Quality and safety markers update, July–September 2018

Falls

Nationally, 91 percent of older patients* were assessed on their falls risk in quarter 3, 2018. The rate has remained around the expected achievement level of 90 percent since quarter 4, 2013, despite some variations in a few quarters. At the district health board (DHB) level, 12 out of 20 DHBs achieved the expected marker level. This includes Hauora Tairāwhiti, which reported a noticeable improvement from 76 percent to 92 percent this quarter.

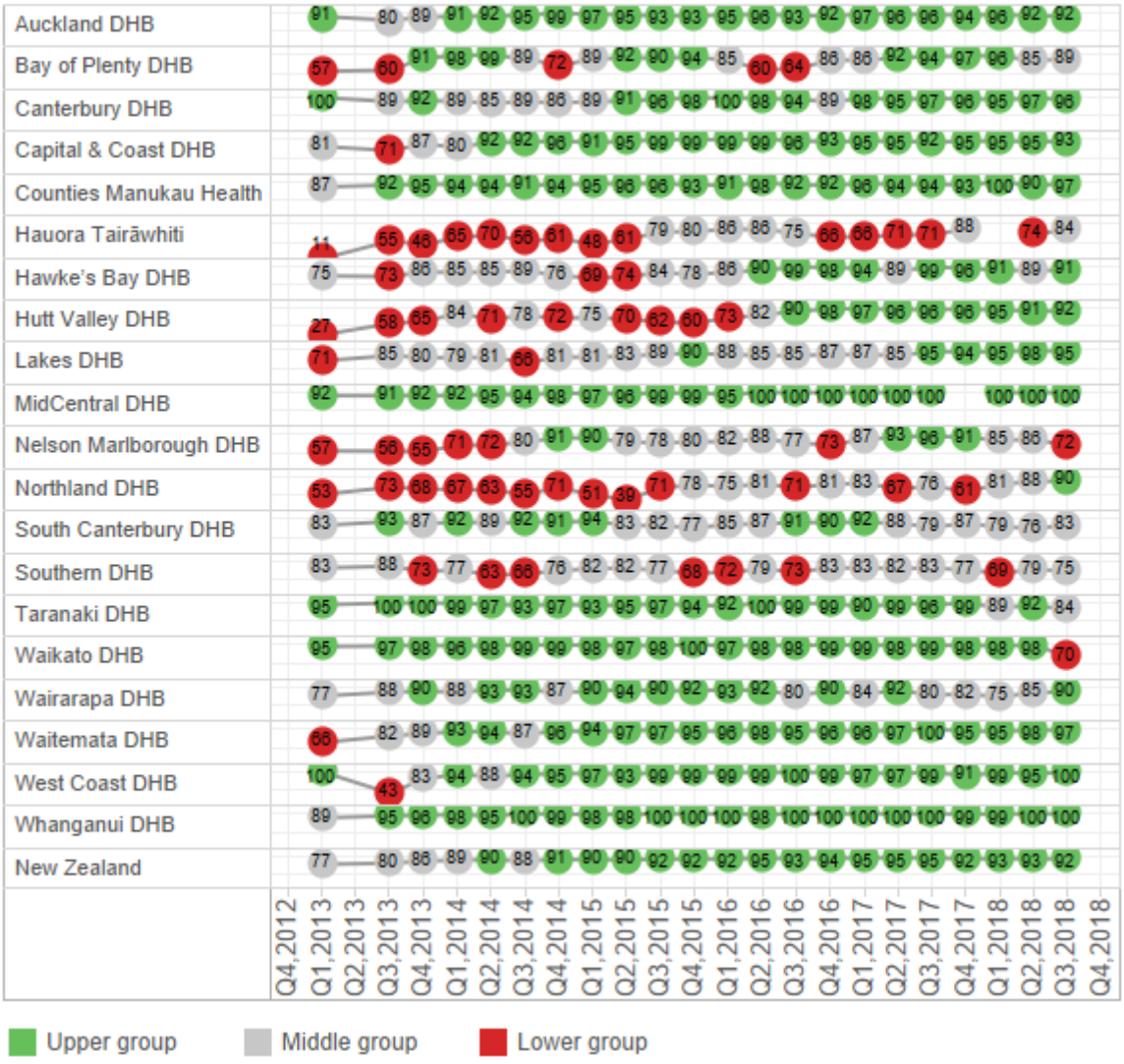
Figure 1: Process marker, percentage of older patients assessed for the risk of falling

- Upper group: ≥ 90 percent
- Middle group: 75–89 percent
- Lower group: < 75 percent

* Patients aged 75+ (55+ for Māori and Pacific peoples)

About 92 percent of patients assessed as being at risk of falling had an individualised care plan completed. This measure has increased 15 percentage points compared with the baseline in quarter 1, 2013. Achievements at DHB level vary but, overall, where patients have been assessed to be at risk of falling, completion of individualised care plans for that population group need to be at a consistently high level. In quarter 3, 2018, there are 13 DHBs in the upper group.

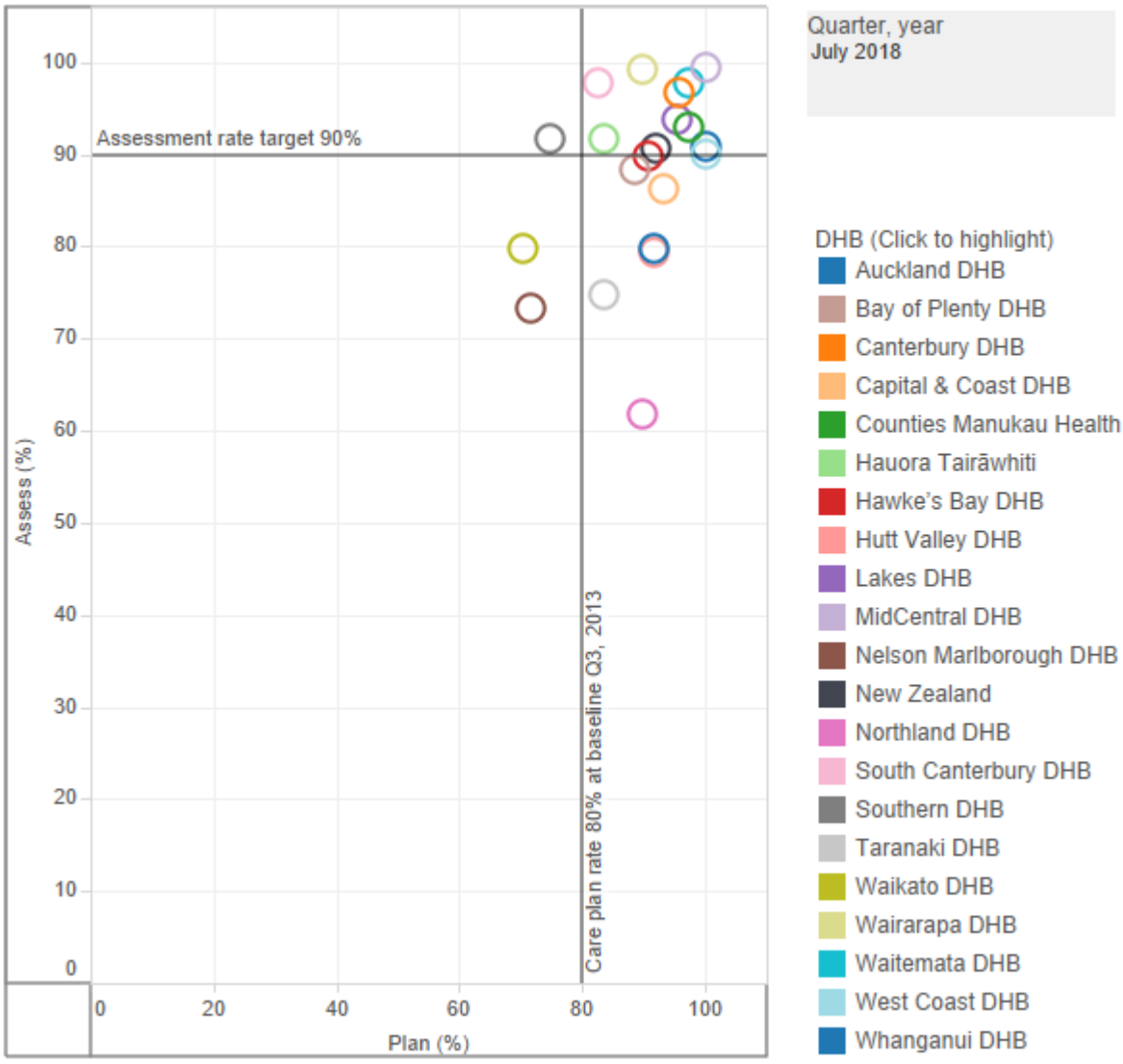
Figure 2: Process marker, percentage of older patients assessed as at risk of falling who received an individualised care plan that addresses these risks



- Upper group: ≥ 90 percent
- Middle group: 75–89 percent
- Lower group: < 75 percent

When assessments and care plans are plotted against each other, a trend of movement over time is shown from the bottom left corner (low assessment and individualised care plan) to the top right corner (high assessment and individualised care plan). Five DHBs sat at the top right corner in quarter 1, 2013; in quarter 3, 2018, 10 DHBs are in this 'ideal' box (see Figure 3), up from nine in the last quarter.

