



Surgery and risk in Aotearoa New Zealand

Te pōkanga me te tūponotanga i Aotearoa

This infographic 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).



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

In 2021, there were:



5,122,600

people living in Aotearoa New Zealand



197,916

surgeries under anaesthetic*



99.2%

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 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.



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

**Te Kāwanatanga
o Aotearoa**
New Zealand Government

¹ General anaesthesia. URL: <https://www.nhs.uk/conditions/general-anaesthesia> (accessed 28 October 2022).



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 2021, there were:

133,397 elective surgeries

310 deaths after elective surgery

99.8% 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 2021, one in three surgeries was for an emergency.

In 2021, there were:

64,519 emergency surgeries

1,200 deaths after emergency surgery

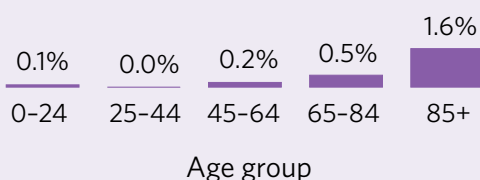
98.1% of people were alive 30 days after their surgery

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.

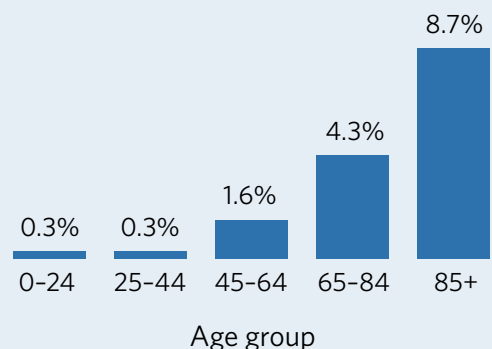
Percentage of people who died within 30 days of their elective surgery



Emergency surgery

Emergency surgery is usually done to save someone's life. Emergency surgery is safer for younger people.

Percentage of people who died within 30 days of their emergency surgery



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

Percentage of people who died within 30 days of their elective surgery:



Emergency surgery

Percentage of people who died within 30 days of their emergency surgery:



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

Elective surgery

Percentage of people who died within 30 days of their elective surgery:

Māori	0.2%
Pacific peoples	0.3%
Asian	0.1%
Pākehā/Other ethnicities	0.1%

Emergency surgery

Percentage of people who died within 30 days of their emergency surgery:

Māori	1.8%
Pacific peoples	1.6%
Asian	1.1%
Pākehā/Other ethnicities	0.9%

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

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/perioperative-mortality-review-committee>.

Most common elective surgeries




This page shows the most common elective surgeries between 2017 and 2021.

The most common elective 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

Example: Elective caesarean section and procedures for women immediately after delivery

Average per year:

 **12,556** surgeries

Less than **0.1%** | **1** person died within 30 days

Surgery on the uterus

Removing tissue from the uterus or removing the whole uterus (hysterectomy)

Average per year:

 **9,474** surgeries

Less than **0.1%** | **2** people died within 30 days

Knee surgery

Example: Knee scopes and removal of the meniscus

Average per year:

 **7,251** surgeries

0.1% | **7** people died within 30 days

Surgery for pelvis, hip or thigh bone

Example: Hip replacement

Average per year:

 **6,234** surgeries

0.3% | **19** people died within 30 days

Pharynx, tonsil and/or adenoid surgery

Example: Removal of tonsils (tonsillectomy) and/or removal of adenoids

Average per year:

 **6,187** surgeries

Less than **0.1%** | **1** person died within 30 days

Hernia repair

Example: Inguinal or umbilical hernia repair

Average per year:

 **5,879** surgeries

Less than **0.1%** | **3** people died within 30 days

General orthopaedics

Example: Removing infection, external fixation, repair of muscles and tendons

Average per year:

 **4,616** surgeries

0.1% | **5** people died within 30 days

Breast surgery

Example: Treatment (incision and drainage) of breast abscess

Average per year:

 **4,411** surgeries

Less than **0.1%** | **1** person died within 30 days

Surgery on the bottom

Example: Removal of haemorrhoids

Average per year:

 **4,261** surgeries

0.2% | **10** people died within 30 days

Elective surgeries with the highest risk



This page shows the elective surgeries with the highest death rates between 2017 and 2021.

Some surgeries have higher rates of death than others. The elective 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 elective aortic surgery is much lower than the risk of dying if the surgery is not done.

