



HEALTH QUALITY & SAFETY
COMMISSION NEW ZEALAND
Kupu Taurangi Hauora o Aotearoa



National Cardiac Surgery Report

January to March 2017

Cardiac surgery
Surgical Site Infection Improvement Programme

SSII Surgical Site Infection
Improvement Programme

Abbreviations

ASA	American Society of Anesthesiologists
CARD	Cardiac surgery, ie, heart procedures including valves and septum, etc
CBGB	Coronary artery bypass graft with both chest and donor sites
CBGC	Coronary artery bypass graft chest site only
CHX	Aqueous chlorhexidine
CHX/Alc	Chlorhexidine in alcohol
CI	Confidence interval
Commission	Health Quality & Safety Commission
DHB	District health board
ESBL	Extended-spectrum beta-lactamases
IPC	Infection prevention and control
KTS	Knife to skin
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
NA	Not applicable
NR	Not recorded
PovI	Aqueous povidone iodine
PovI/Alc	Povidone iodine in alcohol
QSM	Quality and safety marker
SSI	Surgical site infection
SSII	Surgical Site Infection Improvement

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1 Acknowledgements

Thank you to all those who have worked so diligently to get cardiac data collected and entered on time. This helps us greatly with reporting.

Since February 2016 the Accident Compensation Corporation has supported the Commission's Surgical Site Infection Improvement (SSII) Programme to work to reduce the incidence and harm of healthcare associated infections. The funding is being used to complete the programme in public hospitals for hip and knee arthroplasty and cardiac procedures.

2 Summary of findings

This report presents the results of the cardiac SSII Programme for the period 1 January to 31 March 2017. It also provides cumulative data from 1 October 2014 to 31 March 2017.

All five district health boards (DHBs) performing cardiac surgery submitted all procedures for the reporting period.

Paediatric surgical site infection (SSI) data began to be collected in January 2016.

2.1 January to March 2017

During this surveillance period:

- DHBs performed 693 cardiac procedures
- there were 30 SSIs, a rate of 4.3 percent (95 percent confidence interval (CI) 3.0–6.1). Of the 30 SSIs, three were from paediatric procedures (10 percent) and 27 from adult procedures (90 percent)
- most SSIs, 19 (63 percent), were superficial. Eleven (37 percent) involved only the donor site. There were 18 (60 percent) SSIs involving only the chest site; eight were superficial, seven deep and three organ space. There was one procedure with both a chest and donor site deep SSI
- 14 (47 percent) SSIs had staphylococci isolated. There were 13 *Staphylococcus aureus* SSIs (43 percent)
- not all data points were collected but 'not recorded' and 'unknown' data points are reducing over time.

2.2 Cumulative findings

The cumulative procedure total was 4,327 with 210 SSIs, 4.9 percent (95 percent CI 4.3–5.5). This total consists of 3,914 adult procedures performed between October 2014 and March 2017, and 413 paediatric procedures between January 2016 and March 2017.

3 Change in reporting format

3.1 Details of the SSIs expanded

The table in section 10, which details the procedures with reported SSIs, now includes the site of the SSI and states whether each procedure was compliant with the dose quality and safety marker (QSM).

4 Procedures and SSI rates

Procedures are reported in three procedure groups:

- cardiac surgery, ie, heart procedures including valves and septum, etc (CARD)
- coronary artery bypass graft with both chest and donor site (CBGB)
- coronary artery bypass graft chest site only (CBGC).

4.1 Procedures by DHB and SSI rates, January to March 2017

DHB	Procedures			
	Total	CARD	CBGB	CBGC
Auckland adult	260	127	125	8
Auckland paediatric	73	73	0	0
Canterbury	56	13	41	2
Capital & Coast	139	48	83	8
Southern	46	13	31	2
Waikato	119	31	82	6
Total	693	305	362	26
No of SSIs	30	6	22	2
SSI rate	4.3	2.0	6.1	7.7
95% CI	3.0–6.1	0.9–4.2	4.0–9.0	2.1–24.1

4.2 Cumulative SSI rates by procedure, October 2014 to March 2017

Results are based on adult procedures between October 2014 and March 2017 and paediatric procedures between January 2016 and March 2017.