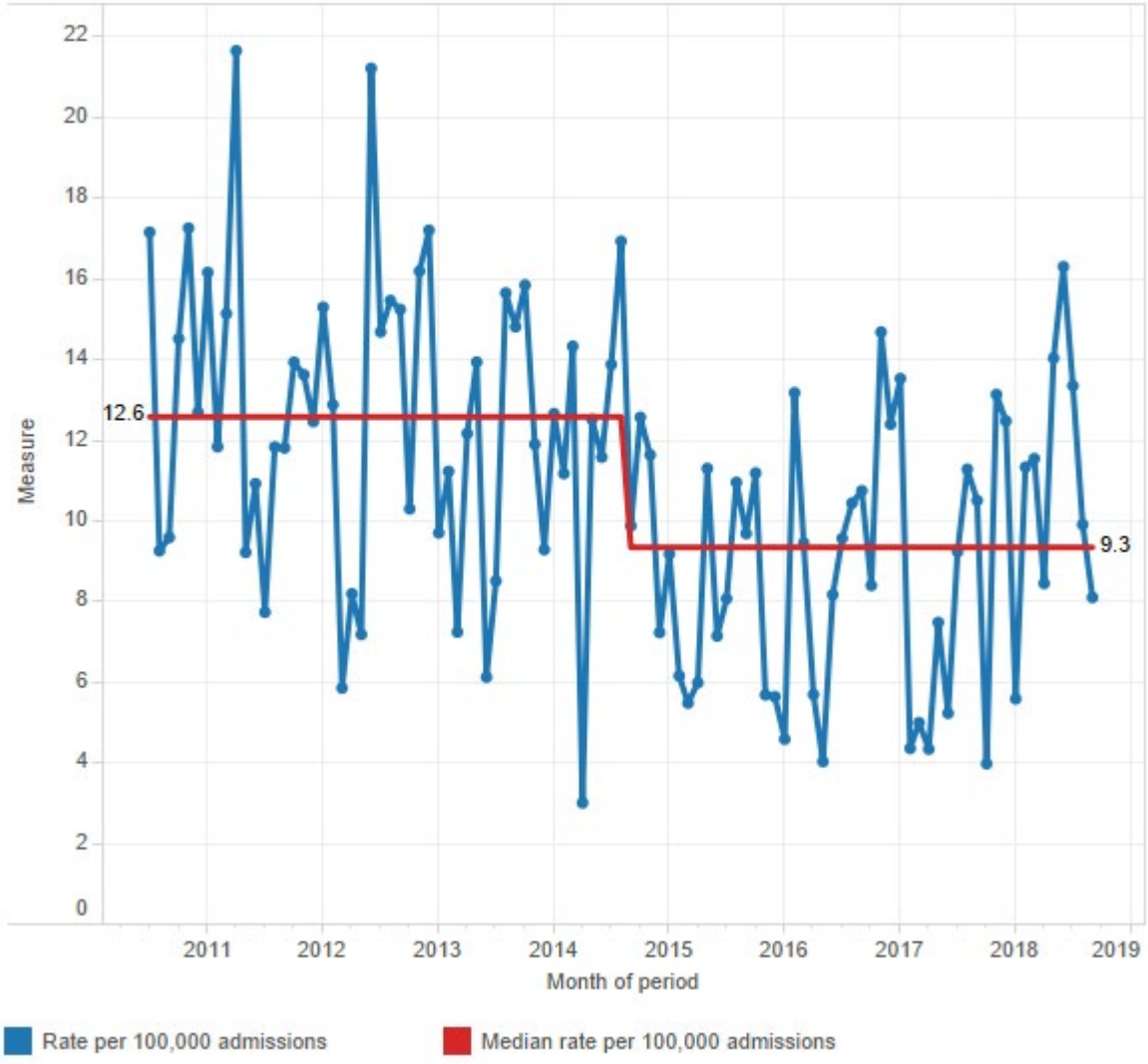
Figure 3: Falls assessment compared with care planning



There were 96 falls resulting in a fractured neck of femur (broken hip) in the 12 months ending September 2018.

To control the impact of changes in the number of admissions per month, Figure 4 shows in-hospital falls causing a fractured neck of femur per 100,000 admissions. The median of this measure was 12.6 in the baseline period of July 2010 to June 2012. It has moved down since September 2014, to 9.3 per 100,000 admissions, and shown a significant improvement. However, there were abnormally many falls in May to July 2018. While this is not significant on its own, we will closely monitor these numbers over the coming quarters.

Figure 4: Outcome marker, in-hospital falls with fractured neck of femur per 100,000 admissions by month

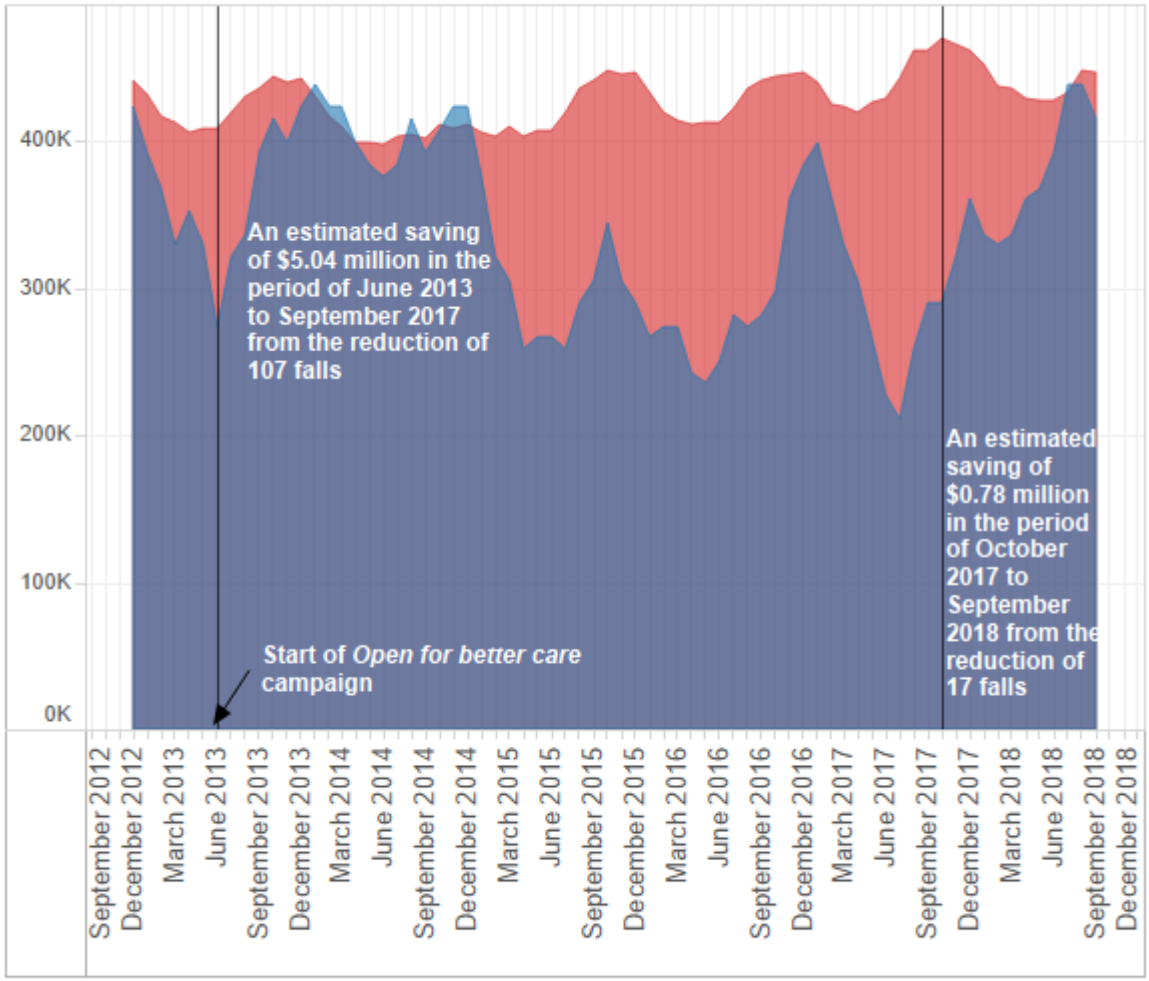


The number of 96 in-hospital falls resulting in a fractured neck of femur is significantly lower than the 113 we would have expected this year, given the falls rate observed in the period between July 2010 and June 2012. The reduction is estimated to have saved $0.78 million in the year ending September 2018, based on an estimate of $47,000[1] for a fall with a fractured neck of femur.

We know some of these patients are likely to be admitted to aged residential care on discharge from hospital, which is estimated to cost $135,000 each time it occurs.[2]

If we conservatively estimate that 20 percent of the patients who avoided a fall-related fractured neck of femur would have been admitted to a residential care facility, the reduction in falls represents $1.07 million in total avoidable costs since October 2017.

Figure 5: Cost/saving associated with in-hospital falls with fractured neck of femur (6-month moving average)



The saving is based on an estimated cost of $47,000 for a fall with a fractured neck of femur.

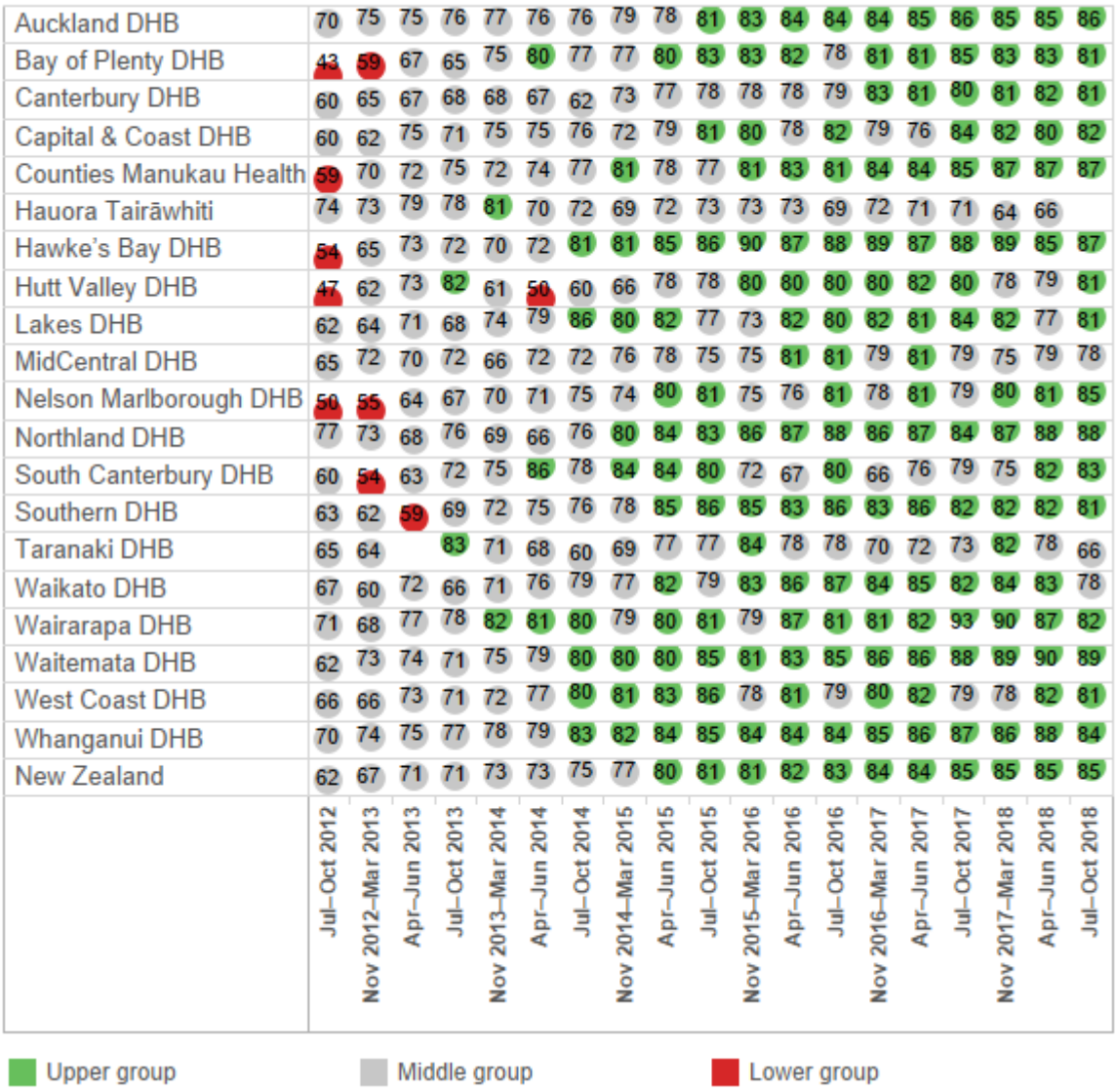
Expected cost Observed cost

[1] de Raad J–P. 2012. *Towards a value proposition: scoping the cost of falls.* Wellington: NZIER.
[2] *Ibid.*

Hand hygiene

National compliance with the five moments for hand hygiene remains high. Nationally, DHBs maintained an average of 85 percent compliance for the period July–October 2018 compared with 62 percent in the baseline in July–October 2012. Hauora Tairāwhiti did not submit data this period.

