# Surgery and risk in Aotearoa New Zealand | Te pokanga me te tuponotanga i Aotearoa



Remembering the late Rob Vigor-Brown and his service to the Perioperative Mortality Review Committee as a consumer representative.

This document summarises information about surgery in Aotearoa New Zealand in 2021, including the risks associated with having surgery. It covers elective surgery (surgery planned in advance) and emergency surgery (surgery for an urgent medical condition).

In 2021, there were 5,122,600 people living in Aotearoa, 197, 916 surgeries under anaesthetic\* and 99.2 percent of people were alive 30 days after their surgery.

\*The anaesthetic types included in these statistics are general or neuraxial anaesthetic. General anaesthetic: during a general anaesthetic, medicines are used to send you to sleep, so you’re unaware and do not move or feel pain while your surgery is carried out.[[1]](#footnote-2) Neuraxial anaesthetic: when a doctor injects a local anaesthetic around the nerves in your spinal area. Neuraxial anaesthesia includes epidurals, caudal and spinal anaesthesia.

A person’s chance of surviving their surgery is affected by factors such as the urgency and complexity of their surgery, and how unwell they are. Other factors include their age, sex, ethnicity and any underlying medical conditions.

If you are unwell, talk to your doctor early. There are benefits and risks to every surgery. Your doctor will help you decide if surgery is right for you.

## Planned surgery is safer than emergency surgery

### Planned surgery

Planned surgery can improve a person’s quality of life or stop their medical condition from becoming worse.

The chance of dying after planned surgery is very low.

In 2021, there were 133,397 planned surgeries, 310 deaths after planned surgery and 99.8 percent of people were alive 30 days after their surgery

### Emergency surgery

Emergency surgery is for an urgent medical condition. Most people who need emergency surgery will die if they don’t have it.

It is less common than planned surgery. In 2021, one in three surgeries was for an emergency.

In 2021, there were 64,519 emergency surgeries, 1,200 deaths after emergency surgery and 98.1 percent of people were alive 30 days after their surgery.

## The risk of dying after surgery is higher for older people

### Planned surgery

The risk of dying after planned surgery is very low. Planned surgery is slightly safer for younger people. The percentage of people who died within 30 days of their planned surgery was as follows: 0–24 years 0.1 percent, 25–44 years 0.0 percent, 45–64 years 1.6 percent, 65–84 years 0.5 percent, 85+ years 1.6 percent.

### Emergency surgery

Emergency surgery is usually done to save someone’s life. Emergency surgery is safer for younger people. The percentage of people who died within 30 days of their emergency surgery was as follows: 0–24 years 0.3 percent, 25–44 years 0.3 percent, 45–64 years 1.6 percent, 65–84 years 4.3 percent, 85+ years 8.7 percent.

## Males had a slightly higher risk of dying after emergency surgery

This might be explained by differences in the types of surgery and reasons for why the surgery is needed, such as males being more likely to have serious injuries.

### Planned surgery

The percentage of people who died within 30 days of their planned surgery was as follows: females 0.2 percent, males 0.3 percent.

### Emergency surgery

The percentage of people who died within 30 days of their emergency surgery was as follows: females 1.6 percent, males 2.2 percent.

## Māori and Pacific peoples had higher rates of death after surgery than other ethnicities

The reasons for these inequities are varied and complex. They include factors such as access to best-practice care, socioeconomic deprivation and comorbidity burden.[[2]](#footnote-3)

### Planned surgery

The percentage of people who died within 30 days of their planned surgery was as follows: Māori 0.2 percent, Pacific peoples 0.3 percent, Asian 0.1 percent, Pākehā/Other ethnicities 0.1 percent.

### Emergency surgery

The percentage of people who died within 30 days of their emergency surgery was as follows: Māori 1.8 percent, Pacific peoples 1.6 percent, Asian 1.1 percent, Pākehā/Other ethnicities 0.9 percent.

For comparisons by sex and ethnicity, we have accounted for differences in the age distribution for each group.

## Most common planned surgeries

This information shows the most common planned surgeries between 2017 and 2021.

The most common planned surgery was obstetric surgery, which is surgery related to having a baby. Obstetric surgeries are very safe, with a death rate of less than 1 in 10,000. Between 2017 and 2021, there was an average of 12,556 obstetric surgeries per year. An average of 1.2 people per year died within 30 days of their obstetric surgery.

### Obstetric surgery

Examples of obstetric surgery include planned caesarean section and procedures for women immediately after delivery. The average number of surgeries per year is 12,556. Less than 0.1 percent or 1.2 people died within 30 days of having obstetric surgery.

