Original Article

Effects of pre-operative isolation on postoperative pulmonary complications after elective surgery: an international prospective cohort study

COVIDSurg Collaborative* and GlobalSurg Collaborative*

NIHR Global Health Research Unit on Global Surgery, Birmingham, UK

Summary

We aimed to determine the impact of pre-operative isolation on postoperative pulmonary complications after elective surgery during the global SARS-CoV-2 pandemic. We performed an international prospective cohort study including patients undergoing elective surgery in October 2020. Isolation was defined as the period before surgery during which patients did not leave their house or receive visitors from outside their household. The primary outcome was postoperative pulmonary complications, adjusted in multivariable models for measured confounders. Pre-defined sub-group analyses were performed for the primary outcome. A total of 96,454 patients from 114 countries were included and overall, 26,948 (27.9%) patients isolated before surgery. Postoperative pulmonary complications were recorded in 1947 (2.0%) patients of which 227 (11.7%) were associated with SARS-CoV-2 infection. Patients who isolated pre-operatively were older, had more respiratory comorbidities and were more commonly from areas of high SARS-CoV-2 incidence and high-income countries. Although the overall rates of postoperative pulmonary complications were similar in those that isolated and those that did not (2.1% vs 2.0%, respectively), isolation was associated with higher rates of postoperative pulmonary complications after adjustment (adjusted OR 1.20, 95%CI 1.05–1.36, p = 0.005). Sensitivity analyses revealed no further differences when patients were categorised by: pre-operative testing; use of COVID-19-free pathways; or community SARS-CoV-2 prevalence. The rate of postoperative pulmonary complications increased with periods of isolation longer than 3 days, with an OR (95%CI) at 4–7 days or ≥ 8 days of 1.25 (1.04–1.48), p = 0.015 and 1.31 (1.11–1.55), p = 0.001, respectively. Isolation before elective surgery might be associated with a small but clinically important increased risk of postoperative pulmonary complications. Longer periods of isolation showed no reduction in the risk of postoperative pulmonary complications. These findings have significant implications for global provision of elective surgical care.

Correspondence to: J. Simoes
Email: jfs945@bham.ac.uk
Accepted: 14 July 2021
Keywords: SARS-Cov-2; COVID-19; surgery; pathways; pre-operative isolation
*Collaborating authors are listed in online Supporting Information Appendix S1.
Twitter: @CovidSurg; @GlobalSurg

Introduction

Several strategies have been explored to mitigate against the risk of peri-operative SARS-CoV-2 infection, given the high associated rate of postoperative pulmonary complications and mortality [1]. It has become clear that a range of measures are needed to ensure safe surgery, including: COVID-19-free surgical pathways; patient testing for SARS-CoV-2; and delaying surgery in patients with SARS-CoV-2 infection [2, 3]. These measures will still be needed despite the roll-out of vaccination

© 2021 Association of Anaesthetists

programmes, which may take years to achieve globally, be less effective against SARS-CoV-2 variants and not achieve universal implementation [4, 5].

Isolation before elective surgery has been recommended by several national surgical associations [6–8]. This attempts to reduce the risk of asymptomatic carriers undergoing surgery, thereby protecting individual patients and reducing in-hospital transmission to other patients and staff. It presents potential problems for patients, including: logistical considerations; reducing patient mobility before major surgery; and social isolation. It also means that last-minute additions to operating theatre lists are less likely, thereby representing an additional potential burden to surgical recovery plans.

These limitations would be acceptable if there was clear evidence of benefit in regard to reduction of postoperative complications, both related to SARS-CoV-2 and otherwise. Demonstrating benefit and optimum duration will support wider rollout of global best practice in elective surgery. Demonstrating no benefit will allow units to tailor clinical guidance and consider reducing the burden of isolation. We aimed to determine the impact of pre-operative isolation on postoperative pulmonary complications after elective surgery.

Methods

This was a planned sub-study of an international prospective cohort study of patients undergoing surgery in hospitals, regardless of local SARS-CoV-2 infection prevalence or isolation policies during at least one 7-day study period in October 2020. Full methodology has been previously reported [9]. Hospitals providing surgical care for patients under any surgical specialty were eligible to participate. Local and national approvals were obtained according to local regulations. In the UK, this study was registered as clinical audit or service evaluation at each participating site. Patient consent was obtained when demanded by local governance requirements,which was not required in the UK. The study was registered prospectively and we adhered to the strengthening of the reporting of observational studies in epidemiology (STROBE) statement for observational studies [10].

All consecutive patients undergoing elective surgery for any indication were included. Elective surgery was defined as any procedure routinely performed in an operating theatre by a surgeon during a planned admission. A list of excluded procedures (such as central line insertion) was provided to all collaborators (see online Supporting Information Table S1). Patients undergoing emergency surgery or who had a pre-operative SARS-CoV-2 diagnosis were not included.

Pre-operative isolation was defined as limitation of social contacts before surgery during which time patients stayed at home, avoided public spaces and transport and did not receive visitors from outside of their household. Patients who were not required to follow any social distancing or isolation measures before surgery were considered to have not been exposed to pre-operative isolation. The number of days that each patient was required to follow the isolation measures was recorded as the duration of isolation. Patients were categorised according to the duration of pre-operative isolation into three groups: up to 3 days; 4 to 7 days; or ≥ 8 days before their planned surgery.

Multiple variables were collected for each patient: age; sex; ASA physical status; revised cardiac risk index (RCRI); presence of respiratory comorbidities; indication for surgery; and grade of surgery. Consistent with previous analyses, age was categorised as < 70 or ≥ 70 y. Country-level income was defined according to the World Bank index classification (updated in 2019) based on gross national income per capita, which determines three incomegroups: high income; upper-middle income; lower-middle income (including patients from both low- and lower- middle income countries).

Pre-operative testing was defined as a reverse transcription-polymerase chain reaction (RT-PCR) or antigen swab test performed within 3 days before surgery. A patient was considered to have undergone surgery in a COVID-19-free surgical pathway if a completely segregated pathway was provided (including ward, operating theatre and critical care areas) or the hospital was not admitting patients with SARS-CoV-2 infection. If otherwise, the surgical pathway was recorded as non-segregated.

Community SARS-CoV-2 prevalence was determinedfor each patient based on the 14-day case notification rate atthe time of surgery in each participating country. These rates were extracted from the World Health Organization, European Centre for Disease Control, US Centre for Disease Control and specific national registries via the Our World in Data platform [11]. Hospitals were classified as being in communities with either a low (< 100 cases per 100,000 population) or high (≥ 100 cases per 100,000 population) SARS-CoV-2 prevalence.

The primary outcome of this study was postoperative pulmonary complications, defined as pneumonia, acute respiratory distress syndrome or unexpected mechanical ventilation within 30 days after surgery. The main secondary outcome was 30-day mortality. Other secondary outcomes

© 2021 Association of Anaesthetists

were postoperative SARS-CoV-2 infection and SARS-CoV-2 postoperative pulmonary complications within 30 days for surgery. Postoperative SARS-CoV-2 diagnosis was based on any one of the following criteria: positive RT-PCR nasopharyngeal swab; positive rapid antigen test; chest computed tomography (CT) scan showing changes consistent with pneumonitis secondary to SARS-CoV-2 infection; positive immunoglobulin-G or immunoglobulin-M antibody test showing active infection; or clinical diagnosis (in the absence of negative RT-PCR swab results). A SARS-CoV-2 postoperative pulmonary complication was defined as a pulmonary complication within 30 days of surgery in a patient with a postoperative SARS-CoV-2 infection (see online Supporting Information Appendix S2).

Descriptive results are reported with absolute and proportional frequencies. Chi-square tests were used to assess unadjusted differences between groups. Multivariable logistic regression models were performed to test for an independent effect of pre-operative isolation on postoperative pulmonary complications and mortality, adjusting for patient, surgical and local setting factors. The results of the adjusted models were summarised using univariable and multivariable OR (95%CI). The statistical significance threshold used was $p < 0.05$. Missing data were reported in all tables and figures. Statistical analyseswere performed using R studio V 3.6.1 (RStudio, Boston, USA) and the packages dplyr, tidyverse, gmodels, finalfit, ggplot2 and forestplot.

The adjusted model for the primary outcome was repeated in key sub-groups to determine the effect of pre-operative isolation in patients: with high vs low ASA physical status; in settings where pre-operative testing was or was not available; where COVID-19-free surgical pathways were or were not established; and where the community SARS-CoV-2 prevalence was high or low. A sensitivity analysis was performed to explore the impact of duration of isolation on postoperative pulmonary complications, comparing patients who were isolated for: up to 3 days; 4 to 7 days; and ≥ 8 days before surgery. An interaction term was used in adjusted models to account for the fact that isolation was likely to be less common in low- and middle-income countries where there is a proven higher rate of postoperative complications and mortality [12].

Results

A total of 96,454 patients were included from 1634 hospitals in 114 countries. There were 62,839 (65.1%) patients who underwent surgery in areas with high SARS-CoV-2 prevalence and 33,615 (34.9%) patients in areas of low prevalence. The study included 65,228 (67.6%) patients from high-income countries and 31,226 (32.4%) patients from low- and middle-income countries. There were 74,347 (77.1%) patients who underwent surgery for a benign condition and 57,079 (59.2%) who underwent major surgery (see online Supporting Information Table S2). Overall, 26,948 (27.9%) patients isolated before surgery, 80,200 (83.1%) underwent surgery in a COVID-19-free pathway and 67,612 (70.1%) had a pre-operative SARS-CoV-2 test.

Patients who isolated before surgery were older, had more respiratory comorbidities and higher ASA physical status. Pre-operative isolation was more common in areas of high SARS-CoV-2 prevalence and in high-income countries (Table 1). Patients who isolated pre-operatively were also more frequently tested for SARS-CoV-2 before surgery and underwent surgery in a COVID-19-free surgical pathway more often (see online Supporting Information Figure S1).

The overall rate of postoperative pulmonary complications was reported in 1947 (2.0%) and postoperative mortality was reported in 648 (0.7%). Of all the postoperative pulmonary complications, 227 (11.7%) occurred in patients with a concomitant postoperative SARS-CoV-2 infection. Compared with patients who had isolated before surgery, those who did not isolate had similar postoperative pulmonary complication rates (2.1% vs 2.0%), lower mortality (0.4% vs 0.8%) and similar SARS-CoV-2 infection rates (0.8% vs 0.8%) (Fig. 1). After adjustment for measured confounders, isolation was associated with higher postoperative pulmonary complication rates (adjusted OR 1.20, 95%CI 1.05–1.36, $p = 0.005$) (Fig. 2) but with no significant difference in postoperative mortality (adjusted OR 0.80, 95%CI 0.62–1.02, $p = 0.081$) (see online Supporting Information Table S3).

Multiple factors were independently associated with increased postoperative pulmonary complication rates, including: age > 70 y; male sex; high ASA physical status; previous respiratory comorbidities; cancer surgery; and major surgical procedures (Fig. 2). Pre-operative testing was associated with reduced postoperative pulmonary complication rates (OR 0.81,95%CI 0.73–0.89, $p < 0.001$) (online Supporting Information Table S4).

Isolation was not associated with reduced post-operative pulmonary complications across any of the pre-defined sub-groups (Fig. 3). Pre-operative isolation was associated with higher postoperative pulmonary complication rates in: patients with ASA physical status 1–2; those undergoing surgery in a high SARS-CoV-2 prevalence area; a COVID-19-free pathway; or those who did not undergo pre-operative testing (see online Supporting Information Tables S5-S12).

© 2021 Association of Anaesthetists

Table 1 Baseline characteristics of patients who isolated and those who did not isolate before surgery. Values are number (proportion). Proportions are expressed as per column total.

	No isolation n = 69,436	Isolation n = 26,948	p value
Age			
< 70 y	56,593 (81.5%)	20,129 (74.7%)	< 0.001
≥ 70 y	12842 (18.5%)	6819 (25.3%)	
Missing	1	0	
Sex			
Female	36,609 (52.7%)	14,370 (53.3%)	0.096
Male	32,824 (47.3%)	12,578 (46.7%)	
Missing	3	0	
ASA physical status			
1–2	53,452 (77.0%)	20,275 (75.3%)	< 0.001
3–5	15,973 (23.0%)	6654 (24.7%)	
Missing	11	19	
Revised cardiac risk index			
0	32,045 (46.2%)	12,401 (46.0%)	< 0.001
1–2	35,484 (51.1%)	13,950 (51.8%)	
≥ 3	1881 (2.7%)	583 (2.2%)	
Missing	26	14	
Respiratory comorbidities			
No	63,651 (91.7%)	23,676 (87.9%)	< 0.001
Yes	5740 (8.3%)	3250 (12.1%)	
Missing	45	22	
Surgical indication			
Benign	54,148 (78.0%)	20,143 (74.8%)	< 0.001
Cancer	15,287 (22.0%)	6803 (25.2%)	
Missing	1	2	
Surgery grade			
Minor/intermediate	27,716 (39.9%)	11,611 (43.1%)	< 0.001
Major	41,703 (60.1%)	15,336 (56.9%)	
Missing	17	1	
Surgery area			
Abdominopelvic	34,202 (50.2%)	12,717 (48.2%)	< 0.001
Thoracic	3188 (4.7%)	1317 (5.0%)	
Head and neck	7276 (10.7%)	2727 (10.3%)	
Limb	9498 (13.9%)	4533 (17.2%)	
Other	13,930 (20.5%)	5111 (19.4%)	
Missing	18	1	
Anaesthesia			
Local	6525 (9.4%)	2789 (10.4%)	< 0.001
Regional	11,172 (16.1%)	3492 (13.0%)	
General	51,712 (74.5%)	20,655 (76.7%)	
Missing	27	12	
SARS-CoV-2 community prevalence			
Low	30,282 (43.6%)	3326 (12.3%)	< 0.001
High	39,154 (56.4%)	23,622 (87.7%)	

(continued)

© 2021 Association of Anaesthetists

Table 1 (*continued*)

	No isolation n = 69,436	Isolation n = 26,948	p value
Country income			
High	42,025 (60.5%)	23,166 (86.0%)	< 0.001
Upper middle	13,192 (19.0%)	2979 (11.1%)	
Low/low-middle	14,219 (20.5%)	803 (3.0%)	

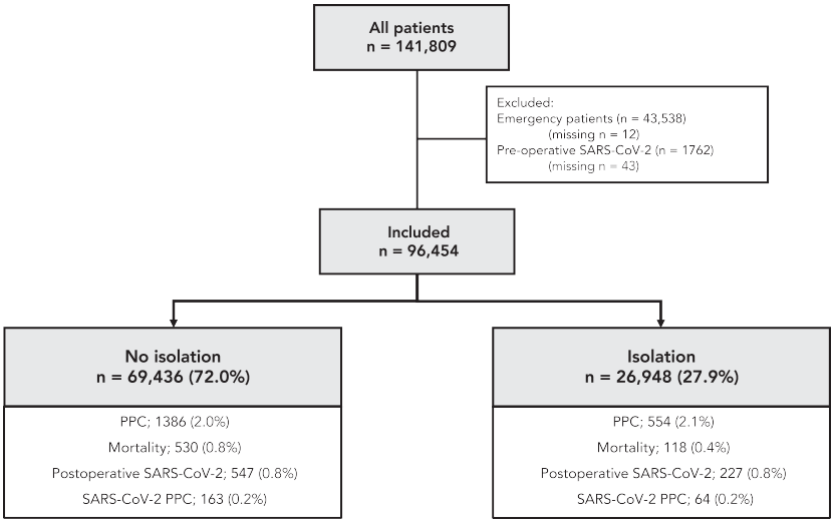


Figure 1 Flowchart of patient inclusion, with postoperative outcomes by isolation group. SARS-CoV-2 associated postoperative pulmonary complications were defined as the presence of postoperative pulmonary complications (PPC) in patients with a postoperative diagnosis of SARS-CoV-2 infection. Missing data for the presented variables: pre-operative isolation n = 70; postoperative pulmonary complications n = 64; postoperative mortality n = 55.

Of patients who isolated before surgery, 6971 (26.0%) isolated for up to 3 days, 10,691 (39.9%) for 4 to 7 days, and 9164 (34.2%) for ≥ 8 days (see online Supporting Information Table S13). Patients isolating for longer durations were progressively older and had a greater comorbid burden, including respiratory comorbidities.