Figure 6: Process marker, percentage of opportunities for hand hygiene taken

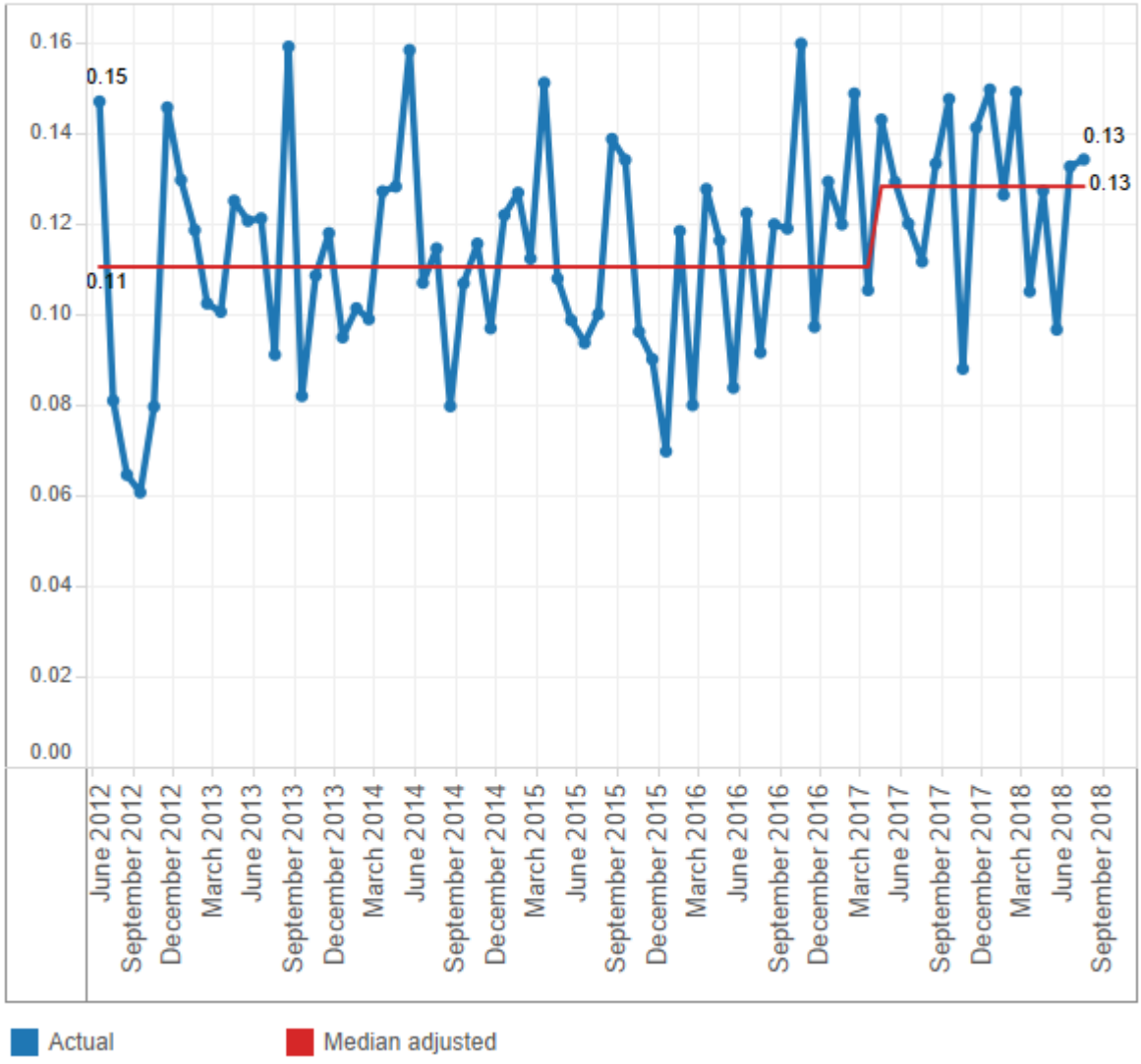


- Upper group: ≥ 70 percent before quarter 3, 2014, 75 percent in quarters 3 and 4, 2014, and 80 percent since quarter 1, 2015.
- Middle group: 60 percent to target.
- Lower group: < 60 percent.
- Hand hygiene national compliance data is reported three times every year, not quarterly.

The hand hygiene outcome marker is healthcare associated *Staphylococcus aureus* bacteraemia (SAB) per 1,000 bed-days. Healthcare associated SAB can be associated with medical devices or surgical procedures which means the onset of

symptoms may occur outside of the hospital (community onset). In quarter 2, 2017, the calculation method for the denominator changed so the definition for calculating DHB bed-days is applied consistently. Figure 7 (monthly healthcare associated SAB per 1,000 bed-days) displays the recalculation of the entire series using the new method. The final month is omitted, due to denominator completeness issues. From May 2017, the median has significantly increased from 0.11 to 0.13 per 1,000 bed-days. This is concerning and will be closely monitored over the next couple of quarters.

Figure 7: Outcome marker, *Staphylococcus aureus* bacteraemia per 1,000 bed-days by month



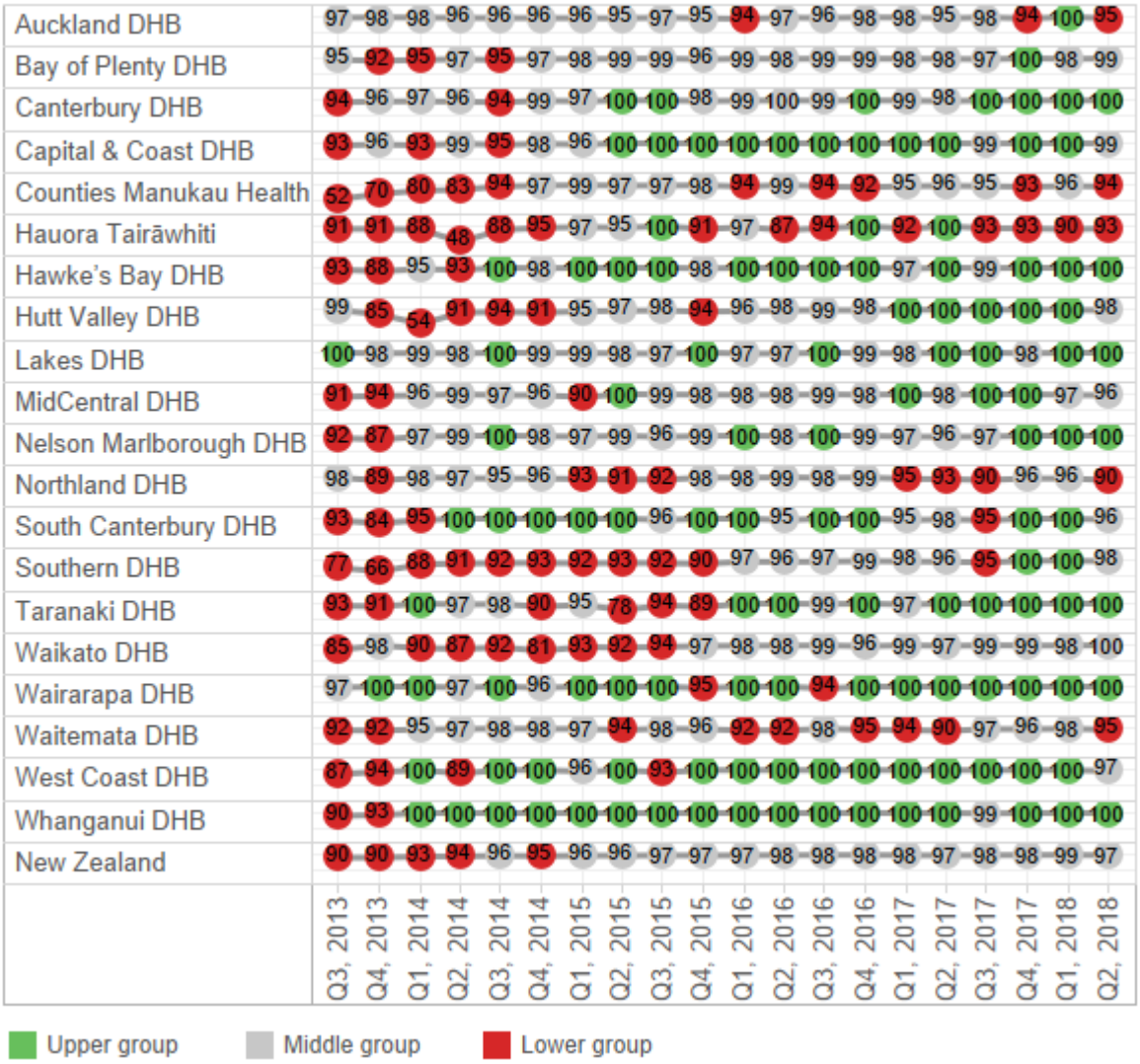
Surgical site infection improvement (SSII) – orthopaedic surgery

As the Commission uses a 90-day outcome measure for surgical site infection (SSI), the data runs one quarter behind other measures. Information in this section relates to hip and knee arthroplasty procedures from quarter 3, 2013, to quarter 2, 2018.

Process marker 1: Antibiotic administered in the right time

For primary procedures, an antibiotic should be administered in the hour before the first incision (‘knife to skin’). As this should happen in all primary cases, the threshold is set at 100 percent. In quarter 2, 2018, 97 percent of hip and knee arthroplasty procedures involved the giving of an antibiotic within 60 minutes before knife to skin. Seven DHBs achieved the national goal.

