

# New Brunswick Cancer Network

*Cancer System Performance 2019*

New Brunswick Cancer Network -  
Cancer System Performance 2019

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## MESSAGE FROM THE NEW BRUNSWICK CANCER NETWORK

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The New Brunswick Cancer Network (NBCN) is pleased to release its second report on the New Brunswick's cancer system performance. NBCN, as a branch of the Department of Health, has been mandated to coordinate at the provincial level development and implementation of evidence-based provincial strategies for all elements of cancer care in New Brunswick (NB).<sup>1</sup>

Cancer is the leading cause of death and disability in NB and in Canada as a whole, responsible for 30% of all deaths, followed by heart and cardiovascular diseases. It is estimated that half of the Canadian population will develop cancer in their life time.<sup>2,3</sup>

The goal of NBCN is to reduce the incidence and mortality of cancer and improve outcomes for people affected by cancer. One of the key priorities towards achieving this goal is to continuously drive quality and accountability through regular cancer system performance measurement. Performance measures collected and reported on since NBCN's inception have been chosen based on their strategic relevance, NB health care system context, scientific-based evidence and comparability at the provincial, national and international level. Through this work, NB reporting capabilities have improved considerably over the last ten years. NBCN can now report on radiation treatment, staging, concordance to treatment guidelines in some areas and three population-based cancer screening programs. However, there is still a lot of work to do such as in the area of patient experience and palliative and end-of-life care.

NBCN's efforts to define and report on cancer control performance draws from the experience of participating in the CPAC's Cancer System Performance Initiative. CPAC (The Canadian Partnership Against Cancer) was created by the federal government, with funding through Health Canada, to move Canada's cancer strategy into action and help it succeed. One of the core CPAC functions is to assess and report on the performance of the cancer system across Canada and involves all provincial cancer agencies or their equivalents. NBCN has been an active partner in this process since 2009.

Cancer affects all New Brunswickers, whether as a patient, family member, friend, neighbor or co-worker. In view of the predicted increase in the burden of cancer over the next 10 years, it is our hope that work on cancer control performance measurement will continue to support cancer control community toward achieving high quality and more cost-effective cancer control in NB.

NBCN's cancer system performance initiative will continue in collaboration with provincial and national partners on selection and development of cancer control indicators, benchmarks and targets; strengthening the use of existing data collection mechanisms and building new ones to ensure availability of good quality data; and achieving comparability with other jurisdictions across Canada.

## ACKNOWLEDGEMENTS

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En français: Réseau du cancer du Nouveau-Brunswick: Rapport sur le rendement du système de lutte contre le cancer 2019  
<https://www2.gnb.ca/content/dam/gnb/Departments/h-s/pdf/fr/Cancer/2019-rapport-rendement-systeme-lutte-contre-cancer.pdf>

## BURDEN OF CANCER IN NEW BRUNSWICK

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- In New Brunswick, it was estimated that 5,100 new cases of cancer would be diagnosed and 2,100 deaths from the disease would occur in 2019.<sup>2</sup>
- Overall the number of new cancer cases is increasing. In NB, the number of new cancer cases is projected to increase by 50.6% by 2030. Three types of cancer are expected to account for the majority of these new cases: prostate, lung and colorectal for males and breast, lung and colorectal for females.<sup>4</sup>
- For both genders combined, on average, 12.6 new cancer cases were diagnosed per day for the period 2007-2013 compared to 10.7 new cancer cases diagnosed per day between 2002 and 2006.<sup>4</sup>
- The most commonly diagnosed cancers for males were lung, colorectal, and prostate cancers accounting for 57.1% of all cancers. The most commonly diagnosed cancers for females were lung, colorectal, and breast cancers accounting for 53.4% of all cancers.<sup>4</sup>
- Overall, the age-standardized mortality rates and survival for all cancers combined have improved over the years. These improvements are related to advances in treatment and early detection, resulting in increased numbers of individuals living longer after the cancer diagnosis.<sup>4</sup>
- Lung cancer is the leading cause of cancer related deaths for both males and females accounting for 32.3% and 26.2% of all cancer deaths, respectively. Colorectal cancer is the second leading cause of cancer related deaths for both males and females accounting for 11.2% and 13.5% of all cancer deaths, respectively.<sup>4</sup>

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# PREVENTION AND SCREENING

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## PREVENTION

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A number of modifiable risk factors such as smoking, poor diet and lack of physical activity can contribute to increased cancer incidence and cancer mortality.<sup>5</sup> Research shows that up to two thirds of cancers can be prevented by implementation of strategies aimed at tobacco cessation, improved nutrition, limited alcohol consumption, maintaining a healthy body weight and regular physical activity.<sup>6</sup>

The following represents a high level selection of prevention indicators in keeping with other reports such as the Canadian Partnership Against Cancer's (CPAC) cancer system performance reports and Statistics Canada reports. These indicators have been compiled using the New Brunswick file of the Canadian Community Health Survey. Due to a small sample size, findings should be interpreted with caution. Only data from NB residents who provided their consent is used, which can lead to slight differences in observations reported by Statistics Canada.

### Smoking Prevalence And Smoking Cessation

Tobacco use is the single largest preventable cause of cancer and is responsible for 30% of all cancer deaths.<sup>7,8</sup> Tobacco use reduces the effectiveness of many cancer therapies and evidence supports the need for inclusion of dedicated tobacco cessation efforts for patients with cancer.<sup>9,10</sup> One of the objectives of NBCN, in collaboration with the Regional Health Authorities, is the implementation of clinical smoking cessation practices as a standard of care within cancer clinics across the province.

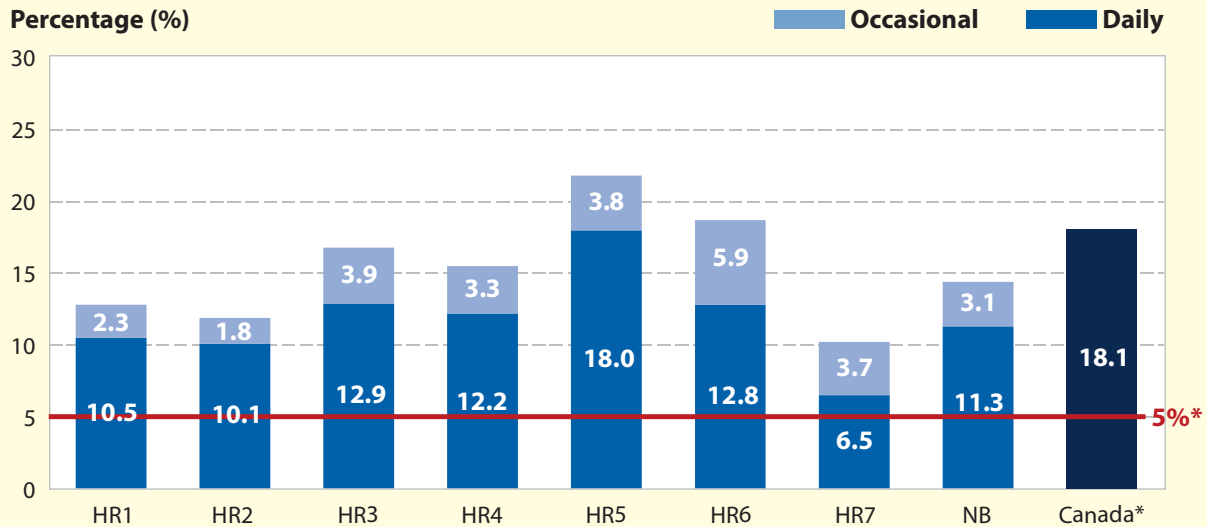
Smoking prevalence in NB (New Brunswickers 12 years of age and older reported daily or occasional smoking) has declined from 21.6% in 2011 to 14.4% in 2017. The percentage of the population that reported smoking varies from 10.2% in Health Region 7 to 21.8% in Health Region 5 (Figure 1). Health Canada has recently set the overall goal of reducing smoking rates to 5% of the population by the year 2035.<sup>6</sup>

Quitting smoking has been shown to decrease the risk of developing cancer. In 2017, 22.1% of New Brunswickers reported quitting smoking in the previous two years (Figure 2). Smoking cessation rates ranged from 30.0% in Health Region 2 to 11.1% in Health Region 5.

**FIGURE 1**

**Percentage of population (age ≥ 12) reporting daily or occasional smoking**

By Health Region, NB

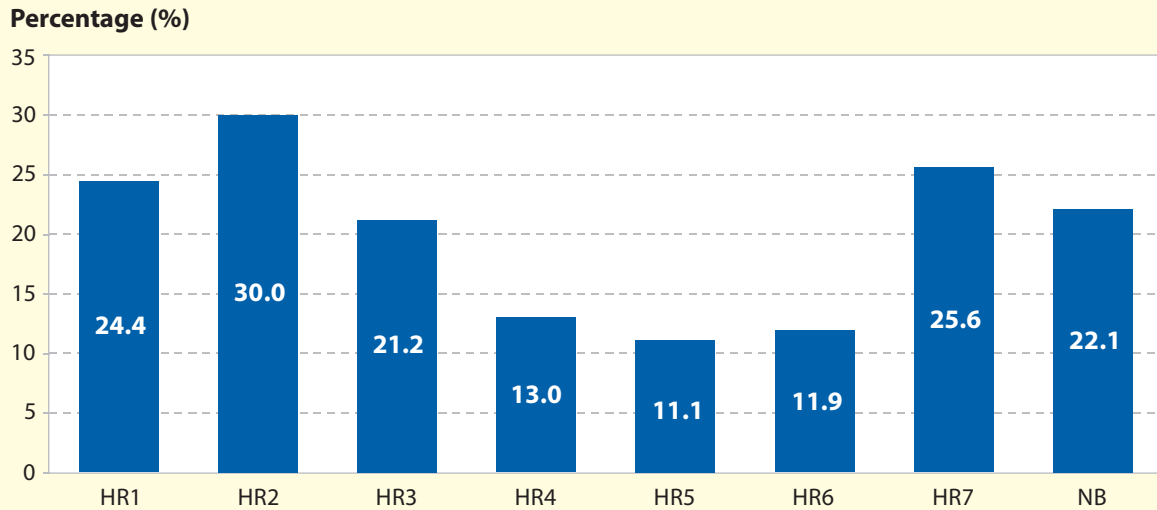


Data Source: Statistics Canada, Canadian Community Health Survey New Brunswick Data 2017  
\*CPAC Cancer System Performance 2018 Report

