# A headshot of Rob Vigor-Brown. Rob is wearing a suit and tie, and eyeglasses, and is looking at the camera.Surgery and risk in Aotearoa New Zealand | Te pōkanga me te tūponotanga 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 2023, 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 2023, there were 5,223,100 people living in Aotearoa New Zealand, 210,500 surgeries and 99.4 percent of people were alive 30 days after their surgery.\*

\* Being alive 30 days after surgery is an internationally recognised way to measure the success of a surgery. For those who die, it is referred to as 'all-cause mortality,' meaning that the death could have been due to any reason, not just directly related to the surgery.

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 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.

## Elective surgery is safer than emergency surgery

### Elective surgery

Elective surgery is planned in advance. It can improve a person’s quality of life or stop their medical condition from becoming worse.

The chance of dying after elective surgery is very low.

In 2023, there were 145,400 elective surgeries, 266 deaths after elective 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 elective surgery. In 2023, fewer than one in three surgeries was for an emergency.

In 2023, there were 65,100 emergency surgeries, 1,068 deaths after emergency surgery and 98.4 percent of people were alive 30 days after their surgery.

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

### Elective surgery

The risk of dying after elective surgery is very low. Elective surgery is slightly safer for younger people. The percentage of people who died within 30 days of their elective surgery was as follows: 0–24 years 0.0 percent, 25–44 years 0.0 percent, 45–64 years 0.1 percent, 65–84 years 0.3 percent, 85+ years 0.7 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 0.2 percent, 25–44 years 0.4 percent, 45–64 years 1.0 percent, 65–84 years 3.4 percent, 85+ years 9.0 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.

### Elective surgery

The percentage of people who died within 30 days of their elective surgery was as follows: females 0.1 percent, males 0.2 percent.

### Emergency surgery

The percentage of people who died within 30 days of their emergency surgery was as follows: females 1.6 percent, males 2.0 percent.

## Māori and Pacific peoples had higher rates of death after emergency surgery than Pākehā and other ethnicities\*

There is a combination of reasons for inequities. These reasons include lesser access to best-practice care, greater likelihood of living in socioeconomic deprived areas, and greater likelihood of having multiple comorbidities.[[1]](#footnote-2)

### Elective surgery

The percentage of people who died within 30 days of their elective surgery was as follows: Māori 0.1 percent, Pacific peoples 0.1 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 1.4 percent, Pacific peoples 1.6 percent, Asian 0.9 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. This accounts for the fact some groups have more old or young people than other groups.

## Most common elective surgeries

This information shows the most common elective surgeries between 2019 and 2023.

The most common elective surgery was ophthalmic surgery, which is surgery on the eye. Between 2019 and 2023, there was an average of 18,678 eye lens surgeries per year. Cataract surgery is performed on older people, whose death could have been due to any reason, not just directly related to the surgery.

### Ophthalmic (eye) surgery

Examples of ophthalmic surgery include cataract surgery. The average number of surgeries per year is 18,678. Annually, an average of 0.1 percent or 25 people died within 30 days of having ophthalmic surgery.

### Obstetric surgery for pregnancy and childbirth

Examples of obstetric surgery include elective caesarean section and procedures immediately after delivery. The average number of surgeries per year is 16,954. Annually, an average of less than 0.1 percent or 1 person 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 7,248. Annually, an average of less than 0.1 percent or 3 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 5,945. Annually, an average of 0.1 percent or 6 people died within 30 days of having knee surgery.

### Surgery on the pelvis, hip or thigh bone

Examples of surgery on the pelvis, hip or thigh bone include hip replacement. The average number of surgeries per year is 5,769. Annually, an average of 0.3 percent or 17 people died within 30 days of having surgery on the pelvis, hip or thigh bone.

### Hernia repair

Examples of hernia repair surgery include inguinal or umbilical hernia repair. The average number of surgeries per year is 5,428. Annually, an average of less than 0.1 percent or 3 people died within 30 days of having hernia repair surgery.

### Surgery on the ears, nose or throat

Examples of surgery on the ears, nose and throat include removal of the tonsils (tonsillectomy) and/or removal of adenoids. The average number of surgeries per year is 5,074. Annually, an average of less than 01 percent or less than 1 person died within 30 days of having surgery on the ears, nose or throat.

### Breast surgery

Examples of breast surgery include mastectomy or other excision procedures on the breast. The average number of surgeries per year is 4,457. Annually, an average of less than 0.1 percent or 2 people died within 30 days of breast surgery.

### Surgery on the hand or finger

Examples of surgery on the hand or finger include finger joint replacement. The average number of surgeries per year is 3,399. Annually, an average of less than 0.1 percent or 1 person died within 30 days of having surgery on the hand or finger.