Figure 8: Process marker, percentage of hip and knee arthroplasty primary procedures where antibiotic given 0–60 minutes before 'knife to skin'

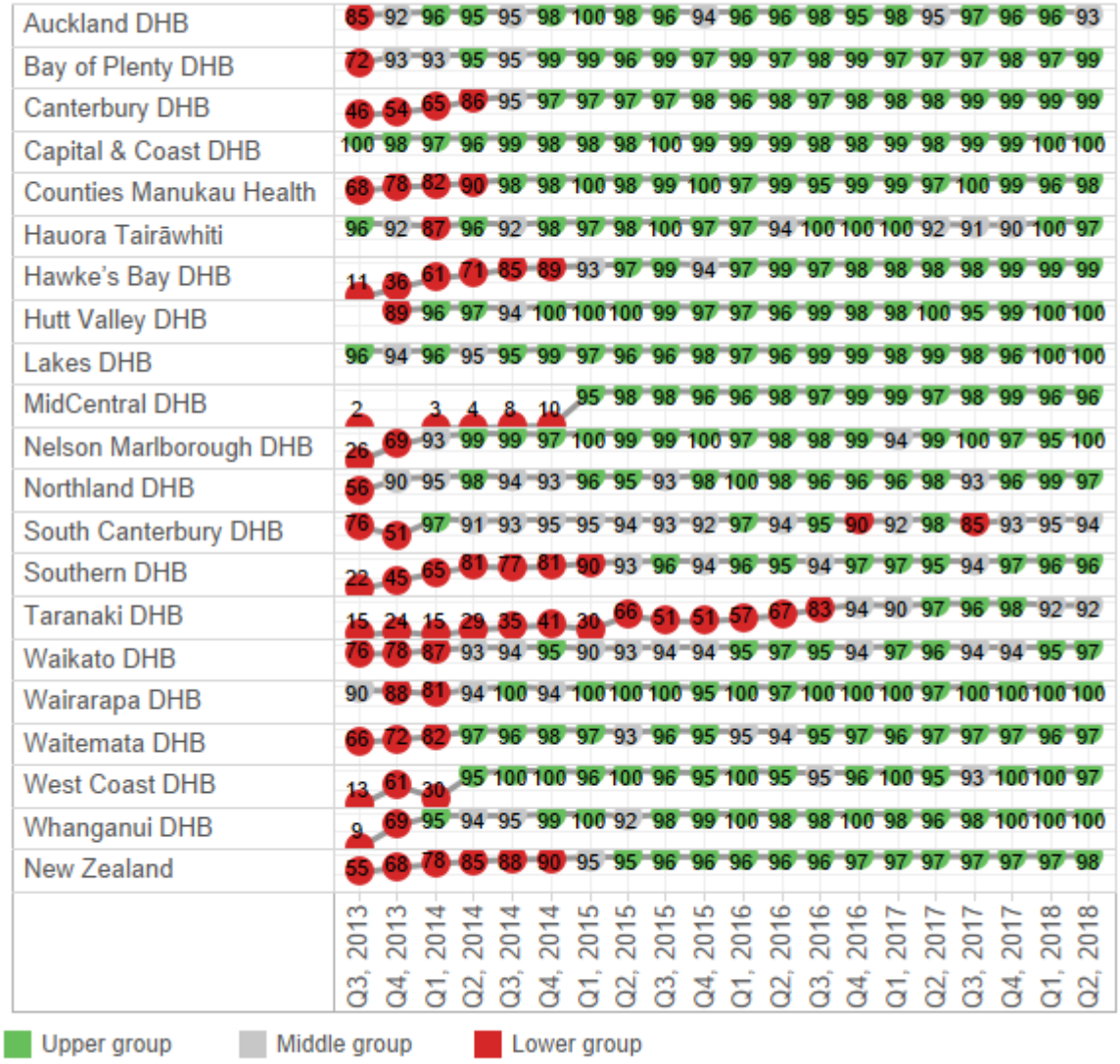


- Upper group: 100 percent
- Middle group: 95–99 percent
- Lower group: < 95 percent

Process marker 2: Right antibiotic in the right dose – cefazolin 2 g or more or cefuroxime 1.5 g or more

In the current quarter, 97 percent of hip and knee arthroplasty procedures received the recommended antibiotic and dose. Seventeen DHBs reached the threshold level of 95 percent compared with only three in the baseline quarter.[3]

Figure 9: Process marker, percentage of hip and knee arthroplasty procedures where 2 g or more cefazolin or 1.5 g or more cefuroxime given



- Upper group: ≥ 95 percent
- Middle group: 90–94 percent
- Lower group: < 90 percent

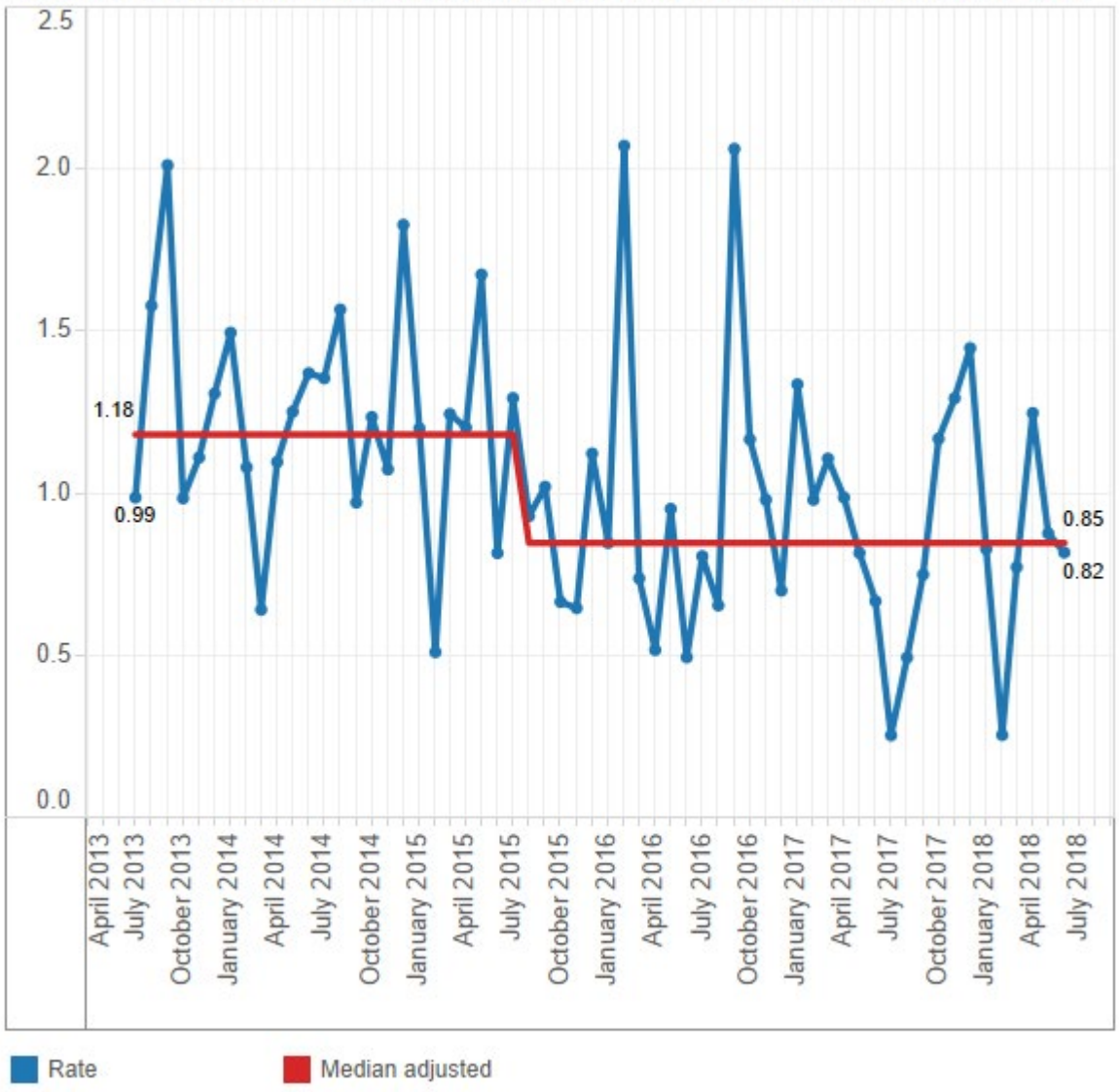
Outcome marker

The outcome marker is SSIs per 100 hip and knee operations. In quarter 2, 2018, there were 26 surgical site infections out of 2687 hip and knee arthroplasty procedures, the SSI rate was 1.0 percent. A shift in the median is detected from

August 2015 with the reduction being from 1.18 percent SSIs during the baseline period to 0.85 percent following it.

During the reduction period, there are spikes in February and September 2016. Examination of the September DHB-level data shows the number of SSIs increased by one or two cases in seven DHBs compared with their baseline levels of zero or one case per month. Figures in both February and September 2016 are high outliers. They indicate some one-time occurrences of special cause variation.

Figure 10: Outcome marker, surgical site infections per 100 hip and knee operations



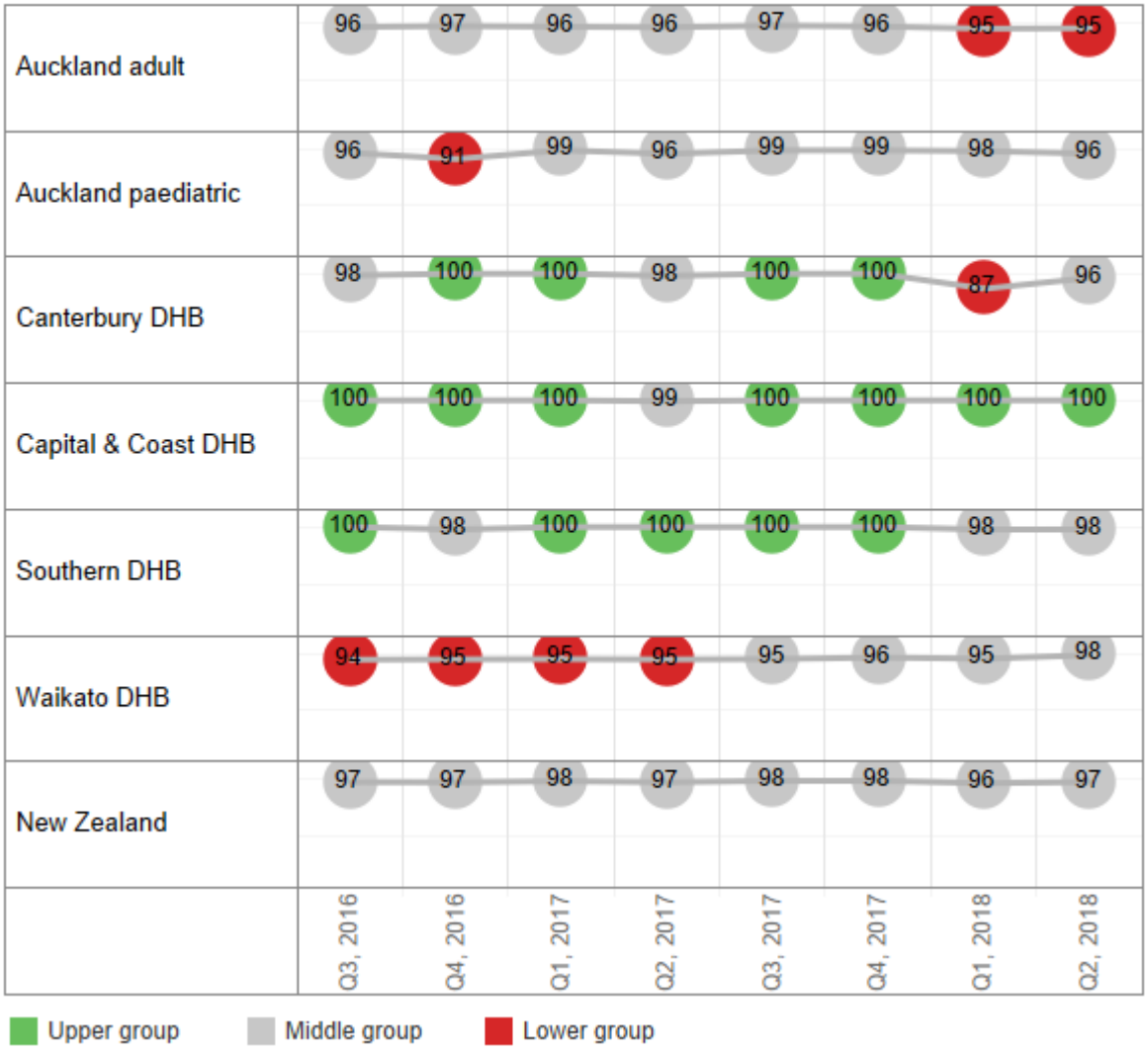
SSI improvement – cardiac surgery

This is the seventh quality and safety marker (QSM) report for cardiac surgery. Since quarter 3, 2016, all five DHBs performing cardiac surgery have submitted process and outcome marker data from all cardiac surgery procedures, including coronary artery bypass graft with both chest and donor site, and with chest site only. There

are three process markers and one outcome marker, which are similar to the markers for orthopaedic surgery.

