UWI

15th ANNIVERSARY Barbados National Registry

MINISTRY OF HEALTH AND WELLNESS BARBADOS

CANCER
IN BARBADOS

REPORT 2024

The George Alleyne Chronic Disease Research Centre

CAIHR
CARIBBEAN INSTITUTE FOR HEALTH RESEARCH

Contents

List of Figures

List of Tables

Executive Summary

What is in this report. This report presents national cancer incidence data and mortality data for Barbados. It reviews eight years of cancer incidence data (2013-2020), and ten years of mortality data (2013-2022), adding information on new cases of cancer for 2019 and 2020 and cancer related deaths for 2022 to our previously reported information.

Definition. Cancer is the uncontrolled overproduction of abnormal cells. It is caused by both external (e.g., tobacco, chemicals, radiation, and infectious organisms) and internal factors (e.g., inherited mutations, hormones, immune conditions, and mutations that occur from metabolism), and its uncontrolled spread can lead to death. These factors act in complex mechanisms to initiate or promote carcinogenesis (i.e., the development of cancer), which requires multiple steps that occur over many years. Cancer can be treated with any one or combination of the following: surgery, hormonal therapy, chemotherapy, immunotherapy, radiotherapy. For a cancer case to be included in the Barbados National Registry for Non-Communicable Diseases (BNR) it must be defined as a neoplasm with a behaviour code of 3 (malignant), according to the International Classification of Diseases for Oncology, 3rd Edition 1st Revision (ICD-O-3.1), or an in-situ (behaviour code of 2) neoplasms of the cervix (CIN III).

Background. Non-communicable diseases continue to present the highest health burden for Barbados. The 2023 Bridgetown Declaration on Noncommunicable Diseases (NCDs) and Mental Health, launched in June 2023 sought to highlight the threat of these diseases to Small Island Developing States (SIDS) and committed to addressing these diseases by aligning with the World Health Organisation's (WHO) 'Best Buys'. Eight of the expanded 'best buys' relate to addressing cancer through screening and early detection, and by prevention through human papilloma virus (HPV) and hepatitis vaccination. National disease surveillance programs can provide data on the outcomes of these interventions over time.

Cancer in Barbados. There were 975 new cancer cases registered in 2020, slightly higher than the 917 cases in 2019. The number of cases since 2013 are presented in Table 1 and represent the updated cases counts, accounting for delays in data reporting. The top four cancers sites diagnosed annually has remained unchanged for the past eight years (prostate, female breast, colorectal and corpus uteri), with lung cancer having the fifth highest number of cases in 2019 and non-Hodgkin lymphoma cases fifth in 2020. Cancer related deaths have increased over the period of study from 577 in 2013, to 729 in 2021 and 821 in 2022. Figure 5 represents all death certificates that mention cancer as a contributor to cause of death, and will overestimate the number of deaths for which cancer can officially be considered the underlying cause of death.

Age-standardised incidence rates were 191 per 100,000 in 2019 and 206 per 100,000 in 2020. Although the cancer cases registered in 2019 were lower than each of the previous four years, this may yet be because of incomplete recording of pancreatic cancer, multiple myelomas and lymphomas, and further checks are ongoing.

Key Messages

- Prostate, female breast, colorectal and corpus uteri cancers remain the top four cancers for the past eight years

- The percentage of patients diagnosed with cancer who have survived to three years has increased over the period 2013 to 2020. More data is needed to monitor the trends related to five-year survival.

- Despite the apparent decrease in new cancer cases compared to previously reported years (Table 1: 917 and 975 in 2019 and 2020 respectively), there has been a rise in the absolute number of breast cancer cases from 2016 to 2020.

- The absolute number of cancer-related deaths continues to increase annually, accounting for 24.5% of overall deaths in the country of Barbados.

Summary Statistics

Table 1: Summary Statistics for BNR-Cancer, 2013-2020

Year	2020	2019	2018	2017	2016	2015	2014	2013
No. registrations (tumours)	975	917	1012	1007	1078	1092	884	884
No. registrations (patients)	948	906	986	989	1042	1070	865	868
% of entire population	0.33%	0.32%	0.34%	0.34%	0.36%	0.38%	0.30%	0.31%
Age-standardized Incidence Rate (ASIR) per 100,000	206.1	190.5	219.3	214.3	234.4	243.9	206.2	209.5
No. registered by death certificate only (DCO)	29	48	60	80	83	101	41	59
% of tumours registered as DCOs	3.0%	5.2%	6.0%	8.0%	7.7%	9.3%	4.7%	6.6%
1-year survival (%)	66.8	69.3	68.8	64.2	63.0	66.6	64.1	66.0
3-year survival (%)	54.6	57.6	59.0	51.0	49.5	51.6	48.9	49.2
5-year survival (%)	.	.	.	47.7	46.1	44.7	40.8	42.9

