

Appendix 1

A multicentre study of the trend of adverse events during outpatient anaesthesia in Switzerland during 2000–2016

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Supplementary data

Table S1: Description of the dependent and independent variables.

	Variables	Groups/categories
IAEs (dependent variables)	Overall: 5 types / categories of IAE	Technical, cardiovascular, organisational, general, and respiratory events (the list of events included in each IAE type is detailed in table 4)
Patient factors	Age (5quantiles)	18–33 / 34–44 / 45–56 / 57–70 / 71–109
	Gender	Male / Female
	ASA status	1–4 ASA physical status.
	Specific groups of comorbidities	None / cardiovascular (angina, arrhythmia, heart disease, infarct, hemodynamic diathesis) / respiratory (COPD, asthma) / general (allergy, arteriopathy, cachexia, diabetes, state of shock, hypertonia, malignant hyperthermia, infection, hepatic insufficiency, renal insufficiency, obesity, endocrine system, neurological disorders) / risk factors (alcohol, smoking, steroid treatment, not fasting) / others
Anaesthesia factors	Type of anaesthesia	General / regional / combined / stand-by-MAC
	Duration of the procedures	<15 min / 15–30 min / 30 min – 1 h / 1–2 h / 2–4 h / >4 h
Surgical factors	Surgical procedures (SSAR/SGAR group of procedures)	Urology / general / gynaecology / ophthalmology / ENT / orthopaedic / neurology
	Emergency status of surgery	Elective scheduled / elective not scheduled / urgent
Hospital factors	Type of stay	Hospitalisation / ambulatory
	Year of surgical procedure	2000–2016
	Hospital	32 hospitals

ASA = American Society of Anesthesiologists; COPD = chronic obstructive pulmonary disease; IAE = intraoperative adverse event; MAC = monitored *anaesthesia* care; SSAR/SGAR = Swiss Society for Anaesthesiology and Resuscitation

Figure S1: Flowchart of included and excluded patients.