Process marker 1 is ‘timing’, which requires an antibiotic to be given 0–60 minutes before knife to skin. The target is 100 percent of procedures achieving this marker. Capital & Coast DHB achieved the target this quarter for the fourth time in a row.

Figure 11: Process marker, percentage of cardiac procedures where antimicrobial prophylaxis is administered as a single dose 0–60 minutes before knife to skin



- Upper group: 100 percent
- Middle group: 95–99 percent
- Lower group: < 95 percent

Process marker 2 is ‘dosing’, which requires the antibiotic prophylaxis of choice to be ≥ 2 g or more of cefazolin for adults and ≥ 30 mg/kg of cefazolin for paediatric patients, not to exceed the adult dose. The target is that either dose is used in at least 95 percent of procedures. All DHBs, except Auckland paediatric achieved the target this quarter.

Figure 12: Process marker, percentage of cardiac procedures where the first choice for antimicrobial prophylaxis is 2 g or more of cefazolin

- Upper group: > 95 percent
- Middle group: 90-95 percent
- Lower group: < 90 percent

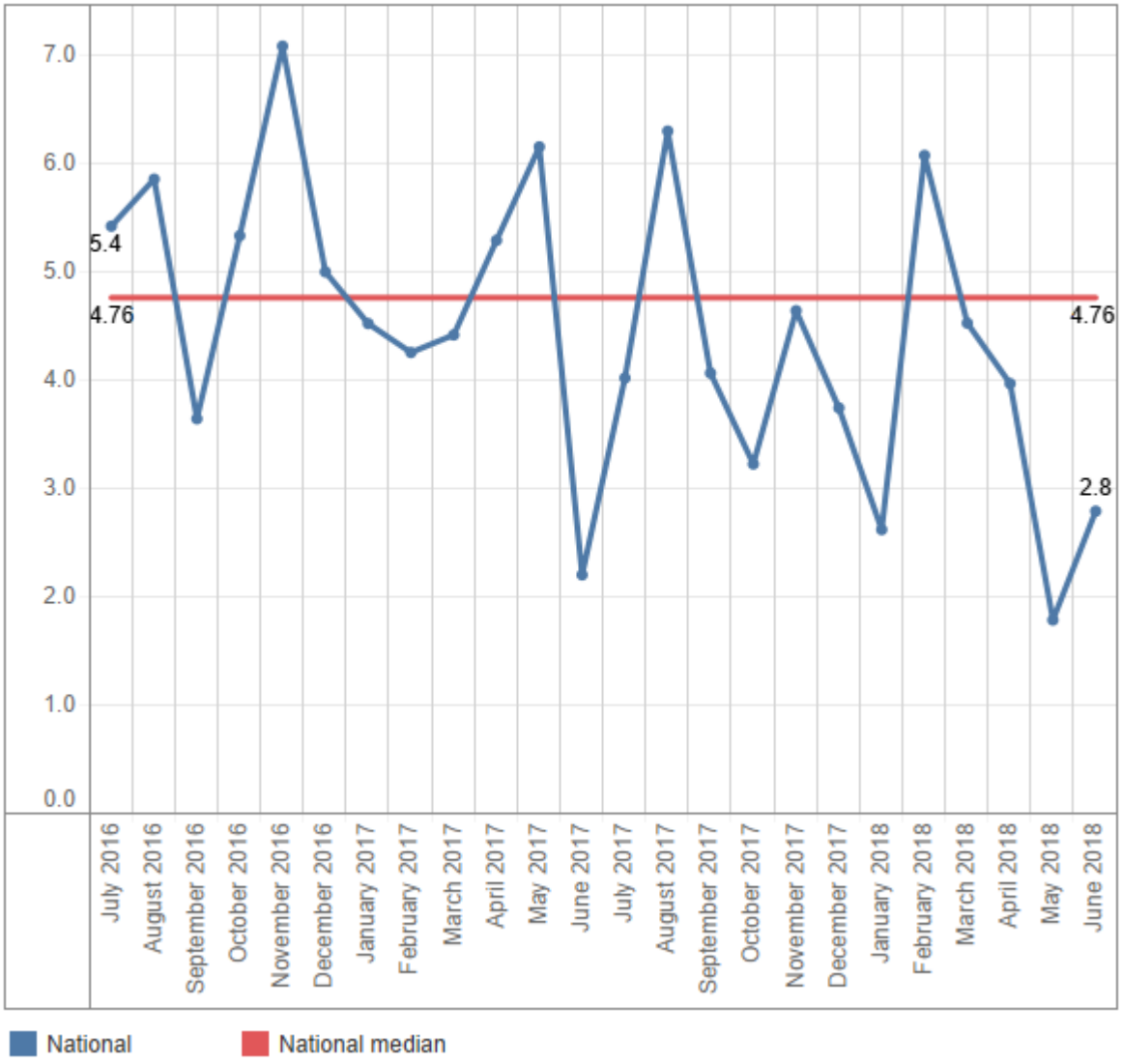
Process marker 3 is ‘skin preparation’, which requires use of an appropriate skin antisepsis in surgery using alcohol/chlorhexidine or alcohol/povidone iodine. The target is 100 percent of procedures achieving this marker. All DHBs, except Auckland adult and Canterbury, achieved the target this quarter.

Figure 13: Process marker, percentage of cardiac procedures where alcohol-based skin antisepsis is always used

- Upper group: 100 percent
- Middle group: 95–99 percent
- Lower group: < 95 percent

The outcome marker is the SSIs per 100 procedures rate. In quarter 2, 2018, there were 21 SSI cases in 747 procedures, an infection rate of 2.8 percent. The rates for nine out of the last 10 months have been below the median, which could indicate a significant shift. We will monitor this graph closely for any further signs of a shift.

Figure 14: Outcome marker, surgical site infections per 100 cardiac procedures



Safe surgery

This is the ninth report for the safe surgery QSM, which measures levels of teamwork and communication around the paperless surgical safety checklist.

Direct observational audit was used to assess the use of the three surgical checklist parts: sign in, time out and sign out. A minimum of 50 observational audits per quarter per part is required before the observation is included in uptake and engagement assessments. Rates are greyed out in the tables below where there were fewer than 50 audits.

Figure 15 shows, for each part of the checklist, how many audits were undertaken. Thirteen out of the 20 DHBs achieved 50 audits for all three parts in quarter 3, 2018 – an increase from 10 DHBs last quarter.

Figure 15: Observations – number of observational audits carried out (minimum of 50 per three months per checklist part)

	Sign in	Time out	Sign out
Auckland DHB	40	45	42
Bay of Plenty DHB	61	60	51
Canterbury DHB	59	82	55
Capital & Coast DHB	52	51	51
Counties Manukau Health	741	740	693
Hauora Tairāwhiti	59	57	52
Hawke's Bay DHB	92	143	82
Hutt Valley DHB	28	22	11
Lakes DHB	24	24	9
MidCentral DHB	52	54	50
Nelson Marlborough DHB	4	19	17
Northland DHB	51	58	51
South Canterbury DHB	3	134	134
Southern DHB	52	67	52
Taranaki DHB	34	38	16
Waikato DHB	11	20	10
Wairarapa DHB	55	59	53
Waitemata DHB	52	51	52
West Coast DHB	57	58	56
Whanganui DHB	65	80	59

Fewer than 50 observations Target achieved

Rates for uptake (all components of the checklist were reviewed by the surgical team) are only presented where at least 50 audits were undertaken for a checklist part. Uptake rates were calculated by measuring the number of audits of a part where all components of the checklist were reviewed against the total number of audits undertaken. The components for each part of the checklist are shown in the poster on the right. Of the 13 DHBs that achieved 50 audits in each checklist, nine achieved the 100 percent uptake target in at least one part of the checklist, during the current quarter (see Figure 16). Data is not presented where there were fewer than 50 audits.

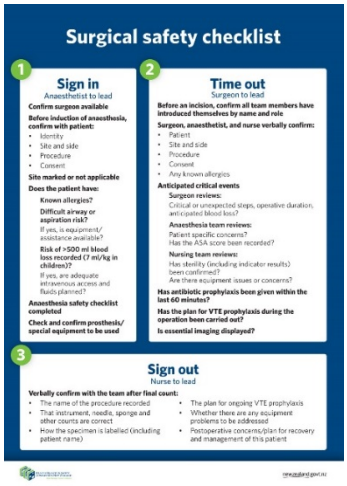


Figure 16: Percentage of audits where all components of the checklist were reviewed (target 100 percent)

	Sign in						Time out						Sign out					
	Baseline	Rolling	Q4, 2017	Q1, 2018	Q2, 2018	Q3, 2018	Baseline	Rolling	Q4, 2017	Q1, 2018	Q2, 2018	Q3, 2018	Baseline	Rolling	Q4, 2017	Q1, 2018	Q2, 2018	Q3, 2018
Auckland DHB	98		96		98		93	96	91		98		98				94	
Bay of Plenty DHB	97	99	100	99	99	100	96	100	100	100	100	100		99	100	99	97	100
Canterbury DHB	91	99	98	99	100	100	92	98	99	95	99	100	96	99	100	97	100	100
Capital & Coast DHB	96			98	98	100	97	97	91	99	100	100	97			100	100	98
Counties Manukau Health	99	99	96	100	100	100	100	100	100	100	100	100	99	97	93	95	100	100
Hauora Tairāwhiti	100	100	100	100	100	98	99	98	98	97	98	96		99	100	98	100	98
Hawke's Bay DHB		96				95	78	82	88	87	82	75						84
Hutt Valley DHB			92	100					92	100	98				94	88		
Lakes DHB			96	82					96	98					98			
MidCentral DHB	96	96	94	100	94	96	92	97	100	100	93	94	97	98	98	100	95	100
Nelson Marlborough DHB	88		100				93		98	100			91		67	75		
Northland DHB			96		100	100	91	92	92		95	97			100			98
South Canterbury DHB								82	93	83	76	75		80	96	78	70	78
Southern DHB			98			96	98					100						98
Taranaki DHB																		
Waikato DHB	81		48	59			67			40								
Wairarapa DHB	97					89	98					95						94
Waitemata DHB	96	99	98	98	98	100	96	99	100	97	100	98	94	97	92	100	98	98
West Coast DHB		100	100	100	100	100		100	100	100	100	100		100	100	100	100	100
Whanganui DHB		88	82	92	95	85		97	92	100	100	96		98	96	97	100	98
New Zealand	93	96	95	95	97	96	93	94	95	94	95	94	94	94	94	93	95	96

For more information about rounding and colouring, see the note.
Baseline = the average of the first 4 quarters of the programme from Q3, 2016 to Q2, 2017.
Rolling = the average of the latest 4 quarters: Q4, 2017 to Q3, 2018.