A duration of isolation of up to 3 days before surgery did not show a difference in postoperative pulmonary complication rates compared with no isolation (OR 0.90, 95%CI 0.70–1.13, p = 0.377). Patients isolating for longer durations had higher rates of postoperative pulmonary complications when isolating for 4 to 7 days (OR 1.25,95% CI 1.04–1.48, p = 0.015) and for ≥ 8 days (OR 1.31, 95%CI 1.11–1.55, p = 0.001) (Table 2).

Discussion

Pre-operative isolation was associated with a small but clinically important increase in postoperative pulmonary complications. A sensitivity analysis looking at the duration of pre-operative isolation found that patients who isolated for longer periods had higher rates of postoperative pulmonary complications. Although there was a difference in mortality rates, the numbers were small and the difference was not statistically significant following adjustment. There were no clinically relevant differences in SARS-CoV-2 positivity or SARS-CoV-2-related postoperative pulmonary complication rates. We also showed no benefit with pre-operative isolation: in areas of different SARS-CoV-2 community prevalence; when pre-operative testing was

© 2021 Association of Anaesthetists

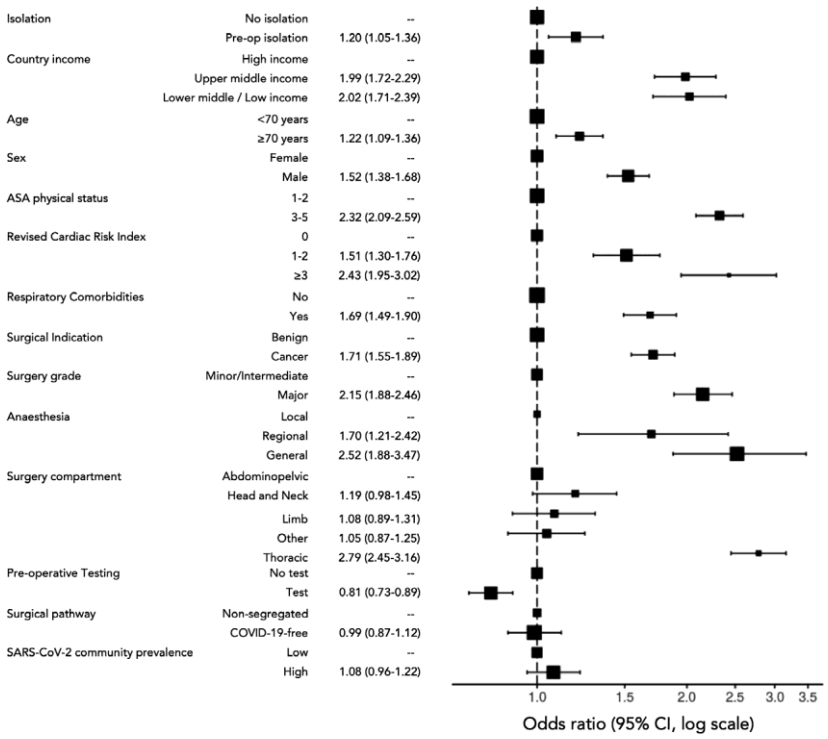


Figure 2 Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, adjusting for patient, surgery and surgical setting factors. Number in dataframe = 96,454; number in model = 96,067; missing = 387; AIC = 16,680.6; C-statistic = 0.784. Full model presented in online Supporting Information Table S4, including an interaction term of isolation and country income. Community prevalence of SARS-CoV-2 was defined as the median 14-day cumulative country case notification rate per 100,000 population during October 2020. Country income groups defined as per the World Bank classification.

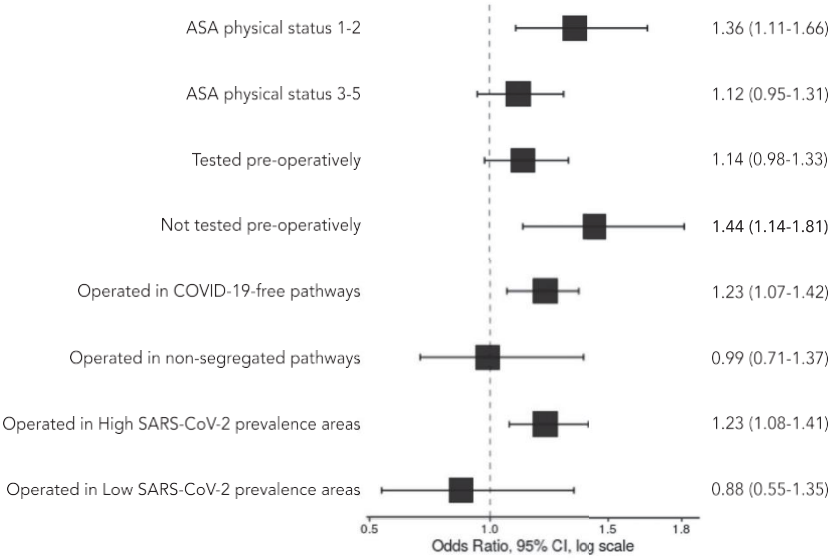


Figure 3 Forest plot of the adjusted odds ratio (95%CI) for the effect of isolation in postoperative pulmonary complications across patient sub-groups for ASA physical status, pre-operative testing, COVID-19-free pathways and community prevalence. Odds ratios are adjusted for the same variables used in the main model, including an interaction term of isolation and country income.

© 2021 Association of Anaesthetists

Table 2 Multivariable logistic regression model exploring the association between pre-operative isolation length and postoperative pulmonary complications, adjusting for patient, surgery and surgical setting factors. Community incidence of SARS-CoV-2 was defined as the median 14-day cumulative country case notification rate per 100,000 population during October 2020. Values are number (proportion).

	No postoperative pulmonary complications	Postoperative pulmonary complication(s)	Univariable OR 95%CI	p value	Multivariable OR 95%CI	p value
Duration of isolation						
No isolation	67,993 (98.0%)	1386 (2.0%)	Reference	–	Reference	–
≤ 3 days	6877 (98.7%)	91 (1.3%)	0.69 (0.54–0.87)	0.002	0.90 (0.70–1.13)	0.377
4–7 days	10,483 (98.1%)	206 (1.9%)	0.99 (0.83–1.17)	0.887	1.25 (1.04–1.48)	0.015
≥ 8 days	8910 (97.2%)	252 (2.8%)	1.51 (1.29–1.77)	< 0.001	1.31 (1.11–1.55)	0.001
Age						
< 70 y	75,397 (98.3%)	1328 (1.7%)	Reference	–	Reference	–
≥ 70 y	19,045 (96.9%)	619 (3.1%)	1.85 (1.67–2.03)	< 0.001	1.22 (1.09–1.36)	< 0.001
Sex						
Female	50,218 (98.5%)	783 (1.5%)	Reference	–	Reference	–
Male	44,222 (97.4%)	1164 (2.6%)	1.69 (1.54–1.85)	<0.001	1.53 (1.39–1.68)	< 0.001
ASA physical status						
1–2	72,837 (98.8%)	884 (1.2%)	Reference	–	Reference	–
3–5	21,566 (95.3%)	1063 (4.7%)	4.06 (3.71–4.45)	< 0.001	2.33 (2.09–2.60)	< 0.001
Revised cardiac risk index						
0	44,029 (99.0%)	425 (1.0%)	Reference	–	Reference	–
1–2	48,109 (97.3%)	1314 (2.7%)	2.83 (2.54–3.16)	< 0.001	1.52 (1.30–1.77)	< 0.001
≥ 3	2258 (91.7%)	205 (8.3%)	9.41 (7.91–11.15)	< 0.001	2.44 (1.95–3.03)	< 0.001
Respiratory comorbidities						
No	85,760 (98.2%)	1560 (1.8%)	Reference	–	Reference	–
Yes	8609 (95.7%)	384 (4.3%)	2.45 (2.19–2.74)	< 0.001	1.67 (1.48–1.89)	< 0.001
Surgical indication						
Benign	73,141 (98.5%)	1151 (1.5%)	Reference	–	Reference	–
Cancer	21,299 (96.4%)	796 (3.6%)	2.37 (2.17–2.60)	< 0.001	1.70 (1.54–1.88)	< 0.001
Surgery grade						
Minor/intermediate	39,019 (99.2%)	306 (0.8%)	Reference	–	Reference	–
Major	55,409 (97.1%)	1638 (2.9%)	3.77 (3.34–4.27)	< 0.001	2.15 (1.88–2.46)	< 0.001
Anaesthesia						
Local	9261 (99.5%)	48 (0.5%)	Reference	–	Reference	–
Regional	14,524 (99.0%)	154 (1.0%)	2.05 (1.49–2.86)	< 0.001	1.68 (1.20–2.40)	0.003
General	70,620 (97.6%)	1745 (2.4%)	4.77 (3.62–6.44)	< 0.001	2.49 (1.86–3.43)	< 0.001
Surgical area						
Abdominopelvic	47,310 (98.1%)	921 (1.9%)	Reference	–	Reference	–
Thoracic	10,196 (98.4%)	168 (1.6%)	0.85 (0.71–1.00)	0.049	1.20 (0.98–1.45)	0.069
Head and neck	13,883 (98.8%)	167 (1.2%)	0.62 (0.52–0.73)	< 0.001	1.08 (0.89–1.30)	0.448
Limb	18,909 (98.8%)	226 (1.2%)	0.61 (0.53–0.71)	< 0.001	1.04 (0.87–1.24)	0.671
Other	4129 (89.9%)	462 (10.1%)	5.75 (5.11–6.45)	< 0.001	2.73 (2.40–3.10)	< 0.001
Pre-operative SARS–CoV–2 testing						
No test	39,375 (97.8%)	871 (2.2%)	Reference	–	Reference	–
Test	54,957 (98.1%)	1066 (1.9%)	0.88 (0.80–0.96)	0.004	0.82 (0.74–0.91)	< 0.001

(continued)

© 2021 Association of Anaesthetists

Table 2 (*continued*)

	No postoperative pulmonary complications	Postoperative pulmonary complication(s)	Univariable OR 95%CI	p value	Multivariable OR 95%CI	p value
Surgical pathway						
Non-segregated	15,830 (97.8%)	354 (2.2%)	Reference	–	Reference	–
COVID-19-free	78,559 (98.0%)	1587 (2.0%)	0.90 (0.81–1.02)	0.087	0.99 (0.87–1.12)	0.828
SARS-CoV-2 community prevalence						
Low	32,876 (97.9%)	698 (2.1%)	Reference	–	Reference	–
High	61,567 (98.0%)	1249 (2.0%)	0.96 (0.87–1.05)	0.341	1.08 (0.95–1.22)	0.235
Country income*						
High	64,024 (98.2%)	1190 (1.8%)	Reference	–	Reference	–
Upper middle	15,740 (97.3%)	438 (2.7%)	1.47 (1.29–1.67)	< 0.001	1.99 (1.72–2.29)	< 0.001
Lower middle/low	14,679 (97.9%)	319 (2.1%)	1.19 (1.04–1.37)	0.010	2.03 (1.71–2.40)	< 0.001
Interaction term						
Isolated ≤ 3 days, LMIC	–	–	1.71 (0.59–3.91)	0.256	1.54 (0.53–3.57)	0.366
Isolated ≤ 3 days, UMIC	–	–	0.93 (0.41–1.84)	0.847	0.77 (0.34–1.56)	0.505
Isolated 4–7 days, LMIC	–	–	0.62 (0.28–1.20)	0.197	0.52 (0.23–1.03)	0.087
Isolated 4–7 days, UMIC	–	–	0.89 (0.63–1.26)	0.531	0.80 (0.55–1.13)	0.212
Isolated ≥ 8 days, LMIC	–	–	1.23 (0.43–2.76)	0.660	0.82 (0.28–1.89)	0.682
Isolated ≥ 8 days, UMIC	–	–	1.28 (0.86–1.86)	0.213	0.82 (0.55–1.21)	0.340

*Country income groups defined as per the World Bank classification. LMIC, low-to-middle income country; UMIC, upper-to-middle income country.

implemented; or when COVID-19-free surgical pathways were in place.

Although this study did not directly identify causes for an association between isolation and increased postoperative pulmonary complication rates, it provides an opportunity to generate hypotheses. Isolation is associated with decreased physical activity, worse nutritional habits and higher levels of anxiety and depression [13–16]. These effects in already vulnerable patients may have contributed to an increased risk of pulmonary complications. Further, there is increasing evidence demonstrating that prehabilitation before surgery improves patient recovery and outcomes [17–19]. It is possible that isolation may have, therefore, conversely led to patient deconditioning and functional decline [20], adversely influencing patient outcomes. Although patients who isolated were slightly more comorbid than those who did not, these findings remained present after adjustment. Our evidence suggests that removing pre-operative isolation strategies is unlikely to lead to worse postoperative outcomes for patients, but institutions should monitor their postoperative pulmonary complication rates as strategies evolve.

Whereas unadjusted mortality rates appeared lower for patients who isolated, this did not remain significant after adjustment. Combined with small numbers, a clear benefit of isolation on 30-day mortality cannot be drawn from our data. There is a known interaction between mortality, failure to rescue patients from surgical complications and lower-income surgical settings [12, 21]. Although such an interaction is likely to have contributed to this finding, it was beyond the scope of this predefined analysis to explore further, especially in the context of small event numbers and the likelihood of further unmeasured confounders.

However, benefits of pre-operative isolation are not only for the individual patient but also to other patients and staff in hospitals who are at risk from asymptomatic carriers of SARS-CoV-2. Although this study included all patients operated upon during the same week in each specialty and hospital, it was not designed to capture cross infection in surgical wards, as only individual level outcomes were collected. Social isolation can have a system-wide benefit in preventing the admission of patients incubating SARS-CoV-2 that was not captured by our study. Further, a systems risk of undiagnosed SARS-CoV-2 infection in institutions that operate COVID-19-free surgical pathways is the risk of individual patients affecting these pathways and other patients within them. For example, a COVID-19-free ward could become a COVID-19-positive ward if one patient tests positive, thereby undermining the entire pathway. Finally, symptomatic screening and pre-operative testing are likely

© 2021 Association of Anaesthetists

to remain key components of elective surgery admissions processes to prevent nosocomial infection by SARS-CoV-2 [22].

Our study has limitations. Firstly, postoperative SARS-CoV-2 rates were similar in both groups, suggesting that pre-operative isolation is not effective in reducing nosocomial SARS-CoV-2 infection. However, we did not include patients who isolated and then tested positive who may have had their surgery delayed or cancelled. This might have underestimated the SARS-CoV-2 incidence and postoperative pulmonary complication rates in patientswho did not isolate. Secondly, although a definition of pre-operative isolation was stated in the study protocol, slightly different strategies could have been reported as pre-operative isolation. Patient compliance with isolation recommendations was not measured, which could have contributed to the underestimation of the benefits of isolation. However, the large numbers and heterogeneous sites contribute to a pragmatic study design and generalisability of our conclusions. Thirdly, although adjustment was performed for all the available variables, there might be residual confounding that affected results. We addressed this through multiple sensitivity analyses, in which the findings were consistent. Finally, community SARS-CoV-2 prevalence was collected from the most reliable sources available, but we acknowledge that they might be inaccurate in some settings, influencing the adjusted analysis [23, 24]. These were assessed at a national level, possibly lacking the granularity of regional variation within countries.

Healthcare providers may wish to take these findings into consideration when reviewing local and national guidance. Relaxation of pre-operative isolation policies appears to be safe for individual patients, especially in the presence of pre-operative testing, which this and previous studies showed to be beneficial [2]. Selected isolation practices may remain in place in certain conditions (such as high-risk patients and periods of high community prevalence). Further research is needed to explore the most effective method of maintaining patient fitness and conditioning for patients that are isolating, which may include home or remote prehabilitation [25, 26]. Postoperative pulmonary complications related to SARS-CoV-2 accounted for only a small proportion of observed postoperative pulmonary complications. Going forward, research to target other causes of postoperative pneumonias is needed, since endemic pathogens may be the more common organisms.

This study demonstrates that patient isolation before elective surgery might be associated with a small increased risk in postoperative pulmonary complications. Longer periods of isolation did not reduce the risk of postoperative pulmonary complications. These findings have implications for the global provision of elective surgery.

