	547	2768
Total	21644	1350	1178	24172

* Data are the number of cases submitted.
† includes caesarean sections.

Figure 11.2 Anaesthetic workload by weekday and NCEPOD classification. Data are the number of cases submitted each day by NCEPOD category of urgency. Elective (day case) ■, Elective (planned inpatient stay) ■, Expedited ■, Urgent ■, Immediate ■.

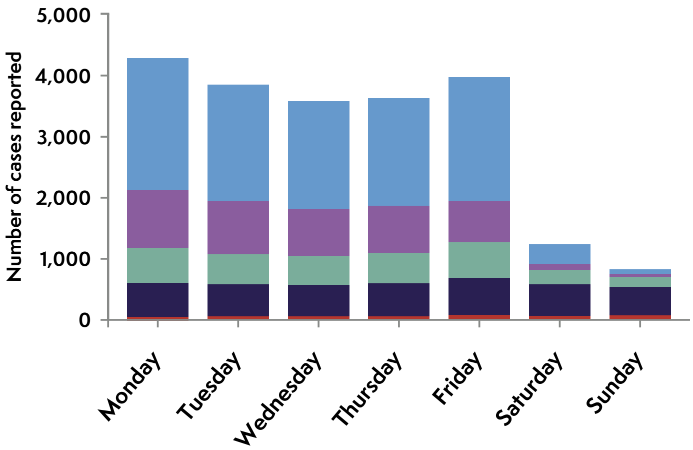


Figure 11.3 Anaesthetic workload specialty and time of day. Data are the raw number of cases submitted by specialty during each period and the percentage. Histogram bars represent the relative volume of work during each period of the day, scaled to the maximum in each period.

Specialty	Daytime (0800-1759)		Evening (1800-2359)		Night (0000-0759)		Total	
	Raw	%	Raw	%	Raw	%	Raw	%
Orthopaedics - cold/elective	2466	11.4	26	1.9	4	0.3	2496	10.3
General Surgery	1969	9.1	191	14.1	82	0.3	2242	9.3
Orthopaedics - trauma	1982	9.2	102	7.6	25	7.0	2109	8.7
Urology	1931	8.9	79	5.9	27	2.1	2037	8.4
Gynaecology	1893	8.7	55	4.1	14	2.3	1962	8.1
Obstetrics: Caesarean section	1178	5.4	203	15.0	300	1.2	1681	7.0
ENT	1323	6.1	20	1.5	13	25.5	1356	5.6
Abdominal: lower GI	992	4.6	103	7.6	43	1.1	1138	4.7
Ophthalmology	1029	4.8	14	1.0	3	3.7	1046	4.3
Obstetrics: labour analgesia	445	2.1	214	15.9	351	0.3	1010	4.2
Plastics	720	3.3	25	1.9	8	29.8	753	3.1
Dental	744	3.4	1	0.1	0	0.7	745	3.1
Maxillo-facial	568	2.6	17	1.3	5	0.0	590	2.4
Abdominal: upper GI	496	2.3	16	1.2	11	0.4	523	2.2
Obstetrics: other	212	1.0	105	7.8	168	0.9	485	2.0
Other	392	1.8	23	1.7	20	14.3	435	1.8
Neurosurgery	358	1.7	29	2.1	37	1.7	424	1.8
Vascular	369	1.7	31	2.3	7	3.1	407	1.7
Pain	249	1.2	8	0.6	3	0.6	260	1.1
Gastroenterology	243	1.1	8	0.6	8	0.3	259	1.1
Abdominal: hepatobiliary	218	1.0	8	0.6	2	0.7	228	0.9
Radiology: diagnostic	212	1.0	2	0.1	0	0.2	214	0.9
Cardiac surgery	203	0.9	6	0.4	3	0.0	212	0.9
Thoracic Surgery	198	0.9	5	0.4	0	0.3	203	0.8
Radiology: interventional	179	0.8	11	0.8	7	0.0	197	0.8
Spinal	182	0.8	4	0.3	1	0.6	187	0.8
Abdominal: other	167	0.8	13	1.0	6	0.1	186	0.8
Psychiatry	150	0.7	0	0.0	0	0.5	150	0.6
Other minor operation	134	0.6	5	0.4	2	0.0	141	0.6
Cardiology: electrophysiology	131	0.6	3	0.2	1	0.2	135	0.6
Cardiology: interventional	93	0.4	5	0.4	8	0.1	106	0.4
Transplant	74	0.3	11	0.8	10	0.7	95	0.4
Other major operation	70	0.3	2	0.1	2	0.8	74	0.3
Burns	39	0.2	0	0.0	0	0.2	39	0.2
Cardiology: diagnostic	24	0.1	2	0.1	1	0.0	27	0.1
None	11	0.1	3	0.2	6	0.1	20	0.1
Total	**21644**	**100.0**	**1350**	**100.0**	**1178**	**100.0**	**24172**	**100.0**

Patient characteristics

COVID-19 status

There were 149 (0.6%) patients who were COVID-19 positive and 794 (3%) cases had an unknown COVID-19 status at the point of surgery. Of those who were COVID-19 positive undergoing surgery, 87 (58%) were not hospitalised with COVID-19 and 55 (37%) were hospitalised with COVID-19 at the point of surgery. By specialty, obstetrics, general surgery and orthopaedic trauma had the highest burden of patients with COVID-19 by absolute numbers (Table 11.2, see Appendix 11.2).