Target achieved
Between 75% and the target
Less than 75%
Fewer than 50 observations

The levels of team engagement with each part of the checklist were scored using a seven-point Likert scale developed by the World Health Organization. A score of 1 represents poor engagement from the team and 7 means team engagement was excellent. The target is that 95 percent of surgical procedures score engagement levels of 5 or above. As Figure 17 shows, for the latest quarter, Bay of Plenty, Canterbury, MidCentral, Southern and West Coast DHBs achieved the target in all three parts – up from three DHBs last quarter. Five other DHBs achieved the target in one or two parts – an increase from three DHBs last quarter. Data is not presented where audits were fewer than 50.

Note: the numbers in Figures 16 and 17 have been rounded but the colours are assigned based on whether the target was achieved.

Figure 17: Percentage of audits with engagement scores of 5 or higher (target 95 percent)

	Sign in engage						Time out engage						Sign out engage					
	Baseline	Rolling	Q4, 2017	Q1, 2018	Q2, 2018	Q3, 2018	Baseline	Rolling	Q4, 2017	Q1, 2018	Q2, 2018	Q3, 2018	Baseline	Rolling	Q4, 2017	Q1, 2018	Q2, 2018	Q3, 2018
Auckland DHB	97		87		95		94	89	78		95		93				89	
Bay of Plenty DHB	88	96	100	92	95	100	87	94	92	92	96	98		89	88	81	91	100
Canterbury DHB	88	97	98	93	98	100	76	93	91	88	94	99	65	90	84	90	93	96
Capital & Coast DHB	86			80	80	87	91	86	84	90	89	76	94			85	88	88
Counties Manukau Health	99	98	98	98	100	97	99	100	99	100	100	100	94	96	96	98	99	94
Hauora Tairāwhiti	85	80	84	82	74	81	89	79	75	84	82	76		85	77	94	85	82
Hawke's Bay DHB		98				97	81	83	81	90	85	79						93
Hutt Valley DHB			89	100					94	100	98				91	91		
Lakes DHB			26	82					66	66					44			
MidCentral DHB	95	98	98	98	94	100	87	100	100	100	100	100	85	95	92	96	93	100
Nelson Marlborough DHB	57		95				87		53	56			66		20	8		
Northland DHB			98		100	100	79	94	93		94	93			74			88
South Canterbury DHB								74	85	77	59	70		66	84	71	46	58
Southern DHB			90			98	93					100						100
Taranaki DHB																		
Waikato DHB	97		100	100			92			96								
Wairarapa DHB	96					92	99					98						98
Waitemata DHB	83	89	84	93	85	96	86	91	89	90	92	94	91	96	94	95	95	100
West Coast DHB		99	100	96	100	98		100	100	100	100	100		97	94	98	96	100
Whanganui DHB		90	89	88	91	93		88	79	93	92	87		89	88	86	96	84
New Zealand	90	94	92	94	95	96	89	92	89	91	93	93	84	89	86	88	90	91

For more information about rounding and colouring, see the note.
Baseline = the average of the first 4 quarters of the programme from Q3, 2016 to Q2, 2017.
Rolling = the average of the latest 4 quarters: Q4, 2017 to Q3, 2018.

Target achieved
Between 75% and the target
Less than 75%
Fewer than 50 observations

The safe surgery quality and safety domain now includes a start-of-list briefing measure, to reinforce the importance of the briefing as a safe surgery intervention.

The measure is described as ‘Was a briefing including all three clinical teams done at the start of the list?’

Figure 18 shows, in quarter 3, 2018, 11 DHBs reported a start-of-list briefing was happening. There is no specific target for this part of the measure; the aim is to have all 20 DHBs increasingly undertaking and reporting briefings over time. The programme team will work with the auditing teams to increase data collection so the report better matches practice in DHBs.

Figure 18: Briefings – the number of times a briefing, including all three clinical teams, was done at the start of the list

	2017		2018		
	Q3	Q4	Q1	Q2	Q3
Auckland DHB			4	1	3
Bay of Plenty DHB	20	11	15	11	16
Canterbury DHB	1				
Capital & Coast DHB		6	3		
Counties Manukau Health	311	462	496	531	761
Haoura Tairāwhiti					
Hawke’s Bay DHB	7				
Hutt Valley DHB	14				
Lakes DHB	12	11	22	15	8
MidCentral DHB	2	2			2
Nelson Marlborough DHB			6		
Northland DHB	18	6	5	7	12
South Canterbury DHB			2		
Southern DHB	13	5			11
Taranaki DHB	3				
Waikato DHB	1		7	2	
Wairarapa DHB		3		2	9
Waitemata DHB		10	36	23	13
West Coast DHB	12	9	12	14	9
Whanganui DHB					5

The rates for postoperative sepsis and deep vein thrombosis/pulmonary embolism (DVT/PE) are the two outcome markers for safe surgery. The rates have fluctuated

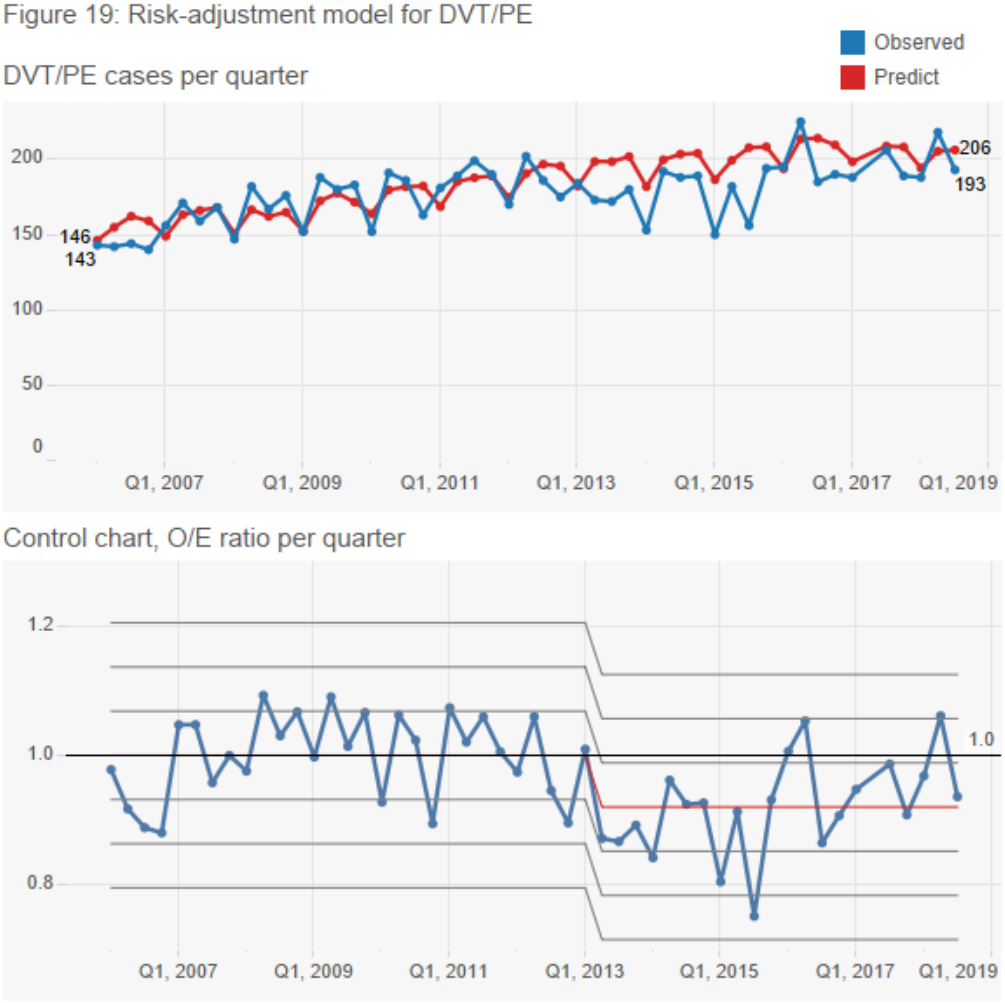
over time. To understand the factors driving the changes and to provide risk-adjusted outcomes in the monitoring and improvement of surgical QSMs, we have developed a risk-adjustment model for these two outcome measures.

The model is used to identify how likely patients being operated on were to develop sepsis or DVT/PE based on factors such as their condition, health history and the operation being undertaken. From this, we can calculate how many patients we would have predicted to develop sepsis or DVT/PE based on historic trends. We can then compare how many patients actually did develop sepsis or DVT/PE, to create an observed/expected (O/E) ratio. If the O/E ratio is more than 1 then there are more sepsis or DVT/PE cases than expected, even when patient risk is taken into account. A ratio of less than 1 indicates fewer sepsis or DVT/PE cases than expected.

We are currently reviewing and analysing the definition of postoperative sepsis. We will update the O/E ratio charts once this definition is finalised.

Figure 19 shows the DVT/PE risk-adjustment model results in two charts. Using the same methodology as above, the O/E ratio control chart shows there were 11 consecutive quarters in which the observed numbers were below the expected numbers since quarter 2, 2013. This indicates a statistically significant downwards shift, taking into account the increasing number of high-risk patients treated by hospitals and more complex procedures undertaken by hospitals.

Figure 19: Risk-adjustment model for DVT/PE



Medication safety

The quality and safety domain for medication safety focuses on medicine reconciliation. This is a process by which health professionals accurately document all medicines a patient is taking and their adverse reactions history (including allergy). The information is then used during the patient's transitions in care. An accurate medicines list can be reviewed to check the medicines are appropriate and safe. Medicines that should be continued, stopped or temporarily stopped can be documented on the list. Reconciliation reduces the risk of medicines being:

- omitted
- prescribed at the wrong dose
- prescribed to a patient who is allergic
- prescribed when they have the potential to interact with other prescribed medicines.

The introduction of electronic medicine reconciliation (eMedRec) allows reconciliation to be done more routinely, including at discharge. There is a national programme to roll out eMedRec throughout the country; Figure 20 shows there are six DHBs that have implemented the system to date. Further uptake of eMedRec is limited until the IT infrastructure is improved in each DHB hospital.