### Surgery on the uterus

Examples of surgery on the uterus include removing tissue from the uterus or removing the whole uterus (hysterectomy). The average number of surgeries per year is 9,474. Less than 0.1% or 2.2 people died within 30 days of having surgery on the uterus.

### Knee surgery

Examples of knee surgery include knee scopes and removal of the meniscus. The average number of surgeries per year is 7,251. Zero-point-one percent or 6.8 people died within 30 days of having knee surgery.

### Surgery for pelvis, hip or thigh bone

Examples of surgery for the pelvis, hip or thigh bone includes hip replacement. The average number of surgeries per year is 6,234. Zero-point-three percent or 19 people died within 30 days of having surgery for the pelvis, hip or thigh bone.

### Pharynx, tonsil and/or adenoid surgery

Examples of surgery for the pharynx, tonsils and/or adenoids includes removal of the tonsils (tonsillectomy) and/or removal of adenoids. The average number of surgeries per year is 6,187. Less than 0.1 percent or 1.0 people died within 30 days of having pharynx, tonsil and/or adenoid surgery.

### Hernia repair

Examples of hernia repair surgery includes inguinal or umbilical hernia repair. The average number of surgeries per year is 5,879. Less than 0.1 percent or 2.8 people died within 30 days of having hernia repair surgery.

### General orthopaedics

Examples of general orthopaedic surgery includes removing infection, external fixation and repair of muscles and tendons. The average number of surgeries per year is 4,616. Zero-point-one percent or 4.8 people died within 30 days of general orthopaedic surgery.

### Breast surgery

Examples of breast surgery include treatment (incision and drainage) of a breast abscess. The average number of surgeries per year is 4,411. Less than 0.1% or 1.4 people died within 30 days of breast surgery.

### Surgery on the bottom

Examples of surgery on the bottom include removal of haemorrhoids. The average number of surgeries per year is 4,261. Zero-point-two percent or 9.8 people died within 30 days of having surgery on the bottom.

## Planned surgeries with the highest risk

This information shows the planned surgeries with the highest death rates between 2017 and 2021.

Some surgeries have higher rates of death than others. The planned surgery with the highest risk between 2017 and 2021 was surgery on the aorta. Between 2017 and 2021, there was an average of 136 aortic surgeries per year, and an average of eight people (6 percent) died within 30 days of this surgery. The risk of dying after planned aortic surgery is much lower than the risk of dying if the surgery is not done.

### Aortic surgery

Examples of aortic surgery include repair or replacement of the aorta. The average number of surgeries per year is 136 surgeries. Six percent or 8.2 people died within 30 days of aortic surgery.

### Vascular surgery/Aneurysm repair (not aorta)

Examples of vascular surgery/aneurysm repair include treatment of abnormal swelling of an artery (aneurysm) in the neck and/or limbs. The average number of surgeries per year is 162 surgeries. Two-point-six percent or 4.0 people died within 30 days of vascular surgery/aneurysm repair.

### Kidney or lung transplant

The average number of kidney or lung transplant surgeries per year is 217. Two-point-eight percent or 6.0 people died within 30 days of kidney or lung transplant surgery.

### Neurosurgery for brain aneurysms

Examples of neurosurgery for brain aneurysms includes opening the skill to treat a brain aneurysm (abnormal swelling of the artery). The average number of surgeries per year is 152. Two-point-six percent or 4.0 people died within 30 days of neurosurgery for brain aneurysms.

### Vascular bypass surgery

Examples of vascular bypass surgery include bypass surgery of arteries in the legs. The average number of surgeries per year is 259. Two-point-two percent or 5.8 people died within 30 days of having vascular bypass surgery.

### Coronary artery bypass graft

Examples of heart surgery include placement of a graft to bypass a blocked artery so that blood can get to the heart muscle. The average number of surgeries per year is 827. Two-point-zero percent or 17 people died within 30 days of having coronary artery bypass graft surgery.

### Heart surgery (not coronary artery bypass graft)

The average number of heart surgeries (not including coronary artery bypass graft surgery) per year is 1,536. One-point-nine percent or 30 people died within 30 days of heart surgery (not including coronary artery bypass graft surgery).

### Neurosurgery for brain tumours

Examples of neurosurgery for brain tumours include opening the skull to remove brain tumours. The average number of surgeries per year is 839. One-point-seven percent or 14 people died within 30 days of neurosurgery for brain tumours.

### Pancreatic surgery

Examples of pancreatic surgery include removal of part or the whole of the pancreas. The average number per year is 227 surgeries. One-point-four percent or 3.2 people died within 30 days of pancreatic surgery.

## Most common emergency surgeries

This information shows the most common emergency surgeries between 2017 and 2021.

