REGIONAL CANCER REPORT 2011-2021

Northern Health

Acknowledgement

We would like to thank all the dedicated people who contributed to this report, including those who collected and provided the data, reviewed the drafts, and provided input throughout the development of this report.

We respectfully acknowledge that Northern Health is collectively located on the traditional and ancestral territories of the 55 First Nations in Northern BC where we live, learn, collaborate, and work together. The regions served by Northern Health are also home to 11 Métis Chartered Communities represented by Métis Nation British Columbia. It is with humility that we continue to strengthen our relationships with First Nation, Métis, and Inuit peoples and communities across the North**.**

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Introduction

Cancer has a significant impact on individuals and communities throughout British Columbia (BC). Cancer statistics help us understand the impact of cancer on our society and healthcare system, as well as look at trends and changes in diagnoses and deaths from cancer over time. This report provides a brief overview for public health teams, decision makers, and the public on cancer statistics for Northern Health (NH) residents from 2011 to 2021. The information in this report is intended to inform on high level trends and rates of cancer within NH, further study is required to understand causes or influencing factors.

In BC, the most common types of cancer include breast, lung, prostate and colorectal[1]. These four cancer types account for nearly half of all cancer diagnoses. BC Cancer estimates that the number of people diagnosed with cancer each year is expected to grow by 43% between 2021 and 2035. This expected growth is largely due to population growth and population aging. Cancer is the leading cause of death in BC, accounting for 24% of all deaths in the province. Nearly half of all cancer deaths are caused by five types of cancer: lung, colorectal, pancreas, prostate, and breast. However, BC has seen a decrease in mortality rates for both males and females over the last 20 years, as well as increased 5-year survival rates for those diagnosed with cancer.

Data Sources

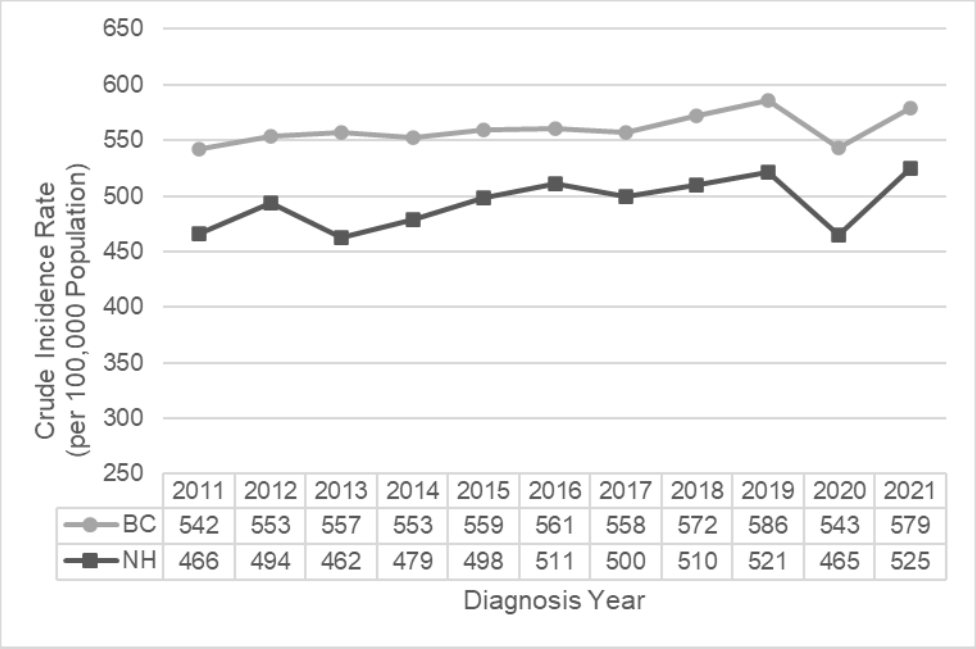
Data for this report were obtained from the BC Cancer Registry's Dashboard[1] and BC Stats Population Estimates and Projections[2]. This report is created using the most recent data publicly available at the time of writing. Data is currently available at the health authority and provincial level. Cancer data is reported using sex, referring to biological attributes and legal categories, and may not represent the full spectrum of gender identity that individuals may self-identify with. Due to rounding, row and column counts may not sum to the total. Due to small population and case counts, patterns and trends should be interpreted with caution.

[1] BC Cancer. (2023). Cancer Statistics Online Dashboard. Available at https://bccandataanalytics.shinyapps.io/BCSummary/. Retrieved June 3, 2024.
[2] BC Stats. Population Estimates & Projections for British Columbia. Available at BC Population Estimates & Projections (shinyapps.io).

Cancer Incidence

Cancer incidence is the number of new cases of cancer diagnosed. The incidence rate is defined as the number of new cases of a disease that occur during a specific period of time in the at-risk population.

In 2021, 1,585 new cases of cancer were diagnosed in NH. The incidence rate for all cancers combined in 2021 was 525 cases per 100,000 population. The rate of new cancer diagnoses has shown a slight increase in the previous 10 years, from an incidence rate of 466 cases per 100,000 population in 2011 (Figure 1). This trend is similar to the general trend for the rate of new cancer diagnoses in BC (Figure 1). As seen in Figure 1, a decrease in new diagnoses of cancer was seen both in NH and BC in 2020. This decrease is likely a result of impacts from the COVID-19 pandemic, when many health care services were delayed or suspended, and is a trend seen across Canada[3].



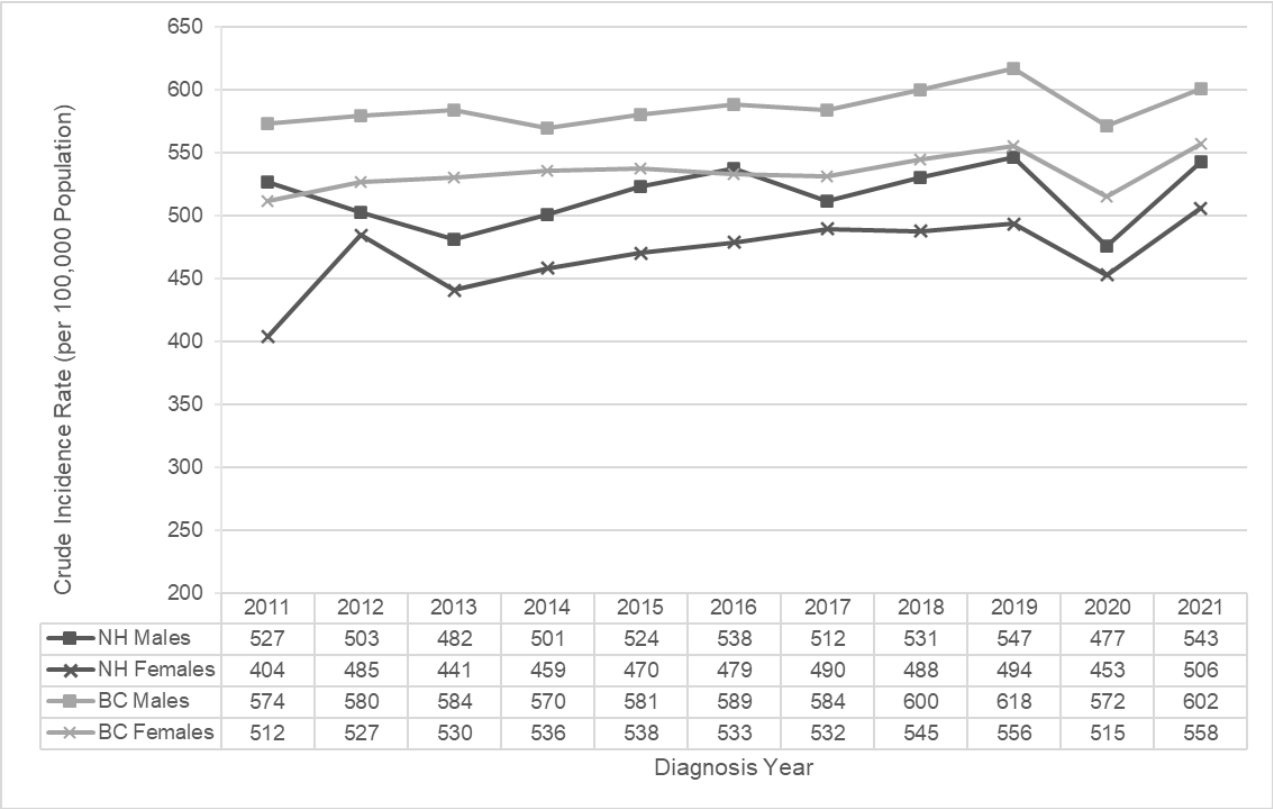
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
BC	542	553	557	553	559	561	558	572	586	543	579
NH	466	494	462	479	498	511	500	510	521	465	525

Figure 1. Cancer incidence crude rates (per 100,000 population) for all cancers combined in BC and NH, 2011 to 2021.