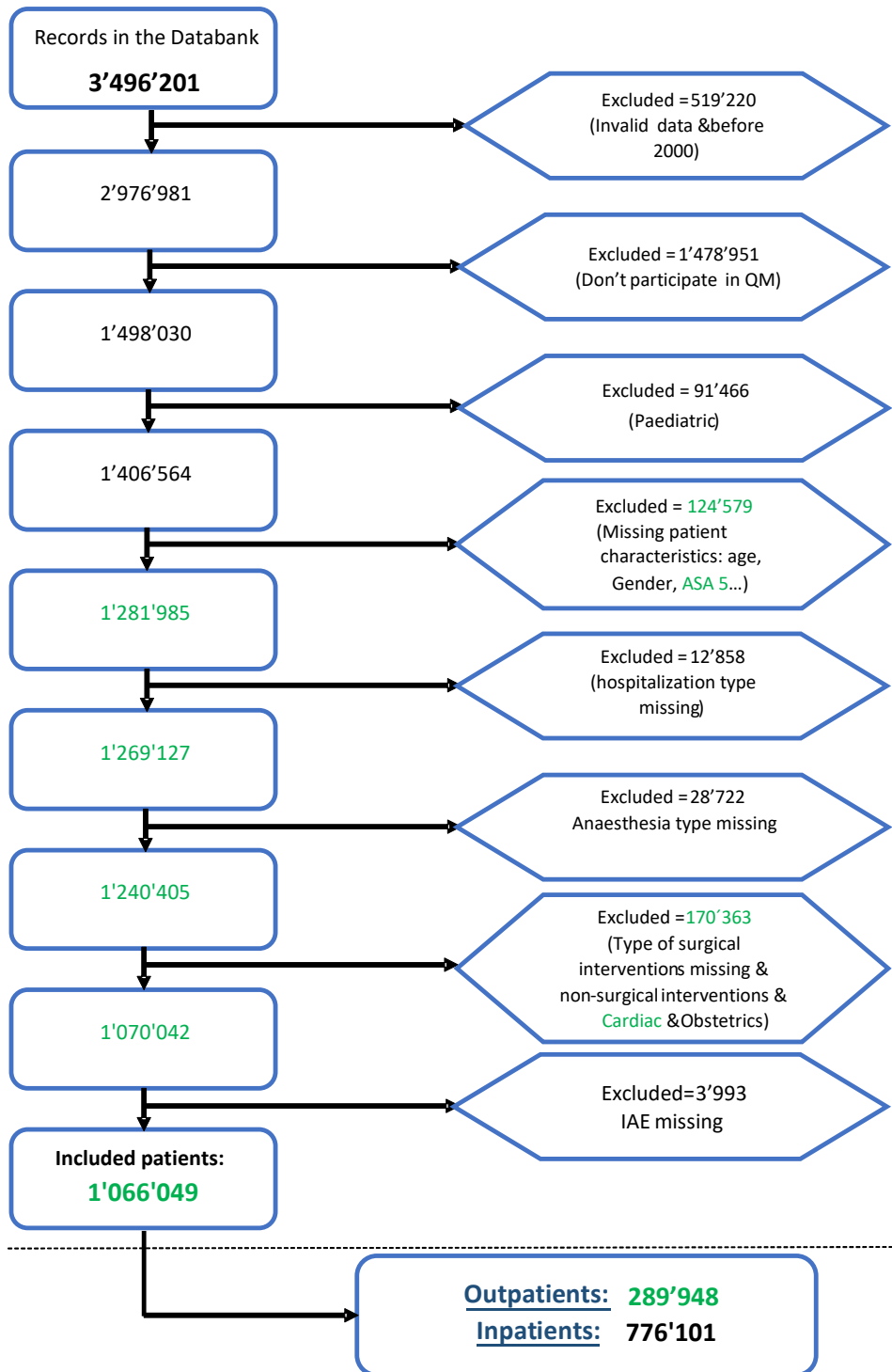


Table S2: Characteristics of inpatients and outpatients.		
	Inpatients (n = 776,101) (73%)	Outpatients (n = 289,948) (27%)
Age, years (mean ± SD) *	58 ± 19	51 ± 19
Gender female, n (%)[†]	403,597 (52)	165'589 (57)
ASA score, n (%)[†]		
1	172,144 (22)	102,756 (35)
2	395,250 (51)	151,214 (52)
3	183,528 (24)	34,076 (12)
4	25,343 (3)	1902 (<1)
Emergency level of surgery, n (%)[†]		
Elective scheduled	582,073 (75)	253,993 (87)
Elective not scheduled	31,404 (4)	7526 (3)
Urgent	162,788 (21)	28,429 (10)
Comorbidity, n (%)[†]		
None	152,876 (20)	81,642 (28)
Cardiovascular	157,764 (20)	31,695 (11)
Respiratory	72,586 (9)	18,620 (6)
General	461,999 (60)	135,221 (47)
Risk factors	209,523 (27)	69,374 (24)
Other	242,149 (31)	73,166 (25)
Anaesthesia type, n (%)[†]		
General	470,844 (61)	139,633 (48)
Regional	212,365 (27)	99,920 (34)
Combined	68,735 (9)	5087 (2)
Stand-by / MAC	24,321 (3)	45,308 (16)
Mean duration of anaesthesia (min), median (IQR)[‡]	137 (82–170)	74 (45–90)
Surgical intervention, n (%)[†]		
Urology	55,943 (8)	11,210 (4)
General	299,987 (39)	72,982 (25)
Gynaecology	67,797 (8)	52,932 (18)
Ophthalmology	10,130 (1)	29,342 (10)
ENT	31,022 (4)	17,708 (6)
Orthopaedic	297,156 (38)	103,994 (36)
Neurology	14,066 (2)	1780 (<1)
Intraoperative adverse event, n (%)[†]	129,100 (16.1)	24,892 (8.6)
ASA = American Society of Anesthesiologists; ENT = ear, nose and throat; IQR = interquartile range; MAC = monitored anaesthesia care; SD = standard deviation * Student t-test, [†] χ^2 test, [‡] Wilcoxon rank-sum test All comparisons were statistically significant ($p < 0.001$)		