Acknowledgements

This trial was registered at clinicaltrials.gov (NCT04509986). Funding was provided by the: National Institute for Health Research (NIHR) Global Health Research Unit; Association of Coloproctology of Great Britain and Ireland; Bowel and Cancer Research; Bowel Disease Research Foundation; Association of Upper Gastrointestinal Surgeons; British Association of Surgical Oncology; British Gynaecological Cancer Society; European Society of Coloproctology; Medtronic, NIHR Academy; Sarcoma UK; Urology Foundation; Vascular Society for Great Britain and Ireland; and Yorkshire Cancer Research. The views expressed are those of the authors and not necessarily those of the funding partners. No other competing interests declared.

References

1. COVIDSurg Collaborative. Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study. *Lancet* 2020; 396: 27–38.
2. COVIDSurg Collaborative. Preoperative nasopharyngeal swab testing and postoperative pulmonary complications in patients undergoing elective surgery during the SARS-CoV-2 pandemic. *Bristish Journal of Surgery* 2021; 108: 88–96.
3. COVIDSurg Collaborative. Elective cancer surgery in covid-19-free surgical pathways during the SARS-CoV-2 pandemic: an international, multicenter, comparative cohort study. *Journal of Clinical Oncology* 2021; 39: 66–78.
4. Sah P, Vilches TN, Moghadas SM, et al. Accelerated vaccine rollout is imperative to mitigate highly transmissible COVID-19 variants. *EClinicalMedicine* 2021; 35: 100865.
5. Burki TK. Challenges in the rollout of COVID-19 vaccines worldwide. *Lancet Respiratory Medicine* 2021; 9: e42–3.
6. National Institute for Health and Care Excellence. COVID-19 rapid guideline: arranging planned care in hospitals and diagnostic services. 27/07/2020. www.nice.org.uk/guidance/ng179 (accessed 29/06/2021).
7. Associacion Espanola de Cirurgia Mayor Ambulatoria. Recomendaciones para la reapertura de las unidades de CMA durante el periodo de transicion de la pandemia por el COVID-19 (SARS-CoV-2). 02/09/2020. https://www.asecma.org/documentos/Recomendaciones-apertura-CMA-tras-Covid.pdf (accessed 29/06/2021).
8. Amaral C, Orfao R, Lanca F, Azenha M. Recomendacoes para retoma da atividade cirurgica electiva apos condicionamento pela pandemia COVID-19. http://www.spanestesiologia.pt/webstspa/wp-content/uploads/2020/05/recomendacoes-de-anestesiologia-obstetrica_final_04052020.pdf (accessed 29/06/2021).
9. COVIDSurg Collaborative, GlobalSurg Collaborative. Timing of surgery following SARS-CoV-2 infection: an international prospective cohort study. *Anaesthesia* 2021; 76: 748–58.
10. Elm EV, Altman DG, Egger M, et al. Strengthening the reporting of observational studies in epidemiology (STROBE) statement:

© 2021 Association of Anaesthetists

guidelines for reporting observational studies. *British Medical Journal* 2007; 335: 806.
11. Our World in Data. Coronavirus Pandemic (COVID-19). https://ourworldindata.org/coronavirus (accessed 01/06/2021).
12. GlobalSurg Collaborative and National Institute for Health Research Global Health Research Unit on Global Surgery. Global variation in postoperative mortality and complications after cancer surgery: a multicentre, prospective cohort study in 82 countries. *Lancet* 2021; 397: 387–97.
13. Schuch FB, Bulzing RA, Meyer J, et al. Associations of moderate to vigorous physical activity and sedentary behavior with depressive and anxiety symptoms in self-isolating people during the COVID-19 pandemic: A cross-sectional survey in Brazil. *Psychiatry Research* 2020; 292: 113339.
14. Meyer J, McDowell C, Lansing J, et al. Changes in physical activity and sedentary behavior in response to COVID-19 and their associations with mental health in 3052 US adults. *International Journal of Environmental Research and Public Health* 2020; 17: 6469.
15. Pierce M, McManus S, Hope H, et al. Mental health responses to the COVID-19 pandemic: a latent class trajectory analysis using longitudinal UK data. *Lancet Psychiatry* 2021; 8: 610–9.
16. Ammar A, Trabelsi K, Brach M, et al. Effects of home confinement on mental health and lifestyle behaviours during the COVID-19 outbreak: insights from the ECLB-COVID19 multicentre study. *Biology of Sport* 2020; 38: 9–21.
17. Treanor C, Kyaw T, Donnelly M. An international review and meta-analysis of prehabilitation compared to usual care for cancer patients. *Journal of Cancer Survivorship* 2018; 12: 64–73.
18. Faithfull S, Turner L, Poole K, et al. Prehabilitation for adults diagnosed with cancer: a systematic review of long-term physical function, nutrition and patient-reported outcomes. *European Journal of Cancer Care* 2019; 28: e13023.
19. Kamarajah SK, Brunded J, Weblin J, Tan BHL. Critical appraisal on the impact of preoperative rehabilitation and outcomes after major abdominal and cardiothoracic surgery: a systematic review and meta-analysis. *Surgery* 2020; 167: 540–9.
20. Silver JK, Sell N, Parangi S, Qadan M. Prehabilitation may influence surgical morbidity and mortality during and after the covid-19 pandemic. May 2020. https://blogs.bmj.com/bmj/2020/05/21/prehabilitation-may-influence-surgical-morbidity-and-mortality-during-and-after-the-covid-19-pandemic (accessed 10/07/2021).
21. GlobalSurg-Collaborative. Mortality of emergency abdominal surgery in high-, middle- and low-income countries. *British Journal of Surgery* 2016; 103: 971–88.
22. El-Boghdadly K, Cook TM, Goodacre T, et al. SARS-CoV-2 infection, COVID-19 and timing of elective surgery: a multidisciplinary consensus statement on behalf of the Association of Anaesthetists, the Centre for Peri-operative Care, the Federation of Surgical Specialty Associations, the Royal College of Anaesthetists and the Royal College of Surgeons of England. *Anaesthesia* 2021; 76: 940–6.
23. Mohanan M, Malani A, Krishnan K, et al. Prevalence of SARS-CoV-2 in Karnataka, India. *Journal of the American Medical Association* 2021; 325: 1001–3.
24. Mwananyanda L, Gill CJ, MacLeod W, et al. Covid-19 deaths in Africa: prospective systematic postmortem surveillance study. *British Medical Journal* 2021; 372: 334.
25. Verduzco-Gutierrez M, Bean AC, Tenforde AS, et al. How to conduct an outpatient telemedicine rehabilitation or prehabilitation visit. *Physical Medicine and Rehabilitation* 2020; 12: 714–20.
26. Sell NM, Silver JK, Rando S, et al. Prehabilitation telemedicine in neoadjuvant surgical oncology patients during the novel COVID-19 coronavirus pandemic. *Annals of Surgery* 2020; 272: e81–e83.

Supporting Information

Additional supporting information may be found online via the journal website.

Figure S1. Rates of pre-operative testing, COVID-free surgical pathways and community incidence by isolation group.

Table S1. List of excluded procedures.

Table S2. Detailed list of included procedures.

Table S3. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative mortality, adjusting for patient, surgery and surgical setting factors.

Table S4. Full multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, in all patients included in the study.

Table S5. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients with mild comorbidities (ASA physical status 1–2).

Table S6. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients with major comorbidities (ASA physical status 3–5).

Table S7. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients who were tested pre-operatively.

Table S8. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients who were not tested pre-operatively.

Table S9. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a COVID-19-free pathway.

Table S10. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a non-segregated pathway.

Table S11. Multivariable logistic regression model exploring the association between pre-operative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a community with high SARS-CoV-2 prevalence.

Table S12. Multivariable logistic regression model exploring the association between pre-operative isolation

© 2021 Association of Anaesthetists

and postoperative pulmonary complications, only for patients who underwent surgery in a community with low SARS-CoV-2 prevalence.

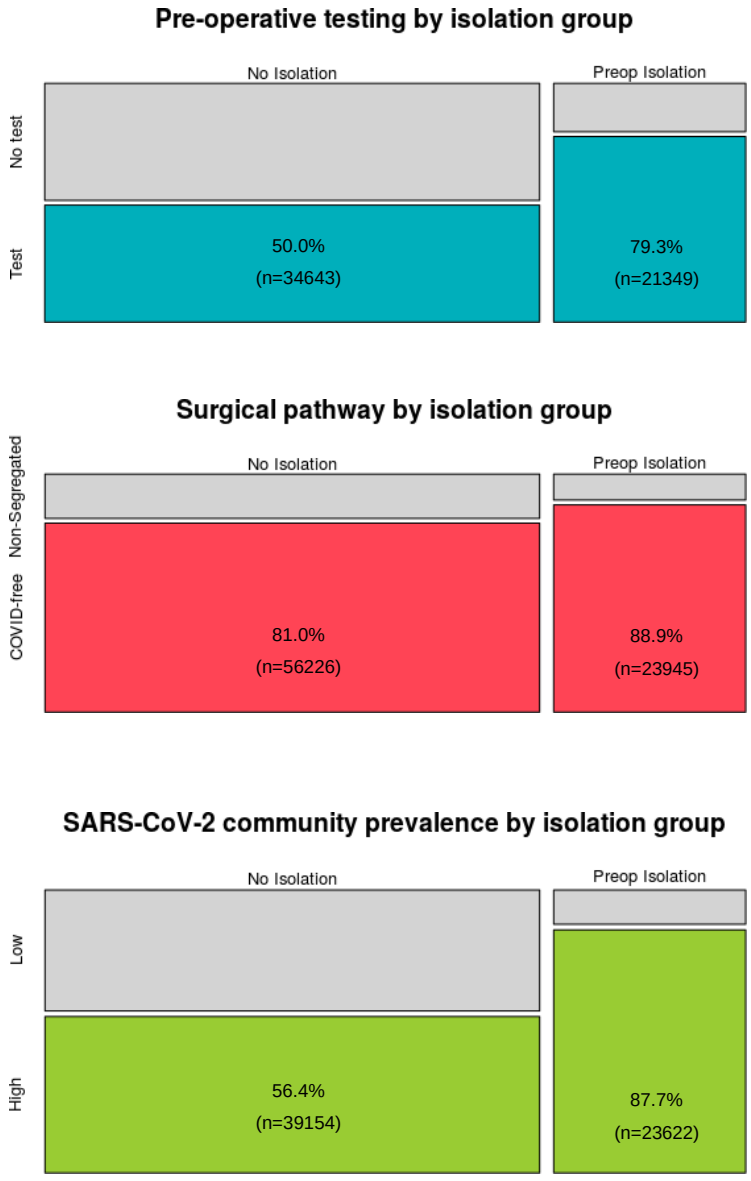
Table S13. Baseline characteristics of patients by status and length of pre-operative isolation.

Appendix S1. COVIDSurg Collaborative and GlobalSurg Collaborative authors (all PubMed indexed co- authors).

Appendix S2. Study definitions.

© 2021 Association of Anaesthetists

Figure S1: Rates of preoperative testing, COVID-free surgical pathways and community prevalence by isolation group.



Plot displays proportion of patients being tested preoperatively, undergoing surgery in a COIVD-free surgical pathway and in a high SARS-CoV-2 prevalence areas, by isolation group.
Missing data for the presented variables: preoperative isolation n=70, preoperative testing n=121, surgical pathway (COVID-free versus non-segregated) n=60. Community prevalence of SARS-CoV-2 was defined as the median 14-day cumulative country case notification rate per 100,000 population during October 2020.

Table S1: List of excluded procedures

Specialty	Excluded procedures
Abdominal surgery	Ascitic drain (drainage of peritoneal cavity)
	Endoscopic ultrasound
	Laparoscopic ultrasound
Breast surgery	Breast biopsy
Cardiac surgery	Insertion of cardiac pacemaker
	Percutaneous coronary intervention
	Transluminal balloon angioplasty of coronary artery
Colorectal surgery	Colonoscopy (diagnostic or therapeutic)
	Flexible sigmoidoscopy (diagnostic or therapeutic)
	Proctoscopy (diagnostic or therapeutic)
Dental procedures	Implantation of tooth
	Insertion of dental prosthesis
	Orthodontic operations
	Restoration of tooth
	Extraction of tooth
Gynaecology	Cervical biopsy
	Colposcopy (diagnostic or therapeutic)
Obstetrics	Any vaginal delivery (normal delivery, breech delivery, forceps delivery, vacuum delivery)
	Surgical termination of pregnancy
Ophthalmology	Removal of foreign body from cornea
Orthopaedics	Bone biopsy
	Injection in to joint
	Muscle biopsy
Otolaryngology	Laryngoscopy (diagnostic or therapeutic)
	Nasendoscopy (diagnostic)
	Packing of cavity of nose
Thoracic surgery	Bronchoscopy (diagnostic)
	Insertion of chest drain
Upper gastrointestinal surgery	Endoscopic retrograde cholangiopancreatography (diagnostic or therpaeutic)
	Liver biopsy
	Oesophago-gastro-duodenoscopy (diagnostic or therapeutic)
Urology	Bladder biopsy
	Extracorporeal shock-wave lithotripsy
	Flexible cystoscopy (diagnostic)
	Percutaneous nephrostomy
Vascular surgery	Endovenous laser treatment for varicose veins
	Insertion or removal of dialysis catheter
	injection into varicose vein of leg
	Transluminal (endovascular) procedures on arteries (diagnostic or therapeutic), including with open cut down to the artery

	Transluminal (endovascular) procedures on veins (diagnostic or therapeutic)
	Insertion or removal of Hickmann line
Other	Insertion of central venous catheter/ line
	Insertion of chest drain
	Lumbar (spinal) puncture
	Percutaneous tracheostomy
	Skin biopsy (including shave biopsy of skin)
	Therapeutic epidural injection
	Vacuum dressing

Table S2: Detailed list of included procedures

ANATOMICAL AREA - surgical procedure	Number of patients (%)
BRAIN & SKULL - any other procedures not listed	191 (0.2)
BRAIN & SKULL - brain - any operation on the meninges	107 (0.1)
BRAIN & SKULL - brain - any operation on ventricles of brain	73 (0.1)
BRAIN & SKULL - brain - biopsy of lesion of tissue of brain	125 (0.1)
BRAIN & SKULL - brain - clipping of intracranial aneurysm	29 (0.0)
BRAIN & SKULL - brain - deep brain stimulation	93 (0.1)
BRAIN & SKULL - brain - drainage of lesion of tissue of brain	44 (0.0)
BRAIN & SKULL - brain - excision of tissue of brain	473 (0.5)
BRAIN & SKULL - brain - intracranial pressure	21 (0.0)
BRAIN & SKULL - insertion of ventriculoperitoneal shunt	178 (0.2)
BRAIN & SKULL - skull - craniectomy	37 (0.0)
BRAIN & SKULL - skull - craniotomy	311 (0.3)
BRAIN & SKULL - skull - drainage of extradural space	7 (0.0)
BRAIN & SKULL - skull - drainage of subdural space (subdural haemorrhage; SDH)	31 (0.0)
BRAIN & SKULL - skull - repair of cranium	99 (0.1)
BRAIN & SKULL - skull - repair of dura	15 (0.0)
BREAST - .any other procedures not listed	189 (0.2)
BREAST - augmentation or reduction	241 (0.3)
BREAST - axilla - axillary clearance (lymphadenectomy)	163 (0.2)
BREAST - axilla - sential node biopsy	123 (0.1)
BREAST - immediate reconstruction - implant/ LD/ DIEP	265 (0.3)
BREAST - incision and drainage of breast abscess	40 (0.0)
BREAST - lumpectomy/ wide local excision +/- wire	2005 (2.1)
BREAST - mastectomy	1917 (2.0)
BREAST - oncoplasty/ mammoplasty	341 (0.4)
COLON & RECTUM - .any other procedures not listed	237 (0.2)
COLON & RECTUM - abdominoperineal resection (APR; APE)	283 (0.3)
COLON & RECTUM - anterior resection (LAR)	821 (0.9)
COLON & RECTUM - any operation for prolapse of rectum	145 (0.2)
COLON & RECTUM - completion proctectomy	70 (0.1)
COLON & RECTUM - formation of colostomy (stoma)	283 (0.3)
COLON & RECTUM - left hemicolectomy (excision of left hemicolon)	396 (0.4)
COLON & RECTUM - panproctocolectomy (total excision of colon and rectum)	57 (0.1)
COLON & RECTUM - parastomal hernia repair	28 (0.0)
COLON & RECTUM - proctology - any other proctology (pilonidal sinus; fistula-in-ano)	1941 (2.0)
COLON & RECTUM - proctology - excision of lesion of anus	308 (0.3)
COLON & RECTUM - proctology - haemorrhoidopexy (hemorrhoidopexy)	121 (0.1)
COLON & RECTUM - proctology- haemorrhoidectomy (haemorrhoidectomy; excision of haemorrhoid)	771 (0.8)
COLON & RECTUM - refashioning or resiting of colostomy (stoma)	64 (0.1)