Among males, there were 840 new cancer diagnoses in NH in 2021, an incidence rate of 543 cases per 100,000 population. Among females in NH, there were a total of 745 new cancer diagnoses in 2021, an incidence rate of 506 new cases of cancer per 100,000 population.

[3] Canadian Partnership Against Cancer. (2022). Road to Recovery: Cancer in the COVID-19 Era. Available at https://www.partnershipagainstcancer.ca/topics/cancer-in-covid-19-era/current-state/impacts-diagnoses/

Since 2011, the rate of newly diagnosed cancers has been higher among males than females in both NH and BC (Figure 2).



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NH Males	527	503	482	501	524	538	512	531	547	477	543
NH Females	404	485	441	459	470	479	490	488	494	453	506
BC Males	574	580	584	570	581	589	584	600	618	572	602
BC Females	512	527	530	536	538	533	532	545	556	515	558

Figure 2. Crude incidence rates (per 100,000 population) for all cancers combined in NH and BC, by sex, 2011 to2021.

Most Common Newly Diagnosed Cancers

In 2021, the most common newly diagnosed cancer in NH was lung cancer, with 235 new cases (78 cases per 100,000 population). This was followed by breast cancer, colorectal cancer, prostate cancer, and bladder cancer (including in-situ) (Table 1).

Table 1. New cancer diagnoses and incidence rates (per 100,000 population) in NH and BC, ranked by cancer type, 2021.

Cancer Type	NH		BC
	Number of New Diagnoses	Incidence Rate (per 100,000 Population)	Incidence Rate (per 100,000 Population)
Lung	235	77.9	68.3
Breast	220	72.9	82.5
Colorectal*	170	56.3	60.7

Prostate†	160	103.5	136.8
Colon	115	38.1	40.5
Bladder (including in-situ)	75	24.9	31.2
Non-Hodgkin Lymphoma	70	23.2	25.9
Pancreas	65	21.5	19.8
Melanoma (Skin)	60	19.9	27.3
Kidney	60	19.9	18.1
Leukemia	55	18.2	15.5
Rectum	55	18.2	20.2
Head and Neck	50	16.6	19.0
Body of Uterus†	50	34.0	37.4
Stomach	35	11.6	9.4
Esophagus	30	9.9	8.6
Thyroid	25	8.3	10.5
Liver	25	8.3	9.1
Brain	20	6.6	8.2
Multiple Myeloma	20	6.6	8.5
Cervix†	15	10.2	7.8
Ovary†	10	6.8	12.1
Testis†	10	6.5	7.1
Hodgkin Lymphoma	10	3.3	2.6
All Other Cancers	130	43.1	53.1

* Case counts for colorectal cancer are a sum of case counts for colon and rectal cancer.
† Cancer type occurs in only one sex. Incidence rates represent sex-specific population rates.

Each of NH's three most common new cancer diagnoses were relatively stable since 2011, with the exception of the decrease in new cancer diagnoses seen both provincially and nationally in 2020 (Figure 3). The rate of new lung cancer diagnoses in NH has exceeded BC rates since 2011, while rates of both breast and colorectal cancer diagnoses remain lower in NH than BC. Since 2011, rates of breast cancer in NH have shown a slight increasing trend.

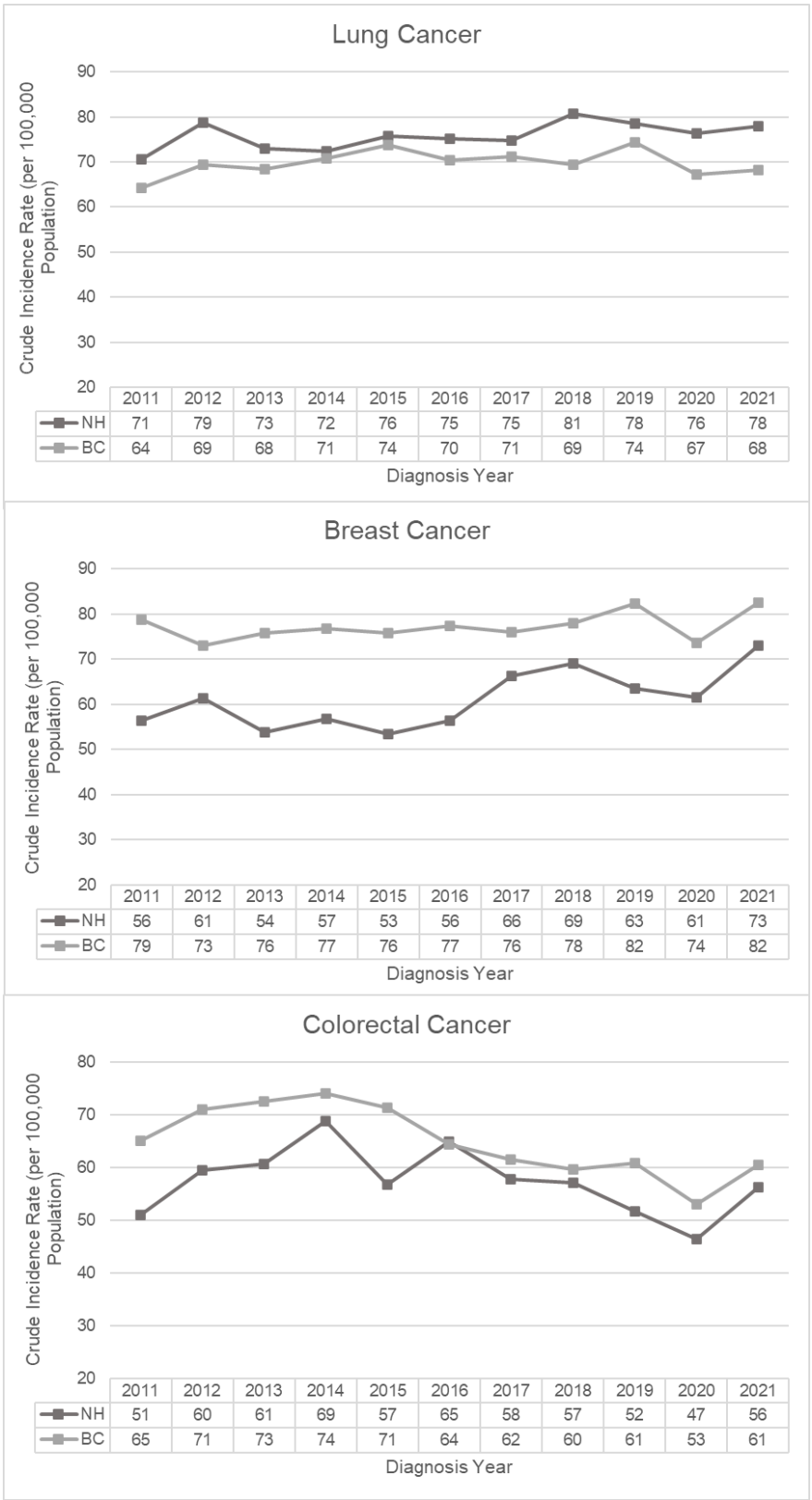


Figure 3. Crude incidence rates for the top causes of new cancer diagnoses for Northern Health residents in 2021, NH and BC, 2011 to 2021.

Among females, the five most common new diagnoses of cancer for NH in 2021 were breast cancer (220 new cases), lung cancer (115 new cases), colorectal cancer (70 new cases), cancers of the uterine body (50 new cases), and pancreas and melanoma (skin cancer) (30 new cases) (Figure 4).