**FIGURE 2**

**Percentage of recent smokers (age ≥ 20) who have quit smoking over the last 2 years**

By Health Region, NB



Data Source: Statistics Canada, Canadian Community Health Survey New Brunswick Data 2017

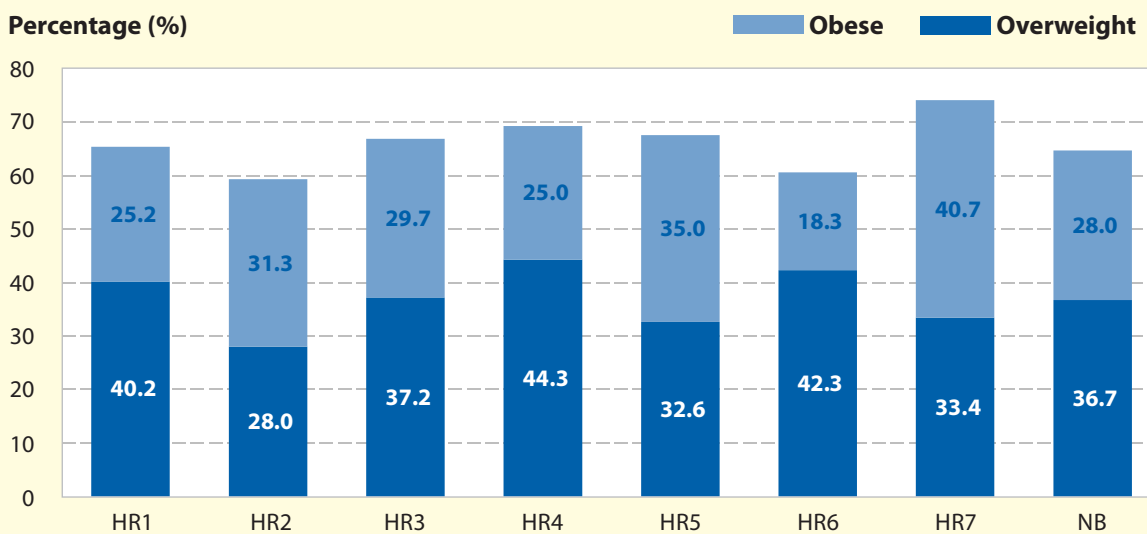
## Overweight And Obesity

Overweight and obesity are risk factors for many cancers such as colon, breast, endometrial, gallbladder, liver, pancreatic, prostate, ovarian and kidney cancers. The risk is higher with increasing Body Mass Index (BMI).<sup>6</sup>

The percentage of New Brunswickers 18 years of age and older who, based on self-reported weight and height, were classified as overweight or obese was 64.7%, one of the highest rates in Canada.<sup>8</sup> The percentage of overweight and obese adults ranged from 59.3% in Health Region 2 to 74.1% in Health Region 7 (Figure 3).

**FIGURE 3**  
**Percentage of adults reported being overweight or obese**

By Health Region, NB



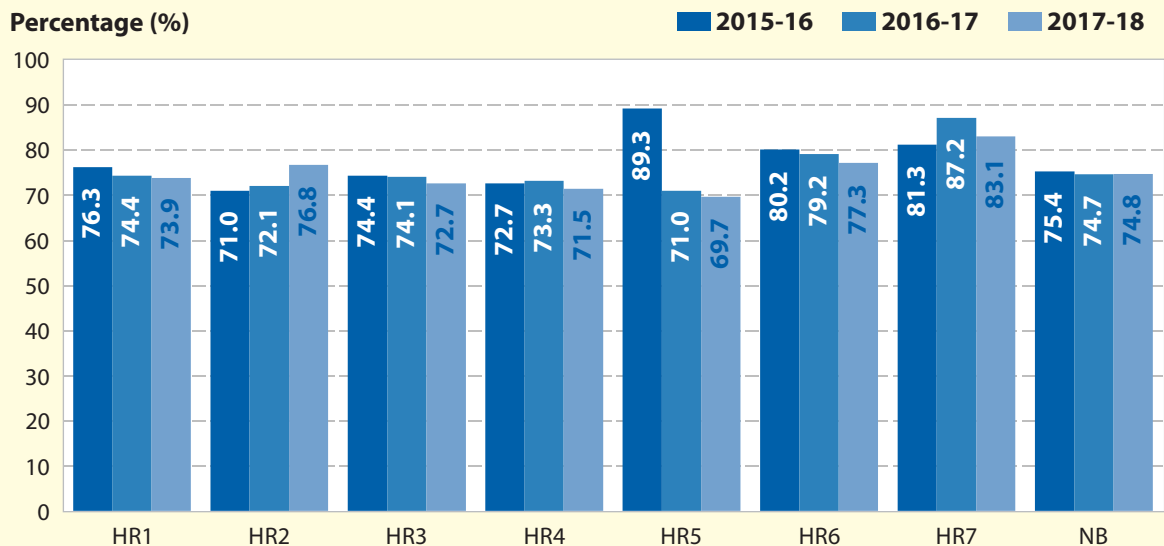
Data Source: Statistics Canada, Canadian Community Health Survey New Brunswick Data 2017

## HPV Vaccination

Persistent infection with one of the high-risk carcinogenic human papillomavirus (HPV) types is the main causative factor in the development of cervical, oropharyngeal, penile and anal cancers.<sup>8</sup> In 2008, New Brunswick implemented a publicly funded school-based HPV immunization program for girls in grade 7 (born in 1995 and later) as an integral part of the provincial comprehensive cervical cancer prevention and screening strategy. Two enhancements were implemented in the fall of 2017 - the program was expanded to include males in grade 7 (born 2005 and later) and the vaccine was replaced with one which protects against 5 additional HPV strains. As of the school year 2015/2016, NB switched from a three-dose to a two-dose HPV vaccination schedule.<sup>11</sup> Figure 4 shows the percentage of the target female population, by school year, that received complete series of the HPV immunization. In 2017/2018, 70.2% of male students in NB received the complete series of the HPV immunizations, uptake ranging from 62.0% in Health Region 4 to 73.3% in Health Regions 6 and 7. Currently, there are no available tools to enable collection of information on the population vaccinated outside of the school-based programs.

**FIGURE 4**  
**Percentage of Grade 7 female students immunized with complete series of HPV immunization**

By Health Region by school year



Data Source: New Brunswick Office of the Chief Medical Officer of Health

## SCREENING

Participation in organized, population-based screening programs reduces the burden of breast, cervical and colorectal cancers.<sup>12</sup> New Brunswick's breast cancer screening program was established in 1994. The provincial Cervical Cancer Prevention and Screening Program (CCPSP) has been operational province-wide since November 2014 and Colon Cancer Screening Program as of July 2017. The New Brunswick Cancer Network collaborates with various partners, provincial and national, to identify performance indicators for monitoring and evaluation of these screening programs.

### Breast Cancer Screening

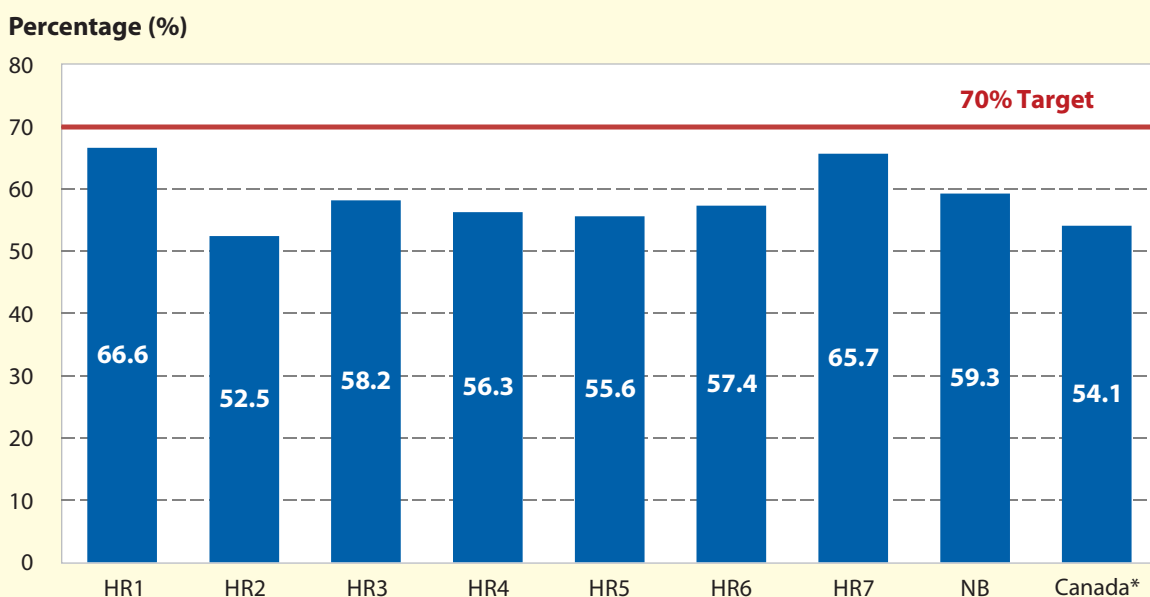
In New Brunswick, breast cancer is the most common cancer among women. It was estimated that 580 new cases would be diagnosed and 110 women would die of the disease in 2019.<sup>2</sup>

New Brunswick Breast Cancer Screening Service is offered through 14 fixed mammography sites, 13 of which perform screening and diagnostic mammography, and only one site performs screening mammography only. The breast cancer screening program targets asymptomatic women between the ages of 50 to 74 without a prior diagnosis of breast cancer. Women outside of this age group require a physician's or nurse practitioner's referral. Screening is recommended every 2-3 years.