Age and sex

Of the 24,172 patients, 14,077 (58%) were female, 10,082 (42%) were male, and sex was reported as unknown in 13 (< 1%) cases (Figure 11.4). After removing patients undergoing obstetric procedures, there were 10,907 (52%) female and 10,078 (48%) male patients in the survey.

ASA status

Across the whole patient cohort, there were 5,910 (24%) patients with ASA physical status grade 1, 11,819 (49%) ASA 2, 5508 (23%) ASA 3, 869 (4%) ASA 4, 49 (< 1%) ASA 5 and 17 (< 1%%) ASA 6 (Figure 11.5). The proportion of patients recorded as ASA 3–6 or more was highest at the extremes of ages (70% of neonates and 81% aged > 85 years) and lowest in early adulthood (7% aged 19–25 years).

Figure 11.4 Patient age and sex. Obstetric cases are marked in green. Male ■, Female ■, Obstetric cases ■.

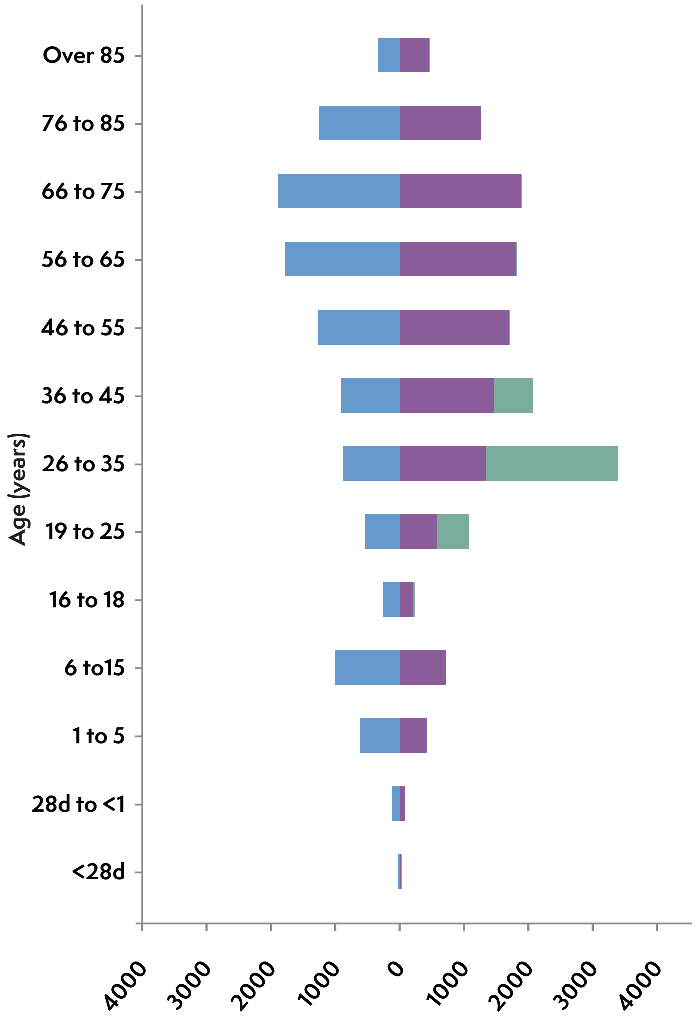
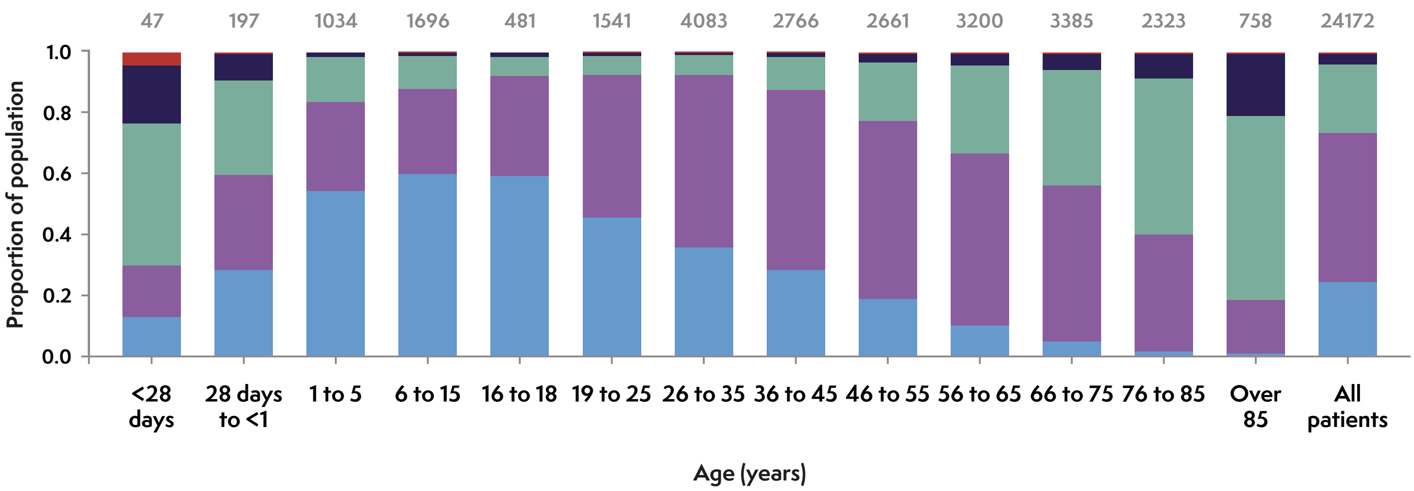


Figure 11.5 ASA physical status distribution by age. Data show the proportion of patients by age for: A) ASA (1 ■, 2 ■, 3 ■, 4 ■, 5 ■, ASA 6 not included, *n*=24,155). Values above the bars show the number of patients in each group.



