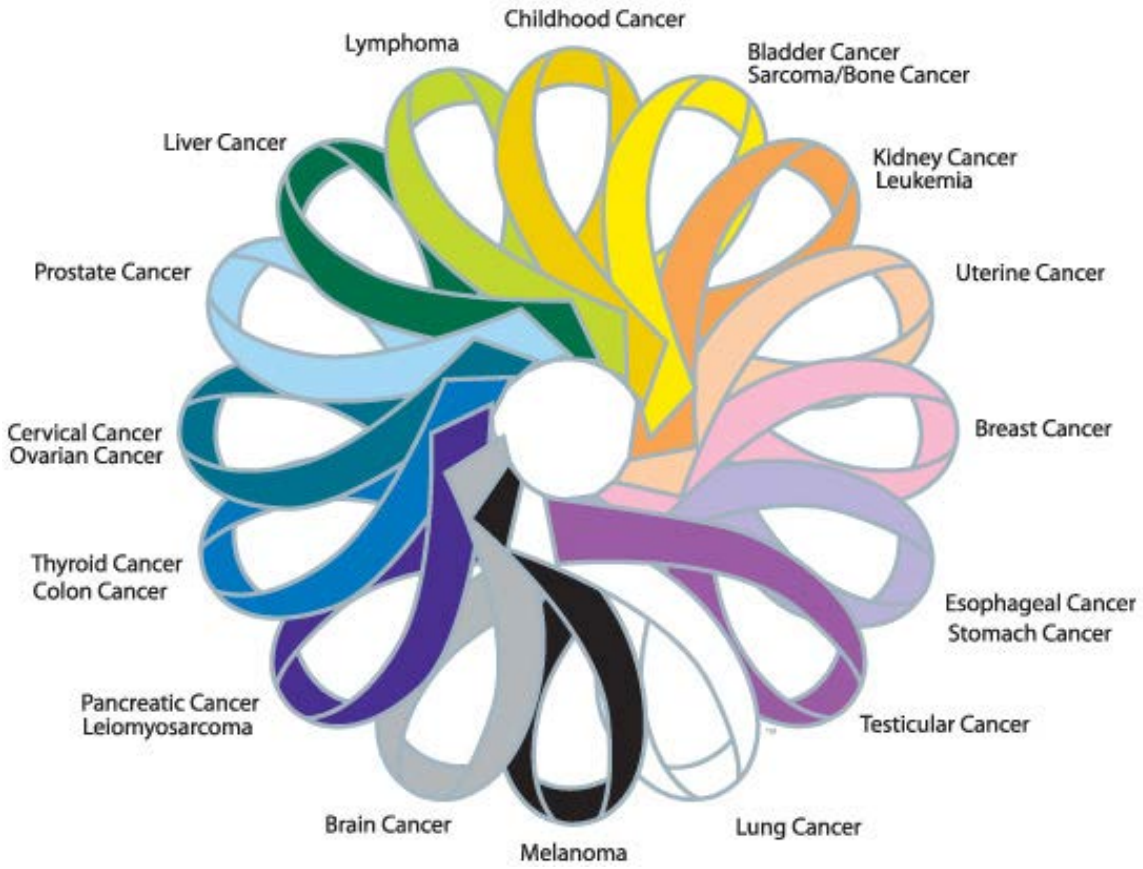
Barbados National Registry

Cancer in Barbados 2008:

Annual Report of the BNR-Cancer



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Contents

Executive Summary

For the first time in Barbados, we have comprehensive incidence and survival data on cancers of all sites nationwide (see Methods section for full case definition of BNR-reportable tumours). In 2008, 1204 tumours diagnosed among 1117 persons (567 men; 51%) in Barbados were registered with the BNR, for an incidence rate per 100,000 age-standardised (ASIR) to the WHO world population of 304.5 (95% CI 287.0–322.8). The top cancer sites were prostate (ASIR 116.1), non-melanoma skin cancers (NMSCs; 73.4) and breast (68.5). The mean age for patients with cancer was 65 years (63 years for men; 67 years for women).

For most tumours (1017; 84%), treatment information was available, and at least one form of treatment was received for 887 (74%) of these. The main initial treatment received (645; 73%) was surgery, followed by hormone therapy (128; 14%). Of the 130 (13%) untreated tumours, the main reason for lack of treatment (46; 35%) was death before treatment could start. Other reasons included treatment refusal (19; 15%) and symptomatic treatment (18; 14%).