The target participation rate in Canadian organized breast cancer screening programs has been established at 70%.<sup>13</sup> The participation rate has steadily increased in New Brunswick, reaching 59.3% in the 2015-2017 period (Figure 5).

**FIGURE 5**  
**Percentage of women (age 50 to 74) who participated in the provincial breast cancer screening program in the last 30 months**

By Health Region, July 1, 2015-December 31, 2017



Data Source: New Brunswick Breast Cancer Screening Service Database

\* Canadian Partnership Against Cancer. Breast Cancer Control in Canada: A System Performance Special Focus Report

## Cervical Cancer Screening

It was estimated that 20 new cases of cervical cancer would be diagnosed in New Brunswick and 10 women would die of the disease in 2019.<sup>2</sup>

The New Brunswick Cervical Cancer Prevention and Screening Program is dedicated to ensuring NB women aged 21-69 participate in regular Pap test screening. The Program sends invitations, recall and follow-up letters to eligible New Brunswick women according to clinical practice guidelines.<sup>14</sup> Reminder letters are also sent to primary health care providers when women are overdue for recommended follow-up from abnormal screening test results. This has been made possible by the establishment of the NB Cervical Cancer Prevention and Screening Data Repository, a secure database of Pap test results performed in the province.

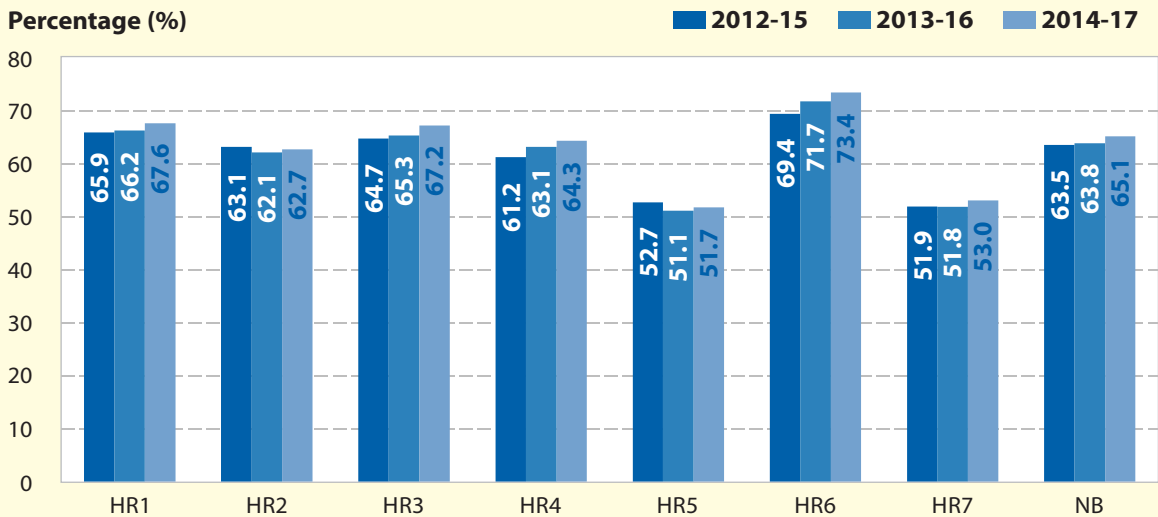
The New Brunswick Cervical Cancer Prevention and Screening Clinical Practice Guidelines, published in 2011, recommend that cervical cancer screening should be performed every year until three consecutive negative Pap tests. After that, the recommended screening interval is every two to three years until the age of 69.<sup>14</sup>

The current Canadian target for participation in cervical cancer screening programs is set at  $\geq 80\%$  within 42 months for women ages 21 to 69.<sup>13</sup> Figure 6 shows the percentage of women in the target age group of 21 to 69 who had a Pap test in the past 42 months from 2012-2017.

**FIGURE 6**

### Age-standardized participation rate\* for women aged 21 to 69 who had at least one Pap Smear test in the past 42 months

By Health Region, 2012-2017



Data Source: New Brunswick Cervical Cancer Prevention and Screening Repository

\*Percentages are not corrected for hysterectomy and are standardized to the 2011 Canadian population estimates.

## Colon Cancer Screening

It was estimated that 650 new cases of colorectal cancer would be diagnosed in New Brunswick and 230 New Brunswick residents would die of the disease in 2019.<sup>2</sup>

The Provincial Colon Cancer Screening Program was introduced in November 2014 and as of July 2017 is available province-wide. The Program invites asymptomatic men and women aged 50-74 to request and complete an at-home test, the Fecal Immunochemical Test (FIT).<sup>15</sup> As per the established Colon Cancer Screening Clinical Practice Guidelines, the Program coordinates access to the full screening and abnormal result follow-up process.<sup>15</sup>

As the Program is in its early stages of implementation, data on participation rates are incomplete. However, as of December 2018, response rates (people responding to the invitation by requesting a FIT) across health zones have been higher than anticipated, ranging between 26% and 35%. For the same period, the Program has detected 219 early cancers in asymptomatic individuals.

NBCN continuously explores opportunities to increase participation in cancer screening programs in order to meet and/or exceed the national participation rate targets. In 2014, the NBCN initiated the integrated approach to implementation of the provincial Screening Programs. Currently, only the Colon and Cervical programs' processes are integrated and highly automated through the entire pathway utilizing the innovated Centralized Cancer Screening Integrated Information System (CS-IIS). The CS-IIS supports automated programs' operations such as invitation/reinvitation processes, participant level navigation, correspondence, promotion, education, quality monitoring and performance evaluation.

# DIAGNOSIS AND TREATMENT

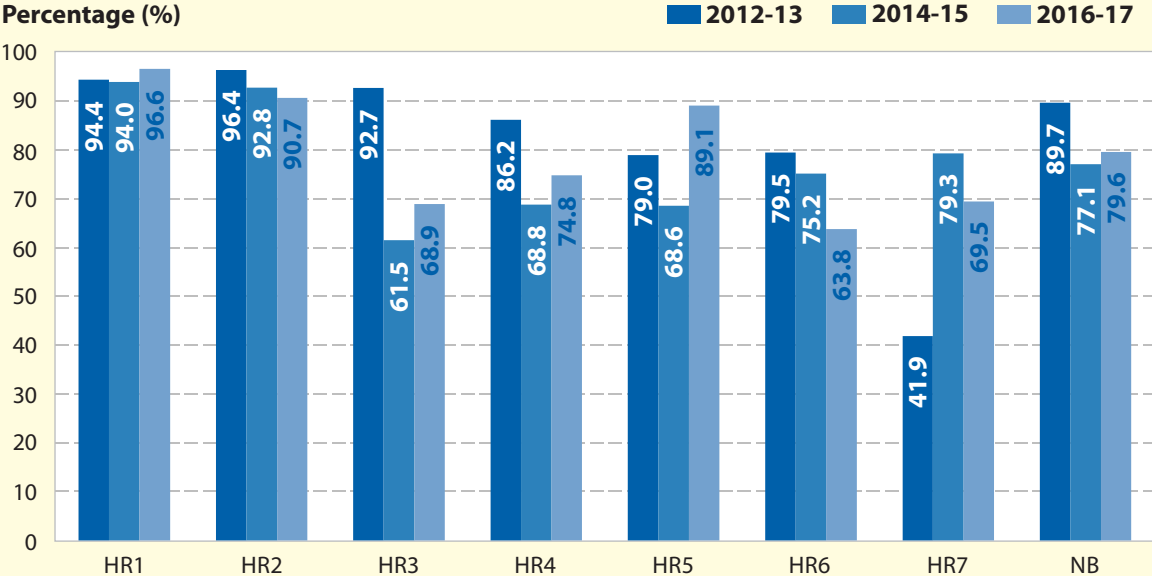
## Breast Cancer Diagnosis Wait Times

Following abnormal breast screening findings, the timely provision of a definitive diagnosis allows for earlier initiation of treatment. The Canadian Breast Cancer Screening Network has established targets for diagnostic intervals at  $\geq 90\%$  of abnormal screens to be resolved within five weeks if no biopsy is required and  $\geq 90\%$  within seven weeks if a tissue biopsy is required.<sup>16</sup>

In 2016-17, the percentage of women whose diagnosis was resolved within the target timeframe of five weeks when a biopsy was not required ranged from 63.8% in Health Region 6 to 96.6% in Health Region 1 (Figure 7).

**FIGURE 7**  
**Percentage of women (age 50-69) not requiring a tissue biopsy with resolution of abnormal breast screen within target\* wait time**

By Health Region, 2012-2017



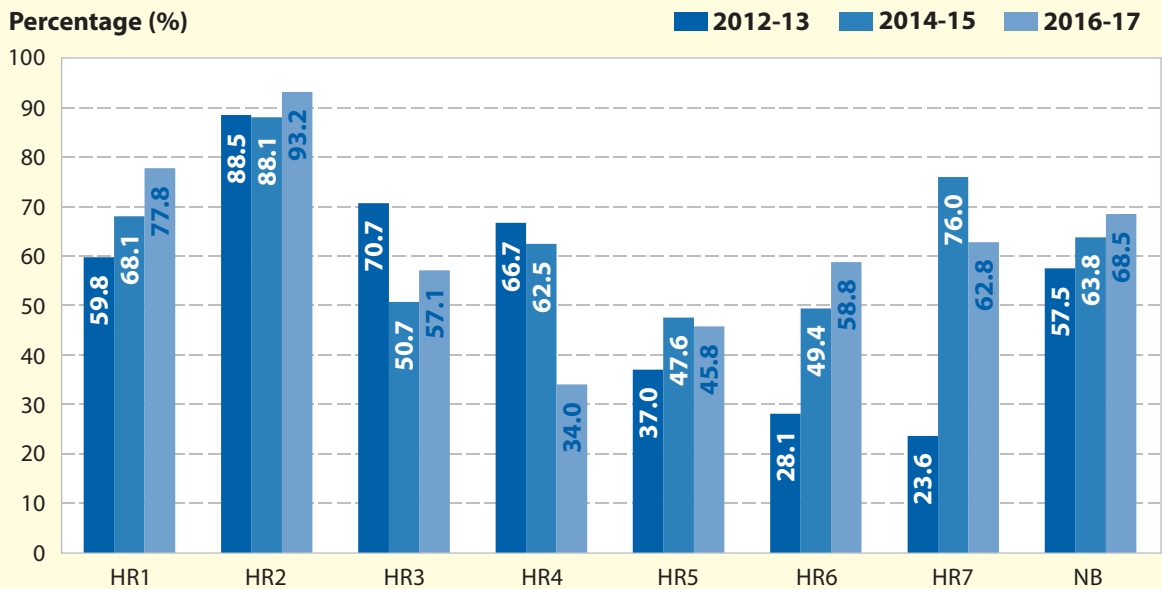
Data Source: New Brunswick Breast Cancer Screening Service Database  
 \* Target time for resolution of abnormal breast screen for women not requiring a tissue biopsy is 5 weeks



The percentage of women whose diagnosis was resolved within the target timeframe of seven weeks when a biopsy was required ranged from 34.0% in Health Region 4 to 93.2% in Health Region 2 for the same timeframe (Figure 8).