Table S3: Comparison of outpatients with and without intraoperative adverse events.		
	No IAE (n = 265,056) (91.4%)	With IAE (n = 24,892) (8.6%)
Age, years (mean ± SD)*	58 ± 19)	51 ± 19
Gender female, n (%)†	153,248 (58)	12,313 (49)
ASA score, n (%)†		
1	95,323 (36)	7433 (30)
2	137,693 (52)	13,521 (54)
3	30,403 (11)	3673 (15)
4	1637 (<1)	265 (1)
Emergency level of surgery, n (%)†		
Elective scheduled	231,813 (87)	22,180 (89)
Elective not scheduled	6883 (3)	643 (3)
Urgent	26,360 (10)	2069 (8)
Comorbidity, n (%)†		
None	76,409 (29)	5216 (21)
Cardiovascular	28,271 (11)	3633 (14)
Respiratory	16,599 (6)	2041 (8)
General	122,047 (46)	13,365 (53)
Risk factors	62,673 (24)	6745 (27)
Other	66,035 (25)	7131 (29)
Anaesthesia type, n (%)†		
General	126,867 (48)	12,766 (51)
Regional	92,380 (35)	7540 (30)
Combined	3442 (1)	1645 (7)
Stand-by / MAC	42,367(16)	2941 (12)
Mean duration of anaesthesia (min), median (IQR)‡	72 (44–90)	93 (60–115)
Surgical intervention, n (%)†		
Urology	10,142 (4)	1068 (4)
General	66,588 (25)	6394 (26)
Gynaecology	49,879 (19)	3053 (12)
Ophthalmology	27,323 (10)	2019 (8)
ENT	15,032 (6)	2676 (11)
Orthopaedic	94,456 (36)	9538 (38)
Neurology	1636 (<1)	144 (<1)
ASA = American Society of Anesthesiologists; ENT = ear, nose and throat; IAE = intraoperative adverse event; IQR = interquartile range; MAC = monitored anaesthesia care		
* Student t-test, † χ^2 test, ‡ Wilcoxon rank-sum test		
All comparisons were statistically significant (p <0.001)		

Table S4: Prevalence of intraoperative adverse events (IAEs) in ambulatory surgery (n = 289,948).		
IAE groups n (%)	IAE	n (%)
Technical incidents 5494 (1.89)	Insufficient sedation: Insufficient anaesthetic technique for the completion of therapy, requiring the addition of analgesics and/or hypnotics (all anaesthesia types)	2519 (0.87)
	Technical problems: Difficulty or problem encountered during puncture, peripheral or central venous access, arterial catheter, central or peripheral blocks	2132 (0.74)
	Inappropriate premedication	154 (0.05)
	Drug error: Inappropriate drug or dose	65 (0.02)
	Patient positioning problem: Problem with positioning of the patient on the operating table (corneal lesions, bedsore, plexus lesions...)	58 (0.02)
Cardiovascular incidents 6735 (2.32)	Hypotension: Decrease of systolic arterial blood pressure >30% of baseline value for >5 min	2360 (0.81)
	Arrhythmia: New occurrence of arrhythmias (except isolated extra systolic arrhythmias) including tachycardia and bradycardia	1741 (0.60)
	Hypertension: Increase of systolic arterial blood pressure >30% of baseline value for >5 min	1618 (0.56)
	Haemodynamic instability: Hypo- and hypertension as defined above and that required administration of vasoactive drugs	328 (0.11)
	Haemorrhage: Blood loss >20% of the circulating volume (body weight × 70 ml)	77 (0.03)
	Myocardial ischaemia: Changing ECG compatible with myocardial ischaemia (ST segment) or abnormal elevation of cardiac enzymes	27 (0.01)
	Resuscitation: Cardiopulmonary resuscitation including cardiac massage	26 (0.01)
Organisational incidents 4105 (1.42)	Surgeon unavailable: Absence of the surgeon in the operating room leading to waiting time >5 min, outside hours on call	3315 (1.14)
	Equipment failure: Insufficient or no function of equipment (including weak laryngoscope light)	311 (0.11)
	Anaesthetist unavailable: Absence or insufficient presence of the anaesthetist in the operating room leading to waiting time >5 min, outside hours on call	242 (0.08)
General incidents 2771 (0.96)	Delayed wake-up: Prolonged recovery >15 min after the end of the surgery or requiring administration of an antagonist drug (naloxone or flumazenil)	2066 (0.71)
	Agitated awakening: Agitation that threatens patient safety	306 (0.11)
	Allergy: Allergic reaction from skin rash to anaphylactic shock (excluding transient skin rash at injection)	126 (0.04)
	Hypothermia: Body temperature <35.5 °C (except for cardiac surgery)	48 (0.02)
	Dental lesion: All types of lesion (avulsion, fracture)	31 (0.01)
	Oliguria: Diuresis <0.5 ml/kg/h	3 (<0.01)
Respiratory incidents 2252 (0.78)	Intubation problem: Intubation requiring help of a senior physician or use of specific equipment (laryngoscope, fibrescope, tracheotomy, etc.) or intubation >40 sec	674 (0.23)
	Bronchospasm: Based on clinical diagnosis	339 (0.12)
	Hypoxaemia: Drop of oxygen saturation <90% for >5 min or <80%	351 (0.12)
	Laryngospasm: Based on clinical diagnosis	355 (0.12)
	Vomitus-broncho aspiration: During induction or recovery if tracheal tube or whole anaesthesia if laryngeal or facial mask	271 (0.09)
Others 5349 (1.84)	Others	3599 (1.24)
	Unknown	1750 (0.6)
Overall	All IAEs	24,892 (8.6)