Note 1: 2020 (Population= 287,371), 2019 (Population= 287,021), 2018 (Population=286,640), 2017 (Population=286,229), 2016 (Population=285,798), 2015 (Population=285,327), 2014 (Population=284,825), 2013 (Population=284,294)

Introduction

The Barbados National Registry (BNR) recognises its 15th year of data collection in 2024. An internationally recognised registry, BNR-Cancer has provided the Ministry of Health and Wellness with real-world incidence and mortality data on cancer as opposed to estimates. As a notifiable disease by law, the cancer data is collected from the Queen Elizabeth Hospital (QEH), private laboratories and doctors, to be aggregated. This provides the Ministry of Health and Wellness with information on the cancer burden in Barbados, and an opportunity to provide resources and policy to support the management of this disease.

In addition, the BNR has been an active participant in providing insight and training opportunities to the medical profession, based on the data observed and collected by the registry. Over the past 15 years, we have conducted and participated in accredited seminars and conferences, locally, regionally and internationally, addressing; prostate cancer, breast cancer, blood cancers, death certification and many other cancer-related topics.

Methods

BNR's methodology remained unchanged since our last report - 2022 (*See Appendix*).

Cancer registries can take between two to five years after the end of a given calendar year to report complete data, due to the continuing accrual of late registrations, completion of trace-back and follow-up. In Barbados, an active data collection methodology is particularly impacted by paper-based systems and physician cooperation, thus increasing the time needed for these activities.

In order to reflect a more accurate date of publishing and allow the report title to reflect the data it contains, the BNR changed the naming convention to match international standards. That is, the report title will bear the year in which it is published, and data and trends will include the most recently available data.

Incidence

Number of Cases

The overall number of cases registered in 2019 was the lowest of the last five recorded years of data (Table 1). In 2020, 975 tumours were registered, this represents a decrease when compared to years prior to 2019, but an increase from the 2019 total of 917. The top four cancers remain unchanged, however, there has been some fluctuation in the ranking within the top 10. The number of pancreatic and multiple myeloma cases remains reduced for a second year as compared to years prior to 2019. Multiple myeloma, which previously ranked in the top 10 for all years except 2017, did not make it into the top 10 in 2019 and 2020, with 15 and 18 cases respectively. The registry is investigating this change in the absolute numbers of pancreas and multiple myeloma cases to determine if it reflects what physicians are actively noting in their practices.

Table 2: Number, Percentage and Rank of the top 10 cancer sites, Barbados 2020

	Number of Tumours (% of all)									
Site	**Rank**	**2020**	**Rank**	**2019**	**Rank**	**2018**	**Rank**	**2017**	**Rank**	**2016**
Prostate	1	235 (24.1%)	1	241 (26.3%)	1	237 (23.4%)	1	291 (28.9%)	1	290 (26.9%)
Female Breast	2	187 (19.2%)	2	181 (19.7%)	2	180 (17.8%)	2	167 (16.6%)	3	154 (14.3%)
Colorectal	3	165 (16.9%)	3	131 (14.3%)	3	151 (14.9%)	3	141 (14.0%)	2	151 (14.0%)
Corpus uteri	4	70 (7.2%)	4	51 (5.6%)	4	55 (5.4%)	4	40 (4.0%)	4	48 (4.5%)
Non-Hodgkin lymphoma	5	32 (3.3%)	9	17 (1.9%)	8	25 (2.5%)	11	16 (1.6%)	12	20 (1.9%)
Lung	6	30 (3.1%)	5	32 (3.5%)	7	28 (2.8%)	6	23 (2.3%)	5	42 (3.9%)
Kidney	7	25 (2.6%)	9	17 (1.9%)	11	19 (1.9%)	13	14 (1.4%)	10	22 (2.0%)
Pancreas	8	19 (2.0%)	6	20 (2.2%)	6	34 (3.4%)	5	33 (3.3%)	7	30 (2.8%)
Cervix uteri	8	19 (2.0%)	11	16 (1.7%)	12	13 (1.3%)	15	12 (1.2%)	9	25 (2.3%)
Stomach	10	18 (1.9%)	6	20 (2.2%)	9	22 (2.2%)	7	22 (2.2%)	7	30 (2.8%)

Cancers of the colon and rectum, which were previously reported separately, have been amalgamated to match international reporting. Ranking the cancers allows policy makers to identify the cancers of greatest concern to the local population, rather than relying on the rankings observed in other countries, which may not match the local experience. For instance, in Barbados, lung cancer is often the number five, six or seven cancer while in many developed countries globally it is consistently in the top three.