**FIGURE 8**  
**Percentage of women (age 50-69) not requiring a tissue biopsy with resolution of abnormal breast screen within target\* wait time**

By Health Region, 2012-2017



Data Source: New Brunswick Breast Cancer Screening Service Database

\*Target time for resolution of abnormal breast screen for women not requiring a tissue biopsy is 7 weeks

## Colorectal Cancer Diagnosis Wait Times

The Colon Cancer Screening Program centrally organizes follow-up colonoscopies for participants with a positive (abnormal) FIT result. Program Nurses do a health assessment by phone and refer the participants directly to colonoscopy in one of the 11 participating facilities closest to the participant's home. From January 1st, 2015 to December 31st, 2018, 51.3% of colonoscopies were completed within the national wait time target of 60 days from the abnormal fecal test.<sup>17</sup> The median wait time for this time period was 59 days and the 90th percentile was 109 days.

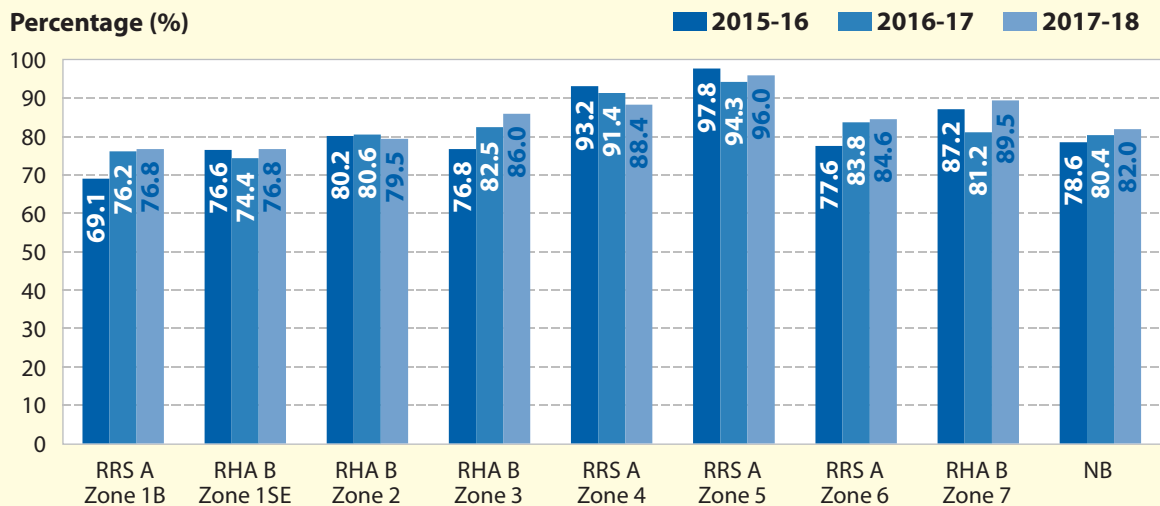
## Cancer Surgery Wait Times

New Brunswick reports wait times for all surgical procedures as a response to Canada's First Ministers' agreement to reduce wait times in five priority areas.<sup>18</sup> Wait times for completed surgeries are reported against the target of six weeks and three months combined, where surgeons determine whether or not the case needs to be completed within six weeks or three months (Figure 9).

**FIGURE 9**

### Percentage of cancer surgeries completed within target of 6 weeks or 3 months combined, all cancer surgeries

By Health Zone and Fiscal Year, 2015-2017



Data Source: New Brunswick Surgical Access Repository

Note: The wait time is measured from the date the patient and surgeon agree to the surgery and the patient is ready to receive it, to the date when the actual procedure is performed.

## Capture Of Collaborative Stage Data

Stage is defined as the extent of disease at the time of diagnosis and pathology reports play a significant role in accurately determining cancer stage when surgical resections are performed. Besides its clinical value, stage at diagnosis is an important indicator of cancer system performance, providing deeper insight into future interpretation of longterm outcomes and impact of cancer control initiatives such as early detection/screening practices.

NBCN continues to facilitate implementation of the standardized population-based Staging and Pathology Synoptic Reporting, currently collecting staged data for the top 5 cancers (breast, colorectal, lung, prostate and endometrium) through the provincial cancer registry. Staging for all new incident cases using this staging method was phased-in, starting with breast and colorectal cancer cases in 2008, prostate in 2009, lung in 2010 and endometrial in 2014. It is a goal of NBCN to expand staging and pathology synoptic reporting to other cancer sites using College of American Pathology content.

New Brunswick captured 99.9% stage data for incident cases of the top 5 cancers in 2014, 2015, and 2016. Figures 10 to 12 represent a selection of diagnosis, stage and treatment indicators available from the New Brunswick Provincial Cancer Registry.

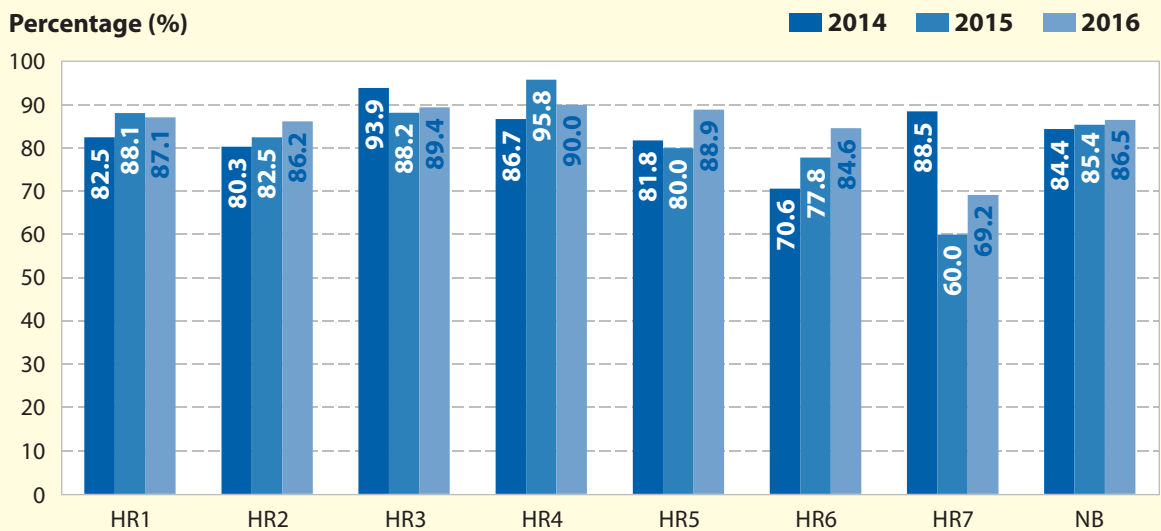
## Removal and Examination of 12 or More Lymph Nodes in Colon Cancer Resections

Clinical guidelines recommend the examination of a minimum of 12 lymph nodes to allow for adequate staging in all patients with colon cancer who are undergoing surgery.<sup>6</sup> The percentage of colon resections that had 12 or more lymph nodes examined was 84.4% in 2014, 85.4% in 2015 and 86.5% in 2016 (Figure 10). In 2016, rates for the Health Regions ranged from 69.2% in Health Region 7 to 90.0% in Health Region 4. The CPAC System Performance Targets and Benchmarks Working Group established 90% as the target in 2014.<sup>19</sup>

**FIGURE 10**

### Percentage of colon resections with 12 or more lymph nodes removed and examined

By Health Region and year of diagnosis, 2014-2016

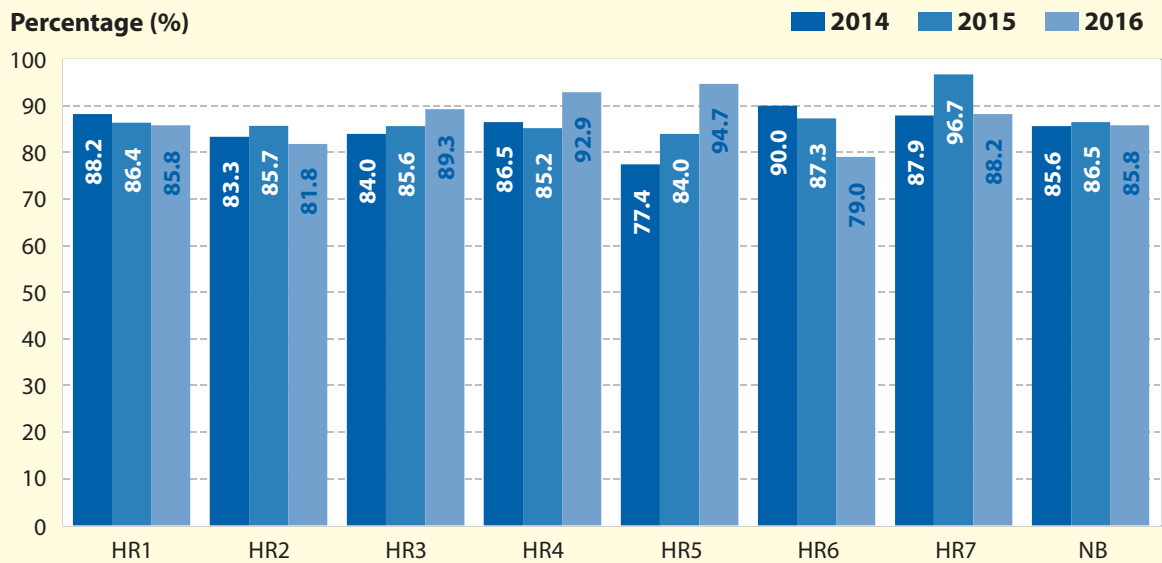


Data Source: New Brunswick Cancer Registry; New Brunswick Discharge Abstract Database