Body mass index

In adult patients where BMI was reported: 431(2%) were underweight (BMI < 18.5 kg m^{-2}); 7,635 (38%) were normal weight (BMI 18.5–24.9 kg m^{-2}); 5,673 (28%) were overweight (BMI 25.0–29.9 kg m^{-2}); 3,613 (18%) were obese class 1 (BMI 30.0–34.9 kg m^{-2}); 1,655 (8%) were obese class 2 (BMI 35.0–39.9 kg m^{-2}) and 1,019 (5%) were obese class 3 (BMI ≥ 40.0 kg m^{-2}). The proportion of patients in each category varied with age. Young and old patients had lower BMI scores than patients in middle age ranges (Figure 11.6).

Activity trends since previous NAPs

Age trends

Within the Activity Survey population, excluding obstetric patients, the estimated median age of patients increased by from 50.5 years (IQR 28.4–69.1 years) to 52.8 years (IQR 32.1–69.2 years) between NAP5 in 2013 to NAP7 in 2021, with this increase being similar in females and males (Figure 11.7). The distribution of patients by age group was significantly different between NAP5, NAP6 and NAP7 ($p < 0.001$).

BMI trends

The estimated median BMI increased between NAP5 and NAP7 from 24.9 kg m^{-2} (IQR 21.5–29.5 kg m^{-2}) to 26.7 kg m^{-2} (IQR 22.3–31.7 kg m^{-2}), while the proportion of patients classified as at least overweight increased from 49% to 59% (Figure 11.8). Within the obstetric population requiring anaesthetic intervention, the increase in obesity was more pronounced. The estimated median BMI increased from 24.8 kg m^{-2} (IQR 21.6–29.8 kg m^{-2}) to 27.1 kg m^{-2} (IQR 22.7–32.4 kg m^{-2}) and the proportion classified as at least overweight increased from 46% to 62% (Figure 11.9). The distributions of BMI in non-obstetric and obstetric patients were significantly different between NAP5, NAP6 and NAP7 (non-obstetric, $p < 0.001$; obstetric, $p < 0.001$)

Figure 11.6 BMI distribution by age. (< 18.5 kg m^{-2} ■, 18.5–24.9 kg m^{-2} ■, 25.0–29.9 kg m^{-2} ■, 30.0–34.9 kg m^{-2} ■, 35.0–39.9 kg m^{-2} ■, 40.0–49.9 kg m^{-2} ■, 50.0–59.9 kg m^{-2} ■, ≥ 60 kg m^{-2} ■, where BMI was reported and patients aged 19 years and over, n=20,026). Values above the bars show the number of patients in each group.

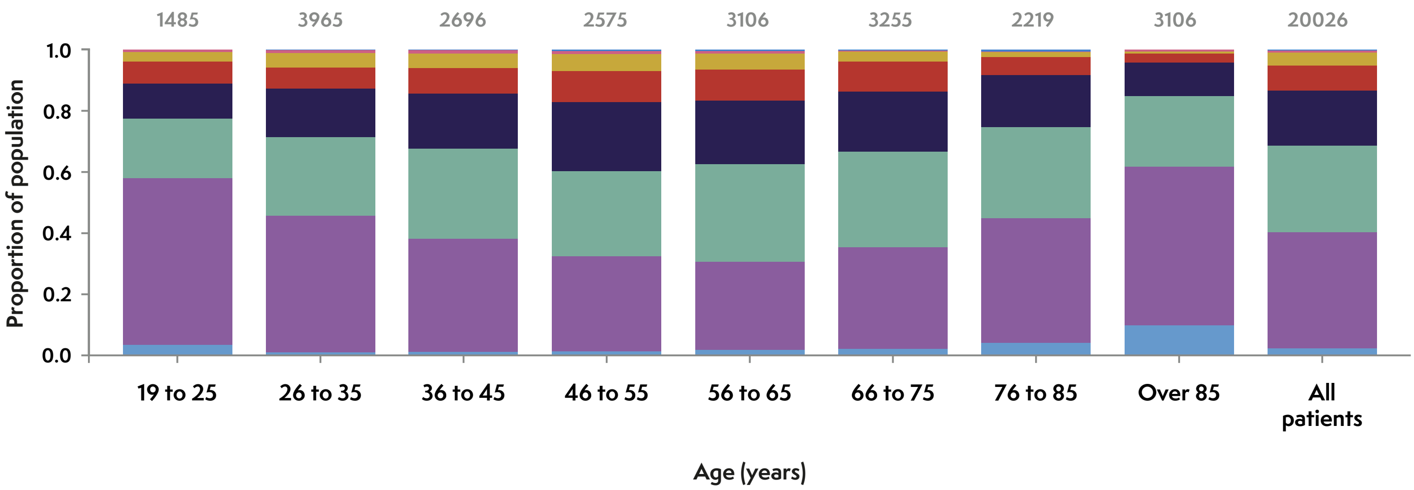


Figure 11.7 Trends in age over time in the NAPs 5 to 7 Activity Survey populations. Data show the proportion of the Activity Survey population by age in non-obstetric patients the NAP5 ■; NAP6 ■; NAP7 ■. Proportions show the relative change in the population proportion within the group between NAP5 and NAP7. ↑, increase; ↓, decrease; ↔, no change. Percentages may not total 100 due to rounding.