Table S5: Multilevel logistic regression analysis of overall intraoperative adverse events in patients undergoing ambulatory anaesthesia.				
Variables	Odds ratio	Standard error	p-value	95% confidence interval
Model constant	0.004	0.001	<0.001	0.002-0.006
Patient factors				
Age (18–33)	1			
Age (34–44)	1.01	0.023	0.593	0.97–1.06
Age (45–56)	1.08	0.024	<0.001	1.04–1.13
Age (57–70)	1.15	0.027	<0.001	1.10–1.20
Age (71–109)	1.30	0.035	<0.001	1.23–1.37
Gender (male)	1			
Gender (female)	0.86	0.013	<0.001	0.84–0.89
ASA 1	1			
ASA 2	1.01	0.022	0.764	0.97–1.05
ASA 3	1.26	0.037	<0.001	1.19–1.34
ASA 4	1.98	0.147	<0.001	1.71–2.29
No comorbidity	1			
Cardiovascular	1.39	0.078	<0.001	1.25–1.55
Respiratory	1.07	0.092	0.399	0.91–1.27
General	1.37	0.034	<0.001	1.31–1.44
Risk factors	1.30	0.034	<0.001	1.24–1.37
Other	1.55	0.040	<0.001	1.47–1.63
Anaesthesia factors				
General anaesthesia	1			
Loco-regional	0.70	0.014	<0.001	0.68–0.73
Combined	4.34	0.161	<0.001	4.04–4.67
Stand-by / MAC	0.58	0.017	<0.001	0.55–0.62
Duration (<15 min)	1			
Duration (15–30 min)	1.13	0.196	0.473	0.8–1.59
Duration (30 min – 1 h)	2.92	0.496	<0.001	2.09–4.07
Duration (1–2 h)	5.75	0.978	<0.001	4.12–8.02
Duration (2–4 h)	8.83	1.506	<0.001	6.32–12.33
Duration (>4 h)	8.98	1.613	<0.001	6.31–12.77
Surgery factors				
Elective scheduled	1			
Elective not scheduled	1.07	0.048	0.101	0.99–1.17
Urgent	1.05	0.027	0.067	1.00–1.10
General	1			
Urology	1.11	0.041	0.003	1.04–1.20
Gynaecology	1.04	0.028	0.114	0.99–1.10
Ophthalmology	1.19	0.040	<0.001	1.11–1.27
ENT	1.25	0.034	<0.001	1.19–1.32
Orthopaedic	1.01	0.021	0.571	0.97–1.05
Neurology	1.12	0.102	0.215	0.94–1.34
Hospital factor				
Lowest	0.77	0.134	0.143	0.55–1.09
⋮	⋮	⋮	⋮	⋮
Highest	14.02	3.737	<0.001	8.31–23.64

Time trend				
Year	0.979	0.003	<0.001	0.97–0.99
Year ²	0.998	<0.001	<0.001	0.997–0.998
Year ³	0.999	<0.001	0.001	0.9995–0.9998

ASA = American Society of Anesthesiologists; ENT = ear, nose and throat; MAC = monitored anaesthesia care

