



## **Appendix**

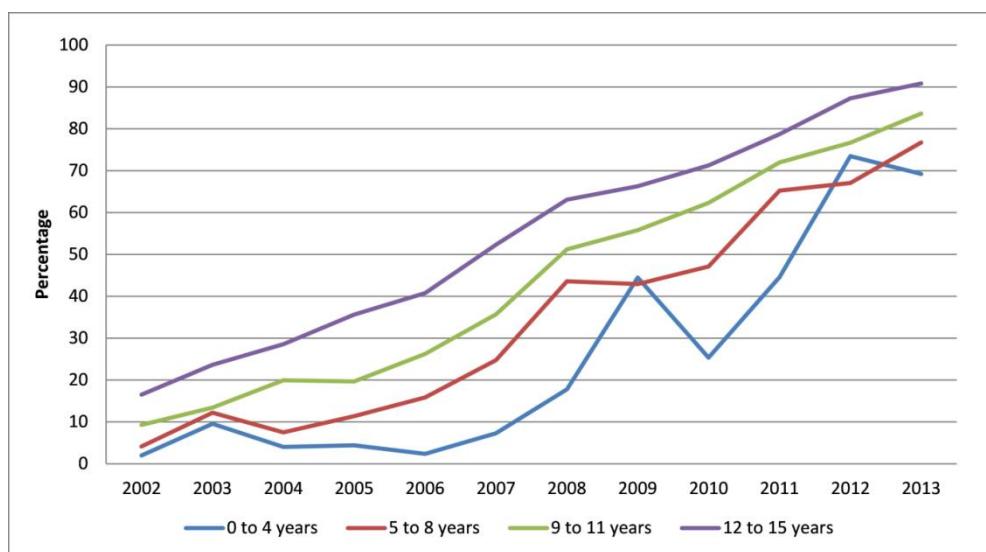
**This appendix was part of the submitted manuscript and has been peer reviewed.  
It is posted as supplied by the authors.**

Appendix to: Schneuer FJ, Adams SE, Bentley JP, et al. A population-based comparison of the post-operative outcomes of open and laparoscopic appendicectomy in children. *Med J Aust* 2018; 208: 80-85. doi: 10.5694mja17.00541.

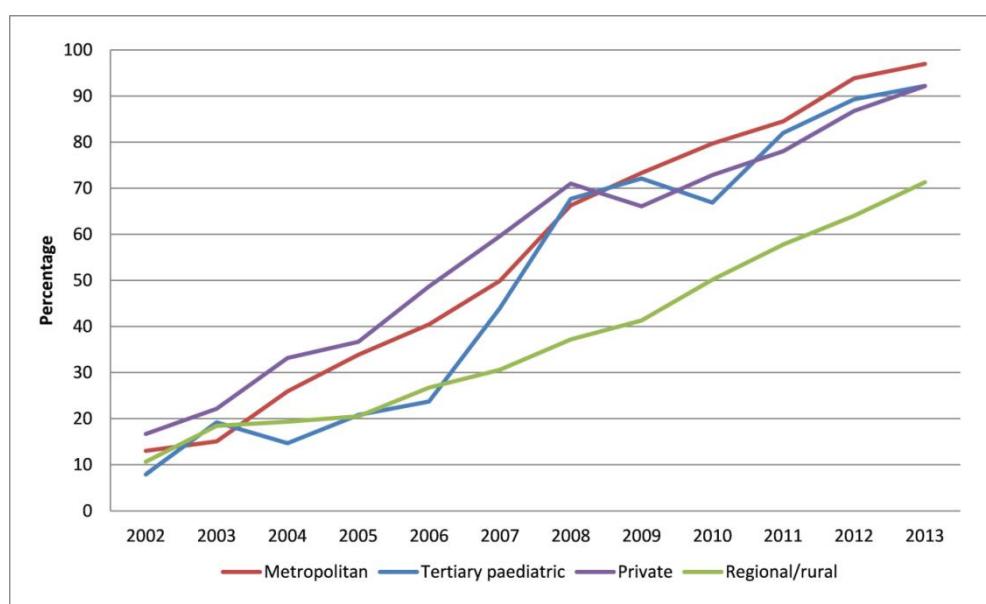
**Table 1. Diagnosis and procedure codes**