## ER/PR Hormone Receptor Testing and HER2 Positivity Status, Breast Cancer

Testing for hormone receptor status is critical for making treatment decisions for breast cancer and whether the patient can benefit from hormonal therapy. Testing for ER/PR (estrogen and progesterone receptors) is done in most regional hospitals in New Brunswick and testing for HER2 (human epidermal growth factor receptor 2) is done in two laboratories (Dr. George L. Dumont University Hospital Centre and the Saint John Regional Hospital). In 2016, 85.8% of women with invasive breast cancer tested ER/PR positive. Figure 11 shows variation in the test positivity between Health Regions ranging from 79.0% in Health Region 6 to 94.7% in Health Region 5. ER/PR positivity among Canadian women with invasive breast cancer ranged from 84% to 89% with an overall Canadian average of 85%.<sup>20</sup>

**FIGURE 11**  
**Percentage of women newly diagnosed with breast cancer in 2014-2016, staged and who were tested ER or PR positive**  
 By Health Region, 2014-2016



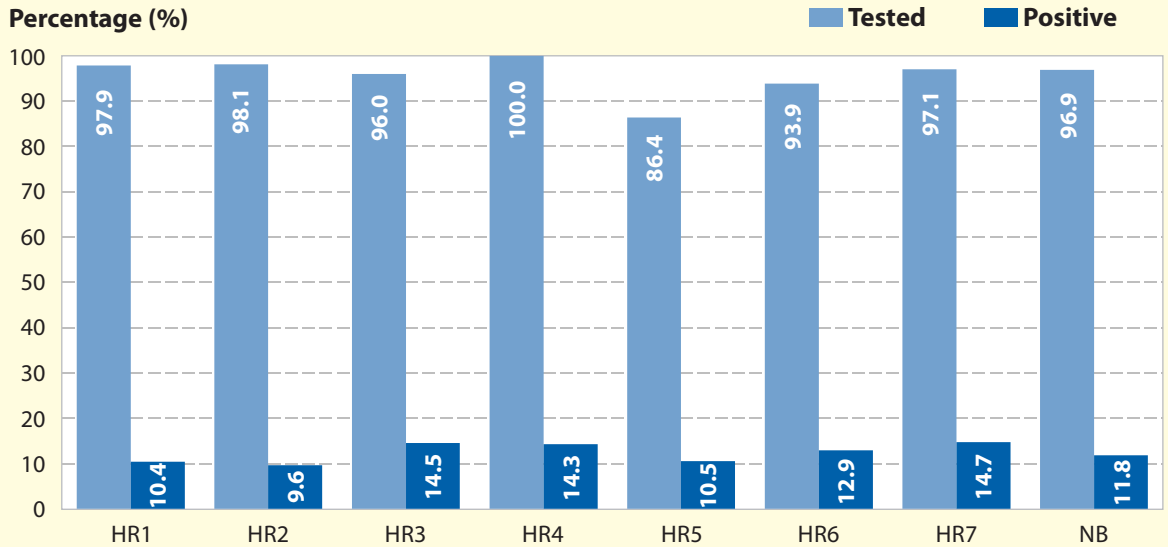
Data Source: New Brunswick Cancer Registry

The percentage of women with invasive breast cancer who had HER2 testing was 96.9% in 2016 with 11.8% being found positive (Figure 12). HER2 positivity among women with invasive breast cancer ranged from 9.6% in Health Region 2 to 14.7% in Health Region 7 with the Canadian average of 13.8% as reported by the CPAC's Breast Cancer Control in Canada Report.<sup>20</sup>

**FIGURE 12**

**Percentage of women newly diagnosed with breast cancer in 2016, staged and who were tested HER2 positive**

By Health Region, 2016



Data Source: New Brunswick Cancer Registry

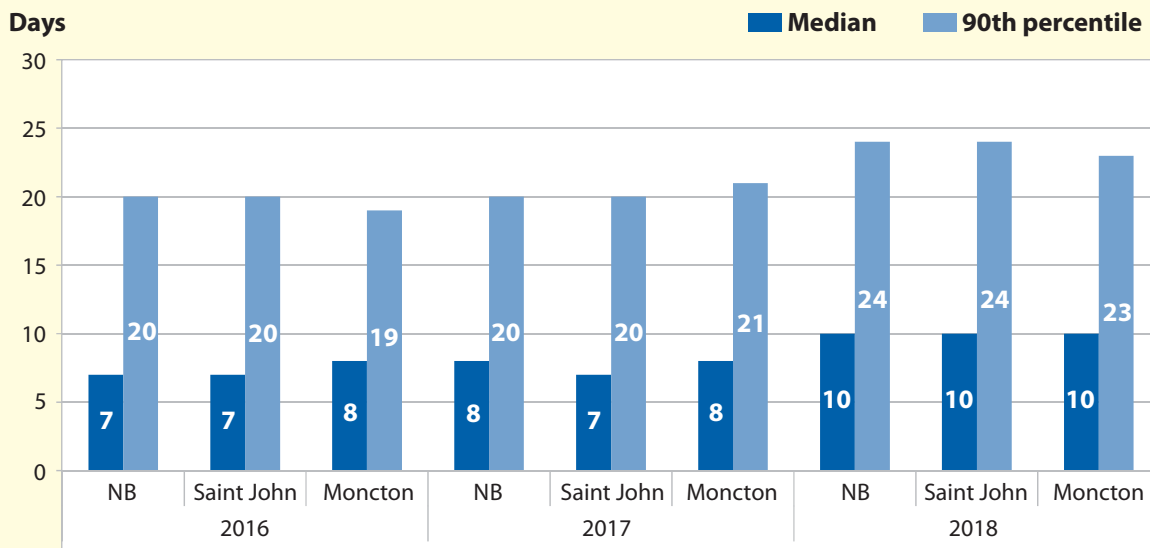
## RADIATION THERAPY

Radiation therapy is a major component of cancer treatment services. New Brunswick has two tertiary cancer centres that provide radiation therapy to cancer patients: the Saint John Regional Hospital in Saint John and the Dr. Georges-L.-Dumont University Hospital Centre in Moncton. New Brunswick has established the New Brunswick Radiation Therapy Wait Time Guarantee to ensure that NB patients will not wait more than eight weeks from being ready to treat to the start of the first treatment.<sup>18</sup> The ready to treat date is defined as the date when the patient is ready to begin treatment from social/personal and medical perspective.

Radiation therapy wait times in New Brunswick have improved since installation of new linear accelerators and better wait time management processes. As of December 2018, 95.2% of NB patients started radiation treatment within four weeks of being ready to treat. The median is 10 days and the 90th percentile is 24 days (Figure 13). The provincial target is 90% or more patients being treated within four weeks of being ready to treat.

**FIGURE 13**  
**Median and 90th percentile wait times for radiation therapy**

By Radiation Treatment Facility, 2016-2018



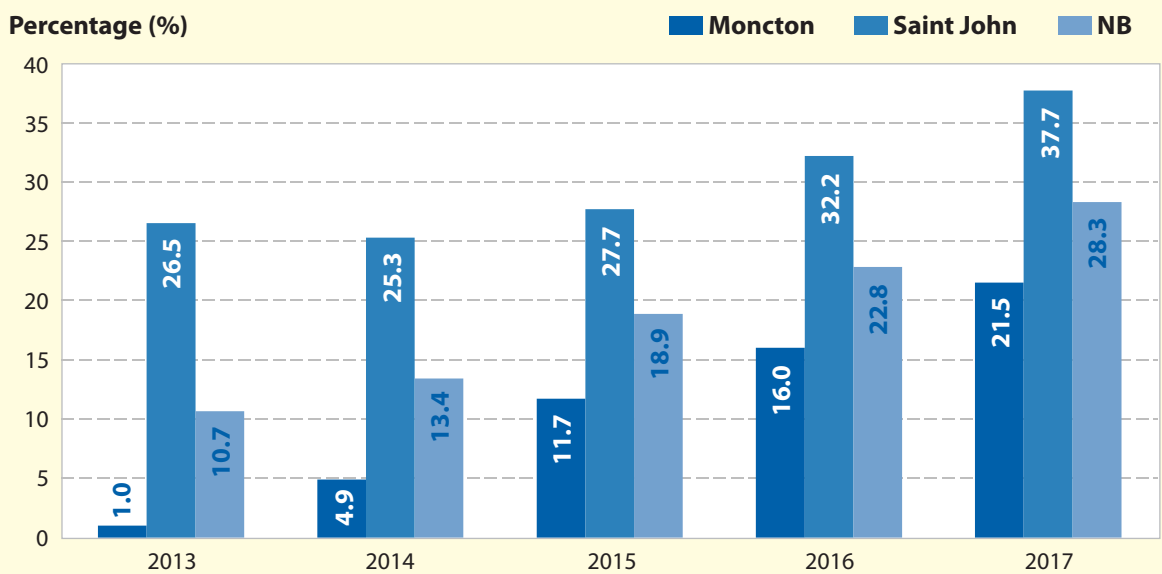
Data Source: Cancer Treatment Access Repository

The introduction of more complex treatment techniques such as Intensity Modulated Radiotherapy (IMRT), a method of delivering high doses of radiation with increased precision while reducing damage to surrounding healthy tissues, has improved the delivery of radiation treatment. IMRT started gradually and is used for select cases, mostly for prostate and head and neck cancers. The percentage of all courses delivered using IMRT technique has increased from 10.7% in 2013 to 28.3% in 2017 (Figure 14).