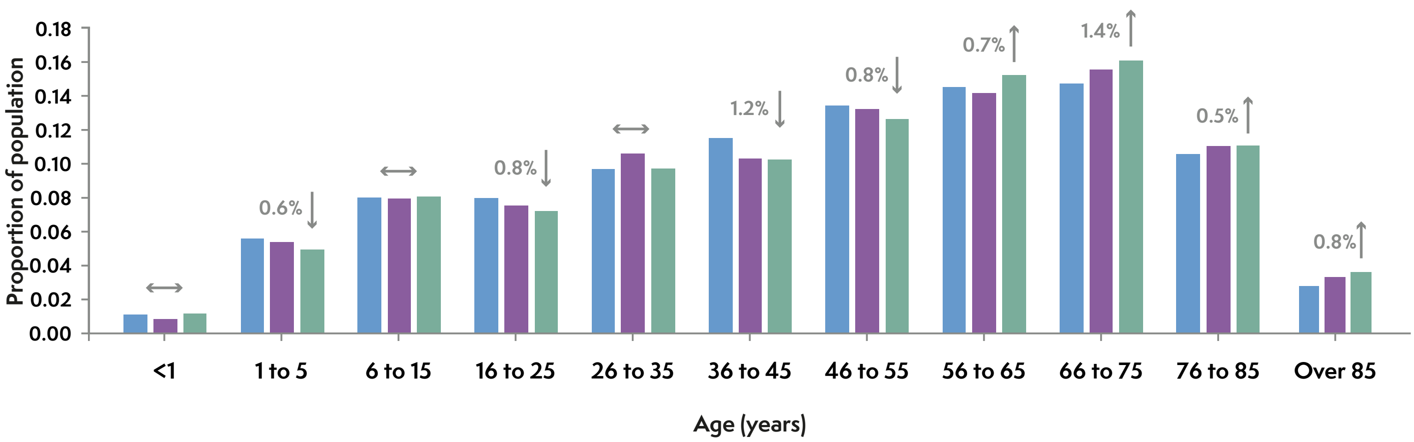


Figure 11.8 Trends in BMI over time in the NAP5–7 non-obstetric Activity Survey populations. Data show proportion of the Activity Survey population by the BMI distribution in the non-obstetric population. NAP5 ■; NAP6 ■; NAP7 ■. Proportions show the relative change in the population proportion within the group between NAP5 and NAP7. ↑, increase; ↓, decrease; ↔, no change. Percentages may not total 100 due to rounding.

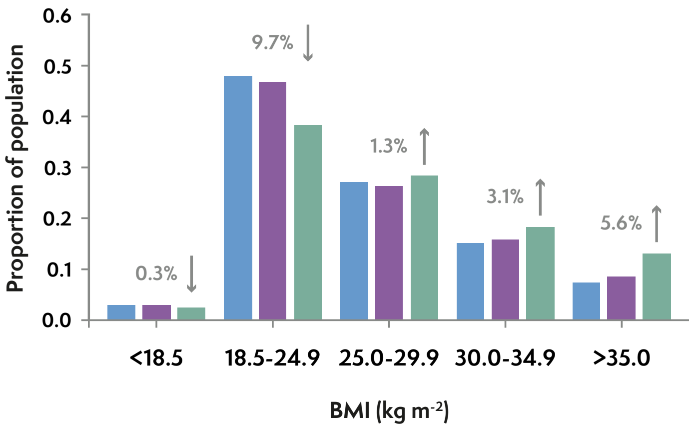
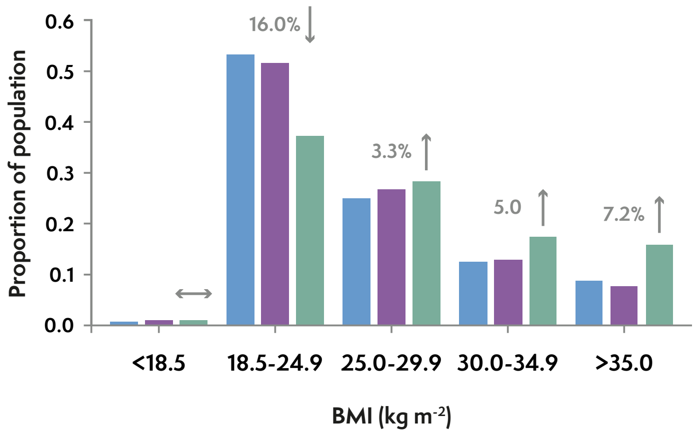