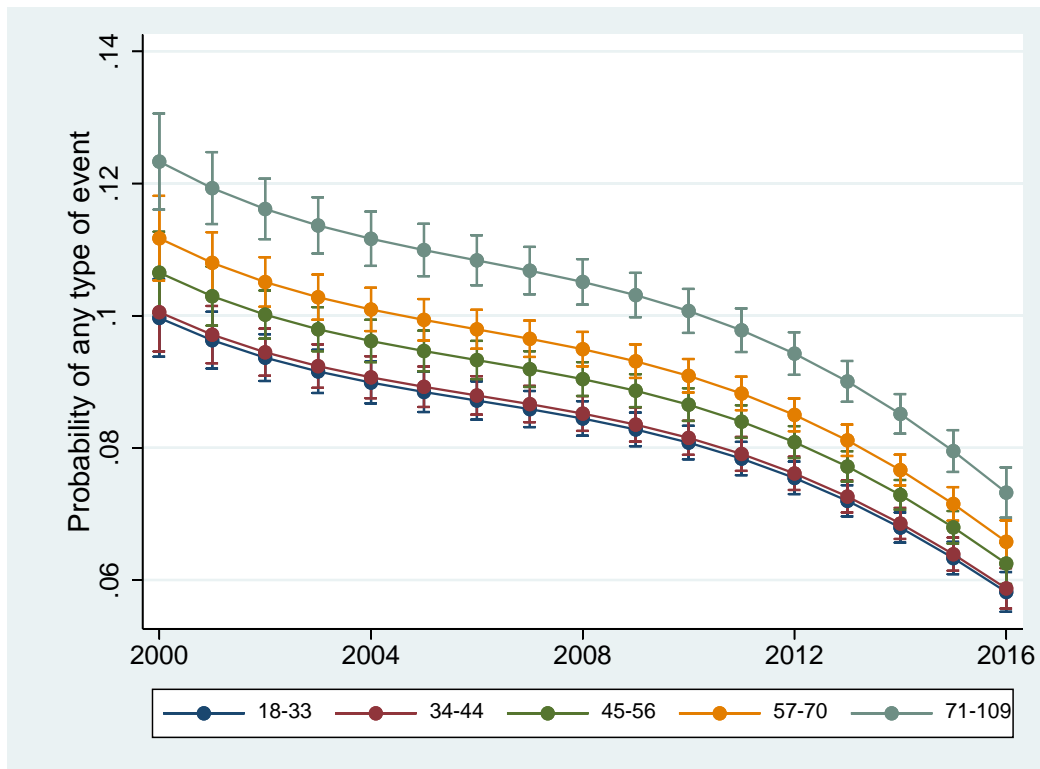


Figure S2: Probability of overall intraoperative adverse event occurrence by age.

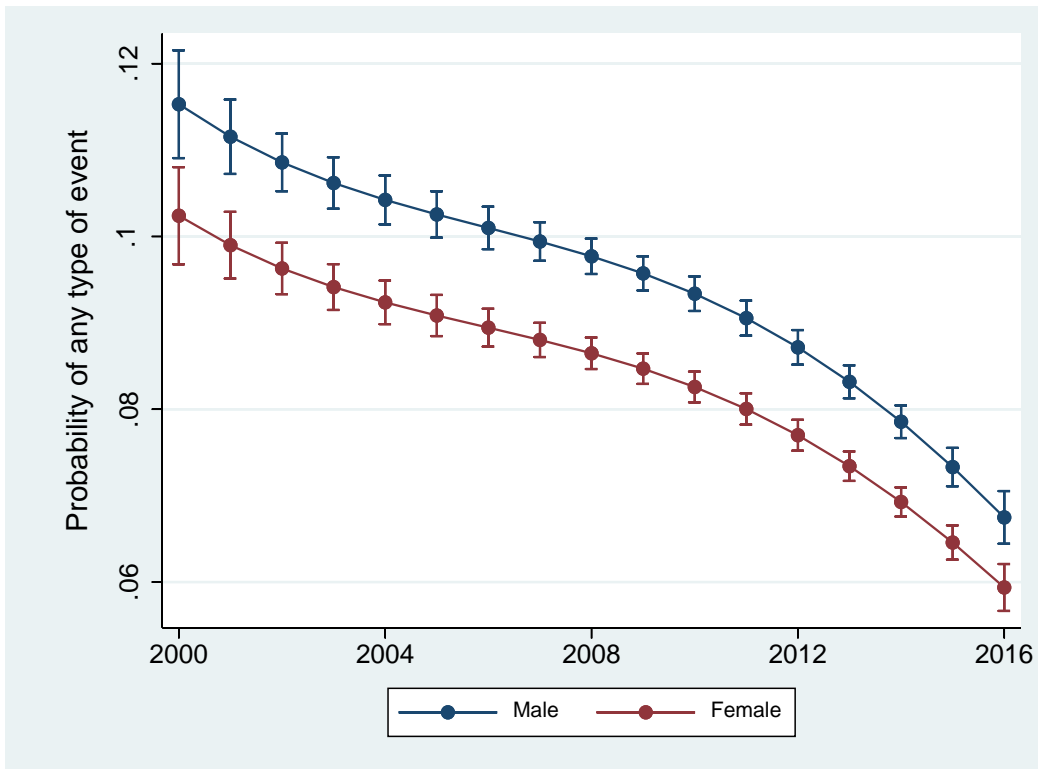


Figure S3: Probability of overall intraoperative adverse event occurrence by gender.