Cancer Distribution by Gender (Top 10 cancers)

The top 10 cancers represent 82% of the incident cancers in 2020, up from 77% in 2019 (Figure 2). Female breast cancer remains number one in women and prostate cancer remains number one in men (Tables 3 and 4). In the cancers which affect both sexes, men had more cases in all cancers, except for cancers of the colon (71 cases in female versus 55 in men in 2020).

Figure 1: Number of cases from top 10 cancer sites, by gender

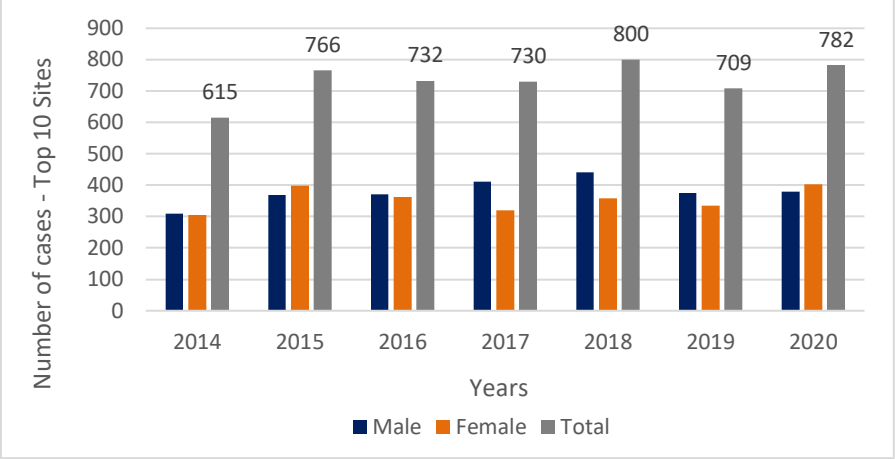


Table 3: Number and percentage of the top five cancer sites by gender, and ASIR with 95% confidence intervals (95%CI), Barbados, 2020, Women (148,287) Men (139,084)

Gender	Site	Number of tumours	% of all tumours	ASIR	95% UI
Women (total cases)		**491**	**50.4**	**201.0**	**182.5 - 221**
Breast		184	18.9	78.3	66.8 - 91.4
Colorectal		87	8.9	31.5	24.9 - 39.5
Corpus uteri		70	7.2	26.4	20.5 - 33.9
Cervix uteri		19	2.0	9.9	5.7 - 15.9
Non-Hodgkin Lymphoma		14	1.4	5.0	2.7 - 9.1
Men (total cases)		**484**	**49.6**	**214.9**	**195.6 – 235.8**
Prostate		235	24.1	99.6	87.1 - 113.7
Colorectal		78	8.0	34.6	27.1 - 43.8
Lung		20	2.0	8.9	5.4 - 14.3
Non-Hodgkin Lymphoma		18	1.9	10.3	5.9 - 16.8
Kidney		11	1.1	5.6	2.5 - 10.7

Table 4: Number and percentage of the top five cancer sites by gender, and ASIR with 95% confidence intervals (95%CI), Barbados, 2019, Women (148,208) Men (138,813)

Gender	Site	Number of tumours	% of all tumours	ASIR	95% UI
Women (total cases)		**446**	**48.64**	**179.0**	**161.7 - 197.8**
Breast		174	18.97	75.1	63.8 - 87.9
Colorectal		67	7.31	26.6	20.2 - 34.7
Corpus Uteri		51	5.56	18.8	14.0 - 25.2
Cervix Uteri		16	1.74	6.7	3.7 - 11.5
Lung		13	1.42	4.3	2.2 - 8.1

Men (total cases)	471	51.4	207.1	188.5 - 227.3
Prostate	241	26.3	105.8	92.7 - 120.4
Colorectal	64	7.0	28.8	22.1 - 37.2
Lung	19	2.1	8.5	5.1 - 13.7
Stomach	14	1.5	5.6	3.0 - 10.0
Kidney	12	1.3	5.1	2.6 - 9.4

Note 2: ASIRs are calculated on malignant tumours only, therefore the total excludes non-malignant diagnoses – see case definition in Appendix.