Figure 20: Structure marker, implementation of eMedRec

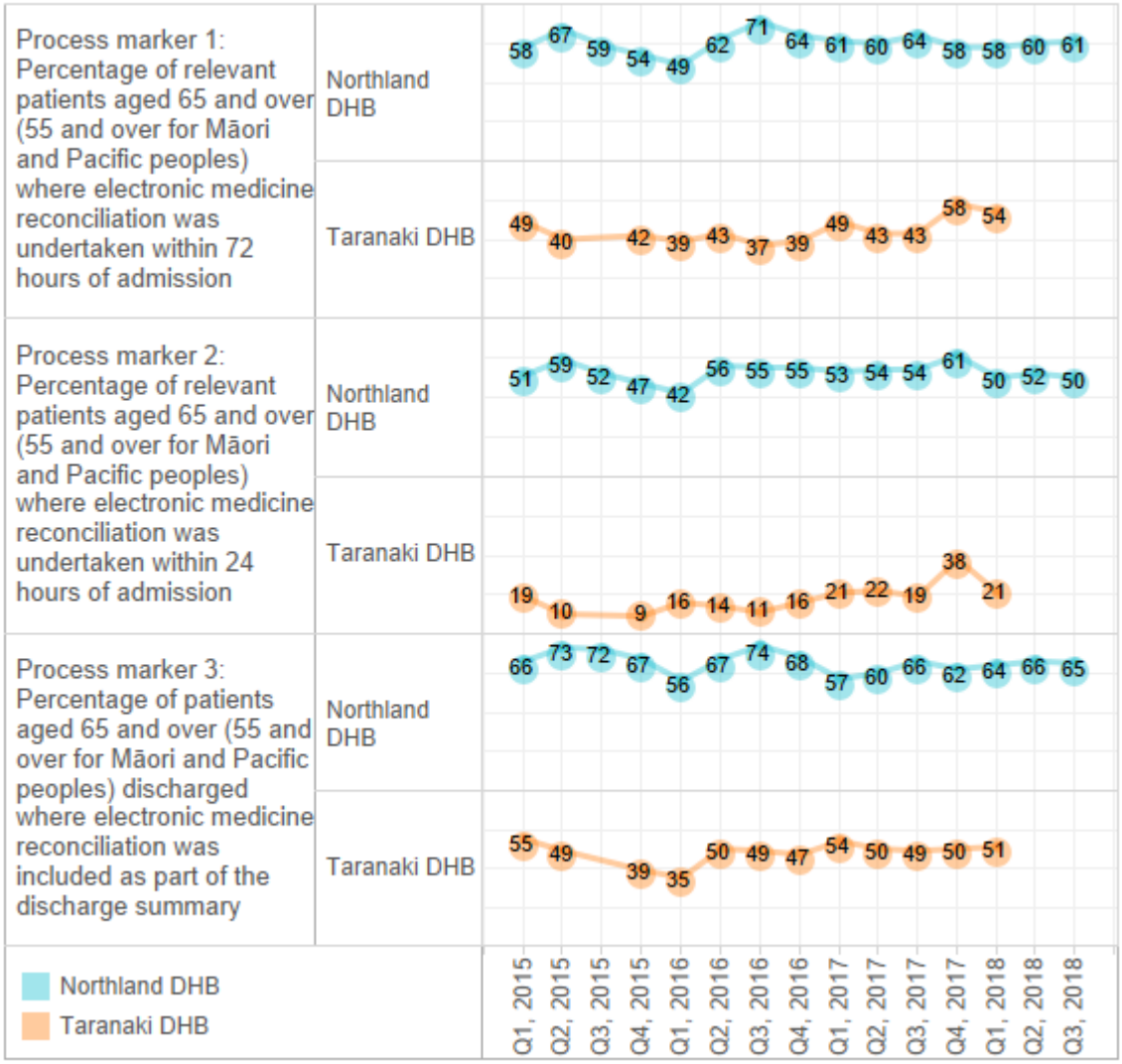
DHB	Status
Canterbury	Implemented
Counties Manukau Health	Implemented
Northland	Implemented
Taranaki	Implemented
Waitemata	Implemented
Auckland	Implemented
Bay of Plenty	Not implemented
Capital & Coast	Not implemented
Hauora Tairāwhiti	Not implemented
Hawke's Bay	Not implemented
Hutt Valley	Not implemented
Lakes	Not implemented
MidCentral	Not implemented
Nelson Marlborough	Not implemented
South Canterbury	Not implemented
Southern	Not implemented
Waikato	Not implemented
Wairarapa	Not implemented
West Coast	Not implemented
Whanganui	Not implemented

Figure 21: Structure markers, eMedRec implementation

Structure marker	**Northland DHB**	**Taranaki DHB**	**Counties Manukau Health**	**Waitemata DHB**	**Canterbury DHB**	**Auckland DHB**
Structure 1: eMedRec implemented anywhere in the DHB (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
Structure 2: Number and percentage of relevant wards with eMedRec implemented	6	7	29	33	60	32
	61%	58%	97%	87%	100%	100%

Within the six DHBs that have implemented eMedRec, only Northland and Taranaki DHB hospitals are reporting their process markers, although Taranaki DHB has not reported for the last two quarters. Figure 22 shows the process marker change over time for these two DHBs. Further work is being undertaken on refining and agreeing the eMedRec marker definitions. Once this has been achieved the other DHB hospitals using eMedRec will report their process markers.

Figure 22: eMedRec process markers



Patient deterioration

This is the second quarter that structural, process and outcome measures for the patient deterioration QSMs have been reported.

DHBs were asked to provide both process and outcome measure data by ethnicity where possible. Despite an increase in ethnicity data submitted from the previous quarter, we have not included this in the national report because the majority of DHBs were still unable to submit. We acknowledge that, for some DHBs, it will take more time to start collecting and submitting ethnicity-level data.

Structural measure: Eligible wards using the New Zealand early warning score

The structural measure demonstrates the progress DHBs have made towards implementing improvements to their recognition and response systems and aligning with the New Zealand early warning score (NZEWS).

Figure 23: Percentage of eligible wards using the New Zealand early warning score

	2018		
	Q1	Q2	Q3
Auckland DHB		100	100
Bay of Plenty DHB	100	100	100
Canterbury DHB	100	100	100
Capital & Coast DHB	100		100
Counties Manukau Health	100	100	100
Hauora Tairāwhiti	100	100	100
Hawke's Bay DHB	0	83	83
Hutt Valley DHB	100	100	100
Lakes DHB	83	83	100
MidCentral DHB	100	100	100
Nelson Marlborough DHB	90	90	89
Northland DHB	45	80	70
South Canterbury DHB*	0	0	0
Southern DHB*		0	0
Taranaki DHB	100	100	100
Waikato DHB	100		100
Wairarapa DHB	100	100	100
Waitemata DHB*	0	0	0
West Coast DHB	0	100	100
Whanganui DHB	100	100	100
New Zealand	96	97	98

*Yet to implement the New Zealand early warning score.

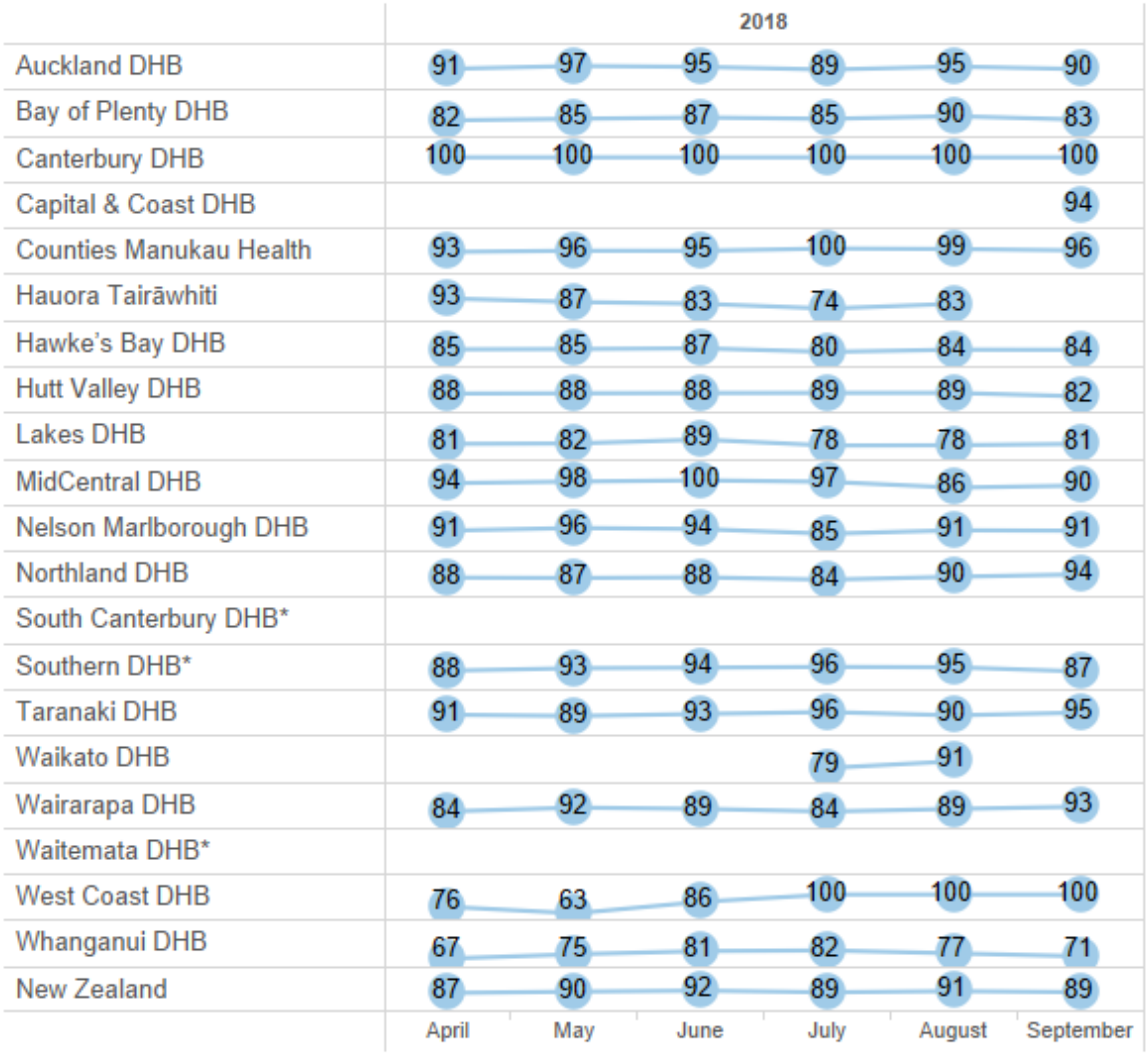
The majority of DHBs (85 percent, n=17) have now implemented (or are in the process of implementing) the NZEWS in their hospitals. We have also seen an increase in the use of the tool across all eligible wards from the last quarter (now at 98 percent). Note: the New Zealand percentage is calculated based on only those DHBs that have implemented the NZEWS.

Process measure 1: Correct calculation of early warning score

The first process measure shows the percentage of audited patients with an early warning score calculated correctly for the most recent set of vital signs. This measure demonstrates how the recognition part of the system is working through the correct use of the NZEWS. Results for this measure revealed a national figure of 90 percent.

A total of 17 DHBs (85 percent) submitted data for this measure. Those using an electronic vital signs system will be able to achieve 100 percent consistently for this measure.