Other improvements in treatment delivery include Frameless Stereotactic Radiosurgery using Surface Guided Radiation Therapy (SGRT); Stereotactic Body Radiation Therapy (SBRT) for Lung; Deep Inspiration Breath Hold (DIBH) for left breast cancers; and the expansion of brachytherapy services in Saint John. In Moncton, HDR (High Dose Rate) prostate and gynecologic brachytherapy programs have been provided since 2003 and 2009 respectively and DIBH for left breast cancers was implemented in January 2019.

**FIGURE 14**  
**Percentage of external beam radiation therapy courses delivered using IMRT technique, all cancers, all intent**

By Radiation Treatment Facility, 2013-2017

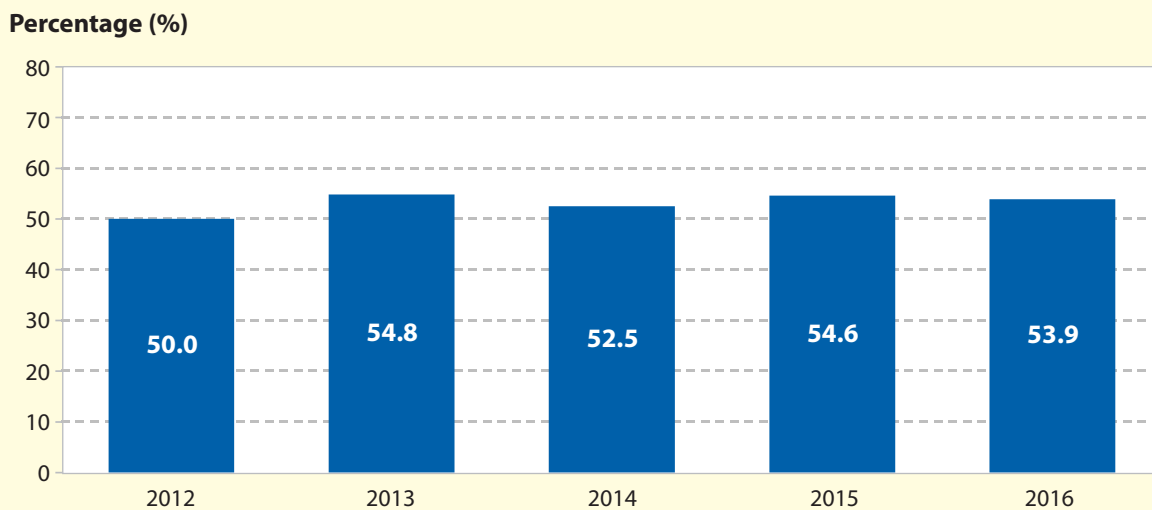


Data Source: NBCN Radiation Treatment Centers  
 Note: May include some out of province residents

## Pre-Operative Radiation Therapy for Patients with Rectal Cancer

Pre-operative radiation treatment (along with chemotherapy) has been associated with improvements in local disease control and a reduction in treatment-related toxicity for patients with Stage II or III rectal cancer compared to post-operative radiation therapy.<sup>19,21</sup> In NB, the percentage of people with Stage II-III rectal cancer who had pre-operative radiation therapy ranged from 50.0% to 54.8% over a five year period (Figure 15). As per the latest Canadian Cancer System Performance Report, preoperative radiation therapy use for patients with Stage II or III rectal cancer in Canada ranged from 52.5% in New Brunswick to 64.7% in Prince Edward Island.<sup>6</sup>

**FIGURE 15**  
**Percentage of pre-operative radiation therapy for stage II or III rectal cancer patients**  
By Year of Diagnosis, 2012-2016



Data Source: New Brunswick Cancer Registry & Cancer Treatment Access Repository

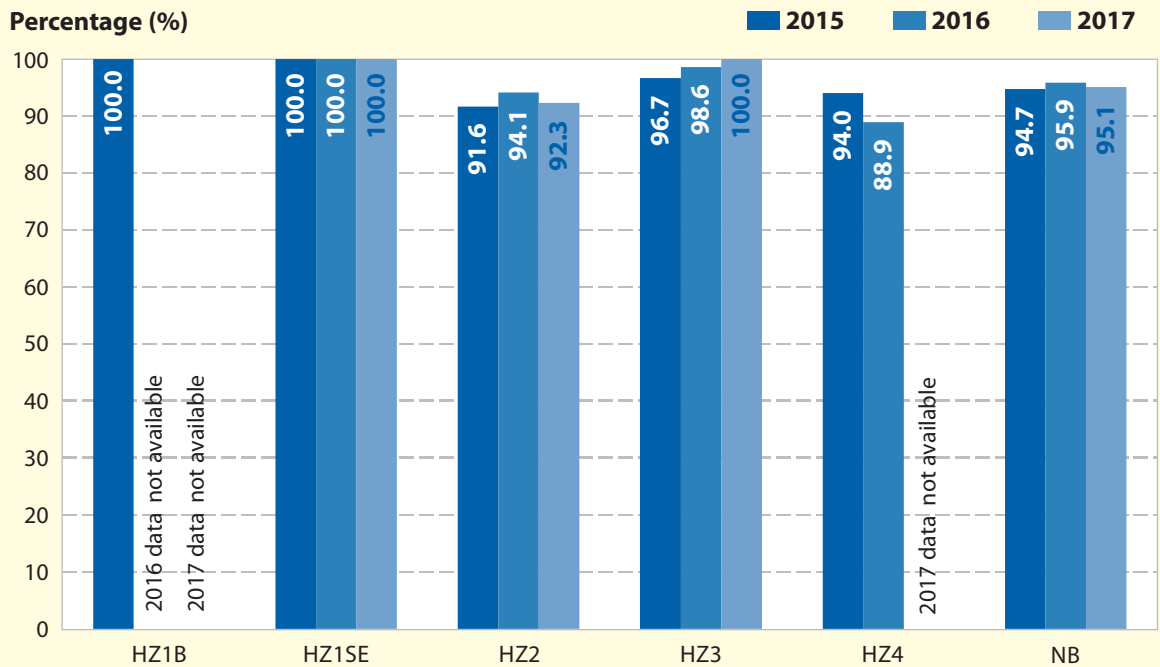


## SYSTEMIC THERAPY WAIT TIMES

NBCN is making efforts to extend wait times monitoring and measurement to the area of systemic therapy. A project for monitoring systemic therapy wait times is ongoing with the Regional Health Authorities to report systemic therapy wait times from the time the patient is considered ready to treat to when the patient receives their first treatment (Figure 16).

**FIGURE 16**  
**Percentage of patients receiving first systemic treatment within 7 days of being ready to treat**

By Health Zone, 2015-2017



Data Source: Health Zones

Note: Outpatient data only; Health Zones 5, 6, and 7 are reported through Zones 1B and/or 1SE

## PROVINCIAL STEM CELL TRANSPLANTATION PROGRAM

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One of the improvements in providing cancer care was the establishment of the Provincial Stem Cell Transplantation Program in 2011. The program is located at the Saint John Regional Hospital. Autologous stem cell transplantation is a critical component of care for cancers such as lymphoma and multiple myeloma. Since the initiation of the Program, 180 stem cell transplants have been performed. Patient data demonstrates that all desired outcome parameters have been met. Outcome indicators are based upon the FACT (Foundation for Accreditation of Cellular Therapy) standards. Some transplant cases have utilized leading edge treatment regimens and have research involvement for clinical trials.

The New Brunswick Stem Cell Transplant Program is a CIBMTR (Center for International Blood and Marrow Transplant Research) Research Center and submits all transplant outcome data as a peer-review effort. The CIBMTR collaborates with the global scientific community to advance hematopoietic cell transplantation and cellular therapy research worldwide. A combined research program of the National Marrow Donor Program and the Medical College of Wisconsin, CIBMTR facilitates critical research that has led to increased survival and an enriched quality of life for thousands of patients.

In September 2016, the transplant program began offering Extracorporeal Photophoresis (ECP) treatments for Cutaneous T-Cell Lymphoma, Graft Versus Host Disease (GVHD), and other dermatologic autoimmune disorders. ECP is a unique form of cellular therapy that is effective in controlling the immune system without causing severe illness. When used to treat GVHD, it suppresses the immune system just enough to decrease damage to the transplant recipient's body; it does not result in over immunosuppression which can lead to fatal infections or secondary cancers. As the only ECP provider in Atlantic Canada, the success of the program has been overwhelming with over 1000 ECP treatments being performed to date.<sup>22</sup>

## PALLIATIVE AND END-OF-LIFE CARE

In New Brunswick, palliative care services are provided in individual homes, special care homes, community residences, nursing homes, hospitals and select community health centers. NB's residential hospices are located in Saint John and Fredericton and are under development in Miramichi and Moncton. The level and consistency of services varies across the province and for the most part, initiatives to date have focused primarily on the end-of-life component of palliative care.