	Procedures			
	Total	CARD	CBGB	CBGC
Procedures	4,327	1,756	2,407	164
No of SSIs	210	58	147	5
SSI rate	4.9	3.3	6.1	3.0
95% CI	4.3–5.5	2.6–4.2	5.2–7.1	1.3–6.9

4.3 Rates by SSI type

For the reporting period, most SSIs, 20 (67 percent), were superficial. Ten (33 percent) involved only the donor site. There were 19 (63 percent) SSIs involving only the chest site; 10 were superficial, six deep and three organ space. There was one procedure with both a chest and donor site SSI.

4.3.1 Rates by SSI type, January to March 2017

Results are based on 693 adult and paediatric procedures for January to March 2017.

SSI type	No of SSIs	%	95% CI
Superficial	19	2.7	1.8–4.2
Deep	8	1.2	0.6–2.3
Organ space	3	0.4	0.1–1.3
Total	30	4.3	3.0–6.1

4.3.2 Cumulative SSI rates by SSI type, October 2014 to March 2017

Results are based on 3,914 adult procedures between October 2014 and March 2017 and 413 paediatric procedures between January 2016 and March 2017 (total procedures 4327).

SSI type	No of SSIs	%	95% CI
Superficial	140	3.2	2.7–3.8
Deep	49	1.1	0.9–1.5
Organ space	21	0.5	0.3–0.7
Total	210	4.9	4.3–5.5

SSI type description: For full SSI definitions please refer to the [SSII Programme cardiac implementation manual](#).

Superficial SSI: Infection occurs within 30 days of an operation and involves only skin and subcutaneous tissue of the incision.

Deep SSI: Infection occurs within 90 days of an operation and involves deep soft tissues of the incision, ie, fascia and muscle layers.

Organ space SSI: Infection occurs within 90 days of an operation and involves any part of the body that is opened or manipulated during the operative procedure excluding the skin incision, fascia or muscle layers. For cardiac surgery this includes myocarditis, pericarditis, mediastinitis, sternal osteomyelitis and endocarditis.

4.4 SSIs by DHB, October 2014 to March 2017

DHB	Procedures Jan–Mar 17	No of SSIs*	%	95% CI	Cumulative procedures Oct 14–Mar 17	No of cumulative SSIs*	%	Cumulative 95% CI
Auckland adult	260	13	5.0	2.9–8.4	2,203	92	4.2	3.4–5.1
Auckland paediatric	73	3	4.1	1.4–11.4	413	35	8.5	6.2–11.6
Canterbury	56	2	3.6	1.0–12.1	613	25	4.1	2.8–6.0
Capital & Coast	139	3	2.2	0.7–6.2	333	9	2.7	1.4–5.1
Southern	46	2	4.3	1.2–14.5	387	31	8.0	5.7–11.1
Waikato	119	7	5.9	2.9–11.6	378	18	4.8	3.0–7.4
Total	693	30	4.3	3.0–6.1	4,327	210	4.9	4.3–5.5

* SSI data collection for paediatric procedures started on 1 January 2016 therefore the number in the table represents paediatric procedures from that date. Data collection for Capital & Coast DHB and Waikato DHB started on 1 July 2016.

4.5 Procedures: graft donor sites, January to March 2017

Procedure	Graft donor site					Total
	Internal mammary	Arm	Leg	Other	Not applicable	
CARD	0	0	0	0	305	305
CBGB	0	22	314	26	0	362
CBGC	26	0	0	0	0	26
Total	26	22	314	26	305	693

4.6 SSI rates by wound site, January to March 2017

During this surveillance period there were 30 SSIs; one procedure had an SSI at both donor (leg) and chest sites.

Site	Procedures	No of SSIs	%	95% CI
Leg*	314	11	3.5	2.0–6.2
Arm	22	0	0.0	0.0–14.9
Other	26	1	3.8	0.7–18.9
Chest**	693	19	2.7	1.8–4.2

* Assumes only a unilateral leg incision for saphenous vein grafts.

** Two internal mammary graft procedures had SSIs; one organ space and one superficial.

4.7 Cumulative SSI rates by wound site, October 2014 to March 2017

Results are based on adult procedures between October 2014 and March 2017 and paediatric procedures between January 2016 and March 2017. During this period there were 210 SSIs. Five procedures had an SSI at both donor and chest site.