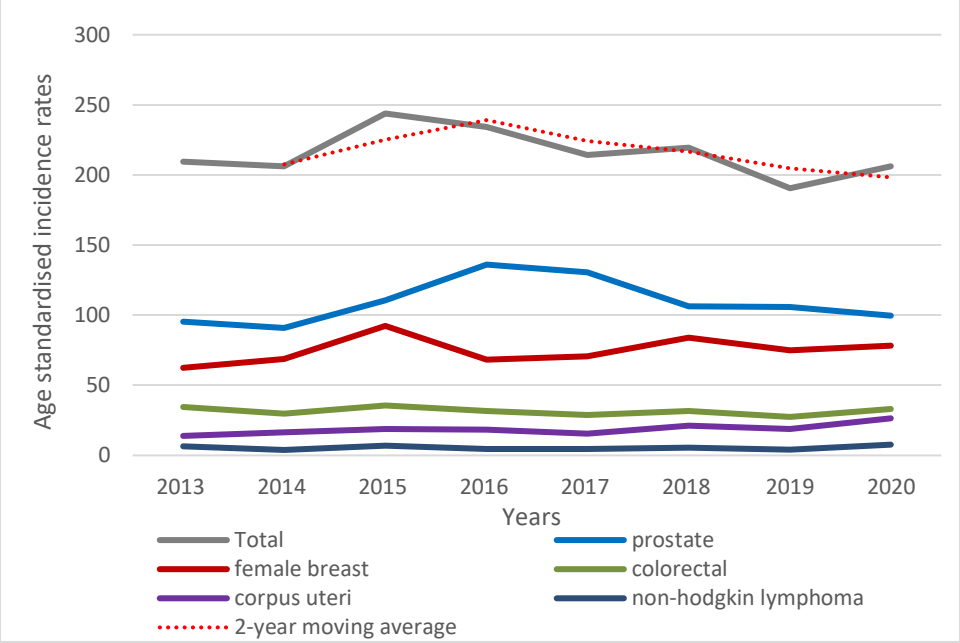
Age-standardised Incidence Rates (ASIR)

So far in this report we have reviewed absolute numbers of cases which allows us to assess the burden on our population. In this section, we focus on age-standardized incidence rates which allows us to compare our data with other countries. Table 5 reviews the age-standardised incidence rates for all cancers by gender. Figure 2 shows these rates for the top five cancers in Barbados. The decline in prostate cancer cases demonstrated in 2018, has plateaued in 2019 and 2020, a similar trend is occurring in the breast cancer cases, which were on the rise in 2018.

Table 5: Age-standardised incidence rates by gender, 95% confidence intervals (95% CI), Barbados, 2013 - 2020

	Men (139,084)				Women (148,287)			
Years	**Cases**	**%**	**ASIR**	**95% UI**	**Cases**	**%**	**ASIR**	**95%UI**
2013	454	51.4	235.1	213.7 – 258.3	430	48.6	191.4	172.7 – 211.7
2014	453	51.2	229.0	207.9 – 251.9	431	48.8	189.9	171.5 – 210.0
2015	515	47.2	251.7	229.8 – 275.2	577	52.8	239.7	219.2 – 261.8
2016	582	54.0	275.1	252.7 – 299.1	496	46.0	203.5	184.8 – 223.7
2017	547	54.5	250.8	229.7 – 273.5	457	45.5	184.7	167.1 – 203.8
2018	504	50.0	229.3	209.3 – 250.9	505	50.0	212.8	193.4 – 233.8
2019	468	51.4	206.2	187.6 - 226.3	443	48.6	177.9	160.6 – 196.6
2020	484	49.6	214.9	195.6 – 235.8	491	50.4	201.0	182.5 – 221.0

Figure 2: Age-standardised Incidence Rate (ASIR) curves for top five cancers, 2013 – 2020



Age and Gender Stratified Incidence

Numbers of cancer cases in women gradually increase with each age group peaking in older ages. Cancers in men continue to peak in the 65 - 69 age group, which is driven by prostate cancer cases.

Figure 3: Age and gender stratified rates for all cases, Barbados, 2020

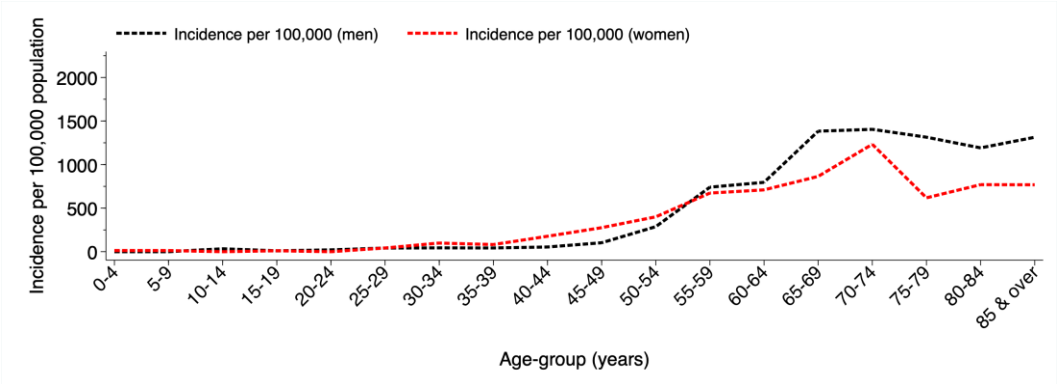
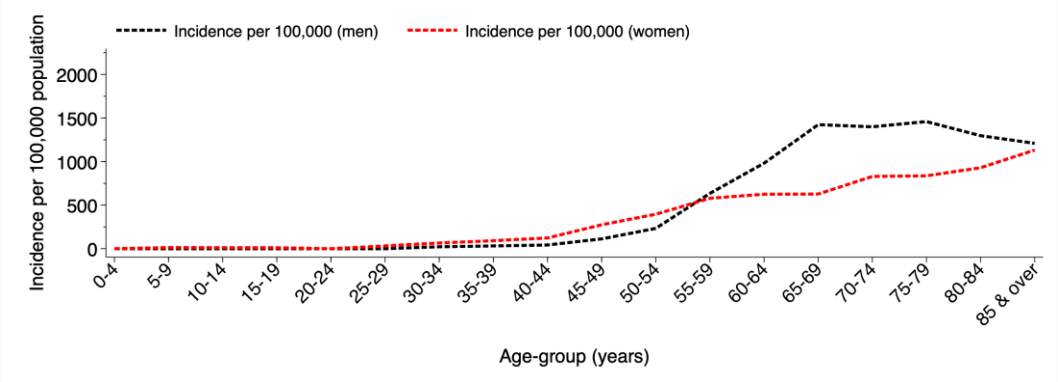