Description	ICD10-AM/ACHI code	Category
<b><u>Diagnosis</u></b>		
Acute appendicitis with generalised peritonitis	K35.0	
Acute appendicitis with peritoneal abscess	K35.1	
Acute appendicitis with generalised peritonitis	K35.2	Complicated appendicitis
Acute appendicitis with localised peritonitis	K35.3	
Acute appendicitis, other or unspecified	K35.8, K35.9	
Other or unspecified appendicitis	K36, K37	
Hyperplasia of appendix	K38.0	Uncomplicated appendicitis
Appendicular concretions	K38.1	
Other or unspecified diseases of appendix	K38.8, K38.9	
<b><u>Surgery</u></b>		
Appendectomy	30571-00	Open appendectomy
Laparoscopic appendectomy	30572-00	Laparoscopic appendectomy
<b><u>Post-operative complications during initial admission</u></b>		
Postprocedural intestinal obstruction	K91.3	Post-operative intestinal obstruction
Postprocedural respiratory disorders	J95	Post-operative respiratory complication
Disruption of operation wound	T81.3	
Infection following a procedure	T81.4	
Wound infection following a procedure	T81.41	Wound infection or sepsis
Sepsis following a procedure	T81.42	
Adverse effect of drug therapy	Y40, Y41, Y44, Y45, Y47, Y53, Y54, Y55, Y57, Y88.0, T88.6, T88.7	Adverse effects of therapeutic drugs
Postprocedural endocrine and metabolic disorders	E89	
Postprocedural disorders of nervous system	G97	
Postprocedural disorders of circulatory system	I97	
Postprocedural disorders of digestive system	K91.0, K91.1, K91.2, K91.8, K91.9	Complications of other organs or unspecified
Postprocedural disorders of genitourinary system	N99	
Complications of anaesthesia	T88.2, T88.3, T88.4, T88.5, Y48, Y70,	
Postprocedural disorders, other or unspecified	T88.8, T88.9, Z98	
<b><u>Post-operative readmissions for complications</u></b>		
Drainage of intra-abdominal abscess	30394-00	
Laparoscopic drainage of intra-abdominal abscess,	30394-01	Intra-abdominal abscess
Percutaneous drainage of intra-abdominal abscess	30224-01, 30224-02	
Paralytic ileus and intestinal obstruction	K56	Intestinal obstruction
Symptoms, signs and abnormal clinical findings	R00-R99	Symptomatic (abdominal pain, fever, nausea or vomiting)
<b><u>Post-operative ED presentations for complications</u></b>		
Wound infections	T81.41, T89.0 (ICD-9: 540.9, 686, 780.6, 782.2, 998, E78, E79)	Wound infection
Abdominal pain, vomiting or other symptoms involving the digestive system	R10, R11, R19 (ICD-9: 787.0, 789)	Symptomatic (abdominal pain, fever, nausea or vomiting)