Site	Procedures	No of SSIs	%	95% CI
Leg*	2,119	91	4.3	3.5–5.2
Arm	199	2	1.0	0.3–3.6
Other	89	3	3.4	1.2–9.4
Chest**	4,327	119	2.8	2.3–3.3

* Assumes only a unilateral leg incision for saphenous vein grafts.

** Five internal mammary graft procedures had an SSI.

5 Timing of antibiotic prophylaxis

The SSII Programme QSM for timing of prophylaxis for cardiac procedures is 100 percent 'on time' (0–60 minutes before knife to skin (KTS)).

Over the reporting period, 97 percent of procedures had prophylaxis given on time. Canterbury, Capital & Coast and Southern DHBs achieved the QSM. One percent had prophylaxis early.

5.1 Antibiotic prophylaxis timing rates, January to March 2017

DHB	Total	Total 'on time'	%*	More than 1 hour before KTS	After KTS	Not recorded
Auckland adult	260	250	96	7	3	0
Auckland paediatric	73	72	99	1	0	0
Canterbury	56	56	100	0	0	0
Capital & Coast	139	139	100	0	0	0
Southern	46	46	100	0	0	0
Waikato	119	113	95	1	3	2
Total	693	676	98	9	6	2
				1%	0.9%	0.3%

* To calculate the percentage 'on time', those with timing not recorded are included in the denominator, ie, number of procedures performed.

6 Dosing of cefazolin prophylaxis

The SSII Programme antibiotic prophylaxis of choice is ≥ 2 g or more of cefazolin for adults and ≥ 30 mg/kg of cefazolin for paediatric patients, not to exceed the adult dose. The QSM target is that either dose is used in at least 95 percent of procedures.

6.1 Cefazolin prophylaxis rates for adult patients, January to March 2017

Over the reporting period, 98 percent of adult procedures used ≥ 2 g cefazolin. All DHBs met the QSM.

DHB	Total	Cefazolin used as prophylaxis	Doses used				% ≥ 2 g
			1 g	2 g	≥ 3 g	Not recorded	
Auckland adult	260	255	2	232	21	0	97
Canterbury	56	56	0	56	0	0	100
Capital & Coast	139	138	0	135	3	0	99
Southern	46	46	2	44	0	0	96
Waikato	119	116	0	109	7	0	97
Total	620	611	4	576	31	0	98
		99%	0.6%	93%	5%	0.0%	

6.2 Cefazolin prophylaxis rates for paediatric patients, January to March 2017

Over the reporting period, 85 percent of paediatric procedures used ≥ 30 mg/kg of cefazolin.

DHB	Total	Cefazolin used as prophylaxis	< 30 mg/kg	≥ 30 mg/kg	Not recorded	% ≥ 30 mg/kg
Auckland paediatric	73	73	2	71	0	97
		100%	3%	97%	0.0%	

7 Duration of antibiotic prophylaxis after surgery

Surgical antimicrobial prophylaxis should be stopped within 48 hours of cardiac surgery. Six doses of cefazolin, given every eight hours after surgery, is accepted as stopping within 48 hours of surgery.

All Capital & Coast DHB and Auckland DHB adult and paediatric procedures had prophylaxis stopped within 48 hours. Canterbury DHB's compliance rate is lower because incomplete data was submitted.

7.1 Antibiotic prophylaxis rates, January to March 2017

DHB	Total	≤ 48 hr	% ≤ 48 hr	> 48 hr	Unknown or not recorded
Auckland adult	260	260	100	0	0
Auckland paediatric	73	73	100	0	1
Canterbury	56	3	5	2	51
Capital & Coast	139	139	100	0	0
Southern	46	43	93	3	0
Waikato	119	109	92	10	0
Total	693	627	90	15	52
				2%	7.5%

8 Skin preparation agents

The SSII Programme QSM for skin antisepsis is use of an alcohol-based preparation in 100 percent of procedures.

Auckland (paediatric procedures), Canterbury, Capital & Coast and Waikato DHBs met this target. The use of aqueous chlorhexidine has prevented Auckland DHB (adult procedures) from meeting this QSM.

