

# A glimpse into the incidence and mortality of aortic dissection in Aotearoa New Zealand

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## ABSTRACT

**BACKGROUND:** Aortic dissection is a lethal medical diagnosis associated with high morbidity and mortality. Currently published studies have noted a rising incidence of aortic dissection globally as well as a downward trend in mortality secondary to aortic dissection. There remains no nationally available study here in Aotearoa New Zealand looking into the incidence and mortality of aortic dissection.

**METHOD:** A retrospective observational study was performed using data extracted from the Manatū Hauora – Ministry of Health National Minimum Dataset (NMDS) from 1 July 2001 to 30 June 2021. Diagnosis of aortic dissection was based on the ICD-10 version 2 code for aortic dissection (I7100). Population-based statistics were obtained from Statistics New Zealand.

**RESULT:** A total of 4,737 patients were included in the study over the 20-year period. The incidence rate of aortic dissection in Aotearoa New Zealand is rising and the current median incidence rate is 4.99 per 100,000 per annum. The mortality rate from aortic dissection is slowly decreasing in Aotearoa New Zealand and the current median mortality rate is 2.19 per 100,000 per annum.

**CONCLUSION:** There appears to be a rise in the incidence of aortic dissection in Aotearoa New Zealand and a decrease in the mortality rate.

Aortic dissection is considered an uncommon medical presentation, yet it is associated with high morbidity and mortality if not recognised. The increased awareness of aortic dissection, the ease of access to healthcare as well as the advancement of medical imaging has allowed for prompt diagnosis of aortic dissection.

Aortic dissection can be classified based on the Stanford classification as type A or type B.<sup>1,2</sup> This is the most commonly used clinical classification. The other well-known classification system is the DeBakey classification, which is more descriptive but less commonly used in clinical practice. In recent years, a new distinct type has been proposed, known as non-A non-B aortic dissection.<sup>1</sup> Diagnosis of aortic dissection is confirmed by computed tomography angiography (CTA) or magnetic resonance aortography (MRA).<sup>1</sup> This is characterised by the presence of a “true lumen”, which refers to the initial channel of blood flow, and a “false lumen”, which is a new channel created between the layers of the aortic wall, from our understanding of the pathophysiology of the disease.<sup>2</sup>

It is noted that the incidence of aortic dissection has been on the rise over the years, with mortality being on the downtrend.<sup>3,4</sup> Current incidence of aortic dissection globally is quoted to be at 4.8 per 100,000 per annum.<sup>3</sup> This is a clear difference

compared to previously published studies from more than 10 years ago, which demonstrated the global incidence of aortic dissection to be at 3.4 per 100,000 per annum.<sup>3</sup> Locally in Aotearoa New Zealand, currently available studies only looked at the incidence of aortic dissection in one specific region rather than nationally.<sup>5</sup> Thus, to date, there are no published studies looking into the incidence of aortic dissection and its mortality in New Zealand. Therefore, this study is aimed at identifying the incidence and mortality of aortic dissection in Aotearoa New Zealand.

## Methods

We performed a retrospective observational study looking at patients diagnosed with aortic dissection. Data were obtained from the publicly available Manatū Hauora – Ministry of Health of New Zealand National Minimum Dataset (NMDS) from 1 July 2001 to 30 June 2021. The diagnosis of aortic dissection was based on the International Classification of Diseases (ICD-10) version 2 code for aortic dissection (I7100), which includes patients with a diagnosis of aortic dissection, unspecified site (I7100), aortic dissection, thoracic (I7101), aortic dissection, abdominal (I7102) and aortic dissection, thoracoabdominal (I7103) in the study. Population-based statistics were obtained

from publicly available data from Statistics New Zealand. Data were analysed using Microsoft Excel. Categorical data are presented as counts (percentages). Ethical approval was not required due to the nature of the study design.