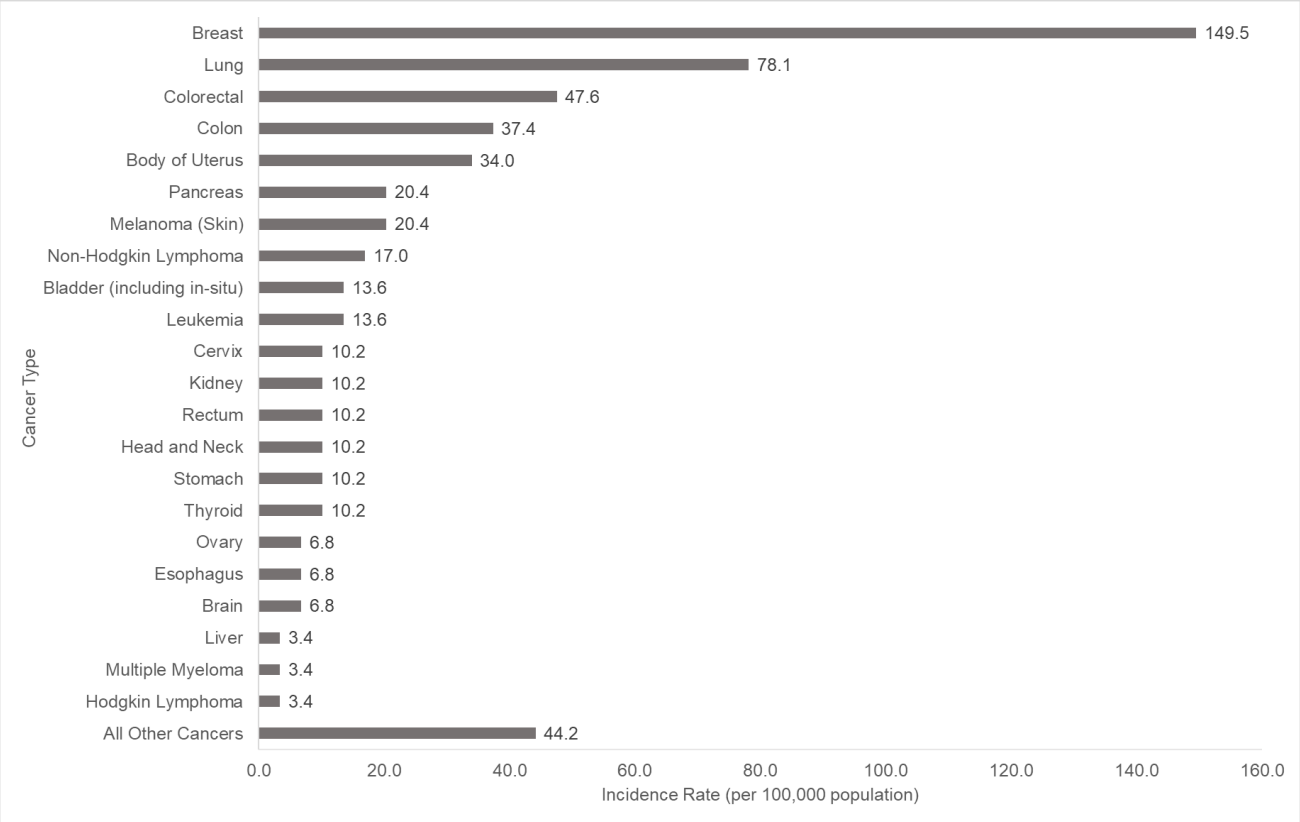


Figure 4. Crude incidence rates (per 100,000 population) for females in NH, by cancer type, 2021.

For males in NH, the most common new diagnoses of cancer in 2021 included prostate cancer (160 new cases), lung cancer (120 new cases), colorectal cancer (100 new cases), bladder cancer (55 new cases) and kidney cancer (50 new cases) (Figure 5).

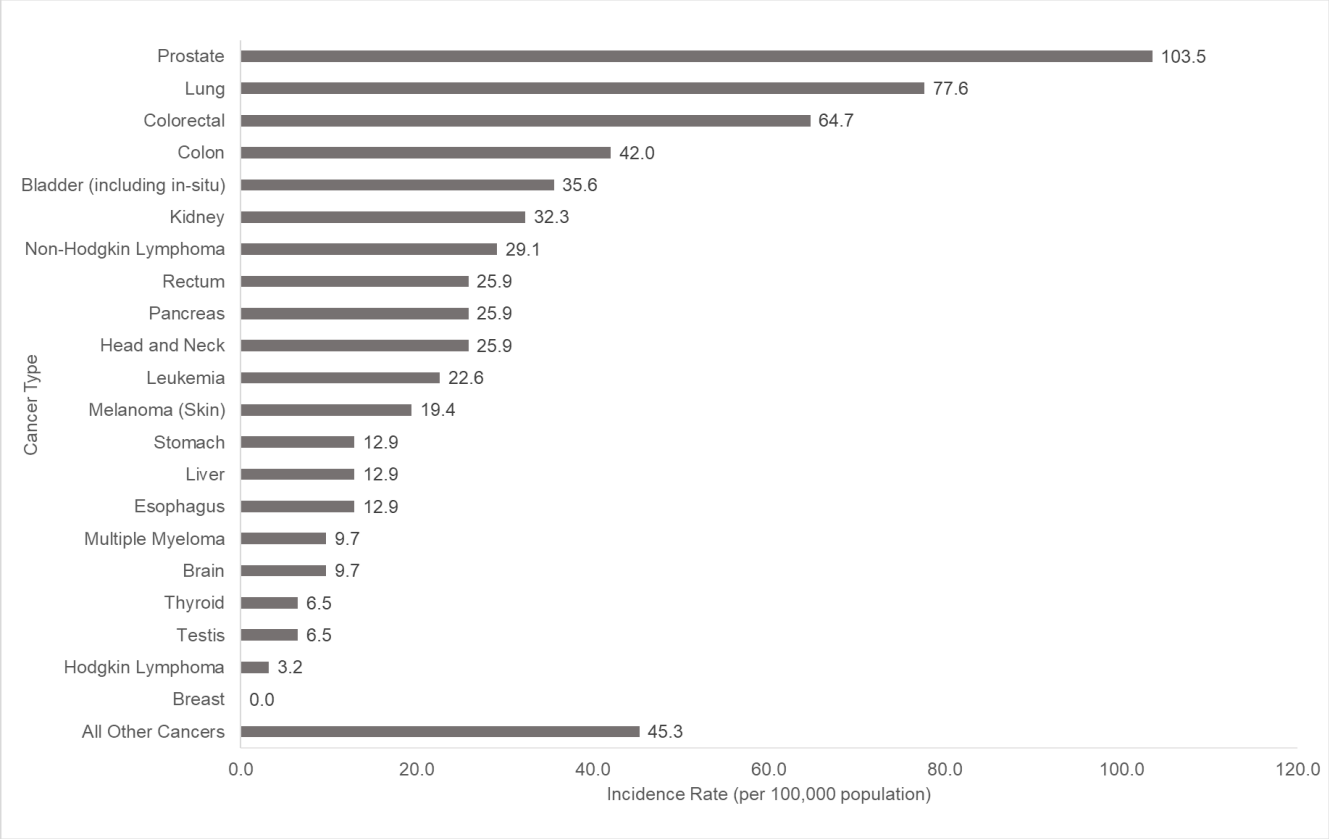


Figure 5. Crude incidence rates (per 100,000 population) for males in NH, by cancer type, 2021.

Cancer Prevalence

Prevalence is the total number of people alive on a certain date who were diagnosed with the specified cancer within a certain time period (i.e. diagnosed in the previous 5 years). The following data provides the prevalence for those alive on January 1st, 2022 ("2022 Index Year") who were diagnosed with cancer or with the specific cancer type in the previous 1, 5, 10, and 20 years. Prevalence data can provide insight into the overall impact on the healthcare system.

Of those alive at the 2022 index year, 10,010 people in NH have been diagnosed with cancer in the previous 20 years (Table 2). Of this, 5090 are female (51%) and 4920 are male (49%). The near equal distribution between sexes highlights balanced cancer diagnosis and survival trends among males and females.

Table 2. Number of prevalent cases of all cancer types combined at 1, 5, 10, and 20 year limited durations from the 2022 index year in NH, by sex.

Limited Duration from Index Year (2022)	Prevalence Count		
	All	Female	Male
1 Year	1,220	590	630

5 Year	4,470	2,225	2,245
10 Year	7,230	3,615	3,615
20 Year	10,010	5,090	4,920

The number of people alive that have been diagnosed in the previous 1, 5, 10, and 20 years has been increasing in NH and provincially over the previous 10 years (Figure 6). This may be due to increasing new diagnoses of cancer due to population growth and aging, as well as increasing survival and length of survival of cancer.