COLON & RECTUM - reversal of colostomy (colostomy closure; stoma)	490 (0.5)
COLON & RECTUM - right hemicolectomy (excision of right hemicolon)	1052 (1.1)
COLON & RECTUM - sigmoid colectomy (Hartmanns procedure; excision of sigmoid colon)	466 (0.5)
COLON & RECTUM - subtotal colectomy	108 (0.1)
COLON & RECTUM - surgery for anorectal malformations (pull-through; posterior sagital anorectoplasty; Hirschsprung's disease)	52 (0.1)
COLON & RECTUM - total colectomy (total excision of colon)	90 (0.1)
COLON & RECTUM - transanal endoscopic microsurgery (TEMS)	115 (0.1)
COLON & RECTUM - transanal total mesorectal excision (taTME)	54 (0.1)
COLON & RECTUM - transverse colectomy (excision of transverse colon)	49 (0.1)
DENTAL - .any other dental procedure not separately listed (note non-surgical extraction of teeth excluded)	51 (0.1)
DENTAL - any procedure on gingiva (gum)	17 (0.0)
DENTAL - excision of dental lesion of jaw	68 (0.1)
DENTAL - orthodontic procedures (tooth; teeth)	45 (0.0)
DENTAL - restoration of tooth (teeth)	27 (0.0)
DENTAL - surgical tooth extraction	143 (0.1)
EMERGENCY SURGERY - abdominal packing	5 (0.0)
EMERGENCY SURGERY - any other procedures not listed	7 (0.0)
EMERGENCY SURGERY - drainage of haematoma	13 (0.0)
EMERGENCY SURGERY - neck wound exploration	3 (0.0)
EMERGENCY SURGERY - peri-anal/ pilonidal abscess drainage (incision and drainage; I&D)	188 (0.2)
EMERGENCY SURGERY - superficial abscess drainage - non-anorectal (incision and drainage; I&D)	129 (0.1)
EMERGENCY SURGERY - trauma laparotomy	13 (0.0)
EMERGENCY SURGERY - wound exploration & washout (debridement)	140 (0.1)
ENDOCRINE - adrenals - .any other procedures not listed	8 (0.0)
ENDOCRINE - adrenals - adrenalectomy (excision of adrenal gland)	159 (0.2)
ENDOCRINE - parathyroid - .any other procedures not listed	7 (0.0)
ENDOCRINE - parathyroid - parathyroidectomy (excision of parathyroid gland)	369 (0.4)
ENDOCRINE - pituitary - excision of pituitary gland	32 (0.0)
ENDOCRINE - thymus - excision of thymus gland	33 (0.0)
ENDOCRINE - thyroid - .any other procedures not listed	97 (0.1)
ENDOCRINE - thyroid - thyroidectomy (excision of thyroid gland)	2039 (2.1)
EYES - .any other procedure not separately listed	669 (0.7)
EYES - corneal surgery	17 (0.0)
EYES - correction of deformity of eyelid	177 (0.2)
EYES - excision of lesion of eyelid	123 (0.1)
EYES - extracapsular cataract extraction	24 (0.0)
EYES - glaucoma surgery	18 (0.0)
EYES - operations on iris	21 (0.0)
EYES - operations on retina	206 (0.2)
EYES - operations on vitreous body	351 (0.4)
EYES - phacoemulsification (cataract surgery)	2666 (2.8)
EYES - pterygium surgery	44 (0.0)

EYES - stabismus surgery	71 (0.1)
FEMALE REPRODUCTIVE ORGANS - abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH-BSO)	147 (0.2)
FEMALE REPRODUCTIVE ORGANS - ablation or excision of intra-abdominal endometriosis	193 (0.2)
FEMALE REPRODUCTIVE ORGANS - any other operation not listed	232 (0.2)
FEMALE REPRODUCTIVE ORGANS - dilatation and curettage	127 (0.1)
FEMALE REPRODUCTIVE ORGANS - evacuation of retained products of pregnancy	187 (0.2)
FEMALE REPRODUCTIVE ORGANS - fallopian tubes - female sterilisation	144 (0.1)
FEMALE REPRODUCTIVE ORGANS - fallopian tubes - salpingectomy (excision of fallopian tube; ectopic)	153 (0.2)
FEMALE REPRODUCTIVE ORGANS - hysteroscopy + insertion / removal of contraceptive implant	49 (0.1)
FEMALE REPRODUCTIVE ORGANS - hysteroscopy + intervention	193 (0.2)
FEMALE REPRODUCTIVE ORGANS - hysteroscopy + polypectomy / biopsy	203 (0.2)
FEMALE REPRODUCTIVE ORGANS - laparoscopic procedures for ovarian cysts other than oophorectomy	393 (0.4)
FEMALE REPRODUCTIVE ORGANS - oophorectomy - unilateral/ bilateral (excision of ovary/ ovaries)	170 (0.2)
FEMALE REPRODUCTIVE ORGANS - open procedures for ovarian cysts other than oophorectomy	11 (0.0)
FEMALE REPRODUCTIVE ORGANS - ovarian cystectomy	75 (0.1)
FEMALE REPRODUCTIVE ORGANS - ovarian detorsion	1 (0.0)
FEMALE REPRODUCTIVE ORGANS - ovaries - other	19 (0.0)
FEMALE REPRODUCTIVE ORGANS - perineum - any procedures on female perineum	88 (0.1)
FEMALE REPRODUCTIVE ORGANS - salpingo-oophorectomy - unilateral/ bilateral (excision of ovary/ ovaries and fallopian tubes)	349 (0.4)
FEMALE REPRODUCTIVE ORGANS - uterus - abdominal hysterectomy (excision of uterus)	1777 (1.8)
FEMALE REPRODUCTIVE ORGANS - uterus - any other procedures not listed	162 (0.2)
FEMALE REPRODUCTIVE ORGANS - uterus - excision of uterus (trachelectomy; cervicectomy)	302 (0.3)
FEMALE REPRODUCTIVE ORGANS - uterus - partial excision of uterus (including myomectomy)	419 (0.4)
FEMALE REPRODUCTIVE ORGANS - uterus - repair of uterus	180 (0.2)
FEMALE REPRODUCTIVE ORGANS - uterus - vaginal hysterectomy (excision of uterus)	391 (0.4)
FEMALE REPRODUCTIVE ORGANS - vagina - .any other procedures not listed	254 (0.3)
FEMALE REPRODUCTIVE ORGANS - vagina - excision of vagina	29 (0.0)
FEMALE REPRODUCTIVE ORGANS - vagina - repair of vaginal prolapse	233 (0.2)
FEMALE REPRODUCTIVE ORGANS - vulva - excision of vulva	136 (0.1)
GALLBLADDER & BILIARY TREE - .any other procedure not separately listed	103 (0.1)
GALLBLADDER & BILIARY TREE - bilio-intestinal diversion	85 (0.1)
GALLBLADDER & BILIARY TREE - cholecystectomy	6069 (6.3)
GENERAL SURGERY - appendicectomy (appendectomy; excision of appendix)	259 (0.3)
GENERAL SURGERY - diagnostic laparoscopy +/- washout or drainage	506 (0.5)
GENERAL SURGERY - diagnostic laparotomy +/- washout or drainage	235 (0.2)
GENERAL SURGERY - laparoscopic adhesiolysis	75 (0.1)
GENERAL SURGERY - laparotomy + adhesiolysis	90 (0.1)
HEAD & NECK - any other procedures not listed	285 (0.3)
HEAD & NECK - ear - attachment of hearing prosthesis	41 (0.0)
HEAD & NECK - ear - drainage of middle ear	101 (0.1)
HEAD & NECK - ear - exenteration of mastoid air cells	92 (0.1)
HEAD & NECK - ear - other procedures on mastoid	84 (0.1)

HEAD & NECK - ear - procedures on the external auditory canal	49 (0.1)
HEAD & NECK - ear - procedures on cochlear	99 (0.1)
HEAD & NECK - ear - procedures on inner ear	23 (0.0)
HEAD & NECK - ear - procedures on middle ear	222 (0.2)
HEAD & NECK - ear - procedures on the external ear	150 (0.2)
HEAD & NECK - ear - repair of eardrum	139 (0.1)
HEAD & NECK - excision of adenoids	217 (0.2)
HEAD & NECK - larynx - .any MAJOR procedures not separately listed	111 (0.1)
HEAD & NECK - larynx - .any MINOR procedures not separately listed	371 (0.4)
HEAD & NECK - larynx - excision of larynx (laryngectomy)	89 (0.1)
HEAD & NECK - lip - any procedures on the lips	79 (0.1)
HEAD & NECK - mandible - any other procedure	252 (0.3)
HEAD & NECK - mandible - orthognathic surgery (jaw)	92 (0.1)
HEAD & NECK - mandible - reduction and/or fixation of mandible	72 (0.1)
HEAD & NECK - maxilla - partial excision of bone of face	139 (0.1)
HEAD & NECK - microlaryngoscopy	23 (0.0)
HEAD & NECK - mouth - any other procedures on the mouth	134 (0.1)
HEAD & NECK - mouth - any procedures on the palate	92 (0.1)
HEAD & NECK - mouth - drainage extra-oral abscess	10 (0.0)
HEAD & NECK - mouth - drainage intra-oral abscess	12 (0.0)
HEAD & NECK - mouth - orofacial cleft surgery	125 (0.1)
HEAD & NECK - mouth - reconstruction of mouth	40 (0.0)
HEAD & NECK - mouth - removal of lesion of mouth	151 (0.2)
HEAD & NECK - nasendoscopy + intervention	21 (0.0)
HEAD & NECK - neck - radical neck dissection	98 (0.1)
HEAD & NECK - neck - selective neck dissection	261 (0.3)
HEAD & NECK - neck - thyroglossal duct cyst surgery	12 (0.0)
HEAD & NECK - nose - any other procedure on nose	577 (0.6)
HEAD & NECK - nose - closed reduction nasal fracture	29 (0.0)
HEAD & NECK - nose - endoscopic sinus surgery	243 (0.3)
HEAD & NECK - nose - operations on septum of nose	682 (0.7)
HEAD & NECK - nose - other endoscopic surgery	40 (0.0)
HEAD & NECK - nose - surgical arrest of bleeding from internal nose	7 (0.0)
HEAD & NECK - orbit - exploration +/- repair	83 (0.1)
HEAD & NECK - pharynx - any procedures other than excision	98 (0.1)
HEAD & NECK - pharynx - excision of pharynx (pharyngectomy)	29 (0.0)
HEAD & NECK - repair fractured zygoma	46 (0.0)
HEAD & NECK - repair soft tissue of head and neck	40 (0.0)
HEAD & NECK - salivary gland/ duct - any other procedure on the salivary gland or duct	46 (0.0)
HEAD & NECK - salivary gland/ duct - excision of parotid gland	256 (0.3)
HEAD & NECK - salivary gland/ duct - excision of submandibular/sublingual gland	77 (0.1)
HEAD & NECK - skin - excisional of lesion of skin of head or neck	282 (0.3)

HEAD & NECK - submental mandibulectomy	29 (0.0)
HEAD & NECK - surgical tracheostomy (note: percutaneous tracheostomy excluded)	106 (0.1)
HEAD & NECK - tongue - .any other procedures on the tongue	71 (0.1)
HEAD & NECK - tongue - partial glossectomy	131 (0.1)
HEAD & NECK - tongue - tongue tie division (lingual frenectomy)	33 (0.0)
HEAD & NECK - tonsils - operation on tonsils ther than tonsillectomy	38 (0.0)
HEAD & NECK - tonsils - tonsillectomy (excision of tonsil)	739 (0.8)
HEART (CARDIAC) - any other procedures not listed	278 (0.3)
HEART (CARDIAC) - aortic root/ascending aorta surgery	37 (0.0)
HEART (CARDIAC) - aortic valve surgery (AVR; valvular)	582 (0.6)
HEART (CARDIAC) - atrial septal defect repair (ASD)	41 (0.0)
HEART (CARDIAC) - coronary artery bypass graft (CABG)	812 (0.8)
HEART (CARDIAC) - heart transplant	2 (0.0)
HEART (CARDIAC) - insertion of pacemaker	15 (0.0)
HEART (CARDIAC) - mitral valve surgery (valvular)	319 (0.3)
HEART (CARDIAC) - surgery on any other valve than aortic/mitral valves (valvular)	61 (0.1)
HEART (CARDIAC) - ventricular septal defect repair (VSD)	45 (0.0)
HERNIA - abdominal wall reconstruction (component separation)	269 (0.3)
HERNIA - any hernia repair not separately listed (herniorrhaphy; hernioplasty)	366 (0.4)
HERNIA - femoral hernia repair (herniorrhaphy; hernioplasty)	97 (0.1)
HERNIA - incisional hernia repair (herniorrhaphy; hernioplasty)	910 (0.9)
HERNIA - inguinal hernia repair (herniorrhaphy; hernioplasty)	4565 (4.7)
HERNIA - umbilical hernia repair (herniorrhaphy; hernioplasty)	1197 (1.2)
HERNIA - ventral / Spigelian / epigastric hernia repair (herniorrhaphy; hernioplasty)	102 (0.1)
KIDNEY - any other procedures not listed	84 (0.1)
KIDNEY - nephrectomy (excision of kidney)	751 (0.8)
KIDNEY - percutaneous nephrolithotomy (PCNL; stone; calculus)	271 (0.3)
KIDNEY - pyeloplasty	110 (0.1)
KIDNEY - transplantation of kidney	128 (0.1)
LIMB - any operation on bursa (joint)	44 (0.0)
LIMB - any operation on ligament	102 (0.1)
LIMB - any operation on nerve	64 (0.1)
LIMB - any operation on tendon	254 (0.3)
LIMB - excision of ganglion	118 (0.1)
LIMB - lower limb	207 (0.2)
LIMB - lower limb - .any other procedure repair not separately listed (keywords: orthopaedics)	624 (0.6)
LIMB - lower limb - ACL repair	28 (0.0)
LIMB - lower limb - amputation of foot	50 (0.1)
LIMB - lower limb - amputation of leg	143 (0.1)
LIMB - lower limb - amputation of toe	102 (0.1)
LIMB - lower limb - ankle replacement	35 (0.0)
LIMB - lower limb - any other operation on toe	290 (0.3)

LIMB - lower limb - arthroscopy of joint other than knee - diagnostic (keywords: orthopaedic; orthopedic)	46 (0.0)
LIMB - lower limb - arthroscopy of joint other than knee - therapeutic (keywords: orthopaedic; orthopedic)	159 (0.2)
LIMB - lower limb - arthroscopy of knee - diagnostic (keywords: orthopaedic; orthopedic)	92 (0.1)
LIMB - lower limb - arthroscopy of knee - therapeutic (keywords: orthopaedic; orthopedic)	783 (0.8)
LIMB - lower limb - bone lengthening	30 (0.0)
LIMB - lower limb - closed reduction of dislocation of joint	22 (0.0)
LIMB - lower limb - closed reduction, wire fixation	37 (0.0)
LIMB - lower limb - debridement and irrigation of joint	72 (0.1)
LIMB - lower limb - debridement of diabetic foot	50 (0.1)
LIMB - lower limb - fasciotomy	12 (0.0)
LIMB - lower limb - joint fusion	129 (0.1)
LIMB - lower limb - knee replacement (keywords: orthopaedic; orthopedic)	1510 (1.6)
LIMB - lower limb - manipulation under anaesthetic (any fracture) (MUA)	12 (0.0)
LIMB - lower limb - open reduction, wire fixation (k-wire; wire)	154 (0.2)
LIMB - lower limb - osteotomy and fixation (scarf osteotomy)	189 (0.2)
LIMB - lower limb - reconstruction of wound (including skin graft, local, regional or free flap)	209 (0.2)
LIMB - lower limb - removal of implant	590 (0.6)
LIMB - lower limb - revascularisation of lower limb	46 (0.0)
LIMB - lower limb - revision of total hip replacement	176 (0.2)
LIMB - lower limb - total hip replacement	1159 (1.2)
LIMB - lower limb - wound debridement	235 (0.2)
LIMB - Lower limb fracture - cannulated screws for proximal femoral fracture	34 (0.0)
LIMB - lower limb fracture - closed reduction and external fixation	53 (0.1)
LIMB - lower limb fracture - closed reduction and internal fixation	133 (0.1)
LIMB - lower limb fracture - closed reduction of fracture, no fixation	13 (0.0)
LIMB - lower limb fracture - dynamic hip screw (DHS)	64 (0.1)
LIMB - lower limb fracture - FEMUR - open reduction and intramedullary fixation	264 (0.3)
LIMB - lower limb fracture - FOOT - open reduction and intramedullary fixation	3 (0.0)
LIMB - lower limb fracture - open reduction, no fixation	22 (0.0)
LIMB - lower limb fracture - partial hip replacement (hemiarthroplasty)	90 (0.1)
LIMB - lower limb fracture - TIBIA - open reduction and intramedullary fixation	235 (0.2)
LIMB - muscle - any other procedure on muscle	39 (0.0)
LIMB - muscle - muscle excision	46 (0.0)
LIMB - upper limb - amputation of hand	16 (0.0)
LIMB - upper limb - .any other procedure repair not separately listed	397 (0.4)
LIMB - upper limb - amputation of arm	17 (0.0)
LIMB - upper limb - amputation of finger	55 (0.1)
LIMB - upper limb - arthroscopy of joint other than knee - diagnostic	46 (0.0)
LIMB - upper limb - arthroscopy of joint other than knee - therapeutic	392 (0.4)
LIMB - upper limb - carpal tunnel release	517 (0.5)
LIMB - upper limb - closed reduction of dislocation of joint	9 (0.0)
LIMB - upper limb - closed reduction, wire fixation (k-wire; wire)	112 (0.1)