Figure 4: Age and gender stratified rates for all cases, Barbados, 2019



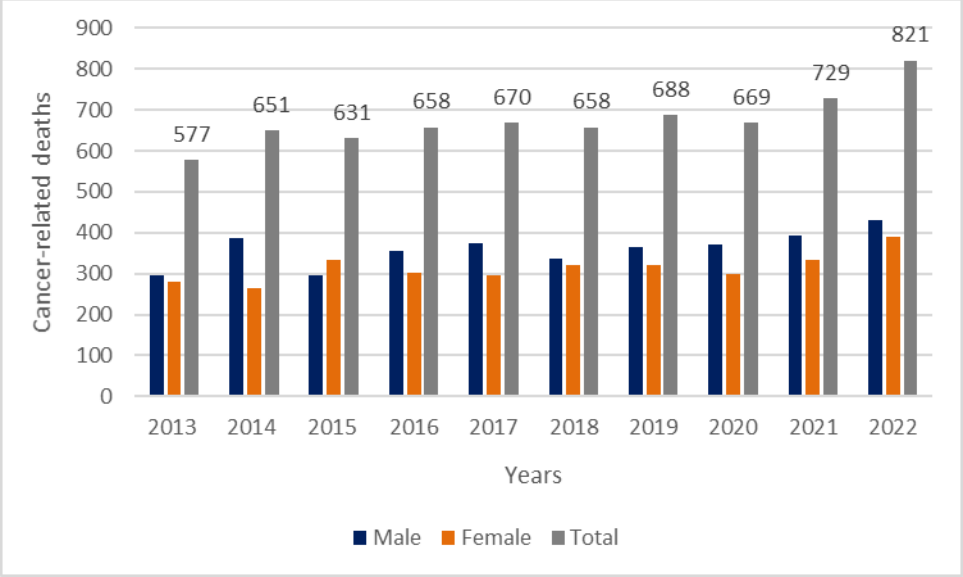
Mortality

The top ten causes of deaths in 2022 where cancer was listed as contributory to death is seen in Table 5. This is not a count of the primary/underlying cause of death, but where cancer was listed anywhere on the death certificate.

Table 6: Number and percentage of the top ten deaths by cancer for the year 2022

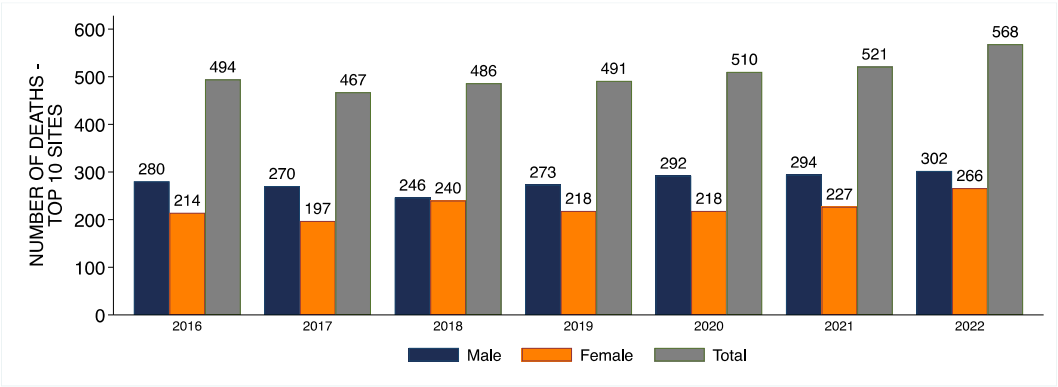
Site	Deaths	% of all cancer deaths
Prostate	160	29.4
Colorectal	116	21.3
Breast	78	14.3
Pancreas	43	7.9
Lung	42	7.7
Kidney	30	5.5
Liver	28	5.1
Cervix uteri	24	4.4
Corpus uteri	24	4.4
Stomach	23	3.2

Figure 5: Cancer-related deaths, Barbados, 2013-2022



The top 10 cancers account for 70% of cancer related deaths in 2020. Figure 6, shows the deaths due to cancers in the top 10 from 2016 – 2020.