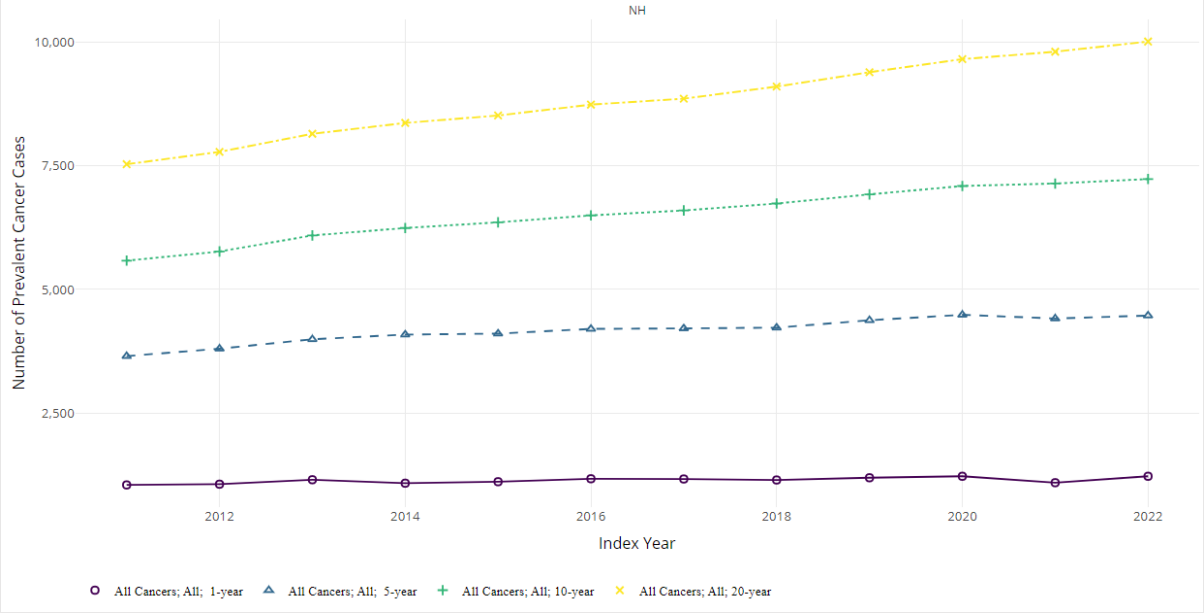


Figure 6. Number of prevalent cases of all cancers combined for a 1, 5, 10, and 20 year duration, NH, 2011 to 2022.

Cancer Mortality

In 2021, there were a total of 670 cancer deaths in NH from all cancers combined and a mortality rate of 222 deaths per 100,000 population. The mortality rate for all cancer deaths increased from a rate of 195 deaths per 100,000 population in 2011 to 222 deaths per 100,000 in 2021, a 13.8% increase from 2011 (Figure 7). Since 2016, the mortality rate for all cancer deaths in NH has been higher than BC (Figure 7).

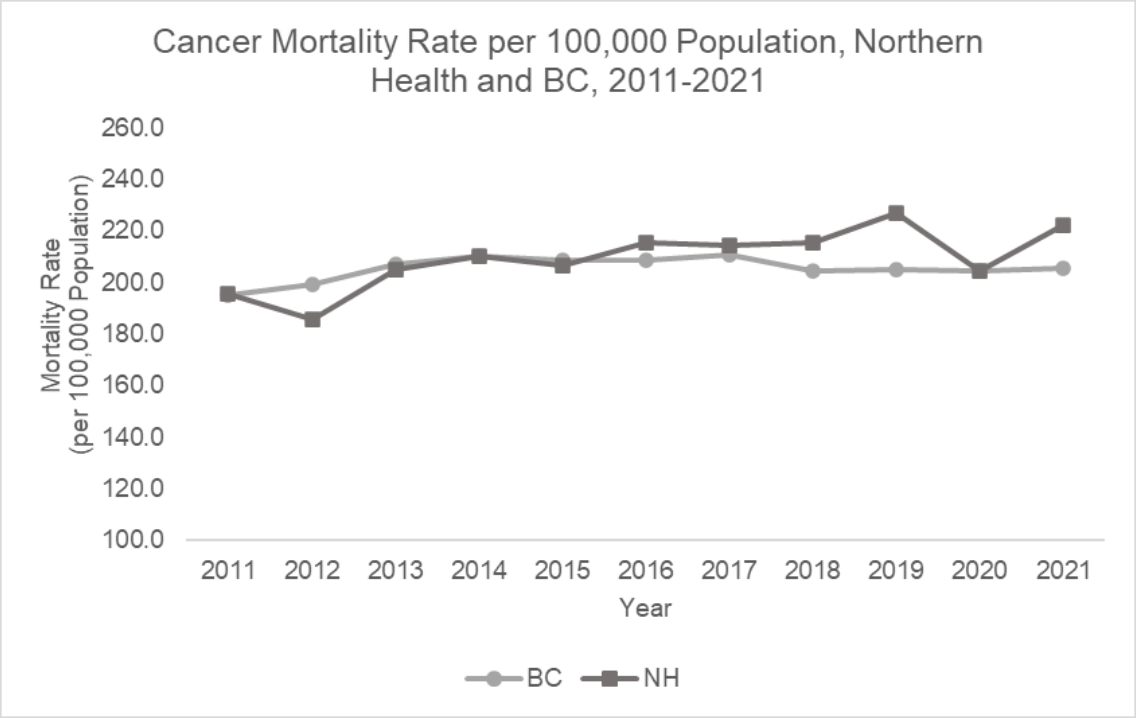


Figure 7. Cancer mortality crude rates (per 100,000 population) for all cancers combined in NH and BC, 2011 to 2021.

In 2021, there were a total of 390 cancer deaths among males in NH resulting in a mortality rate of 252 deaths per 100,000 population. Among females, a total of 285 cancer deaths were seen in 2021and a mortality rate of 194 deaths per 100,000 population. For both males and females in NH, the crude mortality rate increased from 2011 to 2021 (Figure 8). Among both sexes, the mortality rate in NH has frequently been higher than BC males and females, whose rates have remained relatively stable (Figure 8).

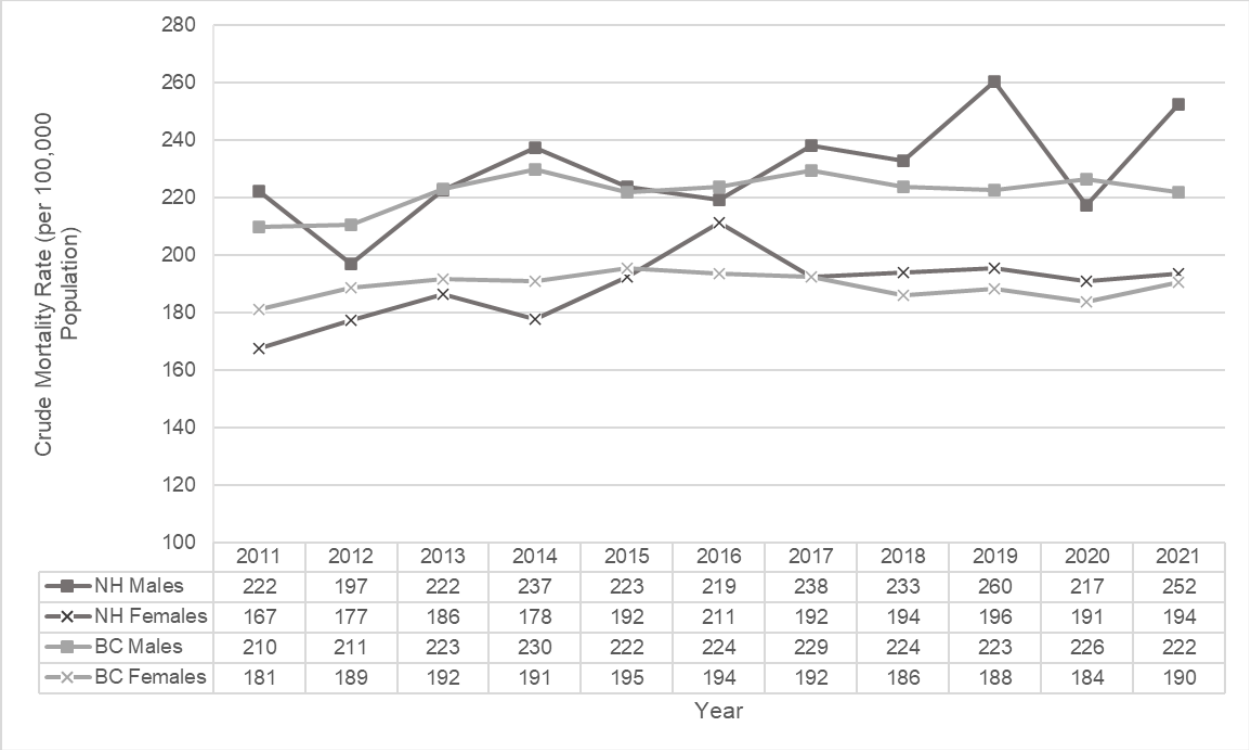


Figure 8. Crude mortality rates (per 100,000 population) for all cancers combined, by sex, for Northern Health and BC, 2011 to 2021.