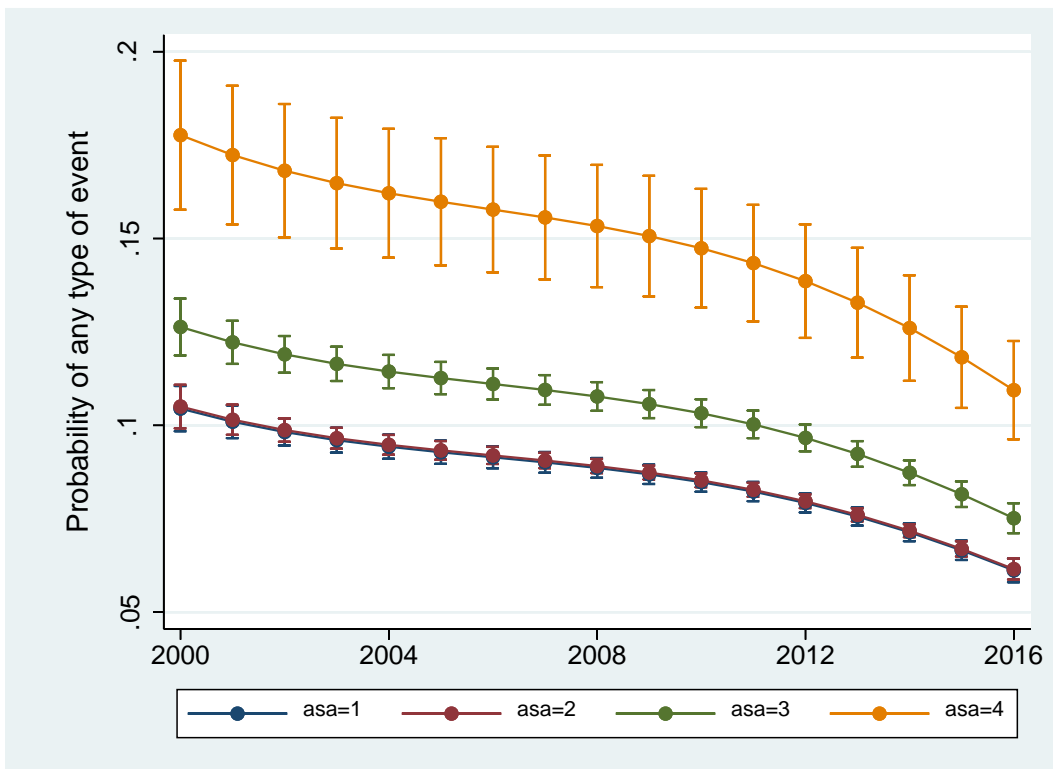


Figure S4: Probability of overall intraoperative adverse event occurrence by ASA (American Society of Anesthesiologists) score.