Almost half (498; 45%) of all persons diagnosed with cancer in 2008 had died by the end of 2013, i.e. 5 years post-diagnosis; most (353; 71% of all deaths) within the first 2 years. Median survival was 165 days from initial diagnosis. Most of these deaths (397; 80%) were from cancer and of these, 247 (62%) were caused by tumours of the gastrointestinal (GI) tract, breast, female genitalia, and prostate. Five-year survival rates were poor, approximately 50% for male or female genital sites, and only 31% for colorectal cancer. The lowest 5-year survival rates were for pancreatic cancer (no survivors), followed by respiratory and intra-thoracic cancer (12%), stomach (13%) and blood and bone marrow (16%). On the other end of the spectrum, 5-year survival for the most common cancer site, NMSC, was 86% (for deaths from all causes; close to 100% for death from cancer), and for the very rare (fewer than 10 patients) mesothelial cancer, survival was 100%.

Age-standardised mortality rate (ASMR) per 100,000 population was estimated from national civil death data only. This is because BNR registrations were only for neoplasms diagnosed in

2008 (and not all of those diagnosed in that year would have died from cancer in 2008). There were 489 deaths from cancer in Barbados in 2008, for an ASMR of 114.3 (104.0–125.5). Almost half of all cancer deaths in Barbados in 2008 were from three sites: prostate (100; 20%), colorectal (66; 14%) and breast (49 deaths; 10%). The highest ASMR was for prostate cancer (49.5; 40.1–60.6), almost twice that for the next highest, breast cancer, at 23.1 (16.8–31.2) and a little over three times that for the third highest, colorectal cancer, at 16.0 (12.3–20.5).

Table ES1. Summary statistics for the BNR-Cancer, 2008

	Cancers (all)	Cancer (in-situ, uncertain and benign*)	Cancers (malignant)
Population†	277 821	277 821	277 821
Reporting obligations			
No. registrations (tumours)	1204	99	1105
(% of entire population)	(0.43%)	(0.04%)	(0.40%)
No. registrations (patients)	1117	93	1025
No. deaths by end 2013	503	14	489
(% of patients registered)	(45.0%)	(15.1%)	(47.7%)
No. registered by death certificate only	55	5	51
(% of tumours registered)	(4.6%)	(5.1%)	(4.6%)
5-year survival	47.7%	-	-

**Note*: uncertain and benign behavior registered for brain cancers or for "death certificate only" registrants where behavior was unknown.

†*Note*: Population data from Barbados 2010 census, adjusted for undercount. Barbados Statistical Service. Barbados Population and Housing Census, 2010. Bridgetown, Barbados, Sep-2013. Available at: http://www.barstats.gov.bb/files/documents/PHC_2010_Census_Volume_1.pdf

Key successes and strategic objectives

Key successes

One of the major successes for the BNR-Cancer has been the completion of the first year of data with a very low percentage of cases (< 5%) registered from death certificate only (DCO). Other achievements since the BNR-Cancer began in 2010 include:

- The creation of a cancer working group, which provided invaluable assistance and advice to the team during the cancer registry startup period
- Increased awareness for, support from and participation by both public and private physicians and medical facilities
- The training of cancer data abstractors in all aspects of cancer registration locally, regionally and internationally
- Hosting of three continuing medical education accredited cancer seminars. The inaugural annual cancer seminar was hosted in 2012 and was on the management of male genitourinary cancers. Subsequent seminars have covered the topics of management of cancers of the breast and gastrointestinal tract
- Increasing requests for the use of BNR data locally and regionally; primarily for presentations and research projects
- Presentations at both local and regional conferences and meetings on a variety of topics; for example:
    - "From Cancer to NCD registry: a case for resource-challenged countries", Cancer registries workshop, Bahamas, 2012
    - "Case-finding and abstracting", African-Caribbean Cancer Consortium (AC3) conference, Martinique, 2014
    - 2nd runner up in the AC3 poster competition, AC3 conference, Martinique (October 2014)

- "NCD surveillance in the English-speaking Caribbean", NCI/PAHO/CDC Workshop, Washington DC (April 2014)
- "Challenges in cancer registration – the Barbados experience", the Caribbean Association on Oncology and Hematology (CAOH) conference, Barbados (May 2015)

- Acceptance of abstract submitted to present the first year of cancer data at the upcoming Caribbean Public Health Agency (CARPHA) conference in Grenada (June 2015)

Key challenges

The BNR-Cancer team has always experienced challenges with notification, which has probably had an impact on the number of cases registered, while the largely paper-based health information system has reduced the capacity for timely reporting.