Most Common Causes of Cancer Deaths

In NH, the five most common causes of cancer deaths in 2021 were lung cancer (160 deaths), colorectal cancer (90 deaths), pancreatic cancer (50 deaths), prostate cancer (50 deaths), and breast cancer (35 deaths) (Table 3).

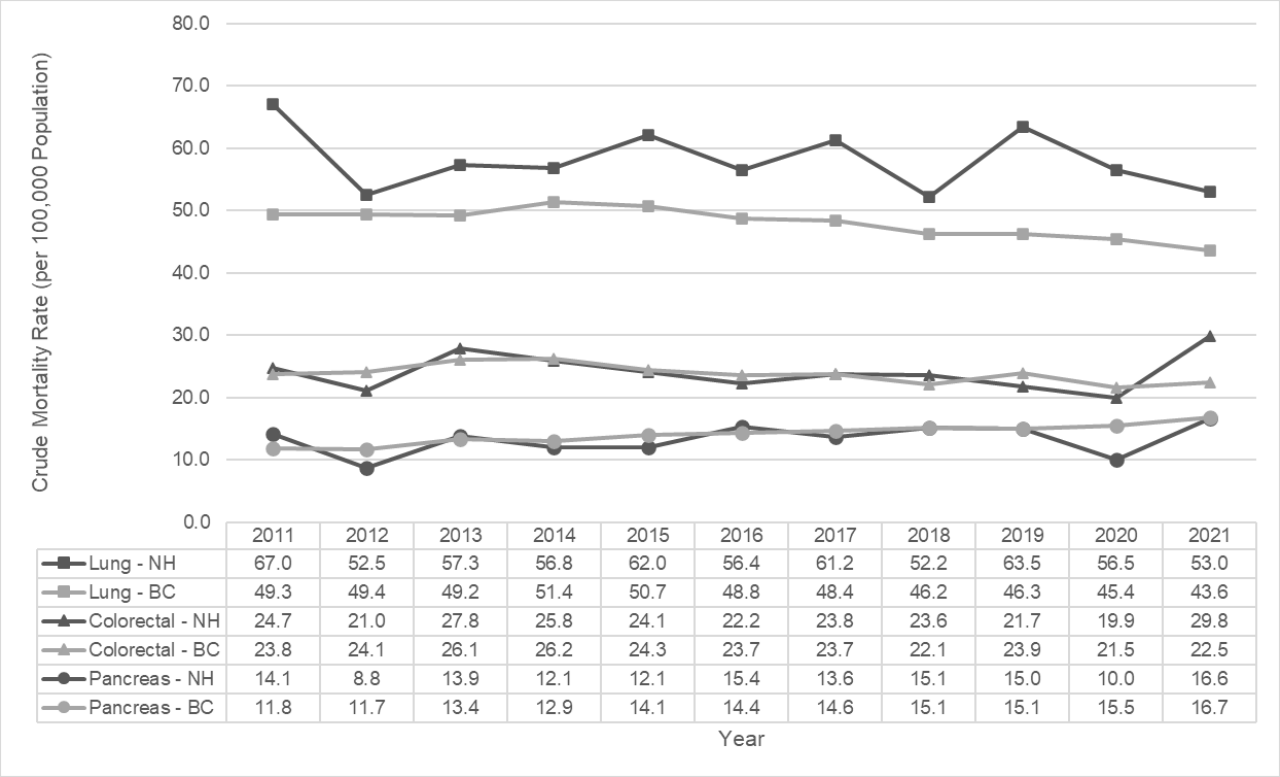
Table 3. Number of cancer deaths and crude mortality rate (per 100,000 population) for NH and BC, ranked by cancer type, 2021.

Cancer Type	NH		BC
	Number of Cancer Deaths	Crude Mortality Rate (per 100,000 Population)	Crude Mortality Rate (per 100,000 Population)
Lung	160	53.0	43.6
Colorectal*	90	29.8	22.5
Colon	70	23.2	15.1
Pancreas	50	16.6	16.7
Prostate†	50	32.3	27.2
Breast	35	11.6	13.3
Head and Neck	25	8.3	5.2
Kidney	25	8.3	4.3
Non-Hodgkin Lymphoma	25	8.3	7.3

Esophagus	20	6.6	6.7
Leukemia	20	6.6	7.1
Liver	20	6.6	4.5
Rectum	20	6.6	7.4
Brain	15	5.0	6.6
Multiple Myeloma	15	5.0	4.5
Stomach	15	5.0	4.5
Ovary†	15	10.2	10.1
Melanoma (Skin)	10	3.3	3.0
Body of Uterus†	10	6.8	7.2
Hodgkin Lymphoma	5	1.7	0.3
Thyroid	5	1.7	0.8
Cervix†	5	3.4	2.1
Testis†	0	0.0	0.2
All Other Cancers	65	21.5	25.6

* Case counts for colorectal cancer are a sum of case counts for colon and rectal cancer.
† Cancer type occurs in only one sex. Incidence rates represent sex-specific population rates.

From 2011 to 2021, mortality rates for the three most common causes of cancer deaths in NH displayed similar trends as BC rates, with the exception of lung cancer, which has been consistently higher in NH than in BC (Figure 9). While BC has seen a slight decline in the rate of lung cancer deaths, NH's rate has stayed relatively stable.



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Lung - NH	67.0	52.5	57.3	56.8	62.0	56.4	61.2	52.2	63.5	56.5	53.0
Lung - BC	49.3	49.4	49.2	51.4	50.7	48.8	48.4	46.2	46.3	45.4	43.6
Colorectal - NH	24.7	21.0	27.8	25.8	24.1	22.2	23.8	23.6	21.7	19.9	29.8
Colorectal - BC	23.8	24.1	26.1	26.2	24.3	23.7	23.7	22.1	23.9	21.5	22.5
Pancreas - NH	14.1	8.8	13.9	12.1	12.1	15.4	13.6	15.1	15.0	10.0	16.6
Pancreas - BC	11.8	11.7	13.4	12.9	14.1	14.4	14.6	15.1	15.1	15.5	16.7

Figure 9. Crude mortality rates for the top causes of cancer deaths for Northern Health residents in 2021, NH and BC, 2011 to 2021.

Among NH males, the most common causes of cancer deaths in 2021 were lung cancer (85 deaths), colorectal cancer (50 deaths), prostate cancer (50 deaths), kidney cancer (20 deaths), and Non-Hodgkin Lymphoma (20 deaths) (Figure 10).

