Atlas of Healthcare Variation

Methodology | Infection & antibiotic use post-surgery

General points:

- Data are not presented where the number of people was less than 10. This is to preserve confidentiality.
- People were assigned to their district health board (DHB) of domicile unless otherwise noted. Where more than one domicile was recorded, the most recent value was selected.
- Ethnicity data presented is prioritised ethnic group (Māori, Pacific peoples, Asian and European/Other). For people reporting multiple ethnic groups, the most recent value was selected. Due to low numbers, two ethnic groups are reported: Māori and non-Māori.
- The term 'major surgery' is used to highlight that minor or short stay surgeries such as hernia or carpel tunnel syndrome were excluded from analysis due to the requirement for people to stay at least two days in hospital.

Confidence intervals
Data for each DHB is presented as rate per 10,000 population. Upper and lower confidence intervals were calculated to 95 percent level of confidence.

Indicator #1:	Rate of infection following a major surgical procedure in a public hospital by DHB of service (rate per 10,000)
Numerator	The number of events with infection following a procedure (T81.41 localised, T81.42 generalised) in any secondary diagnosis
Denominator	The denominator group includes any hospital event with surgical DRG for those aged 18 years and above and has at least one operating room procedure.
Exclusions	• those with a primary diagnosis of sepsis; • those with a primary diagnosis of infection; • those with any code for immunocompromised state; • those with any code for cancer; • those with a major diagnostic category 14 (pregnancy, childbirth and puerperium); • those with a length of stay of less than 2 days.
Data source	NMDS
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity-Māori and non-Māori and sex.
Comments	Public hospital events only
Note	Infections captured in this measure are: intra-abdominal infection, post-procedural infection, sepsis, stitch abscess, subphrenic abscess and wound abscess. Readmissions with a primary diagnosis of infection within 28 days of surgery were included.

Indicator #2:	Rate of infection following a major **elective** surgical procedure in a public hospital by DHB of service (rate per 10,000)
Numerator	The number of events with infection following a procedure (T81.41 localised, T81.42 generalised) in any secondary diagnosis
Denominator	The denominator group includes any hospital event with **elective or arranged admission,** with surgical DRG for those aged 18 years and above and has at least one operating room procedure.
Exclusions	• those with a primary diagnosis of sepsis; • those with a primary diagnosis of infection*; • those with any code for immunocompromised state*; • those with any code for cancer*; • those with a major diagnostic category 14 (pregnancy, childbirth and puerperium); • those with a length of stay of less than 2 days.
Data source	NMDS
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.
Comments	Public hospital elective events only. Readmissions with a primary diagnosis of infection within 28 days of surgery were included.

Indicator #3:	Rate of infection following a major **acute** surgical procedure in a public hospital by DHB of service (rate per 10,000)
Numerator	The number of events infection following a procedure (T81.41 localised, T81.42 generalised) in any secondary diagnosis
Denominator	The denominator group includes any hospital event with **acute admission and** surgical DRG for those aged 18 years and above and has at least one operating room procedure.
Exclusions	• those with a primary diagnosis of sepsis; • those with a primary diagnosis of infection*; • those with any code for immunocompromised state*; • those with any code for cancer*; • those with a major diagnostic category 14 (pregnancy, childbirth and puerperium); • those with a length of stay of less than 2 days.
Data source	NMDS
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.
Comments	Public hospital acute events only Readmissions with a primary diagnosis of infection within 28 days of surgery were included.

Indicator #4	Post-operative sepsis rates by DHB of service (rate per 10,000)
Numerator	The number of events with any secondary diagnosis of sepsis. (A400, A401, A402, A403, A408, A409, A410, A411, A412, A413, A414, A4150, A4151, A4152, A4158, A418, A419, R572, R578, R651, and T811).
Denominator	The denominator group includes any hospital event with surgical DRG for those aged 18 years and above and has at least one operating room procedure.
Exclusions	• those with a primary diagnosis of sepsis; • those with a primary diagnosis of infection*; • those with any code for immunocompromised state*; • those with any code for cancer*; • those with a major diagnostic category 14 (pregnancy, childbirth and puerperium); • those with a length of stay of less than 2 days.
Data source	NMDS
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.
Comment	Readmissions with a primary diagnosis of sepsis within 28 days of surgery were included. In the 2018 update, hypovolaemic and unspecified shock were removed while severe Systemic Inflammatory Response Syndrome (SIRS) and septic shock were added to the definition of sepsis to align with the OECD/WHO definition. (Health Care Quality Indicators).

Indicator #5	Rate of antibiotic dispensing in the community within 30 days of discharge following major surgery in a public hospital | DHB of service (percent)
Numerator	The number of events with an antibiotic dispensed within 30 days following date of discharge post-surgery in a public hospital
Denominator	The denominator group includes any hospital event with surgical DRG for those aged 18 years and above and has at least one operating room procedure. (same as post-op sepsis denom)
Data source	NMDS and Pharms
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.
Comment	A limitation of this indicator is that we cannot tell whether the antibiotics were related to the surgery. People can be included more than once in this indicator if they have more than one surgery in a year and are dispensed antibiotics more than once.

Indicator #6	Rate of antibiotic dispensing in the community within 30 days of discharge following major **elective** surgery in a public hospital | DHB of service (percent)
Numerator	Number of events with antibiotic dispensing within 30 days following date of discharge post-surgery in a public hospital
Denominator	The denominator group includes any hospital event with **an elective** surgical DRG for those aged 18 years and above and has at least one operating room procedure. (same as post-op sepsis denom)
Data source	NMDS and Pharms
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.

Indicator #7	Rate of antibiotic dispensing in the community within 30 days of discharge following major **acute** surgery in a public hospital | DHB of service (percent)
Numerator	Number of events with antibiotic dispensing within 30 days following date of discharge post-surgery in a public hospital
Denominator	The denominator group includes any hospital event with **acute** surgical DRG for those aged 18 years and above and has at least one operating room procedure. (same as post-op sepsis denom)
Data source	NMDS and Pharms
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.

Indicator #8	The average monthly rate of people dispensed an antibiotic in the community | DHB of domicile (percent)
Numerator	People dispensed an antibiotic in the community in a month
Denominator	Stats NZ resident population
Data source	Stats NZ population projections and Pharms
Analysis	By year (2011 – 2017), age (18-24, 25-44, 45-64 and 65+), ethnicity- Māori and non-Māori and sex.
Discussion	This indicator looks at the monthly dispensing of antibiotics to people in the community over a year and then averaged over 12 months. The intention of this indicator is to provide a comparison of the use of antibiotics in community against those who have had surgery. This indicator may be a proxy for the burden of infection in the general community. People can be included only once in a month in this measure, however one person may have been dispensed medication multiple times in a year. In 2017, on average 40.2% people aged 18 years and over had antibiotics dispensed one or more times in a year.