Emergency surgery is usually done to save a person’s life. The most common emergency surgery was surgery on the colon. Between 2017 and 2021, there was an average of 6,712 colon surgeries per year. An average of 63 people per year (0.9 percent) died within 30 days of their surgery.

### Colon surgery

Examples of colon surgery include removal of part of the colon. The average number per year is 6,712. Zero-point-nine percent or 63 people died within 30 days of colon surgery.

### Surgery for broken (fractured) pelvis, hip or thigh bone

The average number of surgeries to repair a fractured pelvis, hip or thigh bone per year is 5,941. Five-point-seven percent or 336 people died within 30 days of surgery for a fractured pelvis, hip or thigh bone.

### Plastic surgery

Examples of plastic surgery include repairing wounds to the skin, tendon repairs of the hands, treatment of burns. The average number per year is 5,707. Zero-point-three percent or 14 people died within 30 days of plastic surgery.

### Generalised orthopaedics

Examples of generalised orthopaedic surgery includes removing infection, external fixation and repair of muscles and tendons. The average number per year is 3,506. Zero-point-nine percent or 31 people died within 30 days of generalised orthopaedic surgery.

### Ankle and foot surgery

Examples of ankle and foot surgery include surgery for a broken ankle or foot. The average number per year is 3,439. Zero-point-three percent or 8.6 people died within 30 days of ankle and foot surgery.

### Gall bladder and biliary tract surgery

Examples of gall bladder and biliary tract surgery include removal of the gall bladder (cholecystectomy). The average number per year is 3,427. One-point-one percent or 38 people died within 30 days of gall bladder and biliary tract surgery.

### Surgery for fractured forearm

Examples of surgery for a fractured forearm include repair and/or manipulation of a fractured forearm. The average number per year is 2,285. Zero-point-one percent or 1.6 people died within 30 days of surgery for a fractured forearm.

### Surgery on the bottom

Examples of surgery on the bottom include treatment of an infection (abscess) of the bottom. The average number per year is 2,163. One percent or 23 people died within 30 days of surgery on the bottom.

### Obstetric surgery

Examples of obstetric surgery include emergency caesarean section and procedures for women immediately after delivery. The average number per year is 1,939. Less than 0.1 percent or less than 1 person died within 30 days of obstetric surgery.

## Emergency surgeries with the highest risk

This information shows the emergency surgeries with the highest death rates between 2017 and 2021.

Emergency surgery is usually done to save a person’s life. The emergency surgery with the highest risk was surgery on the aorta. Between 2017 and 2021, there was an average of 101 aortic surgeries per year. An average of 22 people per year (22 percent) died within 30 days of their surgery.

### Aortic surgery

Examples of aortic surgery include repair or replacement of the aorta. The average number per year is 101. Twenty-two percent or 22 people died within 30 days of aortic surgery.

### Vascular surgery/Aneurysm repair (not aorta)

Examples of vascular surgery/aneurysm repair include treatment of an abnormal swelling of an artery (aneurysm) in the neck and/or limbs. The average number per year is 108. Nineteen percent or 21 people died within 30 days of vascular surgery/aneurysm repair.

### Laparotomy

Examples of laparotomy include major surgery on the abdominal organs after, for example, a serious injury (trauma) or an infection. The average number per year is 146. Seventeen percent or 25 people died within 30 days of a laparotomy.

### Neurosurgery for brain aneurysms

Neurosurgery for brain aneurysms includes opening the skull to treat a brain aneurysm (abnormal swelling of artery). The average number per year is 243. Fourteen percent or 33 people died within 30 days of having neurosurgery for brain aneurysms.

### Stomach surgery

Examples of stomach surgery include removal of part of the stomach for uncontrolled bleeding from ulcers or cancer. The average number per year is 399. Seven-point-nine percent or 31 people died within 30 days of stomach surgery.

### Neurosurgery for brain tumours

Examples of neurosurgery for brain tumours includes opening the skull to remove brain tumours. The average number per year is 1,001. Seven-point-five percent or 75 people died within 30 days of neurosurgery for brain tumours.

### Heart surgery (not coronary artery bypass graft)

Examples of heart surgery (not including coronary artery bypass graft surgery) include drainage of excess fluid around the heart, repair or replacement of a heart valve. The average number of heart surgeries (not including coronary artery bypass graft surgery) per year is 397. Six-point-eight percent or 27 people died within 30 days of heart surgery (not including coronary artery bypass graft surgery).

### Small intestine surgery

Examples of small intestine surgery include removal of a part of the small intestine. The average number per year is 989. Six-point-four percent or 63 people died within 30 days of having small intestine surgery.

### Vascular surgery to open blocked arteries in the legs

The average number of vascular surgeries for blockages/narrowings of the arteries in the lower legs is 388. Six-point-four percent or 25 people died within 30 days of vascular surgery to open blocked arteries in the legs.