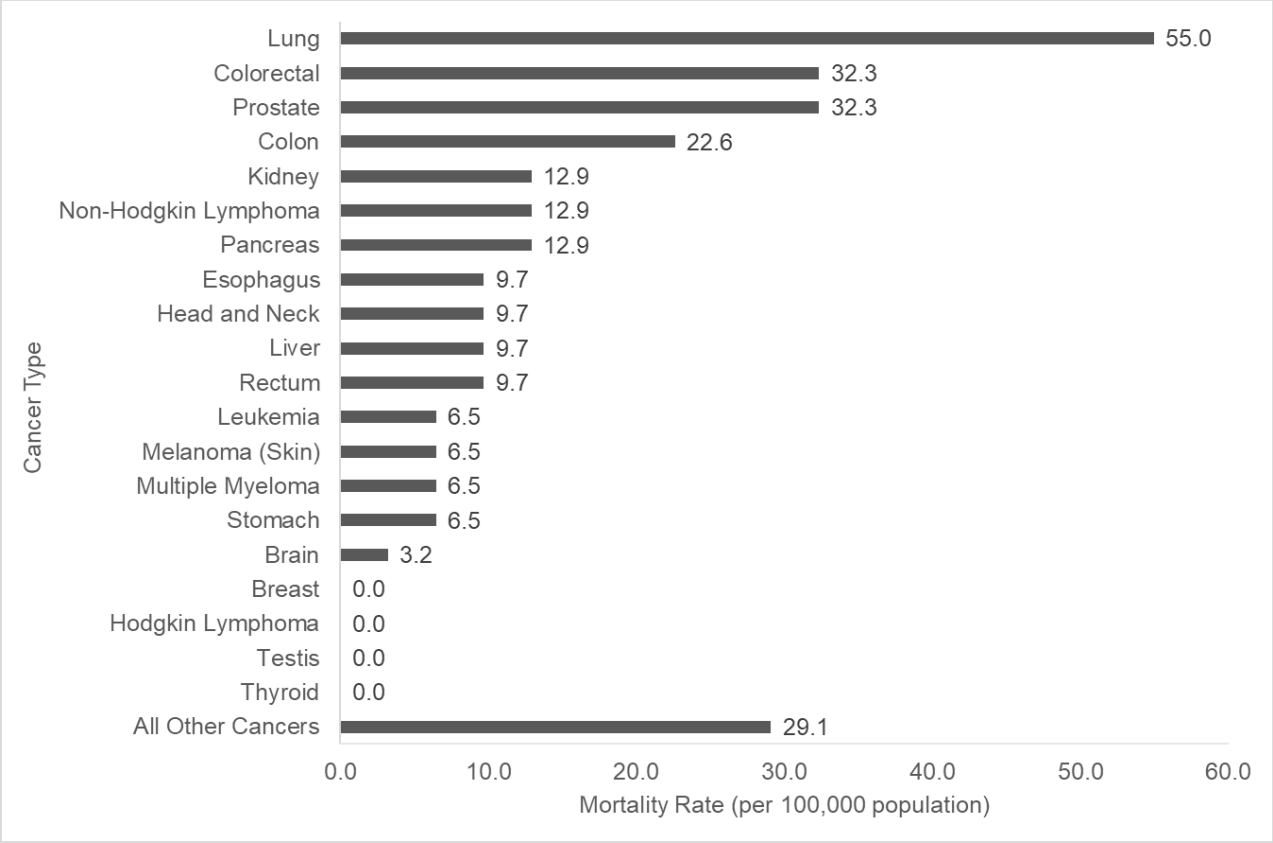


Figure 10. Crude mortality rates (per 100,000 population) for males in NH, by cancer type, 2021.

Among NH females, the most common causes of cancer deaths in 2021 were lung cancer (75 deaths), colorectal cancer (40 deaths), breast cancer (35 deaths), pancreatic cancer (25 deaths), and ovarian cancer (15 deaths) (Figure 11).

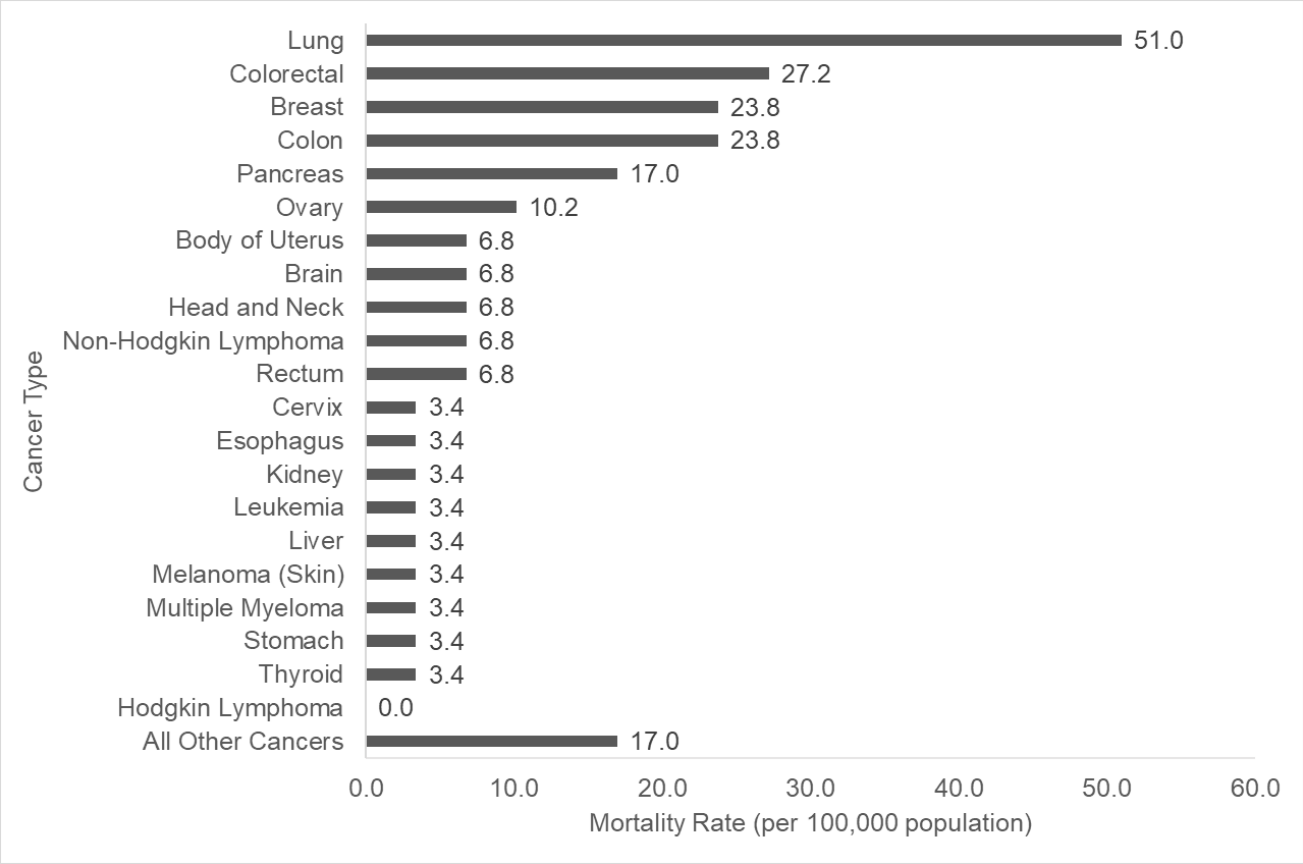


Figure 11. Crude mortality rates (per 100,000 population) for females in NH, by cancer type, 2021.

Standardized Mortality Ratio

The Standardized Mortality Ratio (SMR) is a measure of the ratio of the total number of observed deaths compared to the expected number of deaths within a population. An SMR above 1.0 indicates that the observed number of deaths exceeds the expected number; similarly, an SMR below 1.0 indicates the observed number of deaths is less than expected. Due to wide confidence intervals, SMR comparisons in this report should be interpreted with caution.

For all cancers combined, in 2021 NH had an age-standardized SMR of 1.32. This was the highest SMR for all cancers combined in comparison to other BC health authorities (Figure 11). The SMR for all cancers combined among both females and males was also the highest in the province (Figure 12).