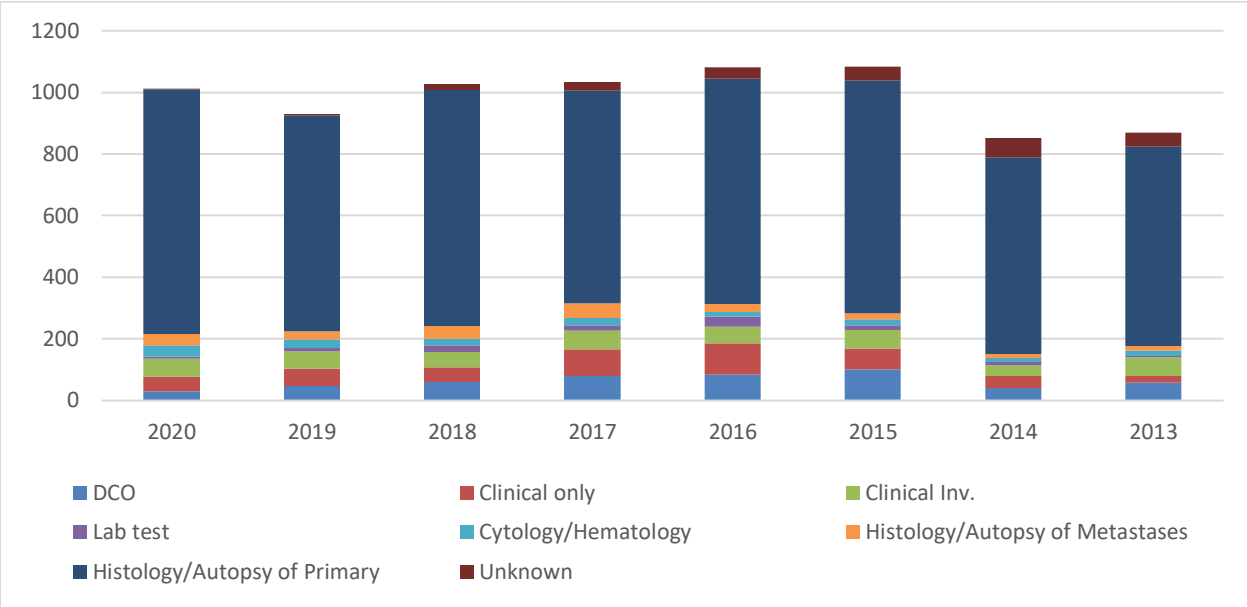
Figure 6: Number of deaths from top 10 cancer sites, by gender



Data Quality

One indication of data quality for a population-based cancer registry is how many cases registered were histologically verified (verified by biopsy). The Barbados National Registry has maintained an average of over 70% of cases histologically verified in the years under review, 78% in 2019 and 82% in 2020.
As demonstrated in Figure 5, the BNR also was able to minimise the number of cases with an unknown basis of diagnosis and kept the death certificate only (DCO) cases to 5.2% in 2019 and 3% in 2020. The North American Association for Central Cancer Registries (NAACCR) recommends a DCO %of less than or equal to 5% for silver certification and less than or equal to 3% for gold certified registries. Another indication of data quality.

Figure 7: Basis of Diagnosis for Cancer Cases, 2013-2020



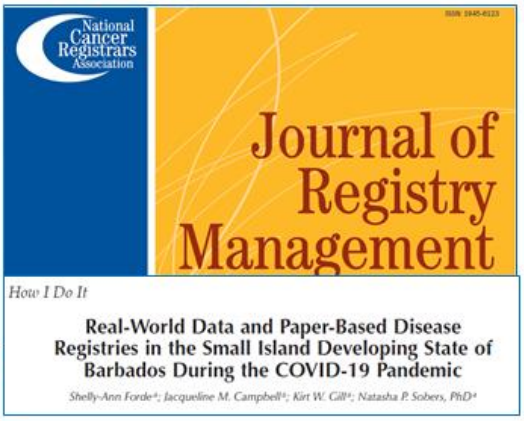
Summary

The BNR continues to provide high quality data on the numbers of newly diagnosed cases and numbers of deaths from cancer in Barbados. In 2019 and 2020, prostate, breast and colorectal cancers remain among the most diagnosed and highest causes of death. These are all diseases, for which death rates can be lowered through early detection and treatment. We are keen to support national efforts to develop national guidelines to promote screening for these conditions and will maintain our commitment to monitoring these and other interventions aimed at the provision of improved cancer care.