## Results

A total of 4,737 patients were included in the study over the 20-year period. There were 2,830 male patients and 1,907 female patients. Most of the patients identified themselves as NZ European/Pakeha (55.3%). This was followed by Māori at 19.3% and Pacific Islanders 8.8% (Table 1). Aortic dissection appears to be more common in the 50–80-year-old age group, with the mode being in the 70–79-year-old age group. In terms of gender, the peak incidence of aortic dissection

for males is younger, in the 60–69-year-old age group; however, for females, this is in the 70–79-year-old age group (Figure 1).

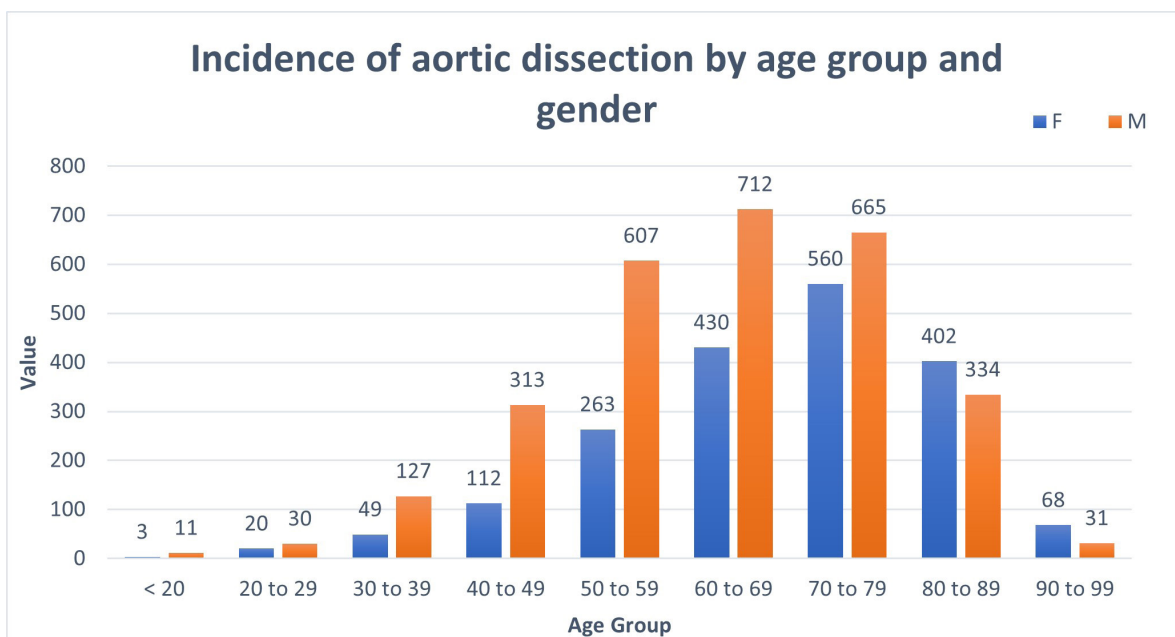
Over the 20-year data period, the incidence of aortic dissection in Aotearoa New Zealand has been rising steadily (Figure 2). Based on the population data obtained from Statistics New Zealand, the calculated median incidence of aortic dissection in New Zealand is 4.99 per 100,000 per annum.

In terms of mortality from aortic dissection, this appears to have been slowly decreasing over the past 20 years (Figure 3). The calculated median mortality rate from aortic dissection is 2.19 per 100,000 annum in Aotearoa New Zealand. Our data show that most deaths due to aortic dissection occur in the 70–79-year-old age group. This is the same when stratified based on gender (Figure 4).

