

1. Cancer incidence overview

1.1 Age distribution

Table 1: Number of New Registered Cancers

population	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
adult	26,572	26,577	27,075	27,642	28,755	28,458	28,807	29,351	29,205	30,199
child	32	54	36	54	42	42	32	40	36	38

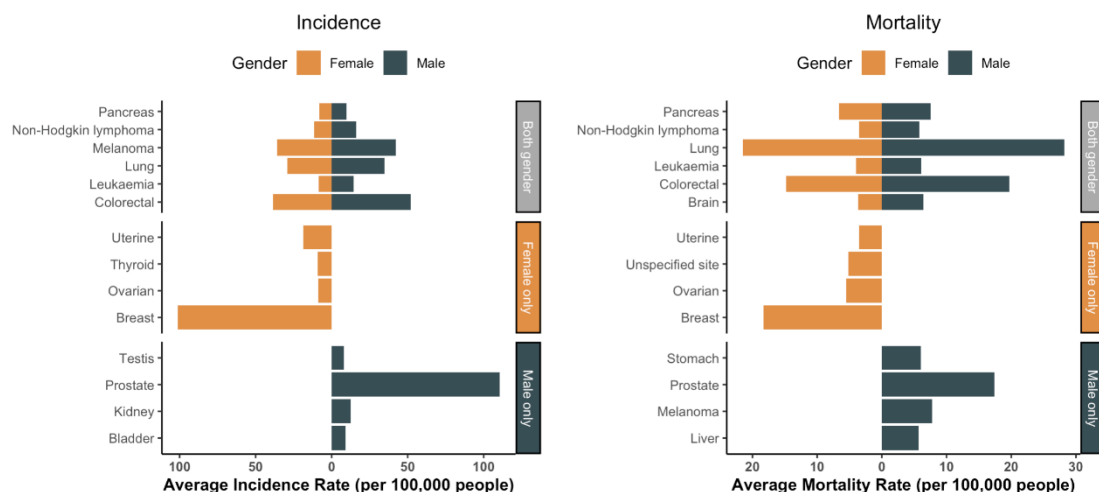
The number of adult cancer registrations is over 800 to 1000 times greater than the number of child cancer registrations.

Table 1 presents cancer registration data from 2011 to 2020, categorized into adults and children. While there has been an upward trend in adult cancer registrations, child cancer registrations have remained relatively stable.

Given the low proportion of child cancer registrations in the overall dataset, the small percentage of child data does not significantly impact our analysis. And our analysis primarily focuses on the general cancer situation in New Zealand. Furthermore, the cancer data we've collected from various regions doesn't differentiate between adults and children. As a result, we can't analyze adult data separately in subsequent analyses.

1.2 Gender variance

Figure 1: Average Incidence Rate and Average Mortality Rate for each cancer type by sex



Females had the highest average incidence of Breast cancer from 2011 to 2020, while males had the highest for Prostate cancer. Colorectal cancer also showed high average incidence rates for both genders.

For average mortality rates over the same period, both genders exhibited the highest rates from Lung cancer. For females, Breast cancer was the second-leading cause of mortality, while for males, it was Colorectal cancer.

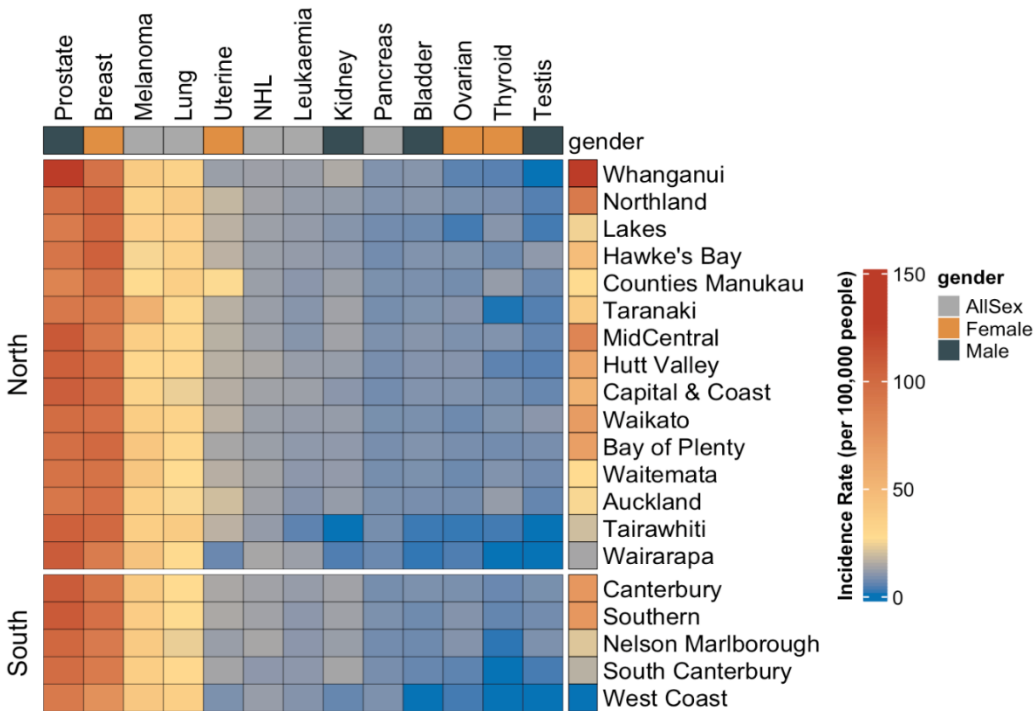
Figure 1 visually represents these average incidence and mortality rates for each cancer type by gender based on data from the website <https://tewhatuora.shinyapps.io/cancer-web-tool/> . However, some data points were missing: female data for Kidney and Bladder cancer and male data for Thyroid cancer.