LIMB - upper limb - cubital / carapal tunnel release	21 (0.0)
LIMB - upper limb - debridement and irrigation of joint	36 (0.0)
LIMB - upper limb - Dupuytren's disease / trigger finger surgery	86 (0.1)
LIMB - upper limb - elbow replacement	22 (0.0)
LIMB - upper limb - fasciotomy	63 (0.1)
LIMB - upper limb - injection into joint	26 (0.0)
LIMB - upper limb - joint fusion	53 (0.1)
LIMB - upper limb - manipulation of hand fracture	62 (0.1)
LIMB - upper limb - manipulation under anaesthetic (any fracture) (MUA)	5 (0.0)
LIMB - upper limb - nail bed surgery	16 (0.0)
LIMB - upper limb - open reduction, wire fixation (k-wire; wire)	242 (0.3)
LIMB - upper limb - osteotomy and fixation	97 (0.1)
LIMB - upper limb - percutaneous pinning of hand fracture	27 (0.0)
LIMB - upper limb - removal of implant	360 (0.4)
LIMB - upper limb - repair of ligament	144 (0.1)
LIMB - upper limb - repair of nerve	53 (0.1)
LIMB - upper limb - repair of tendon	174 (0.2)
LIMB - upper limb - revascularisation or replantation of amputated part	9 (0.0)
LIMB - upper limb - shoulder replacement	170 (0.2)
LIMB - upper limb - trapeziectomy	32 (0.0)
LIMB - upper limb - washout and closure of wound	69 (0.1)
LIMB - upper limb - washout of joint	12 (0.0)
LIMB - upper limb fracture - closed reduction and external fixation	29 (0.0)
LIMB - upper limb fracture - closed reduction and internal fixation	145 (0.2)
LIMB - upper limb fracture - closed reduction of fracture, no fixation	16 (0.0)
LIMB - upper limb fracture - open reduction and intramedullary fixation	376 (0.4)
LIMB - upper limb fracture - open reduction, no fixation	29 (0.0)
LIVER - anatomical liver resection (hepatic resection)	265 (0.3)
LIVER - any other procedures not listed	144 (0.1)
LIVER - non-anatomical liver resection (hepatic resection)	228 (0.2)
LIVER - partial hepatectomy	207 (0.2)
LIVER - transplantation of liver	52 (0.1)
LOWER LIMB - joint aspiration	7 (0.0)
LUNG & AIRWAYS - anatomical/non-anatomical lung resection (excision of a lung lobe)	966 (1.0)
LUNG & AIRWAYS - any other procedures not listed	338 (0.4)
LUNG & AIRWAYS - bronchoscopy, therapeutic	77 (0.1)
LUNG & AIRWAYS - chest exploration for trauma	27 (0.0)
LUNG & AIRWAYS - mediastinal mass resection	80 (0.1)
LUNG & AIRWAYS - mediastinoscopy	81 (0.1)
LUNG & AIRWAYS - operations on bronchus	14 (0.0)
LUNG & AIRWAYS - pneumonectomy (excision of whole lung)	34 (0.0)
LUNG & AIRWAYS - radical surgery for pleural mesothelioma	5 (0.0)

LUNG & AIRWAYS - resection of chest wall tumour +/- lung resection	115 (0.1)
LUNG & AIRWAYS - transplantation of lung	11 (0.0)
MALE REPRODUCTIVE ORGANS - any operation on epididymis	25 (0.0)
MALE REPRODUCTIVE ORGANS - any operation on varicocoele	114 (0.1)
MALE REPRODUCTIVE ORGANS - any other procedures not listed	82 (0.1)
MALE REPRODUCTIVE ORGANS - any procedure on scrotum	71 (0.1)
MALE REPRODUCTIVE ORGANS - circumcision	403 (0.4)
MALE REPRODUCTIVE ORGANS - male sterilisation	50 (0.1)
MALE REPRODUCTIVE ORGANS - penis - any operation on penis	325 (0.3)
MALE REPRODUCTIVE ORGANS - penis - any operations on the penis	162 (0.2)
MALE REPRODUCTIVE ORGANS - penis - hypospadia repair	159 (0.2)
MALE REPRODUCTIVE ORGANS - prostate - prostatectomy	657 (0.7)
MALE REPRODUCTIVE ORGANS - prostate biopsy	47 (0.0)
MALE REPRODUCTIVE ORGANS - scrotal / testicular exploration	3 (0.0)
MALE REPRODUCTIVE ORGANS - spermatic cord - any operation on spermatic cord	18 (0.0)
MALE REPRODUCTIVE ORGANS - testis - any procedure other than orchidectomy	112 (0.1)
MALE REPRODUCTIVE ORGANS - testis - hydrocele surgery	126 (0.1)
MALE REPRODUCTIVE ORGANS - testis - orchidectomy (excision of testis)	188 (0.2)
MALE REPRODUCTIVE ORGANS - testis - orchiopexy	374 (0.4)
OBSTETRICS - any other procedures not listed	54 (0.1)
OBSTETRICS - Caesarean section	3121 (3.2)
OBSTETRICS - evacuation of contents of uterus / manual removal of placenta (MROP)	133 (0.1)
OBSTETRICS - repair of obstetric laceration (3rd/4th degree)	5 (0.0)
OESOPHAGUS & STOMACH - Heller myotomy	49 (0.1)
OESOPHAGUS & STOMACH - nissens fundoplication (anti-reflux surgery)	273 (0.3)
OESOPHAGUS & STOMACH - oesophagus - any other procedure	101 (0.1)
OESOPHAGUS & STOMACH - oesophagus - oesophagectomy	172 (0.2)
OESOPHAGUS & STOMACH - oesophagus - oesophagogastrectomy (excision of oesophagus and stomach)	52 (0.1)
OESOPHAGUS & STOMACH - revision of antireflux operation	19 (0.0)
OESOPHAGUS & STOMACH - stomach - any other procedure	86 (0.1)
OESOPHAGUS & STOMACH - stomach - feeding gastrostomy	155 (0.2)
OESOPHAGUS & STOMACH - stomach - gastrectomy (excision of stomach)	566 (0.6)
OESOPHAGUS & STOMACH - stomach - gastric band insertion (obesity surgery)	59 (0.1)
OESOPHAGUS & STOMACH - stomach - gastric bypass, roux en y / single anastomosis gastric bypass (obesity surgery)	570 (0.6)
OESOPHAGUS & STOMACH - stomach - pyloroplasty	18 (0.0)
OESOPHAGUS & STOMACH - stomach - repair of perforated peptic ulcer (gastric)	5 (0.0)
OESOPHAGUS & STOMACH - stomach - sleeve gastrectomy (obesity surgery)	762 (0.8)
OTHER - block dissection of lymph nodes	136 (0.1)
OTHER - Excision of lipoma	534 (0.6)
OTHER - excision of rib	1 (0.0)
OTHER - Extraction of foreign body	84 (0.1)
OTHER - hyperthermic intraperitoneal chemotherapy (HIPEC)	82 (0.1)

OTHER - lymph node biopsy	416 (0.4)
OTHER - multiorgan resection (sarcoma; including pelvic exenteration)	149 (0.2)
OTHER - Operation on Germ cell tumour	3 (0.0)
OTHER - repair of diaphragmatic hernia	117 (0.1)
OTHER - skin - suture of skin of head or neck	35 (0.0)
OTHER - skin - suture of skin other than head or neck	60 (0.1)
PANCREAS - any other procedure not separately listed	53 (0.1)
PANCREAS - distal pancreatectomy (excision of pancreas)	162 (0.2)
PANCREAS - pancreaticoduodenectomy (Whipple)	441 (0.5)
PANCREAS - total pancreatectomy (excision of pancreas)	40 (0.0)
PLASTICS - abdominoplasty	117 (0.1)
PLASTICS - any other procedure not separately listed	269 (0.3)
PLASTICS - burns - debridement, excision or dressing	153 (0.2)
PLASTICS - burns - reconstruction	81 (0.1)
PLASTICS - free flap	23 (0.0)
PLASTICS - liposuction	77 (0.1)
PLASTICS - local flap	27 (0.0)
PLASTICS - paediatric - any operation	106 (0.1)
PLASTICS - regional lymphadenectomy for skin cancer	43 (0.0)
PLASTICS - sentinel lymph node biopsy for skin cancer	70 (0.1)
PLASTICS - Skin - excision of benign skin lesion	898 (0.9)
PLASTICS - Skin - excision of malignant skin cancer	654 (0.7)
PLASTICS - Skin - excision of malignant skin cancer and reconstruction (any type)	318 (0.3)
PLASTICS - Skin - excision of scar	143 (0.1)
PLASTICS - skin - excision of sebaceous cyst	34 (0.0)
PLASTICS - skin graft	69 (0.1)
SARCOMA - Excision of lesion of extremity (major)	58 (0.1)
SARCOMA - Excision of lesion of extremity (minor/intermediate)	96 (0.1)
SARCOMA - Excision of lesion of posterior peritoneum	84 (0.1)
SMALL BOWEL - .any other procedure not separately listed	60 (0.1)
SMALL BOWEL - feeding jejunostomy	69 (0.1)
SMALL BOWEL - formation of ileostomy (stoma)	83 (0.1)
SMALL BOWEL - ileocaecal resection (excision of ileum)	123 (0.1)
SMALL BOWEL - refashioning or resiting of ileostomy (stoma)	38 (0.0)
SMALL BOWEL - repair of perforated duodenal ulcer (PUD)	3 (0.0)
SMALL BOWEL - reversal of ileostomy (ileostomy closure; stoma)	590 (0.6)
SMALL BOWEL - small bowel bypass (including gastrojejunostomy)	105 (0.1)
SMALL BOWEL - small bowel resection	184 (0.2)
SPINE & NERVOUS SYSTEM - any operation on cranial nerves	50 (0.1)
SPINE & NERVOUS SYSTEM - any operation on peripheral nerve	100 (0.1)
SPINE & NERVOUS SYSTEM - any operation on spinal cord	318 (0.3)
SPINE & NERVOUS SYSTEM - any operation on sympathetic nerve	38 (0.0)

SPINE & NERVOUS SYSTEM - any other operation on vertebrae	903 (0.9)
SPINE & NERVOUS SYSTEM - decompression or excision of intervebral disc	1087 (1.1)
SPINE & NERVOUS SYSTEM - laminectomy	2 (0.0)
SPLEEN - .any other procedure not separately listed	6 (0.0)
SPLEEN - splenectomy	100 (0.1)
URINARY TRACT - bladder - .any other procedure not separately listed	456 (0.5)
URINARY TRACT - bladder - cystectomy (excision of urinary bladder)	210 (0.2)
URINARY TRACT - bladder - transurethral resection of bladder tumour (TURBT)	1074 (1.1)
URINARY TRACT - bladder - transurethral resection of the prostate (TURP)	718 (0.7)
URINARY TRACT - female incontinence surgery	136 (0.1)
URINARY TRACT - flexible cystoscopy + intervention	154 (0.2)
URINARY TRACT - lithotripsy	89 (0.1)
URINARY TRACT - rigid cystoscopy	105 (0.1)
URINARY TRACT - ureter - replantation of ureter	72 (0.1)
URINARY TRACT - ureter - uretectomy (excision of ureter)	24 (0.0)
URINARY TRACT - ureter - ureteric stent insertion	683 (0.7)
URINARY TRACT - ureteroscopy (therapeutic)	703 (0.7)
URINARY TRACT - urethra - any procedure	521 (0.5)
VASCULAR - .any other procedure not separately listed (artery; vein)	306 (0.3)
VASCULAR - bypass of femoral artery	140 (0.1)
VASCULAR - bypass of iliac artery	24 (0.0)
VASCULAR - carotid endarterectomy	204 (0.2)
VASCULAR - embolectomy / thrombectomy	39 (0.0)
VASCULAR - femoral artery endarterectomy	83 (0.1)
VASCULAR - formation of arterio-venous fistula	336 (0.3)
VASCULAR - lower limb - amputation of foot	18 (0.0)
VASCULAR - lower limb - amputation of leg	49 (0.1)
VASCULAR - lower limb - amputation of toe	46 (0.0)
VASCULAR - lower limb - any other operation on toe	14 (0.0)
VASCULAR - lower limb - fasciotomy	2 (0.0)
VASCULAR - repair of abdominal aorta aneurysm (AAA)	174 (0.2)
VASCULAR - repair of femoral artery aneurysm	10 (0.0)
VASCULAR - repair of iliac artery aneurysm	16 (0.0)
VASCULAR - varicose vein - ligation and stripping	448 (0.5)

Table S3: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative mortality, adjusting for patient, surgery and surgical setting factors.