**Table 1:** Demographics.

Age group	Male	Female
<20	11 (0.2%)	3 (0.1%)
20–29	30 (0.6%)	20 (0.4%)
30–39	127 (2.7%)	49 (1.0%)
40–49	313 (6.6%)	112 (2.4%)
50–59	607 (12.8%)	263 (5.6%)
60–69	712 (15.0%)	430 (9.1%)
70–79	665 (14.0%)	560 (11.8%)
80–89	334 (7.1%)	402 (8.5%)
90–99	31 (0.7%)	68 (1.4%)
Ethnicity		
NZ European/Pākehā	1,517 (32.0%)	1,104 (23.3%)
Māori	546 (11.5%)	371 (7.8%)
Pacific Islander	246 (5.2%)	171 (3.6%)
Other European	258 (5.4%)	123 (2.6%)
Asian	164 (3.5%)	99 (2.1%)
Other	60 (1.3%)	24 (0.5%)
Not stated	39 (0.8%)	15 (0.3%)

**Figure 1:** Incidence of aortic dissection by age group and gender.



**Figure 2:** Incidence of aortic dissection per financial year.

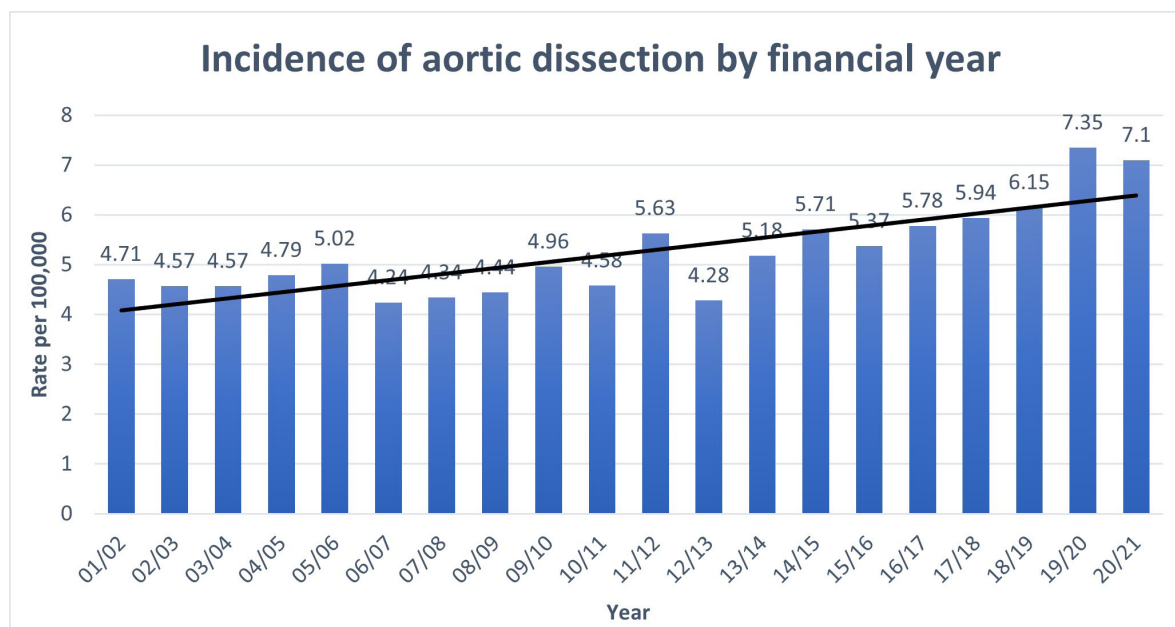


Figure 3: Mortality from aortic dissection per financial year.