Part of the notification challenge is due to the 1976 Pathology Act restricting release of confidential information from laboratories, which makes it difficult to obtain information on tumours from private laboratories. In addition, the difficulty obtaining commitment from some physicians to provide data, and the limited promotion and publicity of the BNR-Cancer have all contributed to limit full coverage of the registry. Numbers and rates provided here for incidence are therefore likely to be an underestimate. Mortality rate estimates, however, which use national civil register data, should not be an under-estimate.

A lack of electronic health information data in the medical sector has and will continue to limit the capacity to collect data, as data collection must by necessity be active and is therefore extremely labour-intensive. This is not only because there are many data sources to be visited for each suspected case, but also because of the time-consuming nature of examining paper records for information. For illustration: data for 2008 were collected retrospectively, starting in 2010 with the inspection of nearly 15,000 records (entries in laboratory books or other minimal-information data repositories) to inform on those which were likely to have been first diagnosed in 2008 (about 3500). These 3500 records (full patient notes) then had to be found, examined in detail, including trace-backs for additional information from other physicians, clinics or

laboratories where indicated. Once the tumour was determined to have been diagnosed in 2008, data were abstracted onto an electronic form. This lengthy, largely paper-based process has taken 4 years for 1 year of data collection.

Moving forward: principal objectives for the BNR-Cancer, 2015–2016

- Improve timeliness to reporting through the following changes:-
  - reduce the number of tumours collected by excluding non-melanoma skin cancers (NMSCs) from the case definition, as well as in situ or uncertain tumours (very few cancer registries worldwide collect data on NMSCs)
  - start the next year of data collection in 2013 (instead of 2009)
  - create a secure, web-based electronic notification system for private physicians
  - work with the Ministry of Health (MoH) to change the notification act to require private laboratory notification of neoplasms to MoH
  - increase the numbers of data abstractors by hiring a part-time team member
  - fine-tune the strategy used by the data abstractors for case-finding and abstracting
- Complete data collection for tumours diagnosed in 2013 by the end of 2016
- Host two seminars on the management of cancers of the female genital system (2015) and the management of lymph and blood related cancers (2016)

Introduction and background

BNR-Cancer

Objective

To collect timely and accurate national data on the occurrence of all malignant neoplasms as well as some non-invasive tumours (in-situ neoplasms and certain benign tumours) in order to contribute to the prevention, control and treatment of cancers in Barbados.

Cancer

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells.[1] Certain types of cancer can be prevented by eliminating exposure to tobacco and other factors that initiate or accelerate the development of cancer. [1] When countries are grouped according to economic development, cancer is the leading cause of death in developed countries and the second leading cause of death in developing countries (following cardiovascular diseases).[1]

Methods

The BNR-Cancer is a retrospective registry, in order to allow time for treatment and outcome data to be collected at the same time as incident and demographic information. Data collection began in 2010 for 2008 (see "Key challenges" in previous section for more information on this lengthy process).

Data were collected on all in-situ and malignant neoplasms diagnosed in 2008 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 and other parts of the CNS (behaviour code of

0 or 1). Cases were ascertained by trained data abstractors via 'hot pursuit' (i.e. active surveillance), mainly at the single tertiary public hospital on the island, the Queen Elizabeth Hospital (QEH), but also from the private hospital and clinics. However, some passive notifications were received from private physicians, either via telephone, collection of case lists or onto hard-copy BNR case reporting forms (CRFs).

Following case ascertainment, notes were retrieved from the relevant source(s) and data collected and 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 required as often patients will visit more than one physician before they receive a firm diagnosis. By collecting data from all sources the correct incidence date for the tumour can be determined (the first date on which cancer was suspected by the healthcare provider).