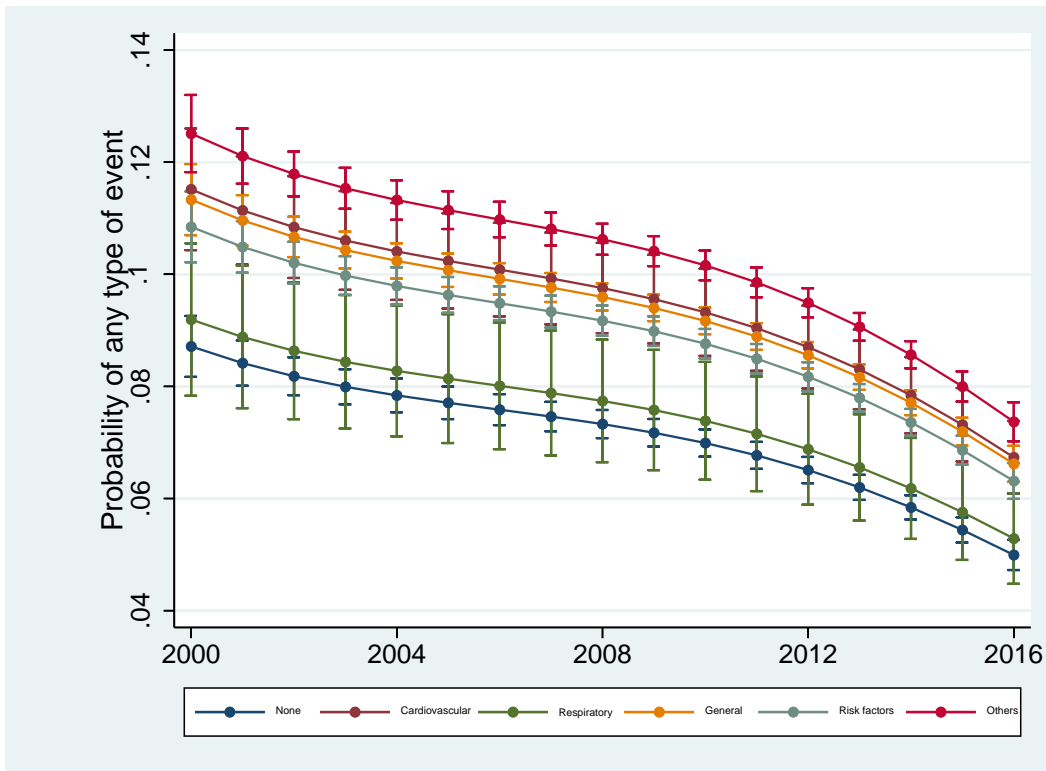


Figure S5: Probability of overall intraoperative adverse event occurrence by comorbidity.

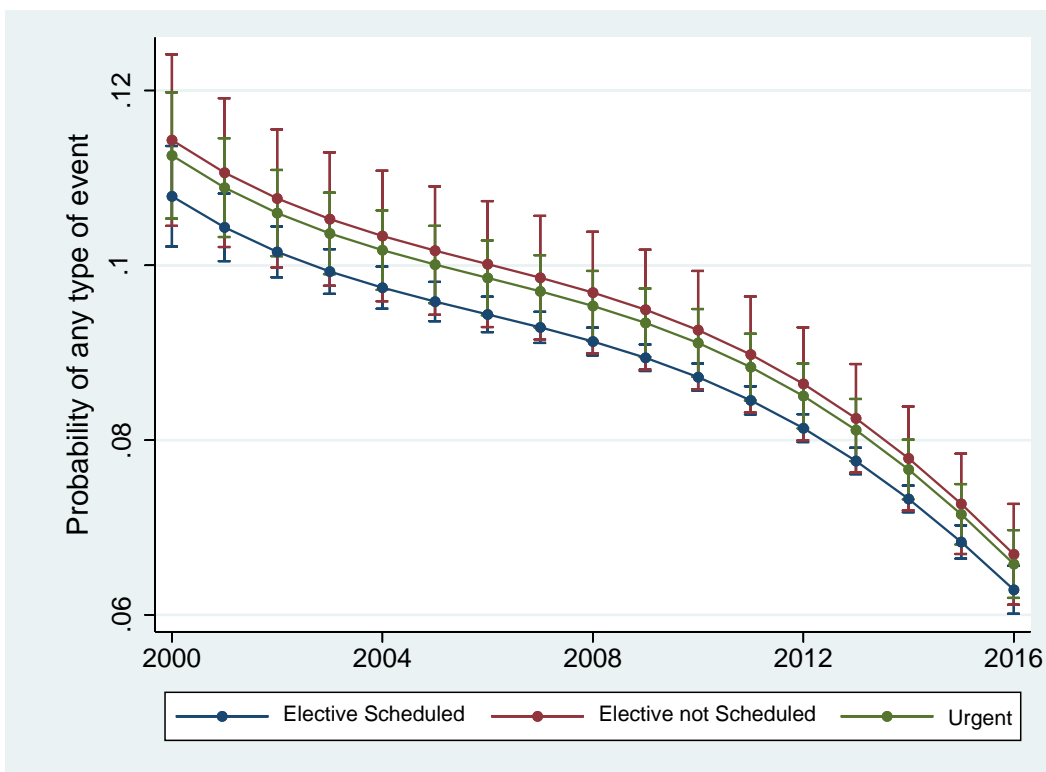


Figure S6: Probability of overall intraoperative adverse event occurrence by emergency status.