		Alive	Dead	OR (univariable)	OR (multivariable)
Isolation	No Isolation	68859 (99.2%)	530 (0.8%)	-	-
	Preop Isolation	26822 (99.6%)	118 (0.4%)	0.70 (0.55-0.89, p=0.004)	0.80 (0.62-1.02, p=0.081)
Age	<70 years	76350 (99.5%)	383 (0.5%)	-	-
	≥70 years	19400 (98.7%)	265 (1.3%)	2.72 (2.32-3.19, p<0.001)	1.69 (1.42-2.02, p<0.001)
Sex	Female	50734 (99.5%)	270 (0.5%)	-	-
	Male	45014 (99.2%)	378 (0.8%)	1.58 (1.35-1.85, p<0.001)	1.31 (1.11-1.54, p=0.001)
ASA physical status	Grades 1-2	73521 (99.7%)	208 (0.3%)	-	-
	Grades 3-5	22190 (98.1%)	440 (1.9%)	7.01 (5.95-8.29, p<0.001)	4.60 (3.79-5.59, p<0.001)
Revised Cardiac Risk Index	0	44349 (99.7%)	112 (0.3%)	-	-
	1-2	48982 (99.1%)	443 (0.9%)	3.58 (2.92-4.43, p<0.001)	2.28 (1.76-2.97, p<0.001)
	≥3	2370 (96.2%)	93 (3.8%)	15.54 (11.75-20.50, p<0.001)	4.57 (3.23-6.45, p<0.001)
Respiratory comorbidities	No	86786 (99.4%)	541 (0.6%)	-	-
	Yes	8889 (98.8%)	106 (1.2%)	1.91 (1.54-2.35, p<0.001)	1.19 (0.96-1.48, p=0.111)
Surgical indication	Benign	73981 (99.6%)	321 (0.4%)	-	-
	Cancer	21767 (98.5%)	327 (1.5%)	3.46 (2.97-4.04, p<0.001)	2.50 (2.10-2.96, p<0.001)
Surgery grade	Minor/Intermediate	39202 (99.7%)	127 (0.3%)	-	-
	Major	56531 (99.1%)	521 (0.9%)	2.84 (2.35-3.47, p<0.001)	1.57 (1.27-1.95, p<0.001)
Anaesthesia	Local	9280 (99.7%)	31 (0.3%)	-	-
	Regional	14629 (99.7%)	49 (0.3%)	1.00 (0.64-1.59, p=0.991)	0.91 (0.57-1.48, p=0.699)
	General	71803 (99.2%)	568 (0.8%)	2.37 (1.68-3.47, p<0.001)	1.62 (1.11-2.46, p=0.016)
Surgery area	Abdominopelvic	47908 (99.3%)	323 (0.7%)	-	-
	Thoracic	10308 (99.5%)	57 (0.5%)	0.82 (0.61-1.08, p=0.169)	1.43 (1.04-1.95, p=0.024)
	Head & Neck	13987 (99.5%)	68 (0.5%)	0.72 (0.55-0.93, p=0.015)	1.70 (1.25-2.29, p=0.001)
	Limb	19043 (99.5%)	95 (0.5%)	0.74 (0.59-0.93, p=0.010)	1.34 (1.01-1.75, p=0.037)
	Other	4486 (97.7%)	105 (2.3%)	3.47 (2.77-4.32, p<0.001)	1.52 (1.19-1.93, p=0.001)
Preoperative Testing	No test	39916 (99.2%)	338 (0.8%)	-	-
	Test	55715 (99.4%)	309 (0.6%)	0.65 (0.56-0.76, p<0.001)	0.75 (0.63-0.89, p=0.001)
Surgical Pathway	Non-Segregated	16057 (99.2%)	131 (0.8%)	-	-
	COVID-free	79634 (99.4%)	517 (0.6%)	0.80 (0.66-0.97, p=0.020)	0.88 (0.72-1.08, p=0.199)
SARS-CoV-2 community prevalence	Low	33310 (99.2%)	269 (0.8%)	-	-
	High	62441 (99.4%)	379 (0.6%)	0.75 (0.64-0.88, p<0.001)	1.19 (0.97-1.47, p=0.100)
Country income	High income	64893 (99.5%)	326 (0.5%)	-	-
	Upper middle income	16013 (99.0%)	164 (1.0%)	1.98 (1.60-2.43, p<0.001)	3.12 (2.48-3.92, p<0.001)
	Lower middle / Low income	14845 (98.9%)	158 (1.1%)	1.90 (1.54-2.33, p<0.001)	4.88 (3.74-6.38, p<0.001)
Interaction term	Isolation*LMIC	-	-	1.35 (0.59-2.71, p=0.435)	0.86 (0.37-1.76, p=0.710)
	Isolation*UMIC	-	-	0.82 (0.47-1.38, p=0.477)	0.57 (0.32-0.97, p=0.046)

Number in dataframe = 96454, Number in model = 96075, Missing = 379, AIC = 6610, C-statistic = 0.852.
ASA=American Society of Anaesthesiologists classification. Community prevalence of SARS-CoV-2 was defined as the median 14-day cumulative country case notification rate per 100,000 population during October 2020. Country income groups defined as per the WHO World Bank classification.

Table S4: Full multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, in all patients included in the study.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	67993 (98.0%)	1386 (2.0%)	-	-
	Preop Isolation	26387 (97.9%)	554 (2.1%)	1.08 (0.96-1.22, p=0.197)	1.20 (1.05-1.36, p=0.005)
Age	<70 years	75397 (98.3%)	1328 (1.7%)	-	-
	≥70 years	19045 (96.9%)	619 (3.1%)	1.85 (1.67-2.03, p<0.001)	1.22 (1.09-1.36, p<0.001)
Sex	Female	50218 (98.5%)	783 (1.5%)	-	-
	Male	44222 (97.4%)	1164 (2.6%)	1.69 (1.54-1.85, p<0.001)	1.52 (1.38-1.68, p<0.001)
ASA physical status	Grades 1-2	72837 (98.8%)	884 (1.2%)	-	-
	Grades 3-5	21566 (95.3%)	1063 (4.7%)	4.06 (3.71-4.45, p<0.001)	2.32 (2.09-2.59, p<0.001)
Revised Cardiac Risk Index	0	44029 (99.0%)	425 (1.0%)	-	-
	1-2	48109 (97.3%)	1314 (2.7%)	2.83 (2.54-3.16, p<0.001)	1.51 (1.30-1.76, p<0.001)
	≥3	2258 (91.7%)	205 (8.3%)	9.41 (7.91-11.15, p<0.001)	2.43 (1.95-3.02, p<0.001)
Respiratory comorbidities	No	85760 (98.2%)	1560 (1.8%)	-	-
	Yes	8609 (95.7%)	384 (4.3%)	2.45 (2.19-2.74, p<0.001)	1.69 (1.49-1.90, p<0.001)
Surgical indication	Benign	73141 (98.5%)	1151 (1.5%)	-	-
	Cancer	21299 (96.4%)	796 (3.6%)	2.37 (2.17-2.60, p<0.001)	1.71 (1.55-1.89, p<0.001)
Surgery grade	Minor/Intermediate	39019 (99.2%)	306 (0.8%)	-	-
	Major	55409 (97.1%)	1638 (2.9%)	3.77 (3.34-4.27, p<0.001)	2.15 (1.88-2.46, p<0.001)
Anaesthesia	Local	9261 (99.5%)	48 (0.5%)	-	-
	Regional	14524 (99.0%)	154 (1.0%)	2.05 (1.49-2.86, p<0.001)	1.70 (1.21-2.42, p=0.003)
	General	70620 (97.6%)	1745 (2.4%)	4.77 (3.62-6.44, p<0.001)	2.52 (1.88-3.47, p<0.001)
Surgery area	Abdominopelvic	47310 (98.1%)	921 (1.9%)	-	-
	Thoracic	10196 (98.4%)	168 (1.6%)	0.85 (0.71-1.00, p=0.049)	1.19 (0.98-1.45, p=0.075)
	Head & Neck	13883 (98.8%)	167 (1.2%)	0.62 (0.52-0.73, p<0.001)	1.08 (0.89-1.31, p=0.413)
	Limb	18909 (98.8%)	226 (1.2%)	0.61 (0.53-0.71, p<0.001)	1.05 (0.87-1.25, p=0.621)
	Other	4129 (89.9%)	462 (10.1%)	5.75 (5.11-6.45, p<0.001)	2.79 (2.45-3.16, p<0.001)
Preoperative Testing	No test	39375 (97.8%)	871 (2.2%)	-	-
	Test	54957 (98.1%)	1066 (1.9%)	0.88 (0.80-0.96, p=0.004)	0.81 (0.73-0.89, p<0.001)
Surgical Pathway	Non-Segregated	15830 (97.8%)	354 (2.2%)	-	-
	COVID-free	78559 (98.0%)	1587 (2.0%)	0.90 (0.81-1.02, p=0.087)	0.99 (0.87-1.12, p=0.842)
SARS-CoV-2 community prevalence	Low	32876 (97.9%)	698 (2.1%)	-	-
	High	61567 (98.0%)	1249 (2.0%)	0.96 (0.87-1.05, p=0.341)	1.08 (0.96-1.22, p=0.224)
Country income	High income	64024 (98.2%)	1190 (1.8%)	-	-
	Upper middle income	15740 (97.3%)	438 (2.7%)	1.47 (1.29-1.67, p<0.001)	1.99 (1.72-2.29, p<0.001)
	Lower middle / Low income	14679 (97.9%)	319 (2.1%)	1.19 (1.04-1.37, p=0.010)	2.02 (1.71-2.39, p<0.001)
Interaction term	Isolation*LMIC	-	-	0.99 (0.58-1.57, p=0.955)	0.75 (0.44-1.21, p=0.271)
	Isolation*UMIC	-	-	1.11 (0.85-1.44, p=0.424)	0.83 (0.63-1.09, p=0.179)

Number in dataframe = 96454, Number in model = 96067, Missing = 387, AIC = 16680.6, C-statistic = 0.784.
ASA=American Society of Anaesthesiologists physical status classification.

Table S5: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients with mild comorbidities (ASA physical status 1-2).

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	52770 (98.8%)	630 (1.2%)	-	-
	Preop Isolation	20023 (98.8%)	247 (1.2%)	1.25 (1.03-1.52, p=0.022)	1.36 (1.11-1.66, p=0.003)
Age	<70 years	62564 (98.9%)	704 (1.1%)	-	-
	≥70 years	10273 (98.3%)	180 (1.7%)	1.56 (1.32-1.83, p<0.001)	1.48 (1.23-1.76, p<0.001)
Sex	Female	40166 (99.0%)	414 (1.0%)	-	-
	Male	32669 (98.6%)	470 (1.4%)	1.40 (1.22-1.59, p<0.001)	1.55 (1.35-1.78, p<0.001)
Revised Cardiac Risk Index	0	38830 (99.2%)	312 (0.8%)	-	-
	1-2	33729 (98.4%)	554 (1.6%)	2.04 (1.78-2.35, p<0.001)	1.16 (0.93-1.45, p=0.196)
	≥3	259 (93.8%)	17 (6.2%)	8.17 (4.76-13.11, p<0.001)	2.89 (1.61-4.92, p<0.001)
Respiratory comorbidities	No	68256 (98.8%)	801 (1.2%)	-	-
	Yes	4545 (98.2%)	81 (1.8%)	1.52 (1.20-1.90, p<0.001)	1.45 (1.13-1.83, p=0.002)
Surgical indication	Benign	58470 (99.1%)	521 (0.9%)	-	-
	Cancer	14367 (97.5%)	363 (2.5%)	2.84 (2.48-3.24, p<0.001)	2.07 (1.78-2.41, p<0.001)
Surgery grade	Minor/Intermediate	32447 (99.5%)	157 (0.5%)	-	-
	Major	40377 (98.2%)	726 (1.8%)	3.72 (3.13-4.43, p<0.001)	2.55 (2.12-3.09, p<0.001)
Anaesthesia	Local	7371 (99.7%)	21 (0.3%)	-	-
	Regional	12217 (99.1%)	112 (0.9%)	3.22 (2.06-5.27, p<0.001)	2.05 (1.27-3.49, p=0.005)
	General	53219 (98.6%)	751 (1.4%)	4.95 (3.30-7.90, p<0.001)	2.50 (1.61-4.11, p<0.001)
Surgery area	Abdominopelvic	37282 (98.7%)	487 (1.3%)	-	-
	Thoracic	8375 (99.0%)	87 (1.0%)	0.80 (0.63-0.99, p=0.050)	0.92 (0.68-1.23, p=0.570)
	Head & Neck	10901 (99.3%)	79 (0.7%)	0.55 (0.43-0.70, p<0.001)	0.83 (0.62-1.10, p=0.197)
	Limb	14853 (99.2%)	120 (0.8%)	0.62 (0.50-0.75, p<0.001)	0.86 (0.65-1.13, p=0.283)
	Other	1412 (92.8%)	110 (7.2%)	5.96 (4.80-7.35, p<0.001)	3.70 (2.94-4.61, p<0.001)
Preoperative Testing	No test	31863 (98.6%)	460 (1.4%)	-	-
	Test	40894 (99.0%)	417 (1.0%)	0.71 (0.62-0.81, p<0.001)	0.76 (0.65-0.88, p<0.001)
Surgical Pathway	Non-Segregated	10762 (98.8%)	127 (1.2%)	-	-
	COVID-free	62024 (98.8%)	751 (1.2%)	1.03 (0.85-1.25, p=0.790)	0.94 (0.78-1.14, p=0.524)
SARS-CoV-2 community prevalence	Low	27299 (98.5%)	402 (1.5%)	-	-
	High	45538 (99.0%)	482 (1.0%)	0.72 (0.63-0.82, p<0.001)	1.02 (0.86-1.22, p=0.818)
Country income	High income	46231 (99.1%)	425 (0.9%)	-	-
	Upper middle income	13374 (98.3%)	235 (1.7%)	1.90 (1.56-2.30, p<0.001)	1.88 (1.53-2.31, p<0.001)
	Lower middle / Low income	13232 (98.3%)	224 (1.7%)	1.98 (1.64-2.38, p<0.001)	2.24 (1.78-2.81, p<0.001)
Interaction term	Isolation*LMIC	-	-	1.03 (0.55-1.77, p=0.930)	0.75 (0.40-1.31, p=0.336)
	Isolation*UMIC	-	-	1.13 (0.78-1.62, p=0.513)	0.93 (0.64-1.34, p=0.686)

Number in dataframe = 73778, Number in model = 73495, Missing = 283, AIC = 8736.9, C-statistic = 0.754.
ASA=American Society of Anaesthesiologists physical status classification.

Table S6: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients with major comorbidities (ASA physical status 3-5).

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	15212 (95.3%)	756 (4.7%)	-	-
	Preop Isolation	6345 (95.4%)	307 (4.6%)	1.11 (0.96-1.30, p=0.166)	1.12 (0.95-1.31, p=0.174)
Age	<70 years	12798 (95.4%)	624 (4.6%)	-	-
	≥70 years	8767 (95.2%)	439 (4.8%)	1.03 (0.91-1.16, p=0.676)	1.08 (0.94-1.23, p=0.261)
Sex	Female	10030 (96.5%)	369 (3.5%)	-	-
	Male	11535 (94.3%)	694 (5.7%)	1.64 (1.44-1.86, p<0.001)	1.52 (1.33-1.74, p<0.001)
Revised Cardiac Risk Index	0	5188 (97.9%)	113 (2.1%)	-	-
	1-2	14374 (95.0%)	760 (5.0%)	2.43 (2.00-2.98, p<0.001)	1.73 (1.37-2.19, p<0.001)
	≥3	1999 (91.4%)	188 (8.6%)	4.32 (3.41-5.50, p<0.001)	2.65 (2.01-3.51, p<0.001)
Respiratory comorbidities	No	17489 (95.8%)	759 (4.2%)	-	-
	Yes	4062 (93.1%)	303 (6.9%)	1.72 (1.50-1.97, p<0.001)	1.77 (1.54-2.04, p<0.001)
Surgical indication	Benign	14643 (95.9%)	630 (4.1%)	-	-
	Cancer	6923 (94.1%)	433 (5.9%)	1.45 (1.28-1.65, p<0.001)	1.39 (1.21-1.59, p<0.001)
Surgery grade	Minor/Intermediate	6548 (97.8%)	149 (2.2%)	-	-
	Major	15016 (94.3%)	912 (5.7%)	2.67 (2.25-3.19, p<0.001)	1.68 (1.39-2.04, p<0.001)
Anaesthesia	Local	1886 (98.6%)	27 (1.4%)	-	-
	Regional	2307 (98.2%)	42 (1.8%)	1.27 (0.79-2.09, p=0.333)	1.13 (0.68-1.90, p=0.633)
	General	17367 (94.6%)	994 (5.4%)	4.00 (2.78-6.02, p<0.001)	2.68 (1.81-4.12, p<0.001)
Surgery area	Abdominopelvic	10022 (95.8%)	434 (4.2%)	-	-
	Thoracic	1797 (95.7%)	81 (4.3%)	1.04 (0.81-1.32, p=0.746)	1.35 (1.04-1.75, p=0.024)
	Head & Neck	2981 (97.1%)	88 (2.9%)	0.68 (0.54-0.86, p=0.001)	1.25 (0.96-1.62, p=0.085)
	Limb	4048 (97.4%)	106 (2.6%)	0.60 (0.49-0.75, p<0.001)	1.07 (0.84-1.36, p=0.572)
	Other	2716 (88.5%)	352 (11.5%)	2.99 (2.58-3.47, p<0.001)	2.46 (2.10-2.88, p<0.001)
Preoperative Testing	No test	7497 (94.8%)	411 (5.2%)	-	-
	Test	14056 (95.6%)	649 (4.4%)	0.84 (0.74-0.96, p=0.008)	0.86 (0.75-1.00, p=0.043)
Surgical Pathway	Non-Segregated	5040 (95.7%)	227 (4.3%)	-	-
	COVID-free	16523 (95.2%)	836 (4.8%)	1.12 (0.97-1.31, p=0.129)	1.07 (0.91-1.25, p=0.436)
SARS-CoV-2 community prevalence	Low	5564 (94.9%)	296 (5.1%)	-	-
	High	16002 (95.4%)	767 (4.6%)	0.90 (0.79-1.04, p=0.137)	1.15 (0.97-1.37, p=0.106)
Country income	High income	17754 (95.9%)	765 (4.1%)	-	-
	Upper middle income	2365 (92.1%)	203 (7.9%)	2.12 (1.76-2.54, p<0.001)	2.24 (1.83-2.73, p<0.001)
	Lower middle / Low income	1447 (93.8%)	95 (6.2%)	1.66 (1.31-2.08, p<0.001)	1.77 (1.34-2.31, p<0.001)
Interaction term	Isolation*LMIC	-	-	0.41 (0.12-1.02, p=0.089)	0.54 (0.16-1.35, p=0.240)
	Isolation*UMIC	-	-	0.78 (0.52-1.15, p=0.223)	0.65 (0.43-0.97, p=0.037)

Number in dataframe = 22636, Number in model = 22572, Missing = 64, AIC = 7900.4, C-statistic = 0.72.
ASA=American Society of Anaesthesiologists physical status classification.