Mortality data were provided by the Barbados National Registration Department.

We present the absolute numbers of cancer cases and the age-standardized incidence and mortality rates per 100,000 population, using the WHO world standard population. All analyses were performed using Stata version 13 (StataCorp., College Station, TX, USA).

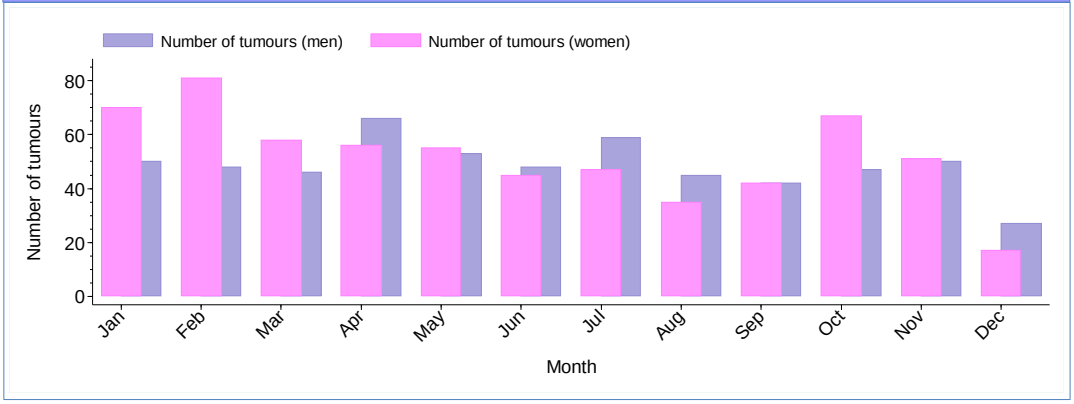
Cancer in Barbados, 2008

1. Incidence

A total of 1117 persons (567 men; 550 women) were diagnosed with 1204 tumours in Barbados in 2008. Of the 1204 tumours, 1105 (92%) were malignant, 82 in situ, and 12 were uncertain or benign brain tumours. The remaining five were non-brain tumours identified only by death certificate, with unknown behaviour. Eighty-seven patients (7%) had multiple tumours (ranging from two to six), most of which (73/87; 84%) were non-melanoma skin cancers (NMSCs).

Figure 1 shows the number of tumours diagnosed every month in Barbados in 2008 and registered with the BNR for that year. The overall age-standardised incidence rate (ASIR) per 100,000 (WHO World population) for all cancers for the year was 304.5 (287.0–322.8).

Figure 1. Number of tumours in male and female cancer patients by month, Barbados (N=1204)



Approximately half of all tumours diagnosed (624; 52%) occurred in men, for an ASIR of 354.2 (326.7–383.6), significantly higher than that in women (271.2; 248.5–295.6). Fewer than 9% (99) of tumours were non-invasive. Invasive cancers, excluding NMSCs, represented 67% (808/1204) of all registered tumours, for an ASIR of 204.2 overall (95%CI 189.9–219.3). Almost half of these (386; 48%) were in women, for an ASIR of 179.7 (161.4–199.8), significantly lower than the ASIR for malignant cancers (excluding skin) in men (239.9; 217.2–264.3).

The leading site overall in number of cases was NMSC (301; 25%). This was the second leading site among men (178 cases; 29%) and women (123 cases; 21%). The top five sites for men (comprising 79% of all tumours in males) and women (73% of tumours in women), and the top 10 sites overall (85% of all tumours) by ASIR, are shown in Tables 1 and 2, respectively.

The highest ASIRs in men and women were seen for prostate and breast cancers, respectively, and were significantly greater than for any other site, apart from NMSC. The leading cancer by ASIR in Barbados in 2008 was prostate cancer (Table 2), significantly higher than ASIR for any other site.