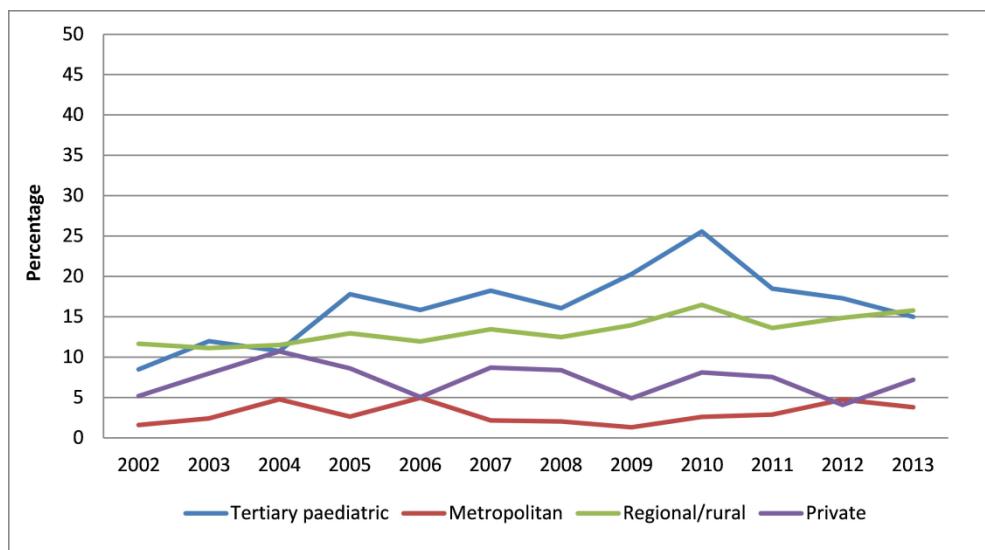
**Figure 1A: Trend in the proportion of laparoscopic appendicectomy by age groups among all paediatric appendectomies in NSW, Australia, 2002 to 2013**



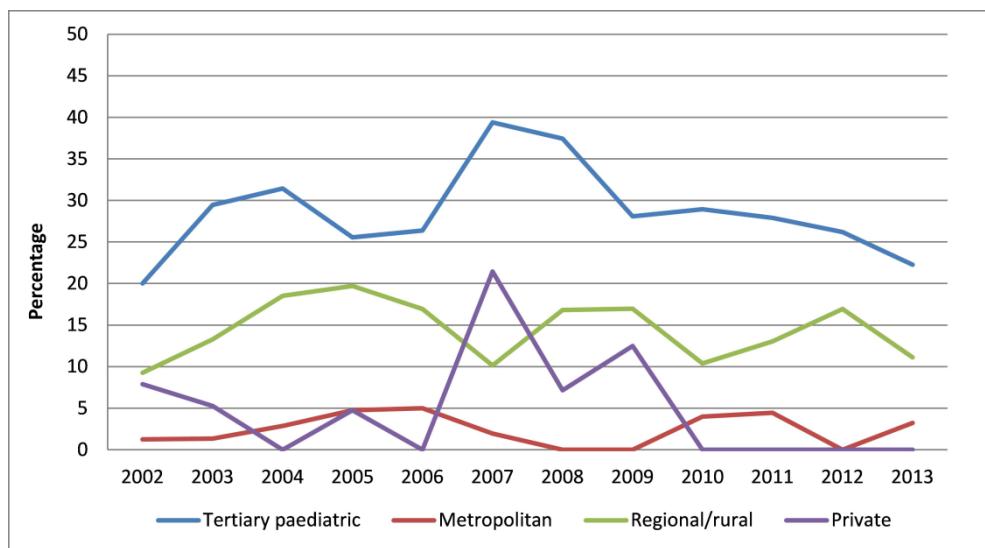
**Figure 1B: Trend in the proportion of laparoscopic appendicectomy by type of hospital among all paediatric appendectomies in NSW, Australia, 2002 to 2013**



**Figure 2A: Trend in the proportion of transfers for appendicectomy by type of hospital among children aged <9 years in NSW, Australia, 2002 to 2013**



**Figure 2B: Trend in the proportion of transfers for appendicectomy by type of hospital among children aged 9 – 15 years in NSW, Australia, 2002 to 2013**



**Table 2. Patient and surgical characteristics for appendicectomies for appendicitis in children under 16 years of age, New South Wales, 2002–2013**