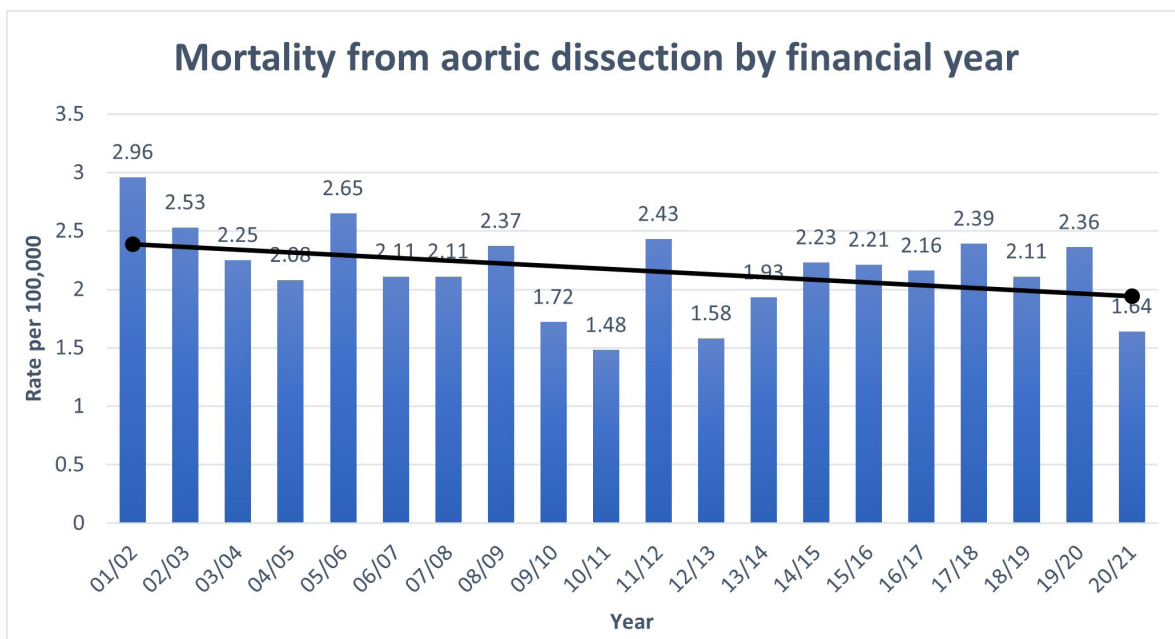
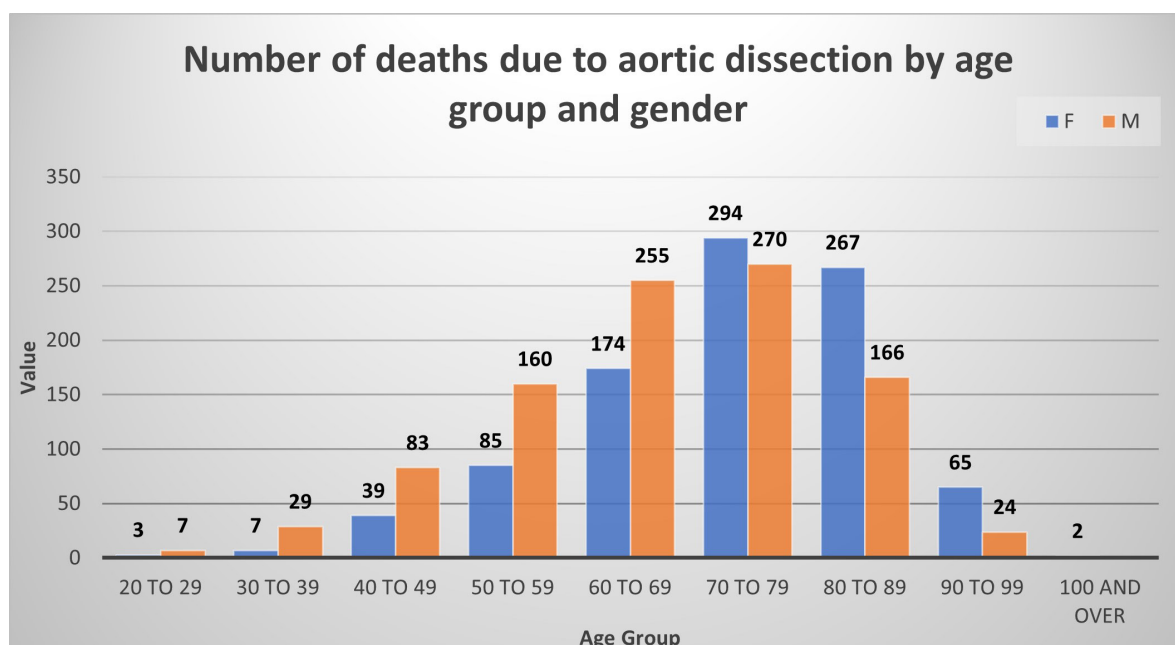


Figure 4: Number of deaths due to aortic dissection by age group and gender.