## About the Perioperative Mortality Review Committee | Mo te komiti

The Perioperative Mortality Review Committee is an independent advisor to the Health Quality & Safety Commission. It advises the Commission on how to reduce the number of surgical deaths in Aotearoa New Zealand.

The Committee’s terms of reference can be found here: [https://www.hqsc.govt.nz/our-work/mortality-review­committees/perioperative-mortality-review-committee/ about-us/terms-of-reference](https://www.hqsc.govt.nz/our-work/mortality-review%C2%ADcommittees/perioperative-mortality-review-committee/%20about-us/terms-of-reference/).

## Useful resources | Nga rauemi papai

* Healthline, for general health advice: <https://www.healthline.govt.nz>
* *Let’s plan for your next health care visit*: [https://www.hqsc.govt.nz/resources/resource­library/lets-plan-for-your-next-health-care-visit](https://www.hqsc.govt.nz/resources/resource%C2%ADlibrary/lets-plan-for-your-next-health-care-visit/)
* What is anaesthesia?: <https://www.anzca.edu.au/patient-information/anaesthesia-information-for-patients-and-carers>
* Preparing for surgery: [https://www.healthnavigator.org.nz/health-a-z/s/surgery-preparing](https://www.healthnavigator.org.nz/health-a-z/s/surgery-preparing/)
* *Let’s plan to leave hospital*: [https://www.hqsc.govt.nz/resources/resource­library/lets-plan-to-leave-hospital](https://www.hqsc.govt.nz/resources/resource%C2%ADlibrary/lets-plan-to-leave-hospital/).

## How we calculated the data | Te tatari raraunga

In this information, ‘surgeries’ are hospital admissions that involved a general or neuraxial anaesthetic. Only publicly funded hospital admissions are included.

The riskiest surgeries only show surgeries that occurred more than 500 times between 2017 and 2021.[[3]](#footnote-4)

Because surgery is safer for younger people, we used ‘age standardisation’ to adjust for differences in the age distribution of different groups. For comparing males with females, we standardised with the age distribution of surgeries (all ethnicities) in 2021.

For comparing different ethnicities, we used the age distribution of all surgeries for Māori in 2021.[[4]](#footnote-5) In this document, we have used ‘prioritised ethnicity’, which is commonly used by the health sector. Prioritised ethnicity assigns people to only one ethnic group.[[5]](#footnote-6) This method gives Māori highest priority, followed by Pacific peoples, Asian, other ethnic groups and then European. In practice, if someone identifies as both Māori and Pacific, they will be counted in the Māori group. If someone identifies as both Pacific and European, they will be counted in the Pacific group. As a result, a person’s prioritised ethnicity may not represent their preferred ethnic identity.

Talk to your health professional for advice that is specific to you. For more general advice ring Healthline: 0800 611 116.

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1. General anaesthesia. URL: <https://www.nhs.uk/conditions/general-anaesthesia/> (accessed 28 October 2022). [↑](#footnote-ref-2)
2. The Perioperative Mortality Review Committee has investigated the ethnic inequities in surgery death rates in its previous reports. See: [https://www.hqsc.govt.nz/our-work/mortality-review-committees/perioperative­mortality-review-committee](file:///C%3A/Users/FEdlin/Downloads/www.hqsc.govt.nz/our-work/mortality-review-committees/perioperative%C2%ADmortality-review-committee). [↑](#footnote-ref-3)
3. We followed the methodology of Gurney JK, McLeod M, Stanley J, et al. 2020. Postoperative mortality in New Zealand following general anaesthetic: demographic patterns and temporal trends. *BMJ Open* 10: e036451. DOI: 10.1136/bmjopen-2019-036451. We used a modified version of surgery groupings from Campbell D, Boyle L, Soakell-Ho M, et al. 2019. National risk prediction model for perioperative mortality in non-cardiac surgery. *British Journal of Surgery* 106: 1549–57. DOI: 10.1002/ bjs.11232 [↑](#footnote-ref-4)
4. Gurney JK, McLeod M, Stanley J, et al. 2022. Regional variation in post-operative mortality in New Zealand. *ANZ Journal of Surgery* 92: 1015–25. DOI: 10.1111/ans.17510. [↑](#footnote-ref-5)
5. 5 Ministry of Health. 2017. HISO 10001:2017 Ethnicity Data Protocols. Wellington: Ministry of Health. URL: [https://www.health.govt.nz/publication/hiso­100012017-ethnicity-data-protocols](file:///C%3A/Users/FEdlin/Downloads/www.health.govt.nz/publication/hiso%C2%AD100012017-ethnicity-data-protocols) (accessed 9 August 2022). [↑](#footnote-ref-6)