Table S7: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients who were tested pre-operatively.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	33986 (98.1%)	668 (1.9%)	-	-
	Preop Isolation	20944 (98.1%)	398 (1.9%)	0.98 (0.85-1.13, p=0.759)	1.14 (0.98-1.33, p=0.080)
Age	<70 years	43028 (98.4%)	689 (1.6%)	-	-
	≥70 years	11929 (96.9%)	377 (3.1%)	1.97 (1.74-2.24, p<0.001)	1.25 (1.08-1.44, p=0.002)
Sex	Female	29053 (98.7%)	383 (1.3%)	-	-
	Male	25902 (97.4%)	683 (2.6%)	2.00 (1.76-2.27, p<0.001)	1.79 (1.57-2.04, p<0.001)
ASA physical status	Grades 1-2	40894 (99.0%)	417 (1.05)	-	-
	Grades 3-5	14056 (95.6%)	649 (4.4%)	4.53 (4.00-5.13, p<0.001)	2.41 (2.08-2.79, p<0.001)
Revised Cardiac Risk Index	0	25013 (99.2%)	204 (0.8%)	-	-
	1-2	28488 (97.5%)	743 (2.5%)	3.20 (2.74-3.75, p<0.001)	1.61 (1.29-2.00, p<0.001)
	≥3	1450 (92.4%)	119 (7.6%)	10.06 (7.96-12.67, p<0.001)	2.35 (1.74-3.17, p<0.001)
Respiratory comorbidities	No	49367 (98.3%)	850 (1.7%)	-	-
	Yes	5568 (96.3%)	216 (3.7%)	2.25 (1.93-2.62, p<0.001)	1.55 (1.32-1.82, p<0.001)
Surgical indication	Benign	41922 (98.6%)	606 (1.4%)	-	-
	Cancer	13033 (96.6%)	460 (3.4%)	2.44 (2.16-2.76, p<0.001)	1.73 (1.51-1.98, p<0.001)
Surgery grade	Minor/Intermediate	22127 (99.3%)	145 (0.7%)	-	-
	Major	32828 (97.3%)	921 (2.7%)	4.28 (3.60-5.12, p<0.001)	2.34 (1.94-2.83, p<0.001)
Anaesthesia	Local	4485 (99.5%)	21 (0.5%)	-	-
	Regional	7627 (99.2%)	59 (0.8%)	1.65 (1.02-2.78, p=0.049)	1.47 (0.89-2.53, p=0.145)
	General	42824 (97.7%)	986 (2.3%)	4.92 (3.28-7.83, p<0.001)	2.55 (1.66-4.13, p<0.001)
Surgery area	Abdominopelvic	27655 (98.3%)	480 (1.7%)	-	-
	Thoracic	6170 (98.7%)	82 (1.3%)	0.77 (0.60-0.96, p=0.027)	1.22 (0.92-1.59, p=0.161)
	Head & Neck	8201 (98.9%)	92 (1.1%)	0.65 (0.51-0.80, p<0.001)	1.30 (0.99-1.68, p=0.053)
	Limb	10110 (98.9%)	113 (1.1%)	0.64 (0.52-0.79, p<0.001)	1.13 (0.88-1.45, p=0.328)
	Other	2819 (90.4%)	299 (9.6%)	6.11 (5.26-7.09, p<0.001)	2.84 (2.41-3.34, p<0.001)
Surgical Pathway	Non-Segregated	8501 (97.6%)	211 (2.4%)	-	-
	COVID-free	46444 (98.2%)	855 (1.8%)	0.74 (0.64-0.87, p<0.001)	0.92 (0.78-1.09, p=0.315)
SARS-CoV-2 community prevalence	Low	11559 (97.9%)	249 (2.1%)	-	-
	High	43398 (98.2%)	817 (1.8%)	0.87 (0.76-1.01, p=0.065)	0.98 (0.82-1.18, p=0.836)
Country income	High income	44833 (98.3%)	796 (1.7%)	-	-
	Upper middle income	6054 (97.1%)	181 (2.9%)	1.57 (1.28-1.91, p<0.001)	2.28 (1.82-2.84, p<0.001)
	Lower middle / Low in come	4070 (97.9%)	89 (2.1%)	1.22 (0.95-1.54, p=0.111)	1.74 (1.29-2.33, p<0.001)
Interaction term	Isolation*LMIC	-	-	1.04 (0.51-1.92, p=0.905)	0.92 (0.45-1.71, p=0.798)
	Isolation*UMIC	-	-	1.25 (0.88-1.76, p=0.209)	0.89 (0.62-1.27, p=0.528)

Number in dataframe = 56049, Number in model = 55932, Missing = 117, AIC = 9187.3, C-statistic = 0.806.
ASA=American Society of Anaesthesiologists physical status classification.

Table S8: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients who were not tested pre-operatively.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	33951 (97.9%)	716 (2.1%)	-	-
	Preop Isolation	5417 (97.2%)	154 (2.8%)	1.58 (1.26-1.96, p<0.001)	1.44 (1.14-1.81, p=0.002)
Age	<70 years	32280 (98.1%)	634 (1.9%)	-	-
	≥70 years	7094 (96.8%)	237 (3.2%)	1.70 (1.46-1.98, p<0.001)	1.19 (1.00-1.41, p=0.051)
Sex	Female	21101 (98.2%)	395 (1.8%)	-	-
	Male	18273 (97.5%)	476 (2.5%)	1.39 (1.22-1.59, p<0.001)	1.26 (1.10-1.46, p=0.001)
ASA physical status	Grades 1-2	31863 (98.6%)	460 (1.4%)	-	-
	Grades 3-5	7497 (94.8%)	411 (5.2%)	3.80 (3.32-4.35, p<0.001)	2.23 (1.89-2.62, p<0.001)
Revised Cardiac Risk Index	0	18969 (98.9%)	218 (1.1%)	-	-
	1-2	19575 (97.2%)	564 (2.8%)	2.51 (2.15-2.94, p<0.001)	1.43 (1.15-1.77, p=0.001)
	≥3	807 (90.4%)	86 (9.6%)	9.27 (7.12-11.97, p<0.001)	2.61 (1.88-3.61, p<0.001)
Respiratory comorbidities	No	36309 (98.1%)	701 (1.9%)	-	-
	Yes	3031 (94.8%)	167 (5.2%)	2.85 (2.39-3.38, p<0.001)	1.89 (1.56-2.28, p<0.001)
Surgical indication	Benign	31137 (98.3%)	537 (1.7%)	-	-
	Cancer	8238 (96.1%)	334 (3.9%)	2.35 (2.04-2.70, p<0.001)	1.69 (1.45-1.97, p<0.001)
Surgery grade	Minor/Intermediate	16851 (99.1%)	159 (0.9%)	-	-
	Major	22511 (96.9%)	709 (3.1%)	3.34 (2.82-3.98, p<0.001)	1.95 (1.61-2.36, p<0.001)
Anaesthesia	Local	4772 (99.5%)	26 (0.5%)	-	-
	Regional	6876 (98.7%)	92 (1.3%)	2.46 (1.61-3.88, p<0.001)	1.92 (1.22-3.12, p=0.006)
	General	27710 (97.4%)	753 (2.6%)	4.99 (3.44-7.57, p<0.001)	2.53 (1.70-3.94, p<0.001)
Surgery area	Abdominopelvic	19596 (97.8%)	434 (2.2%)	-	-
	Thoracic	4003 (97.9%)	86 (2.1%)	0.97 (0.76-1.22, p=0.799)	1.22 (0.92-1.60, p=0.161)
	Head & Neck	5670 (98.7%)	74 (1.3%)	0.59 (0.46-0.75, p<0.001)	0.92 (0.69-1.21, p=0.545)
	Limb	8787 (98.7%)	113 (1.3%)	0.58 (0.47-0.71, p<0.001)	0.97 (0.75-1.25, p=0.822)
	Other	1305 (89.0%)	161 (11.0%)	5.57 (4.60-6.72, p<0.001)	2.68 (2.17-3.29, p<0.001)
Surgical Pathway	Non-Segregated	7302 (98.1%)	143 (1.9%)	-	-
	COVID-free	32052 (97.8%)	728 (2.2%)	1.16 (0.97-1.40, p=0.109)	1.11 (0.92-1.34, p=0.291)
SARS-CoV-2 community prevalence	Low	21291 (97.9%)	449 (2.1%)	-	-
	High	18084 (97.7%)	422 (2.3%)	1.11 (0.97-1.27, p=0.140)	1.18 (1.00-1.39, p=0.049)
Country income	High income	19121 (98.0%)	390 (2.0%)	-	-
	Upper middle income	9662 (97.5%)	251 (2.5%)	1.41 (1.17-1.68, p<0.001)	1.79 (1.48-2.17, p<0.001)
	Lower middle / Low income	10592 (97.9%)	230 (2.1%)	1.18 (0.99-1.41, p=0.067)	2.13 (1.72-2.63, p<0.001)
Interaction term	Isolation*LMIC	-	-	0.72 (0.30-1.49, p=0.424)	0.56 (0.23-1.18, p=0.163)
	Isolation*UMIC	-	-	0.70 (0.45-1.06, p=0.103)	0.57 (0.36-0.88, p=0.013)

Number in dataframe = 40284, Number in model = 40135, Missing = 149, AIC = 7493.1, C-statistic = 0.759.
ASA=American Society of Anaesthesiologists physical status classification.

Table S9: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a COVID-free pathway.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	55091 (98.1%)	1087 (1.9%)	-	-
	Preop Isolation	23440 (97.9%)	499 (2.1%)	1.19 (1.05-1.36, p=0.008)	1.23 (1.07-1.42, p=0.003)
Age	<70 years	62669 (98.3%)	1083 (1.7%)	-	-
	≥70 years	15889 (96.9%)	504 (3.1%)	1.84 (1.65-2.04, p<0.001)	1.21 (1.07-1.36, p=0.002)
Sex	Female	41764 (98.5%)	629 (1.5%)	-	-
	Male	36794 (97.5%)	958 (2.5%)	1.73 (1.56-1.91, p<0.001)	1.55 (1.40-1.73, p<0.001)
ASA physical status	Grades 1-2	62024 (98.8%)	751 (1.2%)	-	-
	Grades 3-5	16523 (95.2%)	836 (4.8%)	4.18 (3.78-4.62, p<0.001)	2.25 (2.00-2.54, p<0.001)
Revised Cardiac Risk Index	0	36300 (99.1%)	339 (0.9%)	-	-
	1-2	40595 (97.4%)	1085 (2.6%)	2.86 (2.53-3.24, p<0.001)	1.45 (1.22-1.73, p<0.001)
	≥3	1639 (91.1%)	160 (8.9%)	10.45 (8.59-12.67, p<0.001)	2.51 (1.95-3.21, p<0.001)
Respiratory comorbidities	No	71482 (98.3%)	1266 (1.7%)	-	-
	Yes	7028 (95.7%)	318 (4.3%)	2.55 (2.25-2.89, p<0.001)	1.76 (1.54-2.01, p<0.001)
Surgical indication	Benign	60358 (98.5%)	912 (1.5%)	-	-
	Cancer	18198 (96.4%)	675 (3.6%)	2.45 (2.22-2.71, p<0.001)	1.75 (1.56-1.95, p<0.001)
Surgery grade	Minor/Intermediate	33094 (99.3%)	239 (0.7%)	-	-
	Major	45450 (97.1%)	1345 (2.9%)	4.10 (3.58-4.72, p<0.001)	2.34 (2.02-2.74, p<0.001)
Anaesthesia	Local	8011 (99.5%)	43 (0.5%)	-	-
	Regional	12222 (98.9%)	130 (1.1%)	1.98 (1.41-2.83, p<0.001)	1.42 (0.99-2.08, p=0.060)
	General	58300 (97.6%)	1414 (2.4%)	4.52 (3.38-6.22, p<0.001)	2.00 (1.46-2.81, p<0.001)
Surgery area	Abdominopelvic	39933 (98.2%)	749 (1.8%)	-	-
	Thoracic	8521 (98.4%)	137 (1.6%)	0.86 (0.71-1.03, p=0.100)	1.19 (0.95-1.47, p=0.122)
	Head & Neck	11281 (98.8%)	136 (1.2%)	0.64 (0.53-0.77, p<0.001)	1.12 (0.90-1.38, p=0.304)
	Limb	15629 (98.9%)	169 (1.1%)	0.58 (0.49-0.68, p<0.001)	0.98 (0.80-1.20, p=0.837)
	Other	3179 (89.0%)	393 (11.0%)	6.59 (5.80-7.48, p<0.001)	3.10 (2.70-3.56, p<0.001)
Preoperative Testing	No test	32052 (97.8%)	728 (2.2%)	-	-
	Test	46444 (98.2%)	855 (1.8%)	0.81 (0.73-0.90, p<0.001)	0.78 (0.70-0.87, p<0.001)
SARS-CoV-2 community prevalence	Low	28704 (97.9%)	628 (2.1%)	-	-
	High	49855 (98.1%)	959 (1.9%)	0.88 (0.79-0.97, p=0.013)	1.02 (0.90-1.16, p=0.756)
Country income	High income	52443 (98.3%)	934 (1.7%)	-	-
	Upper middle income	14169 (97.4%)	383 (2.6%)	1.55 (1.34-1.79, p<0.001)	1.91 (1.64-2.23, p<0.001)
	Lower middle / Low income	11947 (97.8%)	270 (2.2%)	1.36 (1.17-1.58, p<0.001)	1.93 (1.61-2.31, p<0.001)
Interaction term	Isolation*LMIC	-	-	0.79 (0.44-1.32, p=0.398)	0.69 (0.38-1.16, p=0.190)
	Isolation*UMIC	-	-	1.05 (0.80-1.38, p=0.706)	0.84 (0.63-1.11, p=0.225)

Number in dataframe = 80200, Number in model = 79941, Missing = 259, AIC = 13550.6, C-statistic = 0.79.
ASA=American Society of Anaesthesiologists physical status classification.