Patient and surgery characteristics	Total	Open appendicectomy				Laparoscopic appendicectomy			
		2002–2013	2002–2005	2006–2009	2010–2013	2002–2013	2002–2005	2006–2009	2010–2013
All patients	23 961	12 300 (51.3%)	6108 (80.5%)	4168 (52.9%)	2024 (23.8%)	11 661 (48.7%)	1478 (19.5%)	3712 (47.1%)	6471 (76.2%)
Age (years)									
0–4	691 (2.9%)	497 (71.9%)	201 (95.3%)	165 (80.1%)	131 (47.8%)	194 (28.1%)	10 (4.7%)	41 (19.9%)	143 (52.2%)
5–8	3528 (14.7%)	2229 (63.2%)	1002 (91.3%)	768 (68.4%)	459 (35.1%)	1299 (36.8%)	96 (8.7%)	355 (31.6%)	848 (64.9%)
9–11	7448 (31.1%)	4202 (56.4%)	2145 (84.5%)	1399 (58.4%)	658 (26.2%)	3246 (43.6%)	394 (15.5%)	996 (41.6%)	1856 (73.8%)
12–15	12 294 (51.3%)	5372 (43.7%)	2760 (73.8%)	1836 (44.2%)	776 (17.6%)	6922 (56.3%)	978 (26.2%)	2320 (55.8%)	3624 (82.4%)
Sex									
Boys	13 794 (57.6%)	7726 (56.0%)	3726 (86.2%)	2690 (59.0%)	1310 (26.7%)	6068 (44.0%)	599 (13.8%)	1867 (41.0%)	3602 (73.3%)
Girls	10 167 (42.4%)	4574 (45.0%)	2382 (73.0%)	1478 (44.5%)	714 (19.9%)	5593 (55.0%)	879 (27.0%)	1845 (55.5%)	2869 (80.1%)
Socio-economic disadvantage quintile									
1 (most disadvantaged)	5237 (21.9%)	2247 (42.9%)	1239 (78.9%)	723 (42.3%)	285 (14.6%)	2990 (57.1%)	332 (21.1%)	988 (57.7%)	1670 (85.4%)
2–4	14 529 (60.6%)	7776 (53.5%)	3760 (80.4%)	2631 (55.5%)	1385 (27.1%)	6753 (46.5%)	914 (19.6%)	2113 (44.5%)	3726 (72.9%)
5 (least disadvantaged)	4082 (17.0%)	2227 (54.6%)	1083 (82.9%)	796 (57.9%)	348 (24.9%)	1855 (45.4%)	224 (17.1%)	579 (42.1%)	1052 (75.1%)
Pre-existing chronic diseases or major congenital anomalies*									
Yes	669 (2.8%)	403 (60.2%)	298 (79.7%)	70 (45.5%)	35 (24.8%)	266 (39.8%)	76 (20.3%)	84 (54.5%)	106 (75.2%)
No	23 292 (97.2%)	11897 (51.1%)	5810 (80.6%)	4098 (53.0%)	1989 (23.8%)	11395 (48.9%)	1402 (19.4%)	3628 (47.0%)	6365 (76.2%)
Coexisting diagnosis†									
Yes	1646 (6.9%)	447 (27.2%)	177 (57.5%)	142 (29.2%)	128 (15.0%)	1199 (72.8%)	131 (42.5%)	344 (70.8%)	724 (85.0%)
No	22315 (93.1%)	11853 (53.1%)	5931 (81.5%)	4026 (54.4%)	1896 (24.8%)	10462 (46.9%)	1347 (18.5%)	3368 (45.6%)	5747 (75.2%)
Hospital									
Tertiary paediatric	6125 (25.6%)	2628 (42.9%)	1251 (84.1%)	929 (46.0%)	448 (17.1%)	3497 (57.1%)	237 (15.9%)	1092 (54.0%)	2168 (82.9%)
Metropolitan	6124 (25.6%)	2740 (44.7%)	1709 (78.3%)	819 (43.0%)	212 (10.4%)	3384 (55.3%)	474 (21.7%)	1085 (57.0%)	1825 (89.6%)
Regional/rural	9356 (39.0%)	5809 (62.1%)	2426 (82.6%)	2134 (66.2%)	1249 (39.1%)	3547 (37.9%)	511 (17.4%)	1090 (33.8%)	1946 (60.9%)
Private	2356 (9.8%)	1123 (47.7%)	722 (73.8%)	286 (39.1%)	115 (17.8%)	1233 (52.3%)	256 (26.2%)	445 (60.9%)	532 (82.2%)