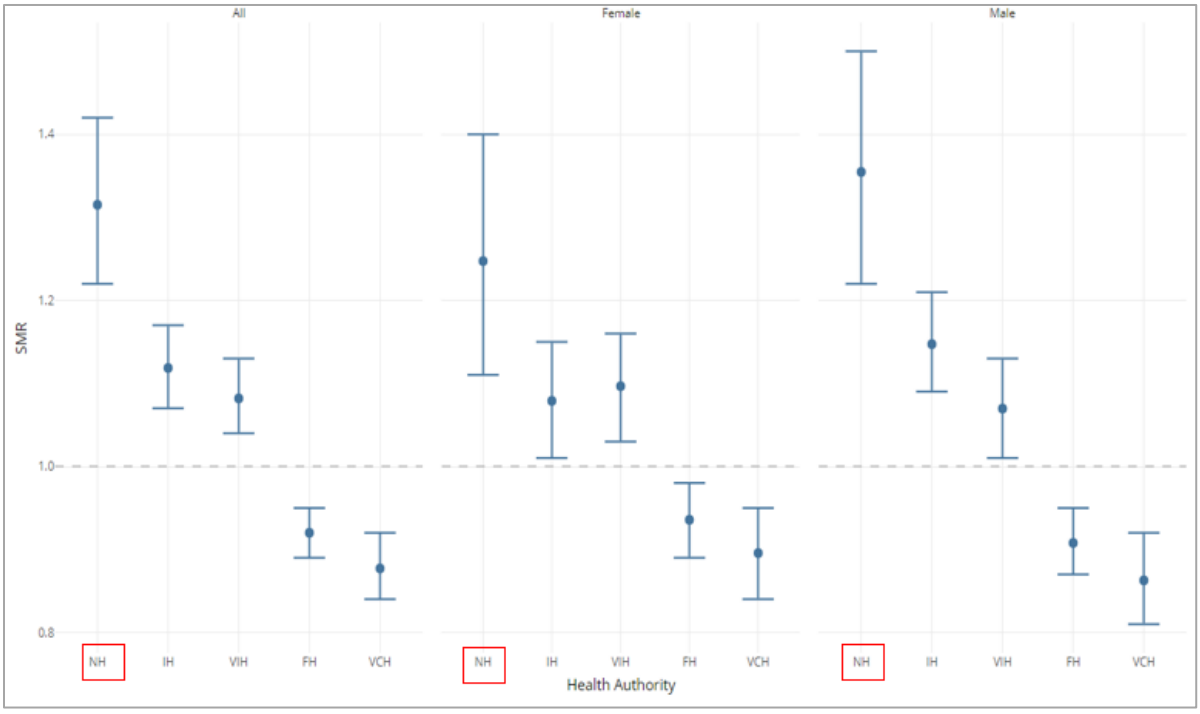
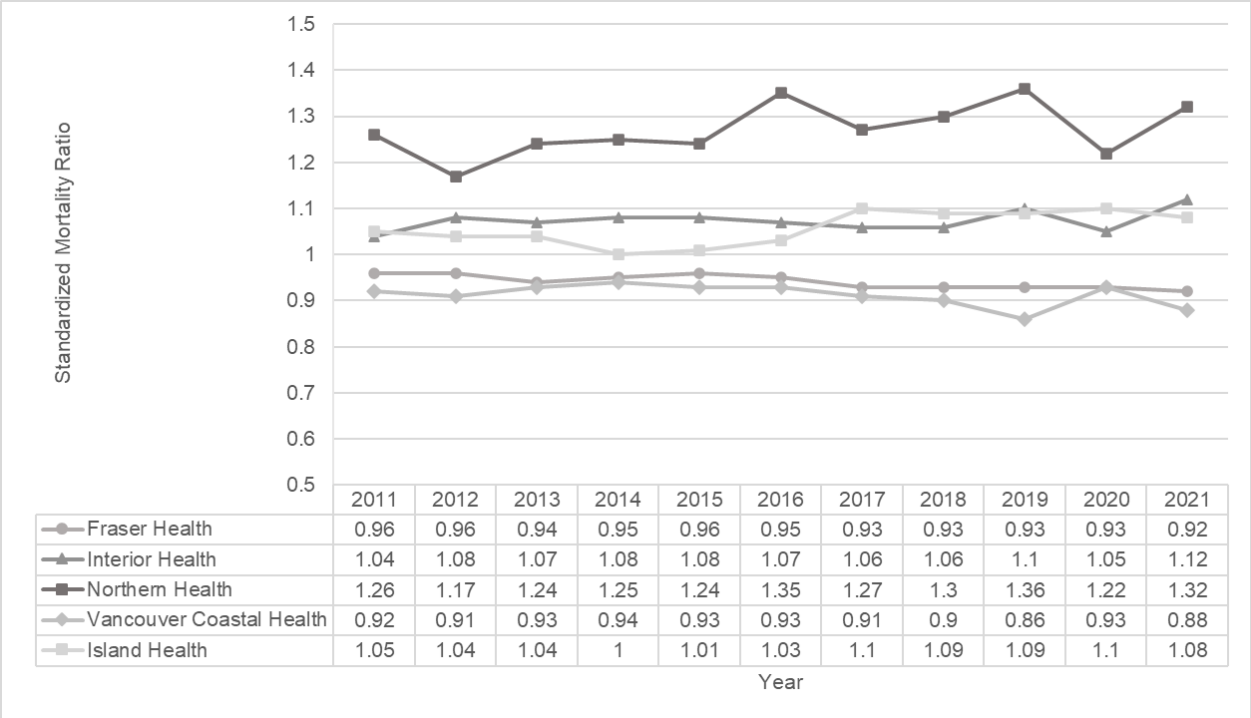


Figure 12. Standardized Mortality Ratio for All Cancers Combined, by Health Authority, 2021.

Between 2011 and 2021, Northern Health had the highest SMR for all cancers combined compared to the other provincial health authorities (Figure 13). There has been a slight overall increase in its SMR since 2011 from 1.26 (CI: 1.16-1.37) to 1.32 (CI: 1.22-1.42) in 2021.



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fraser Health	0.96	0.96	0.94	0.95	0.96	0.95	0.93	0.93	0.93	0.93	0.92
Interior Health	1.04	1.08	1.07	1.08	1.08	1.07	1.06	1.06	1.1	1.05	1.12
Northern Health	1.26	1.17	1.24	1.25	1.24	1.35	1.27	1.3	1.36	1.22	1.32
Vancouver Coastal Health	0.92	0.91	0.93	0.94	0.93	0.93	0.91	0.9	0.86	0.93	0.88
Island Health	1.05	1.04	1.04	1	1.01	1.03	1.1	1.09	1.09	1.1	1.08

Figure 13. SMR for all cancers combined, by health authority, 2011 to 2021.

SMR by Cancer Type

In 2021, NH had a greater than expected number of deaths for most cancer types (Figure 14). Cancers with a SMR significantly higher than expected included kidney, colon, lung, prostate, head and neck, and bladder cancer (invasive). There were lower than expected numbers of deaths for brain, breast, and ovarian cancer in NH, although these were not statistically significant (see Appendix A for SMRs for all cancer types).

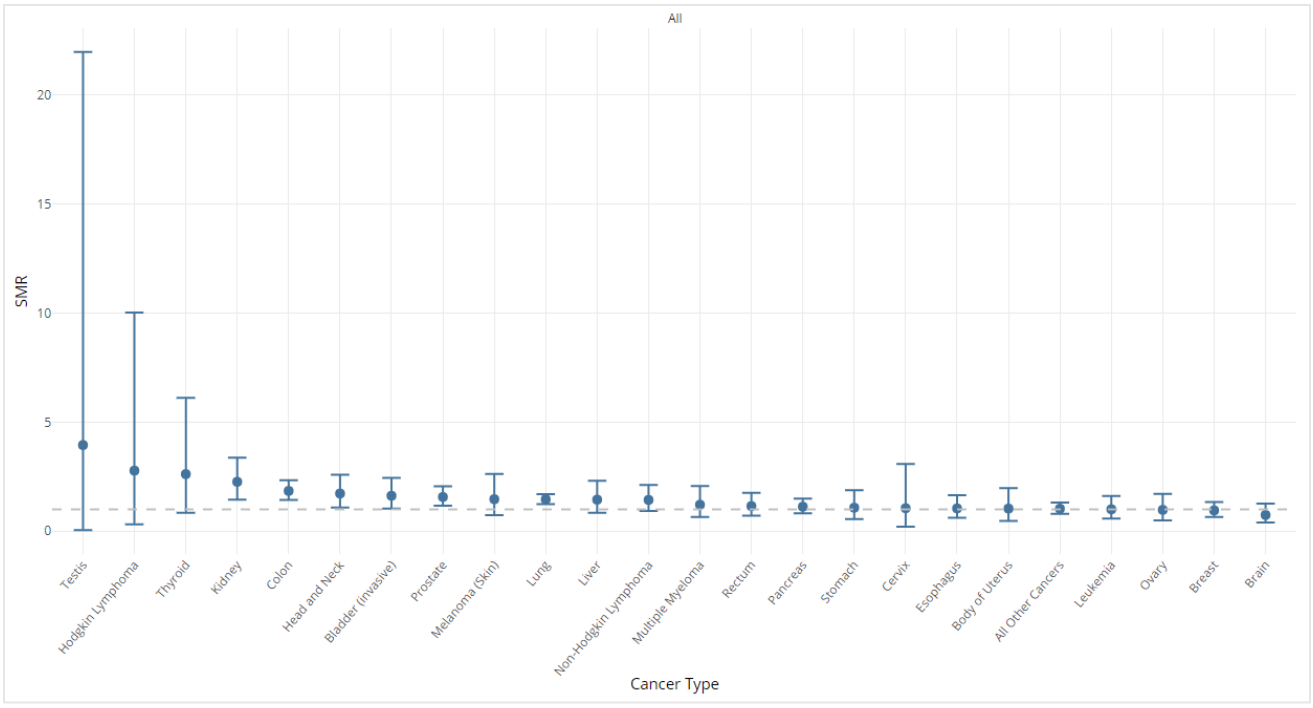


Figure 14. SMR by cancer type for NH, 2021.