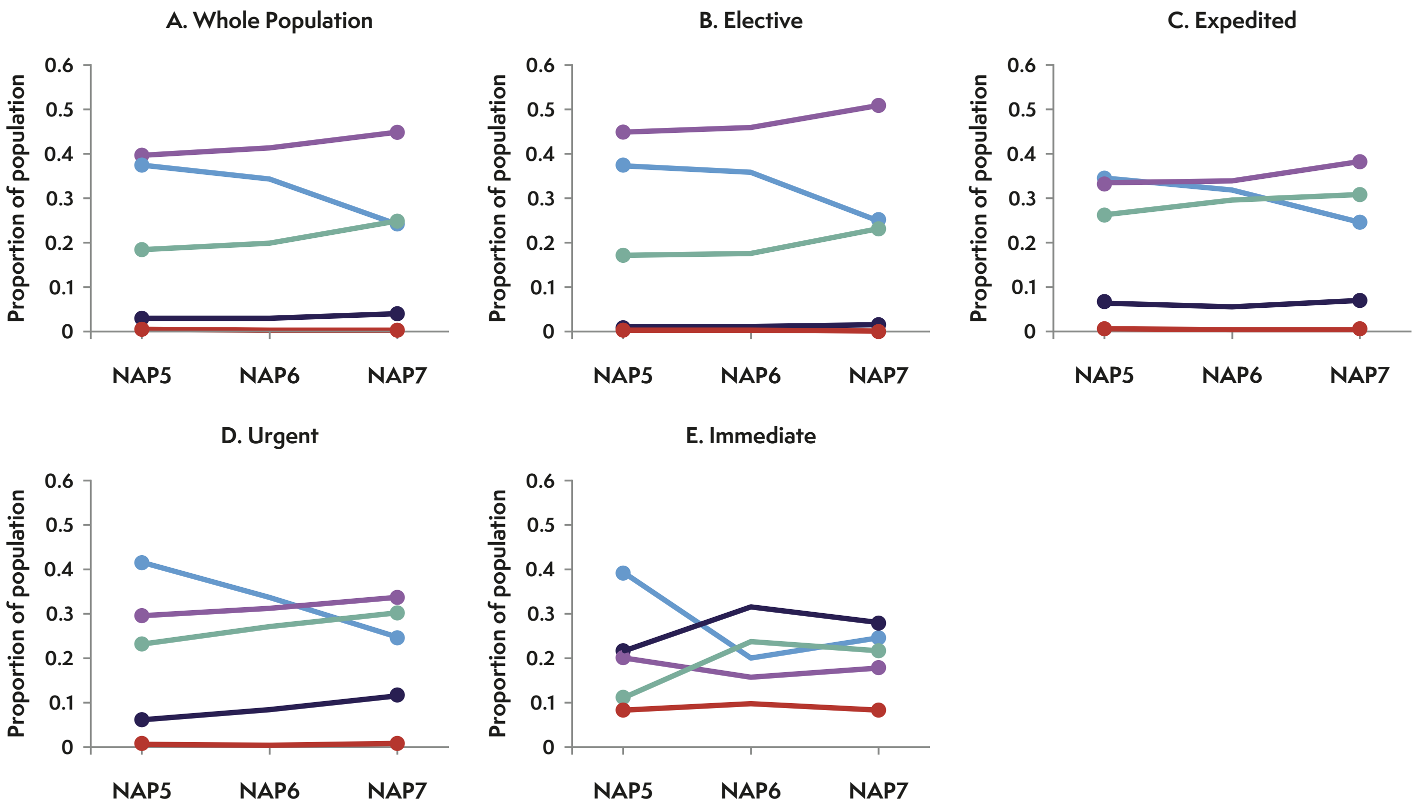
Figure 11.9 Trends in BMI over time in the NAP5–7 obstetric Activity Survey populations. Data show proportion of the Activity Survey population by the BMI distribution in the obstetric population. NAP5 ■; NAP6 ■; NAP7 ■. Proportions show the relative change in the population proportion within the group between NAP5 and NAP7. ↑, increase; ↓, decrease; ↔, no change. Percentages may not total 100 due to rounding.



ASA trends

In the non-obstetric population, between NAP5 and NAP7, the proportion of ASA 1 patients decreased from 6,807 of 18,254 (37%) to 5,075 of 20,996 (24%), a 13% drop. Patients reported as ASA 2 increased by 5% from 7,206 of 18,254 (39%) to 9,410 or 20,996 (45%) and ASA 3 increased by 6% from 3,345 of 18,254 (18%) to 5,172 of 20,996 (25%; Figure 11.3A). These trends are seen in elective and non-elective work (Figure 11.10). The distribution of patients by ASA group was significantly different between NAP5, NAP6 and NAP7 ($p < 0.001$).

Figure 11.10 Proportion of population in ASA class by NCEPOD classification and over time in the NAP5–7 Activity Survey populations. Trends in ASA in A) the whole Activity Survey and B–E) by NCEPOD category between NAP cycles. ASA 1 ■, ASA 2 ■, ASA3 ■, ASA 4 ■, ASA 5 ■, ASA 6 not shown.



Trends in anaesthetic techniques and monitoring

Of the total non-obstetric anaesthetic workload, the rate of general anaesthesia reduced from 14,790 of 17639 (84%) of cases to 16,604 of 20,288 (82%; Table 11.2, see Appendix 11.2). Of these, the proportion of cases performed as total intravenous anaesthesia (TIVA) or propofol as a maintenance agent rose more than three-fold from 1217 of 15,460 (8%) during NAP5 to 4,414 of 16,739 (26%) in NAP7 (Figure 11.11). Between NAP5 and NAP7, there was an increase in the use of processed EEG (pEEG) during general anaesthesia from 429 of 15,460 (3%) to 3,223 of 16,739 (19%) of cases. This was more pronounced as a proportion of TIVA/propofol as a maintenance agent cases; 175 of 1,217 (14%) to 2,799 of 4,414 (62%, Figure 11.12).

A regional anaesthetic block (with or without other anaesthetic techniques) was used in 2,811 of 20,288 (14%) of cases in the NAP7 Activity Survey compared with 2,290 of 17,639 (13%) during NAP5 (Table 11.3).

Discussion

These data show increasing age, obesity and comorbidity trends leading to an increasingly complex perioperative workload (Kane 2023). The extent to which these trends would have occurred without the COVID-19 pandemic is unclear.