Demographic and clinical characteristics of patients undergoing appendectomy in England, 2015-16									
Characteristic		All patients		Age-standardised		Age-standardised		Age-standardised	
		Number	Percentage	Mean	95% CI	Mean	95% CI	Mean	95% CI
<b>Transfers from other hospitals</b>									
Yes	2888 (12.1%)	1415 (49.0%)	626 (83.5%)	539 (54.7%)	250 (21.7%)	1473 (51.0%)	124 (16.5%)	446 (45.3%)	903 (78.3%)
No	21073 (87.9%)	10885 (51.7%)	5482 (80.2%)	3629 (52.6%)	1774 (24.2%)	10188 (48.3%)	1354 (19.8%)	3266 (47.4%)	5568 (75.8%)
<b>Type of appendicitis</b>									
Uncomplicated	19336 (80.7%)	9738 (50.4%)	5072 (79.6%)	3318 (50.6%)	1348 (21.1%)	9598 (49.6%)	1300 (20.4%)	3245 (49.4%)	5053 (78.9%)
Complicated	4625 (19.3%)	2562 (55.4%)	1036 (85.3%)	850 (64.5%)	676 (32.3%)	2063 (44.6%)	178 (14.7%)	467 (35.5%)	1418 (67.7%)
<b>Season of surgery</b>									
Summer	5897 (24.6%)	3211 (54.5%)	1563 (82.5%)	1120 (56.7%)	528 (26.0%)	2686 (45.5%)	332 (17.5%)	854 (43.3%)	1500 (74.0%)
Autumn	5929 (24.7%)	3112 (52.5%)	1548 (82.4%)	1031 (53.9%)	533 (24.9%)	2817 (47.5%)	331 (17.6%)	882 (46.1%)	1604 (75.1%)
Winter	5937 (24.8%)	2973 (50.1%)	1445 (79.2%)	1004 (52.0%)	524 (24.0%)	2964 (49.9%)	380 (20.8%)	926 (48.0%)	1658 (76.0%)
Spring	6198 (25.9%)	3004 (48.5%)	1552 (78.1%)	1013 (49.1%)	439 (20.4%)	3194 (51.5%)	435 (21.9%)	1050 (50.9%)	1709 (79.6%)
<b>Day of surgery</b>									
Weekdays	18210 (76.0%)	9273 (50.9%)	4610 (80.4%)	3126 (52.1%)	1537 (23.7%)	8937 (49.1%)	1122 (19.6%)	2875 (47.9%)	4940 (76.3%)
Weekends	5751 (24.0%)	3027 (52.6%)	1498 (80.8%)	1042 (55.5%)	487 (24.1%)	2724 (47.4%)	356 (19.2%)	837 (44.5%)	1531 (75.9%)

\* Diabetes, chronic kidney disease, obesity, chronic asthma, epilepsy, heart or other major anomalies.

† Secondary diagnosis of peritoneal adhesions, Meckel diverticulum, volvulus, ileus, ovarian cysts.