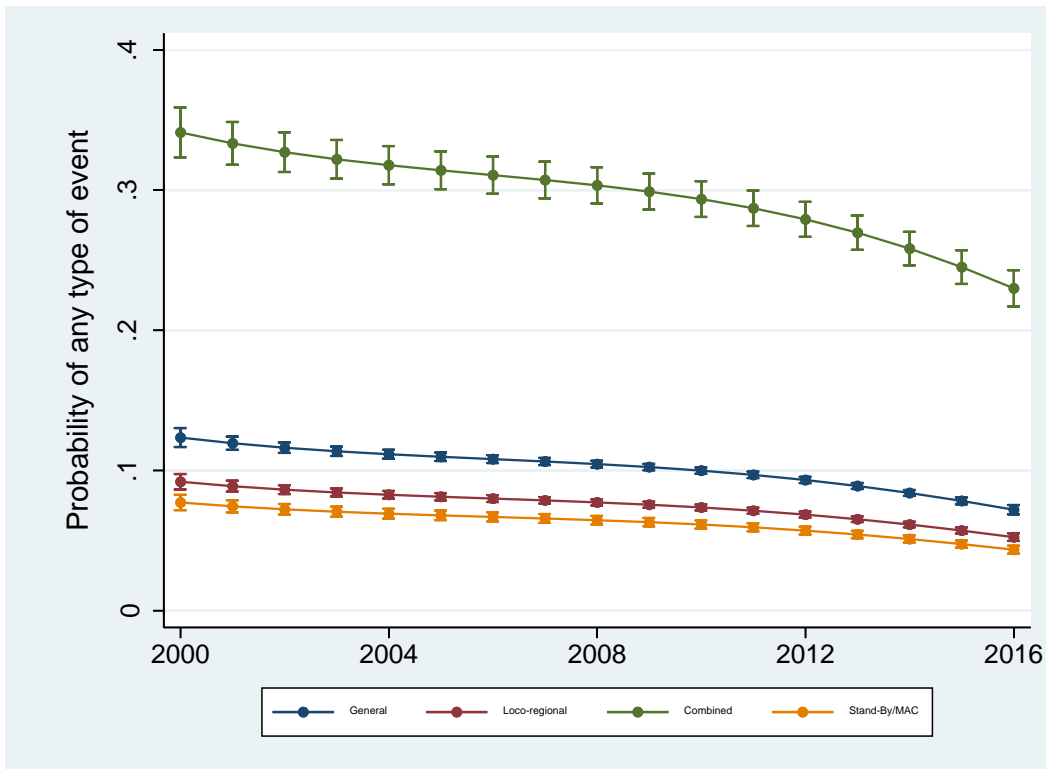


Figure S7: Probability of overall intraoperative adverse event occurrence by anaesthesia type.

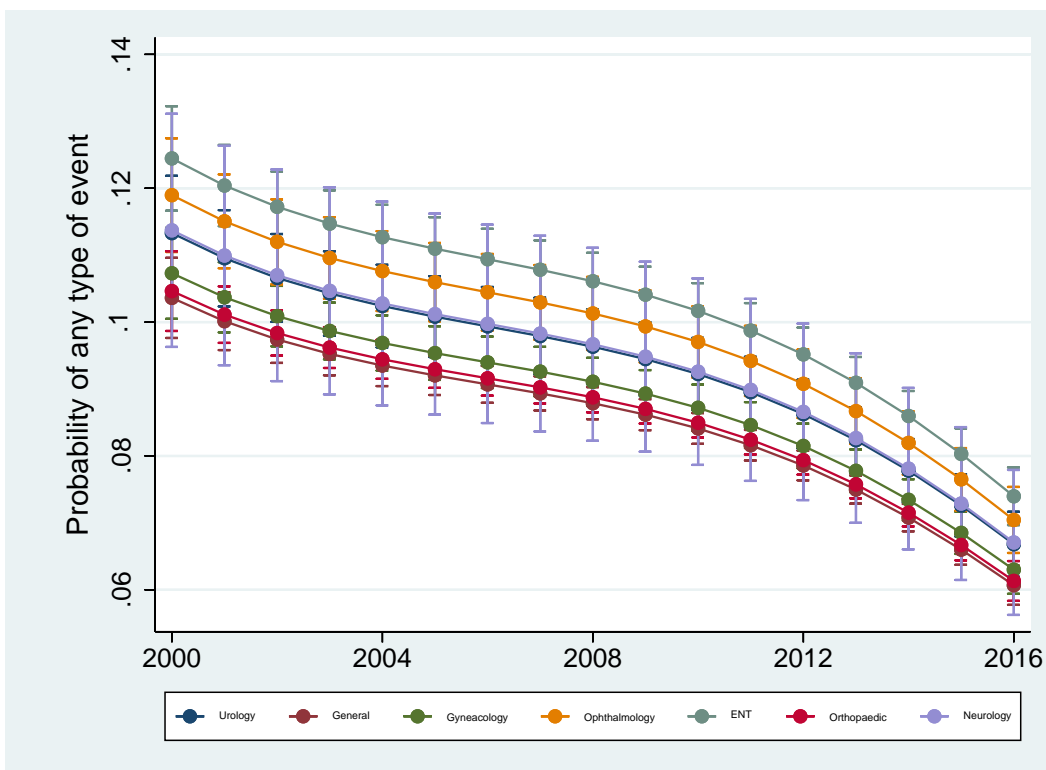


Figure S8: Probability of overall intraoperative adverse event occurrence by surgical procedure type.