The fact that the perioperative population is 2.3 years older than nine years ago has important implications. All-cause mortality in the general population increases approximately 10% for each year of advancing age and doubles for every 6–7 years of ageing (Spiegelhalter 2020): a 2.3-year increase in age equates to an approximately 27% increase in all-cause mortality. This increase in age is likely to interact with perioperative risk, most notably for those patients who are elderly, meaning that morbidity, mortality and healthcare costs might all be expected to have risen (Ebeling 2021).

Figure 11.11 Percentage of cases where 'total intravenous anaesthesia' or 'propofol as a maintenance agent' was used in the NAP5, NAP6 and NAP7 Activity Surveys

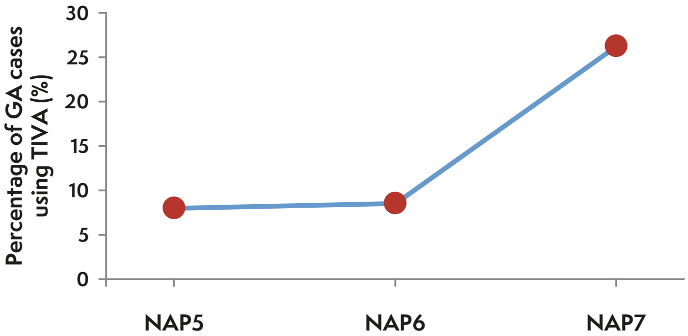


Figure 11.12 Percentage processed EEG use in the NAP5, NAP6 and NAP7 Activity Surveys. All general anaesthesia cases ■, TIVA cases ■.

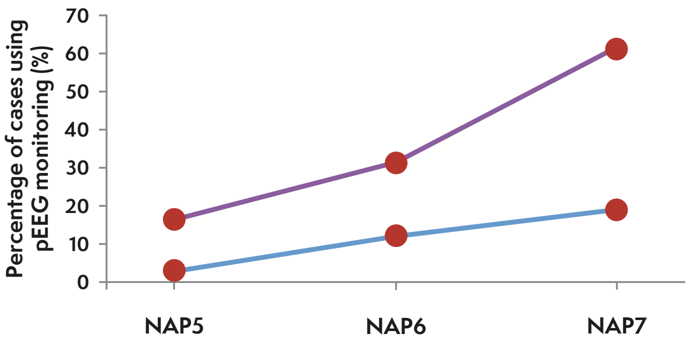


Table 11.3 The distribution of anaesthetics given by intended conscious level and with or without regional or neuraxial anaesthesia

Intended conscious level	Anaesthetic technique combination	NAP5		NAP7	
		(*n*)	(%)	(*n*)	(%)
General anaesthesia	General anaesthesia alone	12,737	72	14,253	70
	With regional anaesthesia	1455	8	1579	8
	With neuraxial anaesthesia	556	3	709	3
	With regional and neuraxial anaesthesia	42	< 1	63	< 1
Sedation	Sedation alone	643	4	954	5
	With regional anaesthesia	179	1	257	1
	With neuraxial anaesthesia	730	4	816	4
	With regional and neuraxial anaesthesia	61	< 1	228	1
Awake	Awake alone	373	2	374	2
	With regional anaesthesia	544	3	623	3
	With neuraxial anaesthesia	310	2	371	2
	With regional and neuraxial anaesthesia	9	< 1	61	< 1
Total		17,639		20,288	

The trends in BMI are also important: with both the prevalence and severity of obesity in the perioperative population increasing. During NAP5, the median BMI of the surgical population was at the top of the 'normal' BMI category and in NAP7 it is 'overweight', such that it is hard to argue that normal weight is indeed normal. While the proportion of patients who are overweight in this survey is no greater than in the population as a whole (using most recently available English population data; Moody 2020), the proportion of patients with obesity is higher: patients with a BMI greater than 30 kg m^{-2} now represent one in three patients presenting to anaesthetists. Particularly notable are the proportionate increases in obesity at different severities between NAP5 and NAP7. For obesity class 1, the relative rise is less than 20%, whereas the prevalence of obesity class 2 (BMI ≥ 35 kg m^{-2}), the proportion of patients in this group has almost doubled. However, most recent national data from 2019 pre-date the COVID-19 pandemic, and the impact of various interventions on national levels of obesity, including lockdowns, home working and restrictions on outdoor exercise, has yet to be determined. The increase in obesity in this study appears to be larger than the trends in the UK population. Obesity is well documented to be associated with anaesthetic complications, not least complications of airway management (Cook 2011) and accidental awareness during general anaesthesia (Pandit and Cook 2014a), highlighted during previous NAP projects. Further, obesity is associated with comorbidity (eg obstructive sleep apnoea, hypertension, ischaemic heart disease, diabetes) and multimorbidity, which increases the risks of anaesthesia (Bazurro 2018). Multimorbidity management requires expanded perioperative services (Onwochei 2020). The impact of obesity may extend well beyond the physical challenges of obesity to the theatre team.

The trends in BMI in the obstetric population are even more pronounced, although it should be noted that the Activity Surveys capture only obstetric patients who interact with an anaesthetist and not the whole obstetric population. Nonetheless, given that obstetrics is an area where much care is delivered out of hours and by junior anaesthetists (Kemp 2018), obstetric units need to have appropriate escalation strategies to support more junior anaesthetists caring for patients with an elevated BMI, as was highlighted in the Ockenden report (Ockenden 2022). Individual units will need to consider the impact on staffing. Further, increased augmentation rates during labour and increased caesarean section rates in mothers who are obese are likely to increase the anaesthetic workload in this group (Odor 2021, Creanga 2022).