Table S10: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a non-segregated pathway.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	12873 (97.7%)	299 (2.3%)	-	-
	Preop Isolation	2942 (98.2%)	55 (1.8%)	0.75 (0.54-1.02, p=0.080)	0.99 (0.71-1.37, p=0.962)
Age	<70 years	12680 (98.1%)	240 (1.9%)	-	-
	≥70 years	3150 (96.5%)	114 (3.5%)	1.91 (1.52-2.39, p<0.001)	1.25 (0.98-1.60, p=0.074)
Sex	Female	8420 (98.2%)	151 (1.8%)	-	-
	Male	7409 (97.3%)	203 (2.7%)	1.53 (1.24-1.89, p<0.001)	1.38 (1.11-1.72, p=0.004)
ASA physical status	Grades 1-2	10762 (98.8%)	127 (1.2%)	-	-
	Grades 3-5	5040 (95.7%)	227 (4.3%)	3.82 (3.07-4.77, p<0.001)	2.61 (2.00-3.42, p<0.001)
Revised Cardiac Risk Index	0	7701 (98.9%)	83 (1.1%)	-	-
	1-2	7489 (97.1%)	226 (2.9%)	2.80 (2.18-3.63, p<0.001)	1.73 (1.24-2.42, p=0.001)
	≥3	618 (93.2%)	45 (6.8%)	6.76 (4.62-9.75, p<0.001)	2.49 (1.54-3.98, p<0.001)
Respiratory comorbidities	No	14229 (98.0%)	289 (2.0%)	-	-
	Yes	1576 (96.0%)	65 (4.0%)	2.03 (1.53-2.65, p<0.001)	1.43 (1.06-1.89, p=0.016)
Surgical indication	Benign	12734 (98.2%)	233 (1.8%)	-	-
	Cancer	3096 (96.2%)	121 (3.8%)	2.14 (1.70-2.66, p<0.001)	1.52 (1.19-1.93, p=0.001)
Surgery grade	Minor/Intermediate	5900 (98.9%)	66 (1.1%)	-	-
	Major	9930 (97.2%)	288 (2.8%)	2.59 (1.99-3.42, p<0.001)	1.55 (1.17-2.07, p=0.003)
Anaesthesia	Local	1247 (99.7%)	4 (0.3%)	-	-
	Regional	2284 (99.1%)	21 (0.9%)	2.87 (1.09-9.84, p=0.054)	3.64 (1.35-12.71, p=0.021)
	General	12289 (97.4%)	329 (2.6%)	8.35 (3.56-27.03, p<0.001)	6.94 (2.90-22.74, p<0.001)
Surgery area	Abdominopelvic	7334 (97.8%)	167 (2.2%)	-	-
	Thoracic	1674 (98.2%)	31 (1.8%)	0.81 (0.54-1.18, p=0.295)	1.17 (0.74-1.78, p=0.488)
	Head & Neck	2597 (98.9%)	30 (1.1%)	0.51 (0.34-0.74, p=0.001)	0.89 (0.57-1.35, p=0.584)
	Limb	3275 (98.3%)	57 (1.7%)	0.76 (0.56-1.03, p=0.083)	1.21 (0.84-1.73, p=0.293)
	Other	950 (93.2%)	69 (6.8%)	3.19 (2.38-4.24, p<0.001)	1.63 (1.18-2.25, p=0.003)
Preoperative Testing	No test	7302 (98.1%)	143 (1.9%)	-	-
	Test	8501 (97.6%)	211 (2.4%)	1.27 (1.02-1.57, p=0.030)	1.00 (0.78-1.27, p=0.976)
SARS-CoV-2 community prevalence	Low	4156 (98.3%)	70 (1.7%)	-	-
	High	11674 (97.6%)	284 (2.4%)	1.44 (1.12-1.89, p=0.006)	1.75 (1.16-2.73, p=0.010)
Country income	High income	11565 (97.8%)	256 (2.2%)	-	-
	Upper middle income	1548 (96.9%)	49 (3.1%)	1.39 (0.99-1.92, p=0.049)	2.57 (1.76-3.69, p<0.001)
	Lower middle / Low income	2717 (98.2%)	49 (1.8%)	0.74 (0.53-1.01, p=0.069)	3.29 (1.94-5.62, p<0.001)
Interaction term	Isolation*LMIC	-	-	2.90 (0.67-8.60, p=0.090)	1.28 (0.29-3.96, p=0.703)
	Isolation*UMIC	-	-	1.00 (0.33-2.48, p=0.999)	0.78 (0.25-1.98, p=0.634)

Number in dataframe = 16194, Number in model = 16126, Missing = 68, AIC = 3120.6, C-statistic = 0.766..ASA=American Society of Anaesthesiologists physical status classification.

Table S11: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a community with high SARS-CoV-2 prevalence.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	38361 (98.0%)	773 (2.0%)	-	-
	Preop Isolation	23149 (98.0%)	470 (2.0%)	1.05 (0.92-1.19, p=0.482)	1.23 (1.08-1.41, p=0.002)
Age	<70 years	47044 (98.4%)	769 (1.6%)	-	-
	≥70 years	14523 (96.8%)	480 (3.2%)	2.02 (1.80-2.27, p<0.001)	1.26 (1.11-1.43, p<0.001)
Sex	Female	32844 (98.5%)	493 (1.55)	-	-
	Male	28722 (97.4%)	756 (2.6%)	1.75 (1.56-1.97, p<0.001)	1.57 (1.39-1.77, p<0.001)
ASA physical status	Grades 1-2	45538 (99.0%)	482 (1.0%)	-	-
	Grades 3-5	16002 (95.4%)	767 (4.6%)	4.53 (4.04-5.08, p<0.001)	2.42 (2.11-2.78, p<0.001)
Revised Cardiac Risk Index	0	28286 (99.2%)	241 (0.8%)	-	-
	1-2	31583 (97.4%)	853 (2.6%)	3.17 (2.75-3.67, p<0.001)	1.51 (1.24-1.84, p<0.001)
	≥3	1666 (91.5%)	155 (8.5%)	10.92 (8.86-13.43, p<0.001)	2.54 (1.94-3.31, p<0.001)
Respiratory comorbidities	No	55077 (98.2%)	994 (1.8%)	-	-
	Yes	6438 (96.2%)	254 (3.8%)	2.19 (1.90-2.51, p<0.001)	1.46 (1.26-1.69, p<0.001)
Surgical indication	Benign	47161 (98.5%)	705 (1.5%)	-	-
	Cancer	14406 (96.4%)	544 (3.6%)	2.53 (2.25-2.83, p<0.001)	1.70 (1.51-1.93, p<0.001)
Surgery grade	Minor/Intermediate	26126 (99.3%)	191 (0.7%)	-	-
	Major	35435 (97.1%)	1058 (2.9%)	4.08 (3.51-4.78, p<0.001)	2.17 (1.84-2.58, p<0.001)
Anaesthesia	Local	6384 (99.6%)	28 (0.4%)	-	-
	Regional	8575 (99.1%)	74 (0.9%)	1.97 (1.29-3.09, p=0.002)	1.70 (1.08-2.76, p=0.025)
	General	46582 (97.6%)	1147 (2.4%)	5.61 (3.94-8.37, p<0.001)	3.03 (2.06-4.63, p<0.001)
Surgery area	Abdominopelvic	30330 (98.1%)	589 (1.9%)	-	-
	Thoracic	6555 (98.5%)	97 (1.5%)	0.76 (0.61-0.94, p=0.014)	1.14 (0.88-1.45, p=0.317)
	Head & Neck	9516 (98.9%)	105 (1.1%)	0.57 (0.46-0.70, p<0.001)	1.04 (0.82-1.33, p=0.729)
	Limb	12223 (98.9%)	134 (1.1%)	0.56 (0.47-0.68, p<0.001)	1.02 (0.81-1.27, p=0.886)
	Other	2937 (90.1%)	324 (9.9%)	5.68 (4.93-6.53, p<0.001)	2.71 (2.33-3.16, p<0.001)
Preoperative Testing	No test	18084 (97.7%)	422 (2.3%)	-	-
	Test	43398 (98.2%)	817 (1.8%)	0.81 (0.72-0.91, p<0.001)	0.73 (0.64-0.84, p<0.001)
SARS-CoV-2 community prevalence	Low	11674 (97.6%)	284 (2.4%)	-	-
	High	49855 (98.1%)	959 (1.9%)	0.79 (0.69-0.91, p=0.001)	0.96 (0.83-1.11, p=0.546)
Country income	High income	52041 (98.1%)	1004 (1.9%)	-	-
	Upper middle income	8908 (97.6%)	220 (2.4%)	1.26 (1.06-1.50, p=0.009)	1.78 (1.46-2.15, p<0.001)
	Lower middle / Low income	618 (96.1%)	25 (3.9%)	2.09 (1.31-3.14, p=0.001)	2.54 (1.57-3.92, p<0.001)
Interaction term	Isolation*LMIC	-	-	1.17 (0.27-3.52, p=0.806)	0.89 (0.20-2.77, p=0.861)
	Isolation*UMIC	-	-	0.99 (0.69-1.39, p=0.936)	0.64 (0.44-0.92, p=0.017)

Number in dataframe = 62839, Number in model = 62603, Missing = 236, AIC = 10608, C-statistic = 0.801.
ASA=American Society of Anaesthesiologists physical status classification.

Table S12: Multivariate logistic regression model exploring the association between preoperative isolation and postoperative pulmonary complications, only for patients who underwent surgery in a community with low SARS-CoV-2 prevalence.

		No PPC	PPC	OR (univariable)	OR (multivariable)
Isolation	No Isolation	29632 (98.0%)	613 (2.0%)	-	-
	Preop Isolation	3238 (97.5%)	84 (2.5%)	1.01 (0.64-1.52, p=0.975)	0.88 (0.55-1.35, p=0.582)
Age	<70 years	28353 (98.1%)	559 (1.9%)	-	-
	≥70 years	4522 (97.0%)	139 (3.0%)	1.56 (1.29-1.88, p<0.001)	1.09 (0.88-1.35, p=0.399)
Sex	Female	17374 (98.4%)	290 (1.6%)	-	-
	Male	15500 (97.4%)	408 (2.6%)	1.58 (1.36-1.84, p<0.001)	1.44 (1.23-1.69, p<0.001)
ASA physical status	Grades 1-2	27299 (98.5%)	402 (1.5%)	-	-
	Grades 3-5	5564 (94.9%)	296 (5.1%)	3.61 (3.10-4.21, p<0.001)	2.17 (1.80-2.60, p<0.001)
Revised Cardiac Risk Index	0	15743 (98.8%)	184 (1.2%)	-	-
	1-2	16526 (97.3%)	461 (2.7%)	2.39 (2.01-2.84, p<0.001)	1.52 (1.19-1.94, p=0.001)
	≥3	592 (92.2%)	50 (7.8%)	7.23 (5.18-9.90, p<0.001)	2.11 (1.40-3.13, p<0.001)
Respiratory comorbidities	No	30683 (98.2%)	566 (1.8%)	-	-
	Yes	2171 (94.4%)	130 (5.6%)	3.25 (2.66-3.93, p<0.001)	2.36 (1.90-2.91, p<0.001)
Surgical indication	Benign	25980 (98.3%)	446 (1.7%)	-	-
	Cancer	6893 (96.5%)	252 (3.5%)	2.13 (1.82-2.49, p<0.001)	1.67 (1.40-1.99, p<0.001)
Surgery grade	Minor/Intermediate	12893 (99.1%)	115 (0.9%)	-	-
	Major	19974 (97.2%)	580 (2.8%)	3.26 (2.67-4.00, p<0.001)	2.11 (1.70-2.65, p<0.001)
Anaesthesia	Local	2877 (99.3%)	20 (0.7%)	-	-
	Regional	5949 (98.7%)	80 (1.3%)	1.93 (1.21-3.25, p=0.009)	1.54 (0.93-2.65, p=0.107)
	General	24038 (97.6%)	598 (2.4%)	3.58 (2.35-5.79, p<0.001)	1.80 (1.15-2.99, p=0.015)
Surgery area	Abdominopelvic	16980 (98.1%)	332 (1.9%)	-	-
	Thoracic	3641 (98.1%)	71 (1.9%)	1.00 (0.76-1.28, p=0.984)	1.31 (0.95-1.78, p=0.092)
	Head & Neck	4367 (98.6%)	62 (1.4%)	0.73 (0.55-0.95, p=0.022)	1.19 (0.87-1.62, p=0.267)
	Limb	6686 (98.6%)	92 (1.4%)	0.70 (0.55-0.88, p=0.003)	1.10 (0.82-1.47, p=0.524)
	Other	1192 (89.6%)	138 (10.4%)	5.92 (4.80-7.27, p<0.001)	2.98 (2.36-3.75, p<0.001)
Preoperative Testing	No test	21291 (97.9%)	449 (2.1%)	-	-
	Test	11559 (97.9%)	249 (2.1%)	1.02 (0.87-1.19, p=0.790)	0.88 (0.74-1.03, p=0.122)
SARS-CoV-2 community prevalence	Low	4156 (98.3%)	70 (1.7%)	-	-
	High	28704 (97.9%)	628 (2.1%)	1.30 (1.02-1.68, p=0.040)	1.14 (0.89-1.48, p=0.322)
Country income	High income	11983 (98.5%)	186 (1.5%)	-	-
	Upper middle income	6832 (96.9%)	218 (3.1%)	1.91 (1.54-2.37, p<0.001)	2.30 (1.83-2.89, p<0.001)
	Lower middle / Low income	14061 (98.0%)	294 (2.0%)	1.34 (1.11-1.64, p=0.003)	2.10 (1.70-2.59, p<0.001)
Interaction term	Isolation*LMIC	-	-	0.99 (0.49-1.94, p=0.983)	0.95 (0.47-1.89, p=0.893)
	Isolation*UMIC	-	-	1.54 (0.90-2.69, p=0.121)	1.66 (0.95-2.94, p=0.078)

Number in dataframe = 33615, Number in model = 33464, Missing = 151, AIC = 6062.4, C-statistic = 0.758.
ASA=American Society of Anaesthesiologists physical status classification.

Table S13: Baseline characteristics of patients by status and length of preoperative isolation.

		No Isolation (n=69436)	Isolated </= 3 days (n=6971)	Isolated 4-7 days (n=10691)	Isolated >8 days (n=9164)	p-value**
Age	<70 years	56593 (81.5%)	5361 (76.9%)	7988 (74.7%)	6698 (73.1%)	<0.001
	≥70 years	12842 (18.5%)	1610 (23.1%)	2703 (25.3%)	2466 (26.9%)	
	Missing (n)	1	0	0	0	
Sex	Female	36609 (52.7%)	3749 (53.8%)	5720 (53.5%)	4849 (52.9%)	0.206
	Male	32824 (47.3%)	3222 (46.2%)	4971 (46.5%)	4315 (47.1%)	
	Missing (n)	3	0	0	0	
ASA physical status	Grades 1-2	53452 (77.0%)	5276 (75.7%)	8248 (77.2%)	6659 (72.7%)	<0.001
	Grades 3-5	15973 (23.0%)	1691 (24.3%)	2433 (22.8%)	2501 (27.3%)	
	Missing (n)	11	4	10	4	
Revised Cardiac Risk Index	0	32045 (46.2%)	3327 (47.7%)	5051 (47.3%)	3950 (43.1%)	<0.001
	1-2	35484 (51.1%)	3518 (50.5%)	5433 (50.9%)	4951 (54.0%)	
	≥3	1881 (2.7%)	125 (1.8%)	196 (1.8%)	262 (2.9%)	
	Missing (n)	26	1	11	1	
Respiratory comorbidities	No	63651 (91.7%)	6295 (90.3%)	9371 (87.8%)	7903 (86.3%)	<0.001
	Yes	5740 (8.3%)	673 (9.7%)	1305 (12.2%)	1258 (13.7%)	
	Missing (n)	45	3	15	3	
Surgical indication	Benign	54148 (78.0%)	5519 (79.2%)	8062 (75.4%)	6478 (70.7%)	<0.001
	Cancer	15287 (22.0%)	1450 (20.8%)	2629 (24.65%)	2686 (29.3%)	
	Missing (n)	1	2	0	0	
Surgery grade	Minor/Intermediate	27716 (39.9%)	3115 (44.7%)	5201 (48.6%)	3245 (35.4%)	<0.001
	Major	41703 (60.1%)	3855 (55.3%)	5490 (51.4%)	5919 (64.6%)	
	Missing (n)	17	1	0	0	
Surgery area	Abdomen & pelvis	35115 (50.6%)	3661 (52.5%)	5099 (47.7%)	4314 (47.1%)	<0.001
	Thoracic	3264 (4.7%)	199 (2.9%)	347 (3.2%)	779 (8.5%)	
	Head & Neck	7525 (10.8%)	826 (11.9%)	1101 (10.3%)	911 (9.9%)	
	Limb	9509 (13.7%)	964 (13.8%)	1930 (18.1%)	1597 (17.4%)	
	Other	14005 (20.2%)	1320 (18.9%)	2214 (20.7%)	1563 (17.1%)	
	Missing (n)	18	1	0	0	
Anaesthesia	Local	6525 (9.4%)	855 (12.3%)	1316 (12.3%)	610 (6.7%)	<0.001
	Regional	11172 (16.1%)	1130 (16.2%)	1198 (11.2%)	1157 (12.6%)	
	General	51712 (74.5%)	4983 (71.5%)	8173 (76.5%)	7395 (80.7%)	
	Missing (n)	27	3	4	2	
SARS-CoV-2 community prevalence	Low	30282 (43.6%)	847 (12.2)%	1080 (10.1%)	1395 (15.2%)	<0.001
	High	39154 (56.4%)	6124 (87.8%)	9611 (89.9%)	7769 (84.8%)	
Country income	High income	42025 (60.5%)	6294 (90.3%)	9350 (87.5%)	7401 (80.8%)	<0.001
	Upper-middle income	13192 (19.0%)	477 (6.8%)	1144 (10.7%)	1358 (14.8%)	
	Low / Low-Middle Income	14219 (20.5%)	200 (2.9%)	197 (1.8%)	405 (4.4%)	

Percentages expressed of column total. ASA=American Society of Anaesthesiologists classification.
** p-value for Chi-square test