Figure 24: Percentage of early warning score calculated correctly



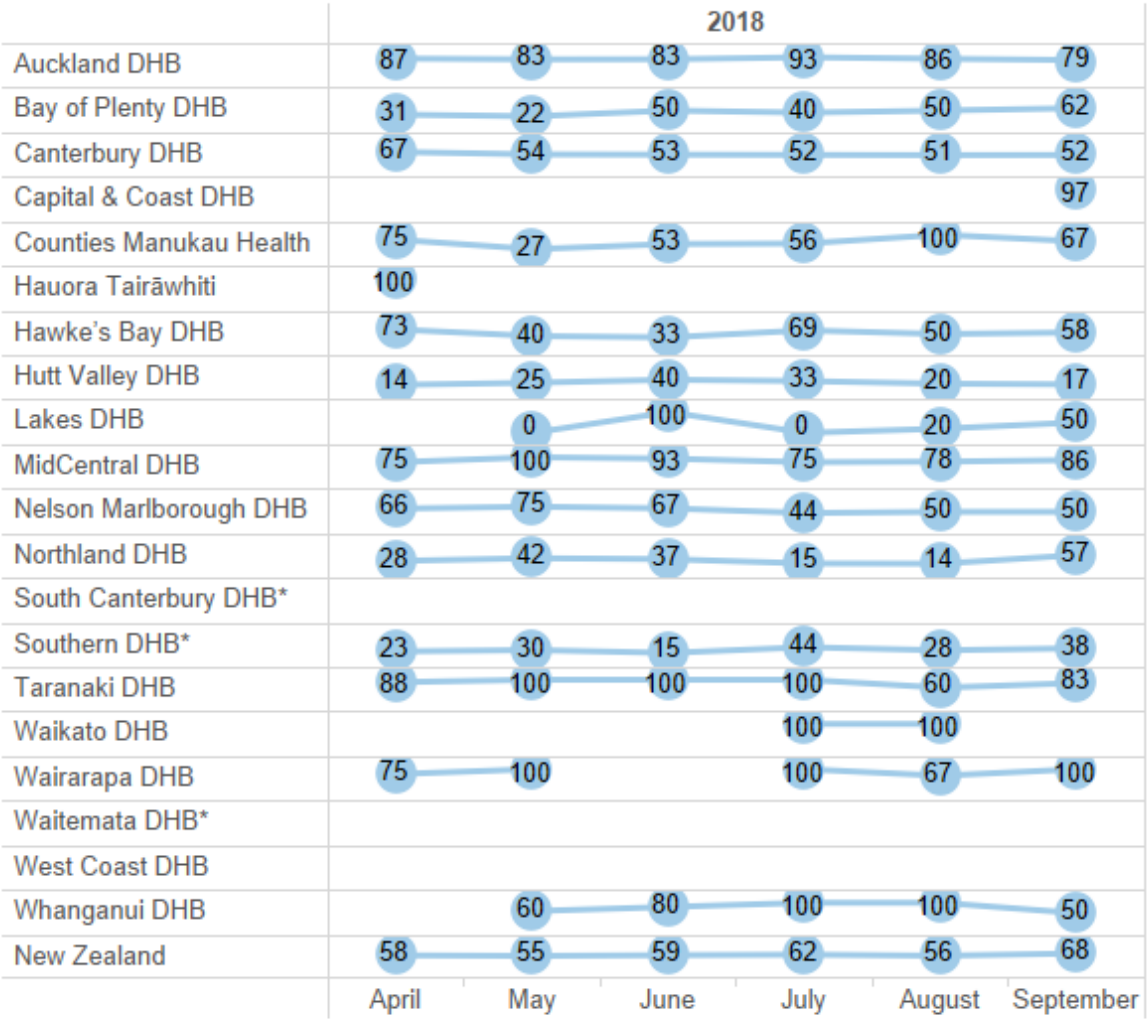
*Yet to implement the New Zealand early warning score.

Process measure 2: Appropriate response to escalations

The second process measure shows the percentage of audited patients that triggered an escalation of care and received the appropriate response to that escalation as per the DHB's agreed escalation pathway. This measure demonstrates how the response part of the system is working through the appropriate response to care that has been escalated.

The national figure for this measure was 63 percent, a slight increase from the previous quarter. There was also considerably more variance between DHBs than for the first process measure, highlighting an opportunity for improvement. Approximately 16 DHBs (80 percent) submitted data for this measure.

Figure 25: Percentage of patients that triggered an escalation of care and received the appropriate response



*Yet to implement the New Zealand early warning score.

Outcome measure 1: Rate of in-hospital cardiopulmonary arrests (preliminary results)

The following outcome measures will be used over time to determine whether the improvements to hospitals' recognition and response systems have improved patient outcomes. Both measures are shown in a rate per 1,000 admissions. It is important to note that the preliminary admissions data used to calculate the rate is taken from the National Minimum Dataset (NMDS) at a DHB level and may differ from rates generated from administrative systems locally.

The results show a national rate of 1.38 cardiopulmonary arrests per 1,000 admissions. A total of 16 DHBs provided data for this measure. Canterbury DHB are not displayed this quarter because they are currently developing systems to capture cardiac arrest data.

Figure 26: Rate of in-hospital cardiopulmonary arrests in adult inpatient wards, units or departments per 1,000 admissions

	2018					
Auckland DHB	1.3	2.6	1.0	1.4	1.4	2.1
Bay of Plenty DHB	1.2	2.7	1.1	1.7	1.0	2.7
Canterbury DHB	1.6	1.2	2.6			
Capital & Coast DHB				0.5	1.6	1.7
Counties Manukau Health	0.5	0.9	0.2	0.2	0.7	1.2
Hauora Tairāwhiti	6.2	2.7	0.0	5.5	0.0	2.8
Hawke's Bay DHB	3.2	0.7	2.2	0.7	1.3	0.7
Hutt Valley DHB	0.0	1.0	4.1	3.8	3.7	4.2
Lakes DHB	1.3	0.0	1.3	2.5	0.0	2.2
MidCentral DHB	2.6	0.8	1.6	1.6	2.2	3.0
Nelson Marlborough DHB	2.6	3.4	2.2			
Northland DHB	5.8	3.3	0.7	2.9	2.1	1.3
South Canterbury DHB*	2.8	0.0	0.0	2.4	0.0	0.0
Southern DHB*						
Taranaki DHB	0.0	3.0	1.0	3.0	5.5	1.9
Waikato DHB						
Wairarapa DHB	0.0	2.8	0.0	8.8	2.7	0.0
Waitemata DHB*	1.9	0.2	0.7	2.2	1.1	0.7
West Coast DHB	4.5	4.1	4.2	20.6	3.9	4.3
Whanganui DHB	0.0	3.4	1.7	3.6	6.4	3.4
New Zealand	1.6	1.4	1.2	1.5	1.2	1.4
	April	May	June	July	August	September

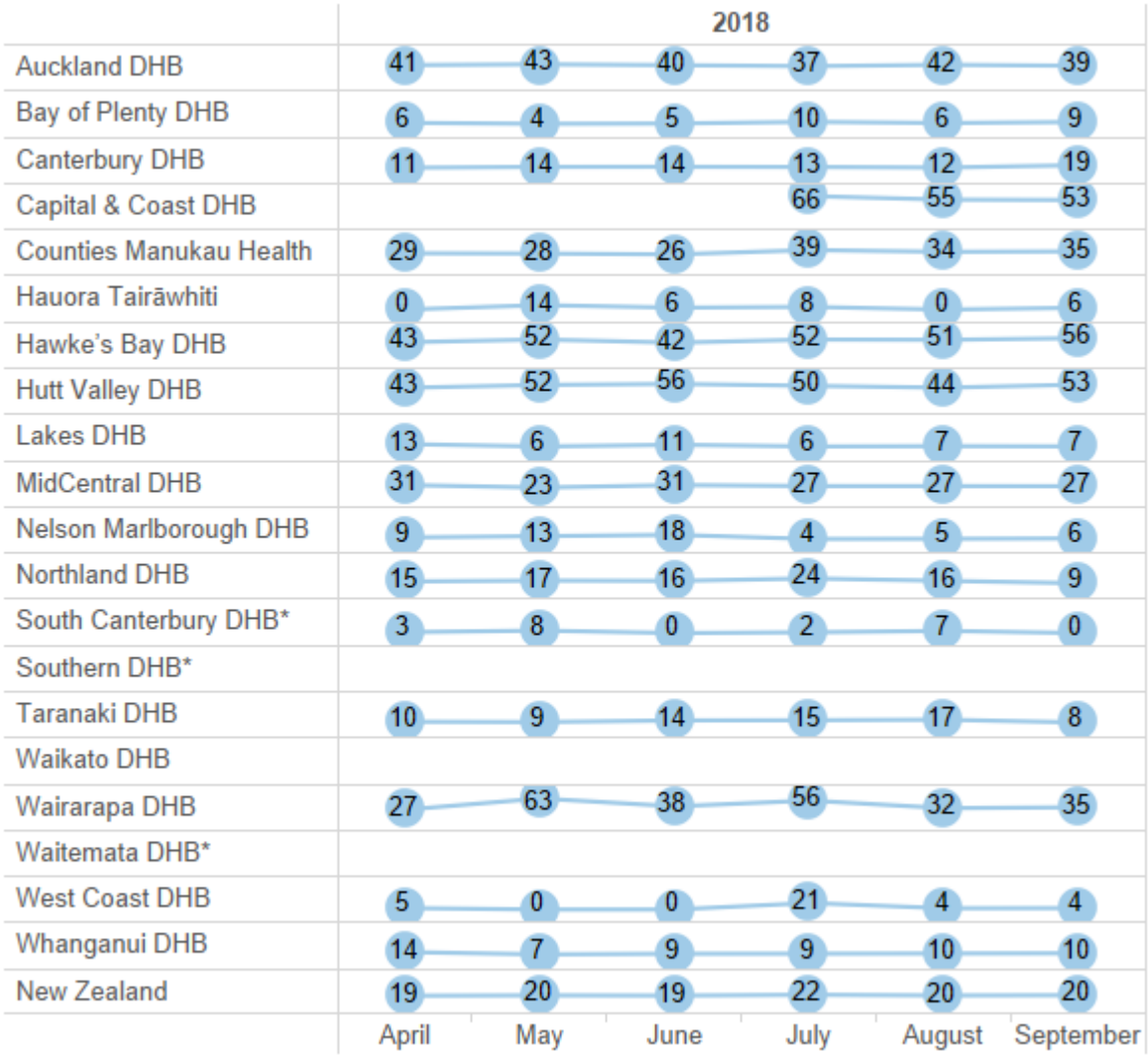
*Yet to implement the New Zealand early warning score.

Outcome measure 2: Rate of rapid response escalations (preliminary results)

The second outcome measure shows the rate of rapid response escalations per 1,000 admissions (excluding those mentioned previously). Consistent with the previous quarter, the results showed a national rate of 21 events per 1,000 admissions. A total of 17 DHBs (85 percent) provided data for this measure.

International research has shown that an effective recognition and response system will result in an inverse relationship between outcome measures 1 and 2 (ie, a higher rate of rapid response escalations with a lower rate of in-hospital cardiopulmonary arrests). Another outcome measure used internationally is unplanned admissions to intensive care units. See the patient deterioration domain of the Atlas of Healthcare Variation for this data.

Figure 27: Rate of rapid response escalations per 1,000 admissions



*Yet to implement the New Zealand early warning score.