Aortic surgery

Example: Repair or replacement of the aorta

Average per year:

 **136** surgeries

6.0% | **8** people died within 30 days

Vascular surgery/Aneurysm repair (not aorta)

Treatment of an abnormal swelling of an artery (aneurysm) in the neck and/or limbs

Average per year:

 **162** surgeries

3.0% | **5** people died within 30 days

Kidney or lung transplant

Example: Kidney or lung transplant

Average per year:

 **217** surgeries

2.8% | **6** people died within 30 days

Neurosurgery for brain aneurysms

Example: Opening the skull to treat a brain aneurysm (abnormal swelling of artery)

Average per year:

 **152** surgeries

2.6% | **4** people died within 30 days

Vascular bypass surgery

Example: Bypass surgery of arteries in the legs

Average per year:


 **259** surgeries

2.2% | **6** people died within 30 days

Coronary artery bypass graft

Example: Placement of a graft to bypass a blocked artery so that blood can get to the heart muscle

Average per year:

 **824** surgeries

2.0% | **17** people died within 30 days

Heart surgery (not coronary artery bypass graft)

Example: Repairing or replacing a heart valve

Average per year:

 **1,536** surgeries

1.9% | **30** people died within 30 days

Neurosurgery for brain tumours

Example: Opening the skull to remove brain tumours

Average per year:

 **839** surgeries

1.7% | **14** people died within 30 days

Pancreatic surgery

Example: Removal of part or the whole of the pancreas

Average per year:

 **227** surgeries

1.4% | **3** people died within 30 days

Most common emergency surgeries



This page 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

Example: Removal of part of the colon

Average per year:


 **6,712** surgeries

0.9% | **63** people died within 30 days

Surgery for fractured pelvis, hip or thigh bone

Example: Repair of fractured hip or thigh bone

Average per year:

 **5,941** surgeries

5.7% | **336** people died within 30 days

Plastic surgery

Example: Repairing wounds to the skin, tendon repairs of the hands, treatment of burns

Average per year:

 **5,707** surgeries

0.3% | **14** people died within 30 days

Generalised orthopaedics

Example: Removing infection, external fixation, repair of muscles and tendons

Average per year:

 **3,506** surgeries

0.9% | **31** people died within 30 days

Ankle and foot surgery

Example: Surgery for a broken ankle or foot

Average per year:

 **3,439** surgeries

0.3% | **9** people died within 30 days

Gall bladder and biliary tract surgery

Example: Removal of gallbladder (cholecystectomy)

Average per year:

 **3,427** surgeries

1.1% | **38** people died within 30 days

Surgery for fractured forearm

Example: Repair and/or manipulation of fractured forearm

Average per year:

 **2,285** surgeries

0.1% | **2** people died within 30 days

Surgery on the bottom

Example: Treatment of an infection (abscess) of the bottom

Average per year:

 **2,163** surgeries

1.0% | **23** people died within 30 days

Obstetric surgery

Example: Emergency caesarean section, procedures for women immediately after delivery

Average per year:

 **1,939** surgeries

Less than **0.1%** | Less than 1 person died within 30 days

Emergency surgeries with the highest risk




This page 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

Example: Repair or replacement of the aorta

Average per year:

 **101** surgeries

22% | **22** people died within 30 days

Vascular surgery/Aneurysm repair (not aorta)

Example: Treatment of an abnormal swelling of an artery (aneurysm) in the neck and/or limbs

Average per year:

 **108** surgeries

19% | **21** people died within 30 days

Laparotomy

Example: Major surgery on the abdominal organs after, for example, a serious injury (trauma) or an infection

Average per year:


 **146** surgeries

17% | **25** people died within 30 days

Neurosurgery for brain aneurysms

Example: Opening the skull to treat a brain aneurysm (abnormal swelling of artery)

Average per year:

 **243** surgeries

14% | **33** people died within 30 days

Stomach surgery

Example: Removal of part of the stomach for uncontrolled bleeding from ulcers or cancer

Average per year:

 **399** surgeries

7.9% | **31** people died within 30 days

Neurosurgery for brain tumours

Example: Opening the skull to remove brain tumours

Average per year:

 **1,001** surgeries

7.5% | **75** people died within 30 days

Heart surgery (not coronary artery bypass graft)

Example: Drainage of excess fluid around the heart, repair or replacement of a heart valve

Average per year:

 **397** surgeries

6.8% | **27** people died within 30 days

Small intestine surgery

Example: Removal of a part of the small intestine

Average per year:

 **989** surgeries

6.4% | **63** people died within 30 days

Vascular surgery to open blocked arteries in the legs

Example: Vascular surgery for blockages/narrowings of the arteries in the lower legs

Average per year:

 **388** surgeries

6.4% | **25** people died within 30 days

About the Perioperative Mortality Review Committee | Mō 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-review-committees/perioperative-mortality-review-committee/about-us/terms-of-reference>.

Useful resources | Ngā 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/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.healthnavigator.org.nz/health-a-z/s/surgery-preparing>

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 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

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 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 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.

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

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.

⁵ Ministry of Health. 2017. HISO 10001:2017 Ethnicity Data Protocols. Wellington: Ministry of Health. URL: <https://www.health.govt.nz/publication/hiso-100012017-ethnicity-data-protocols> (accessed 9 August 2022).

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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