While the ASA physical status grade may be considered a crude measure of comorbidity, it is still strongly associated with complications, morbidity and mortality rates during and following surgery (Moonesinghe 2013; Onwochei 2020). Here, we show that the profile of ASA grades in the surgical population is shifting towards higher scores, indicating that patients are more complex with more comorbidities. The ASA scoring system was updated in 2014 and, more recently, in 2020, with the addition of several examples requiring specific scores. Following the 2014 updates, there were minimal, if any, alterations in the rates of underclassification of ASA scores noted over the following six years (Fielding-Singh 2020). While it is possible that the 2020 updates may alter clinician assessment of ASA scores, it is unlikely that any impact is of the same order of magnitude as the effects seen in this study. Therefore, it is plausible that the observed changes represent actual alterations in the patient population presenting to NHS hospitals for surgery.

The increased comorbidity burden will increase demand on all aspects of the perioperative pathway, from preassessment to complexities on the day of surgery and increased demand for postoperative level 1.5 (enhanced care) and level 2 or 3 (critical care) beds (Centre for Perioperative Care and Faculty of Intensive Care Medicine 2020, Centre for Perioperative Care 2021). Targets for entry into enhanced care beds based on preoperative risk are now in place (Centre for Perioperative Care and Faculty of Intensive Care Medicine 2020).

The Royal College of Anaesthetists Perioperative Quality Improvement Programme has recently shown that there are already shortfalls in achieving these targets (Edwards 2021). The increase in patients who are older, more obese and with high ASA scores will place additional demand on enhanced care and critical care beds that may not be able to be met. It is also likely that this will lead to reductions in theatre efficiency, as all these factors contribute to increased anaesthetic time and prolonged turnaround time on a population level (Escobar 2006; Luedi 2016). Therefore, in the context of our data, the increase in the UK national waiting list from four million (late 2019) to seven million (November 2022) patients not only represents an increase in absolute number but is also an older, more obese and more comorbid cohort of patients. Efforts to impact the waiting list must increase operative theatre capacity and upscale perioperative services from referral to discharge, including preassessment services and enhanced and critical care beds.

The overall patterns of surgical activity by specialty, time and day of the week and urgency are similar to historical data (Pandit and Cook 2014a; Kemp 2018). The top five specialties by volume (orthopaedic trauma and elective work, general surgery, orthopaedic elective, urology, gynaecology and obstetrics) represent more than half of all surgical procedures requiring an anaesthetist. These data suggest that overall activity patterns have largely returned to pre-pandemic levels. This activity is an achievement, given that the system was under significant pressure in early 2021 during the second and third waves of the COVID-19 pandemic (Kursumovic 2021). In early 2021, one in three anaesthetic staff was unavailable to work, 42% of operating theatres were closed and those that were open were running considerably below normal activity: overall national surgical activity was less than 50% of normal activity (Kursumovic 2021).

In addition to changes in patient characteristics, Activity Survey data offers insights into anaesthetic practice. The most striking change in behaviour is a three-fold increase in the proportion of general anaesthetics given by TIVA from 8% during NAP5 to 26% in NAP7. The drivers of this are unknown but may include concerns over environmental impact (Shelton 2022), proposed benefits for cancer recurrence (Chang 2021), increasing equipment availability and the technique now being embedded within the new UK postgraduate curriculum. The use of processed EEG (pEEG) monitoring has also increased. In cases delivered using TIVA, the rates of pEEG use have increased from 17% in NAP5 to 62% in NAP7. Again, this is likely to be a combination of an increased understanding of the risks of accidental awareness when pEEG monitoring is not used (Pandit 2014b), together with growing equipment availability and adherence to guidelines advocating the use of pEEG when TIVA is used with neuromuscular paralysis (Klein 2021). With emerging evidence that targeted pEEG scores may reduce rates of postoperative delirium, it may be that pEEG is used increasingly with volatile anaesthesia (Evered 2021).

In contrast, the Activity Survey showed that the rates of use of regional anaesthetic techniques increased from 13% to 14% between NAP5 and NAP7, with only a 1% absolute increase but a 7% relative increase in regional blocks. These data may be confounded by NHS work that has transferred to the independent sector, known to include large volumes of orthopaedic surgery, which may be masking more significant increases.

The NAP7 Activity Survey was the first NAP undertaken in the COVID-19 era. Data were collected during November 2021, when there was a relatively constant burden of COVID-19 due to the delta variant and before the omicron variant became dominant in December 2021, leading to substantial disruption in January 2022. The 149 confirmed COVID-19 cases in the survey account for 1% of the database or around 1 in 160 anaesthetic cases. Of the cases that were COVID-19-positive, most were non-elective and over half were not hospitalised due to COVID-19. Most of the burden of patients who were COVID-19 positive was in obstetrics, general surgery and orthopaedic trauma. Given the disruption caused by COVID-19, the estimated annual caseload of 2.72 million is subject to higher uncertainty than in previous survey iterations.

The COVID-19 pandemic has provided logistical challenges (Chapter 7 COVID-19). Owing to COVID-19 waves, the volume of surgical work undertaken has been fluctuating and, resultantly, this Activity Survey only really represents a snapshot of November 2021. Further, partly driven by COVID-19 precautions, we moved away from the paper version of the survey used in NAPs 4–6 towards the electronic capture of cases. This method eased the burden of data collection for Local Coordinators but may have resulted in reduced case capture and may have reduced confidence in the case reporting rate. Despite this, these data appear to have high fidelity and are consistent with previous surveys in key features (eg cases by time of day, specialty mix, age profile, and sex profile). Even if the response rate is lower, the high number of cases (> 24,000) and working with proportions rather than absolute numbers allows a consistent comparison over time. The median values for age and BMI are based on where the median would be if the distribution of values within a group (eg age 46–55 years) were evenly distributed within that group. This method adds some uncertainty to these values but, given the large numbers in each NAP survey, we believe that these represent real changes over time. It does not allow the reporting of a range as the absolute values within the lowest and highest groups (eg, age < 28 days) are unknown.