**Table 3. Patient and surgical characteristics for appendicectomies for appendicitis in children under 16 years of age, New South Wales, 2002–2013; breakdown of operation types by patient and clinical characteristics**

Patient and surgery characteristics	Total	Open appendicectomy			Laparoscopic appendicectomy		
		2002–2005	2006–2009	2010–2013	2002–2005	2006–2009	2010–2013
All patients	23 961	6108	4168	2024	1478	3712	6471
Age (years)							
0–4	691 (2.9%)	201 (3.3%)	165 (4.0%)	131 (6.5%)	10 (0.7%)	41 (1.1%)	143 (2.2%)
5–8	3528 (14.7%)	1002 (16.4%)	768 (18.4%)	459 (22.7%)	96 (6.5%)	355 (9.6%)	848 (13.1%)
9–11	7448 (31.1%)	2145 (35.1%)	1399 (33.6%)	658 (32.5%)	394 (26.7%)	996 (26.8%)	1856 (28.7%)
12–15	12 294 (51.3%)	2760 (45.2%)	1836 (44.0%)	776 (38.3%)	978 (66.2%)	2320 (62.5%)	3624 (56.0%)
Sex							
Boys	13 794 (57.6%)	3726 (61.0%)	2690 (64.5%)	1310 (64.7%)	599 (40.5%)	1867 (50.3%)	3602 (55.7%)
Girls	10 167 (42.4%)	2382 (39.0%)	1478 (35.5%)	714 (35.3%)	879 (59.5%)	1845 (49.7%)	2869 (44.3%)
Socio-economic disadvantage quintile							
1 (most disadvantaged)	5237 (21.9%)	1239 (20.3%)	723 (17.3%)	285 (14.1%)	332 (22.5%)	988 (26.6%)	1670 (25.8%)
2–4	14 529 (60.6%)	3760 (61.6%)	2631 (63.1%)	1385 (68.4%)	914 (61.8%)	2113 (56.9%)	3726 (57.6%)
5 (least disadvantaged)	4082 (17.0%)	1083 (17.7%)	796 (19.1%)	348 (17.2%)	224 (15.2%)	579 (15.6%)	1052 (16.3%)
Pre-existing chronic diseases or major congenital anomalies*							
Yes	669 (2.8%)	298 (4.9%)	70 (1.7%)	35 (1.7%)	76 (5.1%)	84 (2.3%)	106 (1.6%)
No	23 292 (97.2%)	5810 (95.1%)	4098 (98.3%)	1989 (98.3%)	1402 (94.9%)	3628 (97.7%)	6365 (98.4%)
Coexisting diagnosis†							
Yes	1646 (6.9%)	177 (2.9%)	142 (3.4%)	128 (6.3%)	131 (8.9%)	344 (9.3%)	724 (11.2%)
No	22315 (93.1%)	5931 (97.1%)	4026 (96.6%)	1896 (93.7%)	1347 (91.1%)	3368 (90.7%)	5747 (88.8%)
Hospital							
Tertiary paediatric	6125 (25.6%)	1251 (20.5%)	929 (22.3%)	448 (22.1%)	237 (16.0%)	1092 (29.4%)	2168 (33.5%)
Metropolitan	6124 (25.6%)	1709 (28%)	819 (19.6%)	212 (10.5%)	474 (32.1%)	1085 (29.2%)	1825 (28.2%)
Regional/rural	9356 (39.0%)	2426 (39.7%)	2134 (51.2%)	1249 (61.7%)	511 (34.6%)	1090 (29.4%)	1946 (30.1%)
Private	2356 (9.8%)	722 (11.8%)	286 (6.9%)	115 (5.7%)	256 (17.3%)	445 (12.0%)	532 (8.2%)