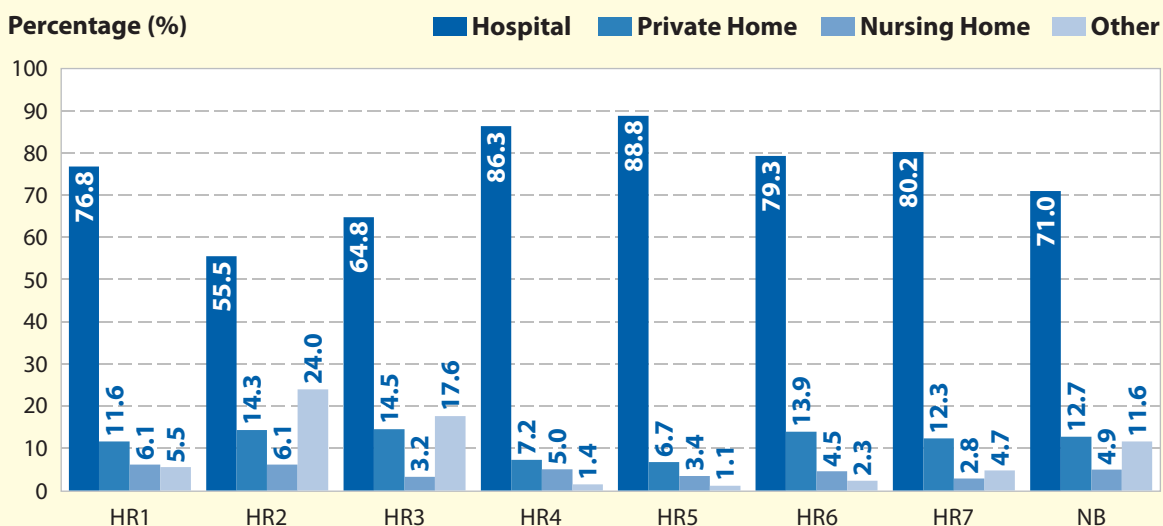
NBCN has identified a need for a provincial approach to cancer related palliative and end-of-life care as an integral part of its mandate. One of the first initiatives was organizing and hosting a provincial forum on palliative cancer care that involved key stakeholders from across the province. This forum provided NBCN with key themes to help focus the palliative cancer care agenda in NB.

In April 2018, the Palliative Care in New Brunswick: A Person-centred Care and Integrated Services Framework was released.<sup>23</sup> The Framework's goal is to outline strategic directions for integrated palliative and end-of-life services to improve the quality of life for New Brunswickers living with life-limited illnesses, their families and caregivers. One of the key priorities identified in the Framework is collection of data to support continuous improvement in palliative care.

Most of the published indicators of the quality of palliative and end-of-life services are based on data collected through administrative databases (such as hospital-based discharge abstract data). Although these data are very valuable, many limitations have been documented, such as poor comparability of data and availability of data related to the patient experience.<sup>24</sup>

Place of death is an indicator regularly reported, as literature indicates that cancer patients prefer to die at home or homelike settings.<sup>6,25</sup> Figure 17 shows that in 2017, 71.0% of NB cancer patients died in hospital and 12.7% died at home. The percentage of cancer patients who died in hospital ranged from 55.5% in Health Region 2 to 88.8% in Health Region 5. In Canada, 43.0% of cancer deaths occurred in hospital, with variations among provinces ranging from 37.0% in Ontario to 70.0% in Manitoba and New Brunswick<sup>26</sup>

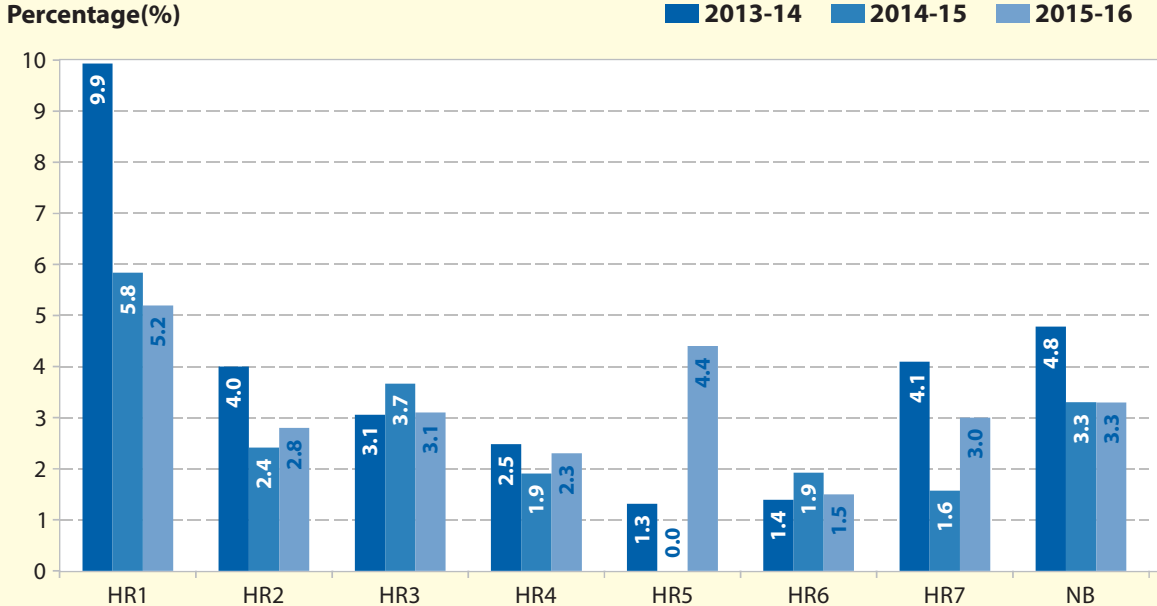
**FIGURE 17**  
**Place of death, cancer patients**  
By Health Region, 2017



Data Source: Vital Statistics, Service New Brunswick  
Note: Other includes DOA/ER/Outpatient, Funeral Home, Other Health Care Facility and Other.

One of the often cited indicators in this area of care is the assessment of admissions and deaths in intensive care units (ICU). Research suggests that many of these admissions could be prevented by planning for impending death using different approaches such as providing better assistance at home or the use of the hospice services at the end-of-life. In the 2015-16 fiscal year, 3.3% of cancer deaths were recorded for patients who were admitted to the ICU. This rate ranges from 5.2% in Health Region 1 to 1.5% in Health Region 5 (Figure 18).

**FIGURE 18**  
**Percentage of patients with cancer diagnosis who were admitted & died in ICU**  
 By Health Regions and Fiscal Year 2013/2014 - 2015/2016

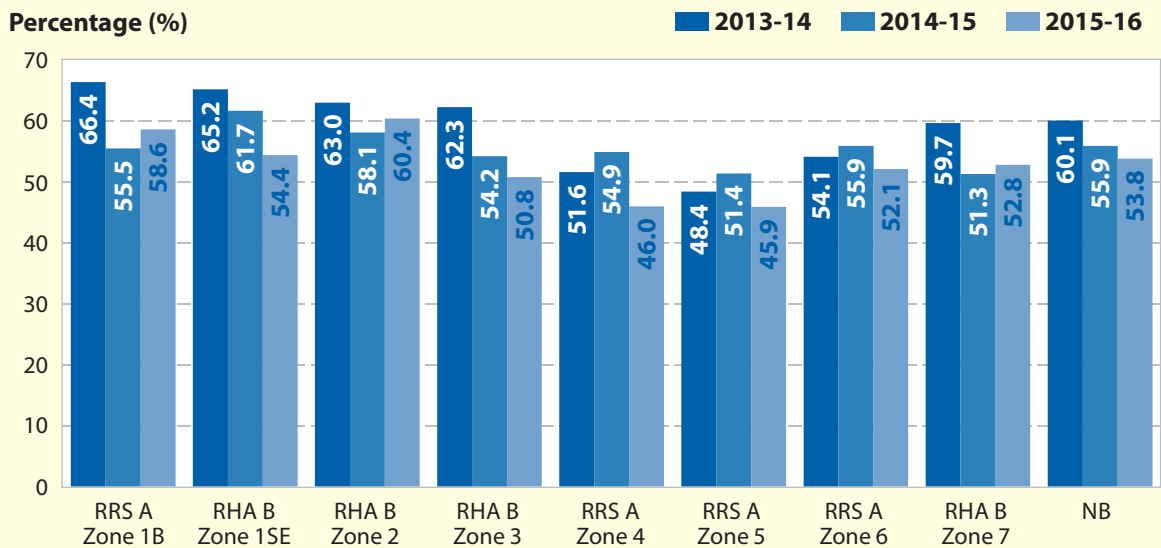


Data Source: Vital Statistics, Service New Brunswick and Discharge Abstract Database

Cancer patients represent the majority of those who receive palliative and end-of-life services.<sup>27</sup> Figure 19 depicts data from the NB Discharge Abstract Database (DAD) which represents only inpatient, acute care services. Information on patients receiving palliative care in the community (individual homes, special care homes, community residences, nursing homes or hospice) is not routinely collected in a systematic and coordinated way. In New Brunswick hospitals, during the period 2015-16, on average 53.8% of palliative care discharges had a diagnosis of cancer assigned to it (Figure 19).

**FIGURE 19**  
**Percentage of patients admitted to acute care hospitals with cancer diagnosis for palliative care**

By Health Zone and Fiscal Year, 2013/2014 - 2015/2016



Data Source: New Brunswick Discharge Abstract Database

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# APPENDIX A - TECHNICAL NOTES

## Prevention

### **INDICATOR: Smoking Prevalence (Figure 1)**

**Definition:** Percentage of population aged 12 years and older in each health zone reporting daily or occasional smoking.

**Numerator:** Number of daily, occasional, former, or never smokers, aged 12 years and older.

**Denominator:** Total population, aged 12 and older.

**Data Source:** Canadian Community Health Survey, New Brunswick data.

**Measurement timeframe:** 2017

### **INDICATOR: Smoking Cessation (Figure 2)**

**Definition:** Percentage of recent daily or occasional smokers aged 20 or older who reported quitting smoking in the past two years and who no longer smoke.

**Numerator:** Former smokers aged 20 years and older who were no longer smoking at the time of the survey who have quit in the last 2 years (i.e. recent quitters).

**Denominator:** Quitters less than 2 years or current smokers (i.e. currently daily or occasional smokers plus smoked more than 100 cigarettes per lifetime) aged 20 years and older.

**Data Source:** Canadian Community Health Survey, New Brunswick Data.

**Measurement timeframe:** 2017

### **INDICATOR: Overweight and Obesity (Figure 3)**

**Definition:** Percentage of population aged 18 years and older in each BMI group: underweight, normal weight, overweight, obese.