## Discussion

The current median incidence of aortic dissection in Aotearoa New Zealand is comparable to the incidence rates reported by other countries world-wide such as Canada, the United States of America, Italy and Taiwan.<sup>3</sup> Despite being geographically close, the incidence of aortic dissection in Aotearoa New Zealand is lower compared to Australia.<sup>3,6</sup> However, the only available study on the incidence of aortic dissection from Australia is based in a single region and may not be completely reflective of the overall incidence in the country.<sup>6</sup> The observed incidence in New Zealand is comparably lower than in the United Kingdom, which has an incidence rate of 6 per 100,000 per annum.<sup>7</sup> One of the possible reasons to account for this difference is the significant over-representation of Europeans in the study in comparison to other ethnic groups.<sup>7</sup>

Our study demonstrates that aortic dissection is more common in the third quarter of life with a male predominance in comparison to their female counterparts. It is noted that males tend to present slightly younger with aortic dissection compared to females. This is not only true with the peak incidence for males happening in a younger age group than in females, but also in general (Figure 1). This is similar to the data from the International Registry of Acute Aortic Dissection (IRAD).<sup>8</sup> One exception was noted from Figure 1, which shows that after the age of 80 years old, females have a higher incidence of aortic dissection. One possible explanation to this observed difference could be attributed to the life expectancy of males in New Zealand, which is quoted to be up to 80 years old.<sup>9</sup> Therefore, as a consequence, there is less of the male population remaining in the octogenarian and older groups. A similar finding can also be observed in Figure 4.

It is also evident that there is a small proportion of cases of aortic dissection that occur in the group under 30 years of age (Figure 1). Connective tissue disease—such as Marfan syndrome—is associated with aortic dissection and patients tend to present at

a much younger age group.<sup>2,8</sup> Interestingly, Marfan syndrome is known to occur equally in both males and females, but in Figure 1 we see a male predominance that could suggest other aetiologies being involved in causing aortic dissection in the younger population. Among the other possible causes could be trauma, illicit drug use and anatomical variations such as presence of a bicuspid aortic valve.<sup>8</sup> This reasoning can also be applied to what is observed in Figure 4 with regards to a number of deaths noted in the younger age group (less than 30 years old).

The limitation in our study is attributed to its retrospective nature and therefore reliance on correct clinical coding of the diagnosis of aortic dissection. From this, we are unable to differentiate between each sub type of aortic dissection—type A and type B—in order to determine their specific incidence rates. Nevertheless, our study is able to provide a snapshot into the current landscape of what the incidence and mortality rates from aortic dissection are in Aotearoa New Zealand.

Our study reports on observed incidence rather than actual incidence. This becomes relevant with regards to identifying if the rise in aortic dissection incidence is due to better recognition rather than being a true epidemic. The suspicion is that this is likely to be multifactorial, from better awareness and ease of access to imaging modalities. However, the only way to be certain this is not a true rising epidemic would be to perform a prospective cohort study.

## Conclusion

There appears to be a rising incidence of aortic dissection in Aotearoa New Zealand, similar to what is being observed world-wide. Further prospective studies should be done to map out the exact incidence of the different sub-types of aortic dissection. There should be a push towards better control of cardiovascular risk factors, which would hopefully lead to a reduced risk of New Zealanders developing aortic dissection in the future.

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**COMPETING INTERESTS**

None declared.

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