Cancers exclusive to one gender, like Uterine cancer, Ovarian cancer, and Breast cancer in females and Prostate and Testicular cancer in males, were analyzed separately. For other cancer types with data for both genders, separate analyses were conducted. Generally, average incidence and mortality rates were similar between genders, though males had slightly higher incidence rates.

Among cancer types with data for both sexes, the average incidence and mortality rates were generally similar between males and females, with slightly higher average incidence rates among males. In subsequent analyses, cancers with data for both genders were analyzed using "all sex" data, while cancers with data available for only one gender were analyzed using the corresponding gender-specific data.

1.3 Regional distribution

Figure 2: Heatmap of the incidence rate of each cancer type in each region



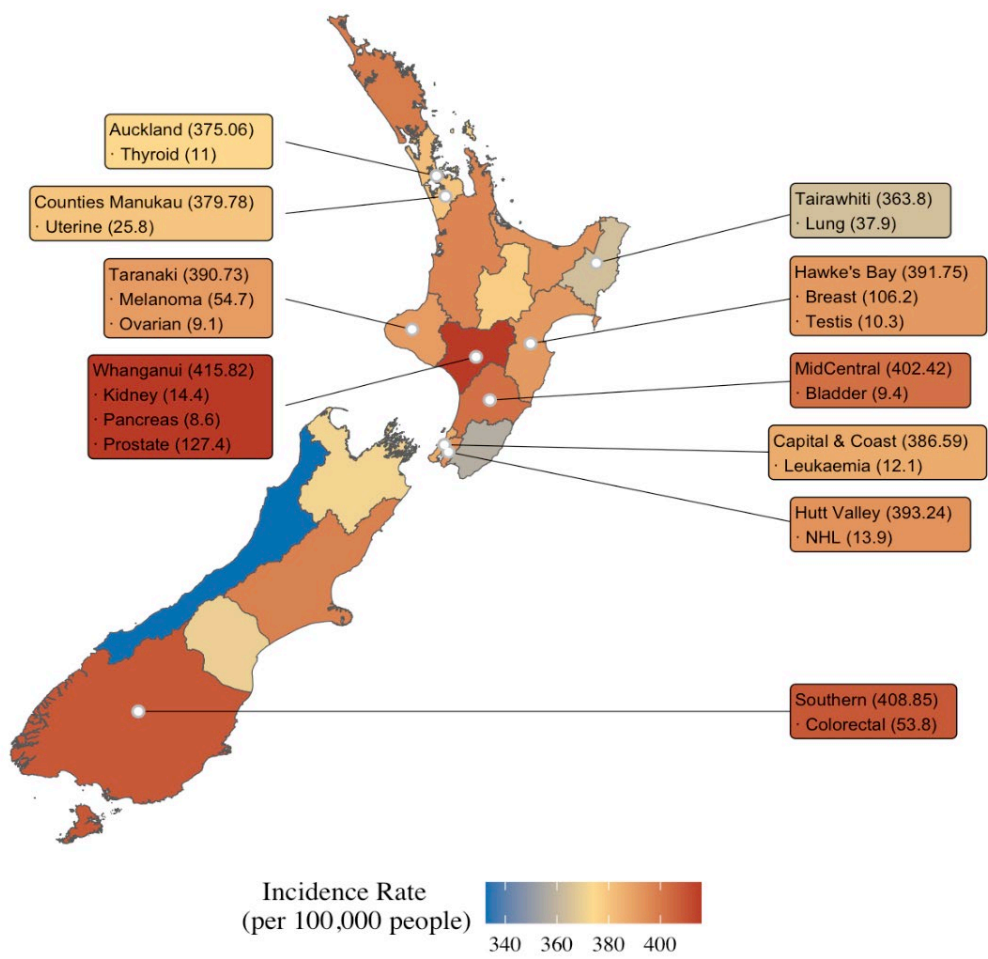
From 2011 to 2020, Whanganui had the highest cancer incidence rate among all New Zealand regions, with the West Coast recording the lowest.