**Numerator:** Number of adults age 18 years and older in each BMI group: underweight, normal weight, overweight or obese.

**Denominator:** Total number of adults age 18 years and older with valid height and weight responses.

**Data Source:** Canadian Community Health Survey, New Brunswick data.

**Measurement timeframe:** 2017

BMI groups are defined as: under 18.5 (underweight); 18.5 to 24.9 (normal weight); 25.0 to 29.9 (overweight); 30.0 to 34.9 (obeseClass I); 35.0 to 39.9 (obeseClass II); 40 or greater (obese Class III).

### **INDICATOR: HPV Vaccination Program Uptake (Figure 4)**

**Definition:** Percentage of females in the target cohort who received all three doses of the HPV vaccine.

**Numerator:** Percentage of Grade 7 female students immunized with complete series of HPV immunization.

**Denominator:** Number of females enrolled in Grade 7.

**Target cohort:** Females in Grade 7.

**Data source:** NB Office of the Chief Medical Officer of Health.

**Measurement timeframe:** Fiscal Years 2015/16-2017/18



## Screening

### **INDICATOR: Breast Cancer Screening Participation Rate (Figure 5)**

**Definition:** Percentage of asymptomatic women aged 50 to 74 who received at least one screening mammogram within 30 months through the organized breast cancer screening program.

**Numerator:** Total number of asymptomatic women aged 50-74 who received at least one screening mammogram in the last 30 months.

**Denominator:** Total number of eligible women.

**Measurement timeframe:** July 2015 – December 2017

**Data source:** NB Medicare Resident Registry; NB Breast Cancer Screening Service Database

### **INDICATOR: Cervical Cancer Screening Participation Rate (Figure 6)**

**Definition:** Percentage of women aged 21-69 who had at least one Pap Smear in the past 42 months.

**Numerator:** Number of women aged 21-69 who had Pap Smear in the last 42 months.

**Denominator:** Total number of eligible women.

**Measurement timeframe:** 2012-2017

**Data Source:** New Brunswick Cervical Cancer Prevention and Screening Data Repository; Statistics Canada Population Estimates 2001-2015

## Diagnosis and Treatment

### **INDICATOR: Wait Times – Abnormal Breast Cancer Screen to Resolution (Figures 7, 8)**

**Definition:** Time in weeks from abnormal breast screen to resolution (definitive diagnosis).

**Population:** Women aged 50-69 with an abnormal breast screen result, requiring tissue biopsy and not requiring tissue biopsy.

**Target time:** 7 weeks for women requiring tissue biopsy; 5 weeks for women not requiring tissue biopsy.

**Measure:** Percentage of resolution among abnormal breast screen within the target time.

**Measurement timeframe:** 2012-2017

**Data source:** NB Breast Cancer Screening Service Database.

### **INDICATOR: Wait Times for Cancer Surgery (Figure 9)**

**Definition:** Percentage of cancer surgeries completed within target of 6 weeks or 3 months, combined.

**Numerator:** Number of cancer surgeries completed within target of 6 weeks or 3 months.

**Denominator:** Total number of cancer surgeries completed.

**Median wait times in days:** median waiting time (in days) from the date of booking request received to the date of surgery completed.

**Measurement timeframe:** 2015/16 to 2017/2018 fiscal year.

**Data Source:** NB Surgical Access Repository.

**Note:** The wait time is measured from the date the patient and surgeon agree to the surgery and the patient is ready to receive it, to the date

when the actual procedure is performed.

Time frames when a patient was not available to have surgery are excluded from calculations.

Surgical cases done emergently are excluded from calculations.

**INDICATOR: Removal and Examination of 12 or More Lymph Nodes in Colon Cancer Resections (Figure 10)**

**Definition:** Percentage of colon cancer resections for which 12 or more lymph nodes were examined.

**Numerator:** Colon cancer cases diagnosed during the year and resected within 1 year of diagnosis for which 12 or more lymph nodes were examined.

**Denominator:** Total number of colon cancer cases diagnosed during the year and resected within 1 year of diagnosis.

**Measurement timeframe:** 2014-2016

**Data Source:** NB Discharge Abstract Database; NB Cancer Registry;

**Note:** Health Region reflect patient's region of residence at diagnosis not where the actual surgery was performed.

**Exclusions:** Cases with unknown number of nodes removed and examined were excluded.

**INDICATOR: ER/PR Hormone Receptor and HER2 Positivity Status, Breast Cancer (Figures 11, 12)**

**Definition:** Percentage of women newly diagnosed with breast cancer who had ER/PR and HER2 test done and were positive.

**1. Numerator:** Number of staged, invasive breast cancer cases who were ER/PR tested and were positive.

**Denominator:** Total number of staged, invasive breast cancer cases.

**2. Numerator:** Number of staged, invasive breast cancer cases who were HER2 tested and were positive.

**Denominator:** Total number of staged, invasive breast cancer cases.

**Measurement timeframe:** ER/PR - 2014-2016  
HER2 - 2016

**Data Source:** NB Cancer Registry.

**INDICATOR: Median and 90th Percentile Wait Times for Radiation Therapy (Figure 13)**

**Definition:** 1. The median and 90th percentile radiation therapy wait time (days) from ready-to-treat to start of radiation for patients treated for all types of cancer and for the four most common cancers.

2. The percentage of radiation therapy cases for which the above wait time was within target timeframes

**Numerator:** Of the denominator, the total number of cancer cases starting radiation therapy within 4 weeks of being 'ready-to-treat'

**Denominator:** Total number of cancer cases receiving radiation therapy

**Measurement timeframe:** 2016-2018

**Data Source:** Cancer Treatment Access Repository.

**Note:** Definition of ready to treat: the date when any planned delay is over and the patient is ready to begin treatment from both social/ personal and medical perspective.

**INDICATOR: IMRT Utilization (Figure 14)**

**Definition:** Percentage of external beam radiation therapy courses delivered using IMRT technique, all intent, all cancers.

**Numerator:** Total number of external beam radiation therapy courses, all intent, all cancers, delivered using IMRT technique.

**Denominator:** Total number of external beam radiation therapy courses delivered, all intent, all cancers.

**Data Source:** Radiation Treatment Cancer Centers.

**Measurement timeframe:** 2013-2017 calendar year

**Note:** May include some out of province residents

**INDICATOR: Pre-Operative Radiation Therapy – Rectal Cancer (Figure 15)**

**Definition:** Percentage of patients diagnosed with stage II or III rectal cancer who received pre-operative radiation therapy.

**Numerator:** Stage II and III rectal cancer patients receiving pre-operative radiation therapy up to 120 days before resection.

**Denominator:** Stage II and III rectal cancer patients who had a rectal resection within one year of diagnosis.

**Data Source:** NB Cancer Registry and Cancer Treatment Access Repository.

**Measurement timeframe:** 2012-2016

**INDICATOR: Systemic Therapy Wait Times (Figure 16)**

**Definition:** Percentage of patients receiving first treatment within 7 days of being ready to treat.

**Numerator:** Total number of patients receiving first treatment within 7 days of being ready to treat.

**Denominator:** Total number of patients receiving first treatment.

**Measurement timeframe:** 2015-2017

**Data Source:** Information on systemic therapy wait times is submitted directly by facilities providing first treatment. Information was analyzed by the NBCN and the accuracy of the reported information is dependent on the data submitted by the facilities.

**Note:** Outpatient data only. There are known issues affecting quality of chemotherapy wait time data such as variations in oncology clinics setup and resources available to maintain data collection process.

**Definition of ready to treat:** the date when any planned delay is over and the patient is ready to start treatment e.g. any planned wait due to patient's personal and/or medical reasons is over.

## Palliative and End-of-Life Care

### **INDICATOR: Place of Death (Figure 17)**

**Definition:** Percentage of patients who died of cancer by location of death: hospital, private home, nursing home and other.

**Numerator:** Number of patients who died of cancer by location of death: hospital, private home and other.

**Denominator:** Total number of patients who died of cancer.

**Data Source:** NB Vital Statistics, Service New Brunswick.

**Measurement timeframe:** 2017

**Notes:** Location of death as specified on the death certificate.

### **INDICATOR: Percentage of Patients with Cancer Diagnosis Who Were Admitted and Died in the Intensive Care Unit (Figure 18)**

**Definition:** The percentage of patients with cancer diagnosis who were admitted and died in the intensive care unit (ICU).

**Numerator:** Number of patients with cancer diagnosis who were admitted and died in the intensive care unit (ICU).

**Denominator:** Total number of patients who died of cancer.

**Data Source:** NB Discharge Abstract Database; NB Vital Statistics Database, Service New Brunswick

**Measurement timeframe:** Fiscal years 2013/2014 – 2015/2016

### **INDICATOR: Percentage of Patients with Cancer Diagnosis Who were Admitted to Acute Care Hospitals for Palliative Care (Figure 19)**

**Definition:** The percentage of patients admitted to NB acute care hospitals with cancer diagnosis (main diagnosis or subsequent diagnosis) for palliative care or for whom palliative care was initiated any time during the admission.

**Numerator:** Number of patients with cancer diagnosis admitted to NB acute care hospitals for palliative care.

**Denominator:** Total number of patients with cancer diagnosis admitted to NB acute care hospitals.

**Data Source:** NB Discharge Abstract Database.

**Measurement timeframe:** Fiscal years 2013/2014 – 2015/2016

**Note:** Palliative cancer care discharges for the purpose of this report were identified as patients admitted to NB acute care hospitals with cancer diagnosis (main diagnosis or subsequent diagnosis, ICD 10 –CA codes C000 to D4890) and for which the intent of admission was palliative care or palliative care was initiated any time during the admission (code Z51.5, CIHI Canadian Coding Standards, Version 2009).

**Notes:** New Brunswick has two Regional Health Authorities (RHAs), Vitalité Health Network and Horizon Health Network. The two RHAs have a broad mandate to deliver health services within New Brunswick. Throughout the report, the nomenclature for the subprovincial levels of geography follows the original nomenclature for the subprovincial levels of geography (health regions or health zones) as designated by the source databases.