Transfers from other hospitals							
Yes	2888 (12.1%)	626 (10.2%)	539 (12.9%)	250 (12.4%)	124 (8.4%)	446 (12.0%)	903 (14.0%)
No	21073 (87.9%)	5482 (89.8%)	3629 (87.1%)	1774 (87.6%)	1354 (91.6%)	3266 (88.0%)	5568 (86.0%)
Type of appendicitis							
Uncomplicated	19336 (80.7%)	5072 (83.0%)	3318 (79.6%)	1348 (66.6%)	1300 (88.0%)	3245 (87.4%)	5053 (78.1%)
Complicated	4625 (19.3%)	1036 (17.0%)	850 (20.4%)	676 (33.4%)	178 (12.0%)	467 (12.6%)	1418 (21.9%)
Season of surgery							
Summer	5897 (24.6%)	1563 (25.6%)	1120 (26.9%)	528 (26.1%)	332 (22.5%)	854 (23.0%)	1500 (23.2%)
Autumn	5929 (24.7%)	1548 (25.3%)	1031 (24.7%)	533 (26.3%)	331 (22.4%)	882 (23.8%)	1604 (24.8%)
Winter	5937 (24.8%)	1445 (23.7%)	1004 (24.1%)	524 (25.9%)	380 (25.7%)	926 (24.9%)	1658 (25.6%)
Spring	6198 (25.9%)	1552 (25.4%)	1013 (24.3%)	439 (21.7%)	435 (29.4%)	1050 (28.3%)	1709 (26.4%)
Day of surgery							
Weekdays	18210 (76.0%)	4610 (75.5%)	3126 (75.0%)	1537 (75.9%)	1122 (75.9%)	2875 (77.5%)	4940 (76.3%)
Weekends	5751 (24.0%)	1498 (24.5%)	1042 (25.0%)	487 (24.1%)	356 (24.1%)	837 (22.5%)	1531 (23.7%)

\* Diabetes, chronic kidney disease, obesity, chronic asthma, epilepsy, heart or other major anomalies.

† Secondary diagnosis of peritoneal adhesions, Meckel diverticulum, volvulus, ileus, ovarian cysts.

**Table 4. Associations between patient and surgery characteristics and any complication following appendicectomy for appendicitis in children under 16 years of age with uncomplicated appendicitis, New South Wales, 2002–2013**

\* Full model adjusted for all patient and surgery characteristics, period (years), and clustering within hospitals; † Diabetes, chronic

Characteristics	Any post-operative complication (proportion of patients in category)	Crude odds ratio (95% CI)	Adjusted odds ratio* (95% CI)
Surgery type			
Open appendicectomy	569 (5.8%)	1	1
Laparoscopic appendicectomy	708 (7.4%)	1.28 (1.14–1.44)	1.13 (0.98–1.30)
Age (years)			
0–4	32 (11.1%)	1.79 (1.32–2.43)	1.89 (1.43–2.50)
5–8	197 (7.8%)	1.23 (1.09–1.39)	1.32 (1.17–1.48)
9–11	392 (6.4%)	1.01 (0.91–1.11)	1.08 (0.97–1.20)
12–15	656 (6.3%)	1	1
Sex			
Boys	716 (6.5%)	1.03 (0.92–1.16)	1.01 (0.9–1.13)
Girls	561 (6.7%)	1	1
Socio-economic disadvantage (quintile)			
1 (most disadvantaged)	226 (6.9%)	1.05 (0.88–1.26)	1.10 (0.90–1.34)
2–4	795 (6.7%)	1.11 (0.93–1.33)	1.08 (0.91–1.29)
5 (least disadvantaged)	249 (6.0%)	1	1
Pre-existing chronic diseases or major congenital anomalies <sup>†</sup>			
Yes	51 (9.4%)	1.46 (1.13–1.88)	1.51 (1.15–1.98)
No	1226 (6.5%)	1	1
Coexisting diagnosis <sup>‡</sup>			
Yes	128 (10.9%)	1.8 (1.53–2.13)	1.69 (1.41–2.02)
No	1149 (6.3%)	1	1
Hospital			
Tertiary paediatric	307 (7.2%)	1	1
Metropolitan	336 (6.3%)	0.85 (0.67–1.09)	0.99 (0.80–1.22)
Regional/rural	538 (7.0%)	0.96 (0.78–1.19)	1.09 (0.91–1.30)
Private	96 (4.7%)	0.62 (0.51–0.75)	0.74 (0.63–0.86)
Transfers from other hospitals			
Yes	159 (7.7%)	1.18 (0.97–1.45)	1.13 (0.92–1.38)
No	1118 (6.5%)	1	1
Season of surgery			
Summer	316 (6.7%)	1	1
Autumn	323 (6.7%)	1.00 (0.89–1.12)	1.00 (0.89–1.11)
Winter	300 (6.3%)	0.94 (0.80–1.11)	0.94 (0.80–1.11)
Spring	338 (6.7%)	1.01 (0.88–1.15)	1.01 (0.87–1.16)
Day of surgery			
Weekdays	1002 (6.8%)	1	1
Weekends	275 (6.0%)	0.86 (0.72–1.02)	0.86 (0.72–1.02)