The heatmap uses shades of orange to represent higher cancer incidence rates and shades of blue for lower rates. Whanganui and Northland had notably high rates, whereas the West

Coast had the lowest.

The heatmap also shows that Prostate and Breast cancers had the highest incidence rates in every region, while Thyroid and Testicular cancers had the lowest rate.

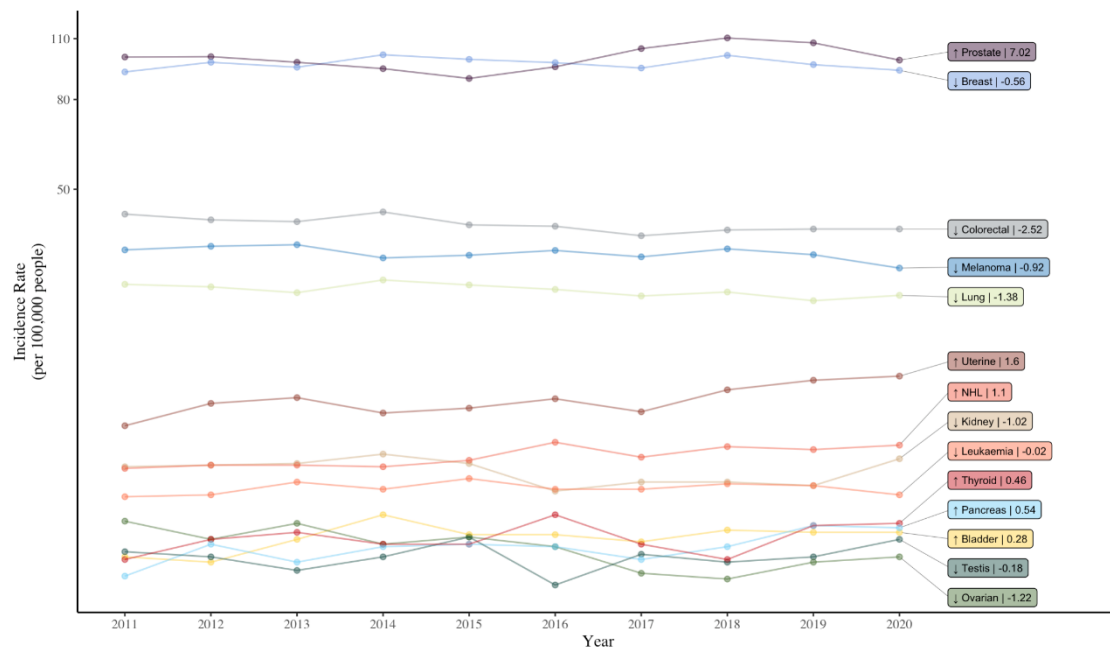
Figure 3: Heatmap of the incidence rate of each cancer type in each region



This heatmap provides a clearer depiction of regional cancer rates. Whanganui topped the list with an incidence rate of 415.82/100,000, primarily driven by Kidney cancer, Pancreas cancer, and Prostate cancers. The Southern region followed with 408.55/100,000, where Colorectal cancer was most prevalent. The West Coast had the lowest incidence rate.

1.4 Contemporary trends

Figure 4: Trend of incidence rate for each cancer type from 2011 to 2020



Between 2011 and 2022, the incidence rates of Prostate cancer, Uterine cancer, Non-Hodgkin lymphoma cancer, Thyroid cancer, Pancreas cancer, and Bladder cancers all increased. In contrast, Colorectal cancer showed a significant decline.

Figure 4's label's number represent the difference between median cancer incidence rates from 2016 to 2020 and those from 2011 to 2015, indicating growth or decline trends over these five-year periods.

Lastly, the incidence rates for Thyroid cancer and Testicular cancers fluctuated substantially during this decade, while other cancers had more stable trends.