## Elective surgeries with the highest risk

This information shows the elective surgeries with the highest death rates between 2019 and 2023.

Some surgeries have higher rates of death than others. The elective surgery with the highest risk between 2019 and 2023 was surgery on the aorta. Between 2019 and 2023, there was an average of 115 aortic surgeries per year, and an average of five people (4.5 percent) died within 30 days of this surgery. The risk of dying after elective 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 aorta carries blood from your heart to the rest of your body. The average number of surgeries per year is 115. Annually, an average of 4.5 percent or 5 people died within 30 days of aortic surgery.

### Vascular surgery or aneurysm repair

Examples of vascular surgery or aneurysm repair include treatment of abnormal swelling of an artery (aneurysm) in the neck and/or limbs. This category excludes aortic surgery (above). The average number of surgeries per year is 137. Annually, an average of 3.6 percent or 5 people died within 30 days of vascular surgery or aneurysm repair.

### Pancreatic surgery

Examples of pancreatic surgery include removal of part or the whole of the pancreas. The average number per year is 161 surgeries. Annually, an average of 2.6 percent or 4 people died within 30 days of pancreatic surgery.

### Heart surgery

Examples of heart surgery include repair or replacement of a heart valve. This category does not include coronary artery bypass graft (below). The average number of surgeries per year is 672. Annually, an average of 2.3 percent or 15 people died within 30 days of having heart surgery.

### Chest surgery

Examples of chest surgery include repair of a hernia in the diaphragm. The average number of chest surgeries per year is 176. Annually, an average of 1.9 percent or 3 people died within 30 days of chest 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 743. Annually, an average of 1.7 percent or 13 people died within 30 days of neurosurgery for brain tumours.

### Surgery on the (tissue) sac that surrounds the heart

Examples of surgery on the sac that surrounds the heart include draining fluid from the sac around the heart (pericardium). The average number of surgeries on the sac that surrounds the heart per year is 129. Annually, an average of 1.7 percent or 2 people died within 30 days of surgery on the sac that surrounds the heart.

### Vascular bypass surgery

Examples of vascular bypass surgery include bypass surgery of arteries in the legs. The average number of surgeries per year is 211. Annually, an average of 1.7 percent or 4 people died within 30 days of having vascular bypass surgery.

### Coronary artery bypass graft

Examples of coronary artery bypass graft 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 791. Annually, an average of 1.7 percent or 13 people died within 30 days of coronary artery bypass graft surgeries.

## Most common emergency surgeries

This information shows the most common emergency surgeries between 2019 and 2023.

Emergency surgery is usually done to save a person’s life. The most common emergency surgery was surgery for a fractured pelvis, hip or thigh bone. Between 2019 and 2023, there was an average of 6,733 pelvis, hip or thigh bone surgeries per year. An average of 355 people per year (5.3 percent) died within 30 days of their surgery.

### Surgery for fractured pelvis, hip or thigh bone

Examples of surgery for fractured (broken) pelvis, hip or thigh bone include repair of a fractured pelvis, hip or thigh bone. The average number of surgeries to repair a fractured pelvis, hip or thigh bone per year is 6,733. Annually, an average of 5.3 percent or 355 people died within 30 days of surgery for a fractured pelvis, hip or thigh bone.

### Surgery for appendicitis

Examples of surgery for appendicitis include removal of the appendix. The average number per year is 4,793 surgeries. Annually, an average of 0.1 percent or 3 people died within 30 days of surgery for appendicitis.

### Generalised orthopaedics

Examples of generalised orthopaedic surgery include removing infection, external fixation, and repair of muscles and tendons. The average number of surgeries per year is 4,025. Annually, an average of 1.4 percent or 56 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 of surgeries per year is 3,617. Annually, an average of 0.4 percent or 16 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 of surgeries per year is 3,554. Annually, an average of 0.3 percent or 10 people died within 30 days of gall bladder and biliary tract surgery.

### Surgery on the anus and rectum (bottom)

Examples of surgery on the anus and rectum include treatment of an infection (abscess) of the bottom. The average number of surgeries per year is 2,821. Annually, an average of 0.2 percent or 6 people died within 30 days of surgery on the anus and rectum.

### Obstetric surgery for pregnancy and childbirth

Examples of obstetric surgery include emergency caesarean section and other procedures immediately after delivery. The average number per year is 2,606 surgeries. Annually, an average of less than 0.1 percent or less than 1 person died within 30 days of obstetric surgery.