In summary, these data describe an increasingly complex population of patients that anaesthetists care for in the UK alongside an increase in TIVA and pEEG use. These data may be helpful for future planning of perioperative services on local and national levels.

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Appendix 11.1

Scaling factor workings

It is not possible to simply multiply the weekly caseload by 52 to estimate a yearly caseload because a number of weeks have bank holidays. Assuming that the activity on a bank holiday is similar to that on a weekend day, the 'effective' number of weeks can be calculated.

There were 365 days (52.14 weeks) in the data collection period (16 June 2021 to 16 June 2022). The number of effective weeks factors in weekdays and weekends with bank holidays being assumed as having similar activity to weekends.

There were 9 bank holidays in England and Wales (10 in Scotland and Northern Ireland) during the data collection period, giving 365 – (104 weekend days + 9 bank holidays) = 252 weekdays.

Effective weeks in the data collection period is (365 x 252)/(5 x 365) = 50.4 weeks.

Annual caseload as per Pandit method (Sury 2014b)

Cases	
Cases reported (4 days/site)	24172
Case per week (x 7/4)	42301
Weeks in year	50.4
Site participation	
Totals sites eligible to participate	416
Total sites participating	352
Site participation rate	0.85
Estimated return rate per site	0.93
Estimated annualised caseload	**2710618**

(cases per week x weeks)/(response rate x site participation rate)

Assumptions and limitations

We have assumed that missing sites are similar to those that reported cases.

We have assumed that four days of activity at reporting sites can be extrapolated to annual activity and have not factored in variation in annual activity caused by COVID-19 and other pressures on anaesthetic activity.

Appendix 11.2

Table 11.2A Covid-19 within the Activity Survey population

COVID-19 status	Elective (day case)	Elective (planned inpatient stay)	Expedited	Urgent	Immediate	N/A or unknown	Total
Negative	9775	4079	2793	3196	291	1985	22119
Positive	16	10	29	59	5	30	149
Uncertain (eg PCR in progress)	55	18	129	327	79	185	793
Not applicable or unknown	199	49	77	164	54	57	511
Total	10045	4156	3028	3746	429	2768	24172

N/A, not applicable; PCR, polymerase chain reaction.

Table 11.2B Covid-19 within the Activity Survey population

COVID-19 status	Elective (day case)	Elective (planned inpatient stay)	Expedited	Urgent	Immediate	N/A or unknown	Total
Hospitalised:							
Receiving invasive mechanical ventilation or ECMO	0	0	7	7	2	0	16
Requiring NIV or HFNO	0	1	0	0	0	1	2
Requiring any supplemental oxygen	0	0	0	5	1	2	8
Not requiring supplemental oxygen	2	0	4	17	0	6	29
Not hospitalised:							
Limitation of activities	3	1	2	1	0	2	9
No limitation of activities	8	6	16	28	2	18	78
Unknown	3	2	0	1	0	1	7
Total	16	10	29	59	5	22	149

ECMO, extracorporeal membrane oxygenation; HFNO, high-flow nasal oxygen; N/A, not applicable; NIV, noninvasive ventilation.

Table 11.2C Covid-19 within the Activity Survey population

COVID-19 status	COVID-19 negative	COVID-19 positive	Uncertain (eg PCR in progress)	N/A or unknown	Total
Abdominal:					
Hepatobiliary	214	2	3	9	228
Lower GI	1051	6	39	42	1138
Other	172	0	3	11	186
Upper GI	485	3	7	28	523
Burns	31	0	3	5	39
Cardiac surgery	192	0	3	17	212
Cardiology:					
Diagnostic	24	0	1	2	27
Electrophysiology	128	1	2	4	135
Interventional	100	1	2	3	106
Dental	671	2	13	59	745
Ear, nose and throat	1282	14	16	44	1356
Gastroenterology	241	3	3	12	259
General surgery	2052	22	92	76	2242
Gynaecology	1863	3	36	60	1962
Maxillo-facial	556	6	10	18	590
Neurosurgery	376	2	37	9	424
None	10	0	4	6	20
Obstetrics:					
Caesarean section	1463	22	105	91	1681
Labour analgesia	791	11	117	91	1010
Other	368	4	58	55	485
Ophthalmology	963	4	18	61	1046
Orthopaedics:					
Cold/elective	2431	2	4	59	2496
Trauma	1908	19	84	98	2109
Other	370	6	18	41	435
Other major operation	66	1	1	6	74
Other minor operation	129	0	4	8	141
Pain	238	2	4	16	260
Plastics	685	0	24	44	753
Psychiatry	126	0	4	20	150
Radiology:					
Diagnostic	196	1	9	8	214
Interventional	176	3	7	11	197
Spinal	177	1	4	5	187
Thoracic surgery	198	1	0	4	203
Transplant	87	0	1	7	95
Urology	1917	5	52	63	2037
Vascular	382	2	5	18	407
Total	22119	149	793	1111	24172

GI, gastrointestinal; N/A, not applicable.