BNR Professional and Public Engagement

The below are some of the professional and public engagement activities which the BNR hosted in 2022–2023.

Morning Report | Mornin' Barbados - March 3, 2023




Dr Natalie Greaves, clinician-researcher, lecturer in Public Health at The University of the West Indies Cave Hill Campus.

Two University of the West Indies (UWI) medical researchers are sounding the alarm on the rising incidence of cancers in developing states.

Dr. Natalie Greaves, clinician -researcher, lecturer in Public Health at The University of the West Indies Cave Hill Campus and Co-Chair of the colo-rectal working group for the African Caribbean Cancer Consortium (AC3), and Dr. Cheryl Alexis, haematologist, oncologist and senior lecturer in Clinical haematology also at The University of the West Indies, Cave Hill are advocating for increased education towards early identification and treatment of the disease.

1. BNR Annual CME Seminar Poster, 2. Dr Natalie Greaves discusses the BNR's report on Mornin' Barbados, 3. Cohort of Students from the Barbados Community College's Health Information Management visit the BNR, 4. Paper Published by Mrs. Shelly-Ann Forde in the Journal of Registry Management, 5. Dr Cheryl Alexis and Dr Natalie Greaves Loop News Feature in response to the BNR Cancer report https://caribbean.loopnews.com/content/uwi-medical-researchers-advocate-improved-cancer-care, 6. Participants in community health fair attended by Mrs Shelly-Ann Forde, BNR, pose with the BNR Selfie Board.

Appendices

Appendix A – Acknowledgements

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Prof. Sir Trevor Hassell, Chairman of National Chronic Non-Communicable Disease Commission
Staff in the following departments of the Queen Elizabeth Hospital: Medical Records, Pathology, Radiotherapy, Haematology, Death Records, Colposcopy
Special thanks also to the private laboratories, physicians, and surgeons as well as The Barbados Cancer Society Breast Screening Programme who faithfully notify.

Appendix B – PAB Membership

The Professional Advisory Board of the BNR (2020)

Name	Affiliation
Prof. Sir Trevor Hassell (Chair)	Chairman of the National Commission for Chronic NCDs
Prof. Simon Anderson	Director, George Alleyne Chronic Disease Research Centre (GACDRC)
Dr Patrice Lawrence-Williams	Representative, PAHO/WHO
Dr Kenneth George	Chief Medical Officer, Ag. Ministry of Health and Wellness
Dr E Arthur Phillips	Senior Medical Officer of Health, Ministry of Health and Wellness
Dr Joy St. John	Caribbean Public Health Agency (CARPHA)
Dr Natalie Greaves	University of the West Indies
Dr Dawn Scantlebury	Queen Elizabeth Hospital (QEH)
Dr Cheryl Alexis	University of the West Indies
Ms Lee-Ann Salandy	Health Planner, QEH
Mrs Tanya Martelly	GACDRC
Dr Richard Ishmael	Consultant Radiologist, QEH
Prof. David Corbin	Consultant Neurologist, QEH; Clinical Director, BNR–Stroke
Dr Rudolph Delice	Head of Dept. of Medicine, QEH; Clinical Director, BNR–Heart

Prof. Patsy Prussia	Honorary Consultant Pathologist, QEH; Clinical Director, BNR–Cancer

Appendix C – Definitions

An incidence rate is the number of new disease events occurring in a specified population during a year, usually expressed as the number of events per 100,000 population at risk. That is,
Incidence rate = (new events / population) × 100,000

The numerator of the incidence rate is the number of new disease events; the denominator is the size of the population. The number of new events may include multiple events occurring in one patient. In general, the incidence rate does not include recurrences (where recurrence is defined as a presentation to the healthcare system within a certain period of the initiating event).

The age standardised rate is the proportion of cases (or deaths) in a given population (and year) weighted by the age structure of the population. For incidence (ASIR) and mortality (ASMR) calculations, cases and deaths were weighted by the WHO World Standard population.

A mortality rate is the number of deaths, in which the disease (cancer) was the underlying cause of death, occurring in a specified population during a year. Mortality is usually expressed as the number of deaths due to the disease per 100,000 population. That is,
Mortality rate = (disease deaths/population) × 100,000

The numerator of the mortality rate is the number of deaths; the denominator is the size of the population.

Case Definitions
Case definition for 2008 diagnoses: "All in-situ and malignant neoplasms with a behaviour code of 2 or 3 according to the International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3) as well as benign tumours of the brain & other parts of CNS, pituitary gland, craniopharyngeal duct and the pineal gland (behaviour code of 0 or 1)."