kidney disease, obesity, chronic asthma, epilepsy, heart or other major anomalies; ‡ Including secondary diagnosis of peritoneal adhesions, Meckel diverticulum, volvulus, ileus, ovarian cysts.

**Table 5. Associations between patient and surgery characteristics and any complication following appendicectomy for appendicitis in children under 16 years of age with complicated appendicitis, New South Wales, 2002–2013**

Characteristics	Any post-operative complication (proportion of patients in category)	Crude odds ratio (95% CI)	Adjusted odds ratio* (95% CI)
Surgery type			
Open appendicectomy	586 (22.9%)	1	1
Laparoscopic appendicectomy	388 (18.8%)	0.77 (0.66–0.90)	0.78 (0.68–0.90)
Age (years)			
0–4	109 (27.0%)	1.49 (0.99–2.24)	1.32 (0.95–1.83)
5–8	210 (21.1%)	1.08 (0.88–1.33)	1.06 (0.85–1.32)
9–11	281 (21.0%)	1.08 (0.94–1.23)	1.08 (0.93–1.25)
12–15	374 (19.8%)	1	1
Sex			
Boys	585 (20.6%)	1.07 (0.94–1.21)	1.09 (0.96–1.24)
Girls	389 (21.7%)	1	1
Socio-economic disadvantage (quintile)			
1 (most disadvantaged)	162 (20.1%)	1.12 (0.85–1.46)	1.01 (0.79–1.28)
2–4	606 (22.2%)	1.26 (1.00–1.59)	1.20 (0.97–1.48)
5 (least disadvantaged)	200 (18.7%)	1	1
Pre-existing chronic diseases or major congenital anomalies†			
Yes	32 (24.8%)	1.22 (0.78–1.91)	1.19 (0.77–1.84)
No	942 (21.0%)	1	1
Coexisting diagnosis‡			
Yes	156 (33.3%)	2.04 (1.68–2.47)	2.11 (1.72–2.58)
No	818 (19.7%)	1	1
Hospital			
Tertiary paediatric	407 (21.9%)	1	1
Metropolitan	174 (21.4%)	0.97 (0.78–1.21)	1.06 (0.88–1.27)
Regional/rural	349 (21.0%)	0.95 (0.80–1.12)	0.93 (0.79–1.11)
Private	44 (14.9%)	0.62 (0.55–0.71)	0.70 (0.63–0.78)
Transfers from other hospitals			
Yes	193 (23.1%)	1.15 (0.91–1.46)	1.09 (0.88–1.35)
No	781 (20.6%)	1	1
Season of surgery			
Summer	231 (19.6%)	1	1
Autumn	232 (21.1%)	1.10 (0.92–1.32)	1.09 (0.91–1.31)
Winter	252 (21.5%)	1.13 (0.98–1.31)	1.14 (0.98–1.32)
Spring	259 (22.0%)	1.16 (0.97–1.38)	1.15 (0.97–1.35)
Day of surgery			
Weekdays	731 (21.1%)	1	1
Weekends	243 (21.0%)	0.99 (0.87–1.13)	1.00 (0.88–1.14)

\* Full model adjusted for all patient and surgery characteristics, period (years), and clustering within hospitals. † Diabetes, chronic kidney disease, obesity, chronic asthma, epilepsy, heart or other major anomalies; ‡ Including secondary diagnosis of peritoneal adhesions, Meckel diverticulum, volvulus, ileus, ovarian cysts.