### Surgery on hand or finger

Examples of surgery on hand or finger include repair of a fracture of the hand. The average number of surgeries per year is 2,388. Annually, an average of 0.1 percent or 2 people died within 30 days of hand and finger surgery.

### Surgery for fractured forearm

Examples of surgery for a fractured forearm include repair and/or manipulation of a fractured forearm. The average number of surgeries per year is 2,314. Annually, an average of 0.1 percent or 2 people died within 30 days of surgery for a fractured forearm.

## Emergency surgeries with the highest risk

This information shows the emergency surgeries with the highest death rates between 2019 and 2023.

Emergency surgery is usually done to save a person’s life. The emergency surgery with the highest risk was laparotomy. Between 2019 and 2023, there was an average of 185 laparotomies per year. An average of 34 people per year (18 percent) died within 30 days of their surgery.

### Laparotomy

Examples of laparotomy include major surgery on the abdominal organs after a serious injury (trauma) or an infection. The average number of surgeries per year is 185. Annually, an average of 18 percent or 34 people died within 30 days of a laparotomy.

### Neurosurgery for brain aneurysms

Neurosurgery for brain aneurysms include opening the skull to treat a brain aneurysm (abnormal swelling of artery). The average number per year is 107 surgeries. Annually, an average of 16 percent or 17 people died within 30 days of having neurosurgery for brain aneurysms.

### Chest surgery

Examples of chest surgery include repair of an injury to the chest wall. The average number of surgeries per year is 111. Annually, an average of 9.9 percent or 11 people died within 30 days of chest 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 1,057. Annually, an average of 8.3 percent or 88 people died within 30 days of neurosurgery for brain tumours.

### Colon surgery

Examples of colon surgery include removal of part of the colon. The average number per year is 1,153 surgeries. Annually, an average of 6.3 percent or 72 people died within 30 days of colon surgery.

### Surgery on the small bowel

Examples of surgery on the small bowel include releasing adhesions or relieving a blockage. The average number per year is 843. Annually, an average of 6.0 percent or 51 people died within 30 days of gut surgery.

### Stomach surgery

Examples of stomach surgery include removal of part of the stomach for uncontrolled bleeding from ulcers or cancer. The average number of surgeries per year is 219. Annually, an average of 5.7 percent or 12 people died within 30 days of stomach surgery.

### Blood vessel surgery

Examples of blood vessel surgery include removing a blood clot from a blood vessel or artery. The average number of blood vessel surgeries per year is 306. Annually, an average of 5.6 percent or 17 people died within 30 days of blood vessel surgery.

### Heart surgery (not on coronary artery)

Examples of heart surgery include replacement of a part of a heart valve. The average number of surgeries per year is 173. Annually, an average of 5.3 percent or 9 people died within 30 days of having heart surgery.

## About the Perioperative Mortality Subject Matter Experts | Mō te ropu

The Perioperative Mortality Subject Matter Experts advise the National Mortality Review Committee and Te Tāhū Hauora on how to reduce the number of perioperative deaths in Aotearoa New Zealand.

The Perioperative Mortality Review Committee’s past work can be found here: <https://www.hqsc.govt.nz/our-work/national-review-of-avoidable-deaths/mortality-review-workstreams/>

## Useful resources | Ngā rauemi papai

* Healthline, for general health advice: <https://www.healthy.org.nz>
* *Let’s plan for your next health care visit*: <https://www.hqsc.govt.nz/resources/resource-library/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.healthify.nz/health-a-z/s/surgery-preparing-for/>
* *Let’s plan to leave hospital*: <https://www.hqsc.govt.nz/resources/resource-library/lets-plan-to-leave-hospital/>

## How we calculated the data | Te tātari raraunga

In this document, ‘surgeries’ are hospital admissions that involved a surgery performed by a surgeon in a theatre. This is a change from our last infographic published December 2022 where ‘surgeries’ were hospital admissions that involved a general or neuraxial anaesthetic. Results cannot therefore be directly compared. Only publicly funded hospital admissions and the most complex surgery in a hospital stay are included.

The riskiest surgeries only show surgeries that occurred more than 500 times between 2019 and 2023.[[2]](#footnote-3)

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 2023.

For comparing different ethnicities, we used the age distribution of all surgeries for Māori in 2023.[[3]](#footnote-4) 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.[[4]](#footnote-5) 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. The Perioperative Mortality Review Committee has investigated the ethnic inequities in surgery death rates in its previous reports. See: <https://www.hqsc.govt.nz/resources/resource-library/summary-of-perioperative-mortality-review-committee-pomrc-reports/> [↑](#footnote-ref-2)
2. 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-3)
3. 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-4)
4. 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-5)