Case definition for 2013 onwards diagnoses: "All malignant neoplasms with a behaviour code of 3 according to the ICD-O-3 and in-situ neoplasms of the cervix only (CIN3). Exclude all other in-situ neoplasms and basal cell and squamous cell carcinoma of skin, non-genital areas".

The case definition for 2014 onwards remains the same as 2013 but was reworded to: Data were collected on all malignant neoplasms with a behaviour code of 3, according to the International Classification of Diseases for Oncology, 3rd Edition 1st Revision (ICD-O-3.1), as well as in situ neoplasms of the cervix only (CIN 3) diagnosed in 2014.

Residency
'Usual Residence' used in the Population and Housing Census is as follows:
Usual Residence – This is defined as the place where a person being enumerated lives and sleeps most of the time.
(a) For persons with more than one home, usual residence will be the one at which the person spends

the greater part of the year. Thus, for an individual who has more than one place of residence because his workplace or school is away from home, the usual residence should be that place in which he/she spends at least four nights of the week.
(b) Fishermen at sea are considered to have their place of usual residence where they dwell when on shore.
(c) Barbadians in the farm labour programme were enumerated in their usual households; seamen or crewmembers on vessels plying foreign ports should record as their usual residence the place where they stay when on shore.
(d) Aircraft pilots are considered to have their usual residence in the households in which they dwell.
(e) Foreign diplomats are the usual residents of the countries they represent and were not enumerated.

Appendix D – Data Quality

Data Collection Methodology
Cases were ascertained by trained data abstractors via review of pathological and laboratory data, as well as data from key departments at the Queen Elizabeth Hospital: haematology clinic, the Clara Brathwaite Centre for Oncology & Nuclear Medicine, colposcopy, and death records.
Following case ascertainment, data were abstracted directly onto encrypted laptops, using the International Agency for Research on Cancer (IARC)'s CanReg software, version 5. For complete information on each tumour, further retrieval from additional sources (e.g., private physicians and clinics) was performed as required. This is necessary as patients may take several pathways to diagnosis, whether accessing initial care through: the general practitioner, a non-governmental organisation (NGO) through breast or prostate screening programs, a specialist physician, or a surgeon. By collecting data from all sources, the most representative incidence date for the tumour can be determined (the first date of definitive diagnosis).

Mortality data was entered into a Research electronic data capture (REDCap) database from paper records existing within the Barbados National Registration Department. This allowed the team to conduct death clearance and provides death clearance data to other departments within the Ministry of Health and Wellness.

The Barbados National Registry continues to make every effort to ensure cancer data is comparable with other registries internationally, as such, we have outlined below the definitions and assumptions used for reporting and the changes made over time:

a. The Registry switched from The International Agency for Research on Cancer (IARC) definition of incidence, for 2008 data collection year, to the European Network of Cancer Registries (ENCR) definition which better matched data we had collected for 2013 onward (*see Appendix for definitions*)
b. Residency is categorised as:
    i. Persons living on the island for six months or more
    ii. 'Usual residence' as per the Barbados Statistical Services definition (*See Appendix*)
    iii. All persons registered with the Electoral and Boundaries Commission
    iv. The address listed on the death certificate if no other information available

c. Only malignant tumours are for ASIRs are included in this report, per international standards. The summary tables include both malignant tumours and cervical carcinoma in situ. Notes accompanying the tables will guide readers accordingly.
d. Nationally reported annual numbers of cancer deaths, presented by the Ministry of Health and Wellness, may differ from numbers of deaths and age-standardised mortality rates (ASMRs) reported by the BNR. MHW reports based on underlying cause of death and BNR reports all cases with cancer listed on the death certificate. All cases with cancer listed as a cause-of-death are treated as a death certificate notification and are investigated to determine the year of incidence.

Data Analysis

In order to share data and make it comparable to other countries and year-to-year, the BNR must maintain quality. We engage several tools for standardising and formatting variables, checking for accuracy, duplicates and missing data as well as performing preliminary analysis. Data Management and Analysis were performed using the International Association for Research in Cancer software: IARCcrgTools version 2.12 (by J. Ferlay, Section of Cancer Surveillance, International Agency for Research on Cancer, Lyon, France), Stata version 17.1 (StataCorp., College Station, TX, USA), CanReg5 database version 5.43 (International Agency for Research on Cancer, Lyon, France), Research electronic data capture (REDCap), Version 12.3.3, the SEER Hematopoietic database (Surveillance, Epidemiology and End Results (SEER) Program [www.seer.cancer.gov] Hematopoietic and Lymphoid Database, Version 2.1 data released 05/23/2012. National Cancer Institute, DCCPS, Surveillance Research Program).

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