In comparison to other health authorities, Northern Health had a statistically significantly higher SMR for colon cancer in 2021 (Figure 15).

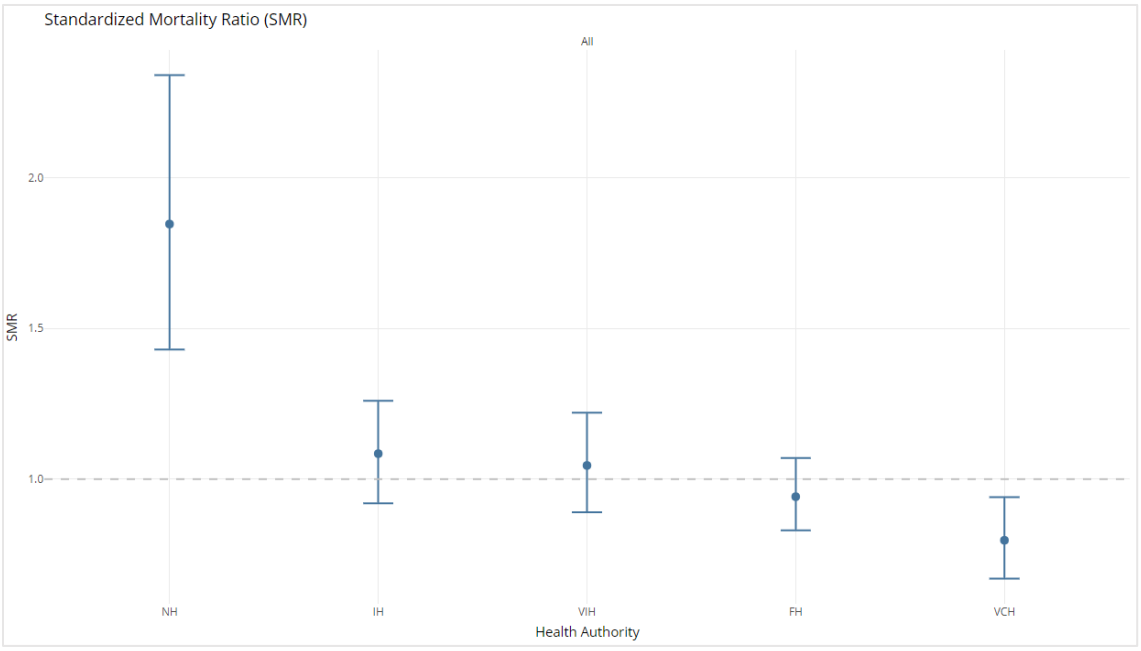


Figure 15. SMR for Colon Cancer, by health authority, 2021.

Summary

From 2011 to 2021, compared to BC Northern Health had a lower rate of new diagnoses of most cancers, but a higher rate of deaths due to cancer. This trend was visible for all cancers combined, as well as for a variety of specific cancer types. NH males had higher rates of both new diagnoses and deaths from cancer than females.

Incidence rates for all cancers combined have been increasing since 2011 in both BC and NH, except in 2020, which may reflect the impact of COVID-19 in delaying diagnoses. Overall, the most common new diagnosis of cancer in NH in 2021 was lung cancer. Relative to BC, NH residents had a higher rate of new lung cancer diagnoses between 2011 and 2021. In 2021, breast, lung, and colorectal cancers were the most common new diagnoses of female cancers in NH. For male cancers, prostate cancer, followed by lung and colorectal cancer were the most common new diagnoses in 2021.

While the NH incidence rate of all cancers combined has been lower than BC, the cancer mortality rate in NH has been greater than BC since 2016. In recent years, the mortality rate for both males and females in NH has exceeded the provincial rate. The most common cause of cancer deaths in NH in 2021 was lung cancer. While BC has seen a slight decline in the rate of lung cancer deaths, NH's rate has stayed relatively stable. For all cancers combined, NH has seen a significantly higher number of cancers than expected since 2011. In particular, deaths observed in NH from kidney, colon, lung, prostate, head and neck, and bladder cancers were higher than expected in 2021.

The information in this report provides information on general trends and rates of cancer incidence, prevalence, and mortality within NH. Further research and study is required to understand the causes or influencing factors behind these trends in Northern Health.

Technical Notes

Definitions

All Other Cancers: Additional other cancer types and unspecified cancers as defined by BC Cancer[4], including but not limited to mast cell tumors, malignant neoplasms, and myelodysplastic syndromes.

Crude Rate: the crude rate is an unadjusted rate of disease, calculated as the total number of events that occur in a population in a given time frame divided by the total population in that given time frame. Often these figures are very small and so are multiplied by 100,000 to make them more meaningful.

Incidence: The number of new cases of a given type of cancer diagnosed.

Prevalence: The total number of cases of a given type of cancer in a population. Prevalence can be either at a particular point in time or during a given time period.

Standardized Mortality Ratio: A ratio of the total number of observed deaths compared to the expected number of deaths within a population.

Limitations

[4] BC Cancer. (2023). Cancer Site/Type Definitions. Available at http://www.bccancer.bc.ca/statistics-and-reports-site/Documents/cancer%20definitions%20table_20230215.pdf Retrieved August 2, 2024.

Appendix A: Cancer Incidence and Mortality Tables

Table 4. New cancer diagnoses and incidence rates (per 100,000 population) in NH, by cancer type and sex, 2021.

Cancer Type	Female		Male	
	New Diagnoses	Incidence	New Diagnoses	Incidence
Bladder (including in-situ)	20	13.6	55	35.6
Body of Uterus	50	34.0	-	
Brain	10	6.8	15	9.7
Breast	220	149.5	0	0.0
Cervix	15	10.2	-	
Colon	55	37.4	65	42.0
Colorectal	70	47.6	100	64.7
Esophagus	10	6.8	20	12.9
Head and Neck	15	10.2	40	25.9
Hodgkin Lymphoma	5	3.4	5	3.2
Kidney	15	10.2	50	32.3
Leukemia	20	13.6	35	22.6
Liver	5	3.4	20	12.9
Lung	115	78.1	120	77.6
Melanoma (Skin)	30	20.4	30	19.4
Multiple Myeloma	5	3.4	15	9.7
Non-Hodgkin Lymphoma	25	17.0	45	29.1
Ovary	10	6.8	-	
Pancreas	30	20.4	40	25.9
Prostate	-		160	103.5
Rectum	15	10.2	40	25.9
Stomach	15	10.2	20	12.9
Testis	-		10	6.5
Thyroid	15	10.2	10	6.5
All Other Cancers	65	44.2	70	45.3

Table 5. Number of deaths and standardized mortality ratio, by cancer type, for NH, 2021.

Cancer Type	Deaths	SMR	Confidence Limits

*All Cancers Combined**	*670*	*1.32*	*1.22 - 1.42*
All Other Cancers	65	1.03	0.80 - 1.31
*Bladder (invasive)**	*25*	*1.62*	*1.03 - 2.44*
Body of Uterus	10	1.04	0.47 - 1.97
Brain	15	0.74	0.40 - 1.27
Breast	35	0.95	0.65 - 1.34
Cervix	5	1.05	0.21 - 3.08
*Colon**	*70*	*1.85*	*1.43 - 2.34*
Esophagus	20	1.04	0.62 - 1.65
*Head and Neck**	*25*	*1.73*	*1.09 - 2.59*
Hodgkin Lymphoma	5	2.78	0.31 - 10.0
*Kidney**	*25*	*2.26*	*1.45 - 3.37*
Leukemia	20	1.00	0.58 - 1.61
Liver	20	1.45	0.84 - 2.31
*Lung**	*160*	*1.46*	*1.24 - 1.70*
Melanoma (Skin)	10	1.47	0.73 - 2.63
Multiple Myeloma	15	1.21	0.65 - 2.07
Non-Hodgkin Lymphoma	25	1.43	0.93 - 2.12
Ovary	15	0.98	0.50 - 1.71
Pancreas	50	1.12	0.82 - 1.49
*Prostate**	*50*	*1.57*	*1.17 - 2.06*
Rectum	20	1.15	0.71 - 1.76
Stomach	15	1.08	0.56 - 1.88
Testis	0	3.95	0.05 - 21.98
Thyroid	5	2.62	0.84 - 6.11
** Indicates SMR is statistically significantly different.*			