8.1 Skin preparation rates, January to March 2017

DHB	Total	Skin preparation						
		CHX/ Alc	Povl/ Alc	Alcohol- based	%	Povl	Other	Not recorded
Auckland adult	260	244	15	259	99.6	0	1	0
Auckland paediatric	73	73	0	73	100	0	0	0
Canterbury	56	56	0	56	100	0	0	0
Capital & Coast	139	0	139	139	100	0	0	0
Southern	46	1	45	46	100	0	0	0
Waikato	119	96	23	119	100	0	0	0
Total	693	470	222	692	99.9	0	1	0
						0.0%	0.1%	0.0%

CHX/Alc = chlorhexidine in alcohol

Povl = aqueous povidone iodine

Povl/Alc = povidone iodine in alcohol

9 Risk scores and SSI rates

The American Society of Anesthesiologists (ASA) score is a global score that assesses the physical status of patients before surgery. It has five classes, from 1 (a normal healthy patient) up to 5 (a moribund patient not expected to survive).

(See *ANZ Journal of Surgery*, www.anzjsurg.com/view/0/ASA_score.html.)

The SSI risk index is a score used to predict a surgical patient's risk of acquiring an SSI.

Total surgical risk score = ASA score (ASA > 2, score 1)

+ surgical wound score (contaminated or dirty wounds, score 1)

+ operation duration score (CBGC procedure > 4 hours, score 1; CBGB and CARD > 5 hours, score 1).

9.1 ASA score and SSI rates, January to March 2017

ASA score	1	2	3	4	5	Not recorded	Total
Procedures	1	15	286	386	2	3	693
No of SSIs	0	0	11	19	0	0	30
SSI rate	0.0	0.0	3.8	4.9	0.0	0.0	4.3
95% CI	0.0–79.3	0.0–20.4	2.2–6.8	3.2–7.6	0.0–65.8	0.0–56.1	3.0–6.1

9.2 Cumulative ASA score and SSI rates, October 2014 to March 2017

Results are based on adult procedures between October 2014 and March 2017 (n=3914) and paediatric procedures between January 2016 and March 2017 (n=413), total procedures 4,327.

ASA score	1	2	3	4	5	Not recorded	Total
Procedures	5	72	1,709	2,521	14	6	4,327
No of SSIs	0	0	81	129	0	0	210
SSI rate	0.0	0.0	4.7	5.1	0.0	0.0	4.9
95% CI	0.0–43.4	0.0–5.1	3.8–5.9	4.3–6.0	0.0–21.5	0.0–39.0	4.3–5.5

9.3 Total surgical risk score and SSI rates, January to March 2017

Total risk score	0	1	2	3	Not recorded	Total
Procedures	16	583	91	0	3	693
No of SSIs	0	29	1	0	0	30
SSI rate	0.0	5.0	1.1	0.0	0.0	4.3
95% CI	0.0–19.4	3.5–7.1	0.2–6.0	NA	0.0–56.1	3.0–6.1

9.4 Cumulative total surgical risk score and SSI rates, October 2014 to March 2017

Results are based on adult procedures between October 2014 and March 2017 (n=3914) and paediatric procedures between January 2016 and March 2017 (n=413), total procedures 4,327.

Total risk score	0	1	2	3	Not recorded	Total
Procedures	73	3,106	1142	0	6	4,327
No of SSIs	0	129	81	0	0	210
SSI rate	0.0	4.2	7.1	0.0	0.0	4.9
95% CI	0.0–5.0	3.5–4.9	5.7–8.7	NA	0.0–39.0	4.3–5.5

10 Timeline of future reports

Surveillance period	90-day follow-up ends	All data entered by	Draft report circulated for feedback	Final report circulated	Commission QSM publication
Apr–Jun 2017	30 Sep 2017	31 Oct 2017	Early Nov 2017	Dec 2017	15 Dec 2017
Jul–Sep 2017	31 Dec 2017	31 Jan 2018	Early Feb 2018	Mar 2018	31 Mar 2018
Oct–Dec 2017	30 Mar 2018	30 Apr 2018	Early May 2018	Jun 2018	30 Jun 2018
Jan–Mar 2018	30 Jun 2018	31 Jul 2018	Early Aug 2018	Sep 2018	30 Sep 2018

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