Table 1. Number and percentage of the top five cancer sites by sex, and age-standardised incidence rate per 100,000 population (ASIR) with 95% confidence intervals (95%CI), Barbados, 2008 (N=1204)

Sex	Site	Number of tumours	% of all tumours	ASIR	(95% CI)
Both		**1204**	**100.0**	**304.5**	**(287.0–322.8)**
Women		**580**	**48.2**	**271.8**	**(249.0–296.2)**
	Breast	143	24.6	68.5	(57.3–81.3)
	NMSC*	123	21.2	52.3	(43.1–63.1)
	Cervix	52	9.0	31.9	(23.5–42.1)
	Colon	65	11.2	29.3	(22.4–37.8)
	Uterus	42	7.2	19.0	(13.6–26.1)
Men		**624**	**51.8**	**354.2**	**(326.7–383.6)**
	Prostate	209	33.5	116.1	(100.8–133.3)
	NMSC*	178	28.5	100.5	(86.1–116.6)
	Colon	59	9.5	33.4	(25.4–43.4)
	Respiratory	30	4.8	17.6	(11.8–25.3)
	Rectum	18	2.9	10.7	(6.3–17.0)

*NMSC: Non-melanoma skin cancers.

Note: Excluding NMSCs, the fifth site for women would be the blood and bone marrow cancers (25; 4.3% of tumours; ASIR=12.3, 95%CI 7.6–18.8 and for men this would be the stomach (19; 3.0% of tumours; ASIR=9.9, 95%CI 5.9–15.8).

Table 2. Number and percentage of the top 10 cancer sites, and age-standardised incidence rate per 100,000 population (ASIR) with 95% confidence intervals (95%CI), Barbados, 2008 (N=1021; 85% of all tumours)				
Site	**Number of tumours**	**% of all tumours**	**ASIR**	**(95%CI)**
All	**1204**	**100**	**304.5**	**(287.0–322.8)**
Prostate	209	17.3	116.1	(100.8–133.3)
Skin (NMSC*)	301	25.0	73.4	(65.1–82.5)
Breast	143	11.9	68.5	(57.3–81.3)
Cervix	52	4.3	31.9	(23.5–42.1)
Colon	124	10.3	30.8	(25.5–37.0)
Uterus	42	3.5	17.7	(12.4–24.6)
Blood and bone marrow	42	3.5	11.0	(7.7–15.1)
Respiratory	40	3.3	10.2	(7.2–14.0)
Rectum	36	3.0	8.9	(6.2–12.5)
Stomach	32	2.7	6.9	(4.6–9.9)

*NMSC: non-melanoma skin cancer.

Note: Excluding skin, the 10th site is other digestive organs (24; 2.0%, ASIR=5.6, 95%CI 3.5–8.6).

Breast and prostate cancer: a closer look

Both breast and prostate cancers were the subject of a large case–control study conducted in Barbados at the start of this century: the Barbados National Cancer Study (BNCS). The BNCS found ASIRs (WHO world standard population) of 112.0 (95% CI: 105.2–119.3) for prostate[2] (covering the years 2002–2008) and 58.4 (52.5–65.0) for breast cancer (for 2002–2006).[3] The ASIR for prostate cancer found previously is comparable to what we found for 2008. Although the breast cancer ASIR we have found is somewhat higher (68.5 vs 58.4), note that the 95% confidence intervals do overlap. However, despite the lack of statistical significance, rising rates of breast cancer will still have an impact on national healthcare needs and resources. The ASIR (world standard) for breast cancer in Martinique between 2006 and 2010 was lower than in Barbados at 58.9, but for prostate cancer, Martinique's ASIR was much higher, at 175.3 (95% CI not provided).[4]

2. Treatment summary

Treatment information was available for 1017/1204 tumours (84%; Table 3). At least one form of treatment was received for 887 (74%) of all tumours (Table 4). Of the 887, 257 (29%) received two forms of treatment, 82 (9%) received three and only 20 (2%) received four different types of treatment (data not shown). One hundred and thirty (13%) tumours were not treated, for reasons provided in Table 5.

Table 3. Number and percentage of tumours diagnosed for which the patient received treatment, Barbados, 2008 (N=1204)

Treatment information	Number of tumours	%
Known to have had treatment	887	73.6
Unknown whether had treatment	187	15.5
Known to have not had treatment	130	10.8

Table 4. Number and percentage of each type of first and any treatment* given for tumours diagnosed in Barbados, 2008 (N=887)

Treatment type	Number of tumours (1st treatment)	%	Number of tumours (any treatment†)	%
Surgery	645	72.7	668	75.0
Hormone therapy	128	14.4	209	23.6
Chemotherapy	50	5.6	189	21.3
Palliative care	23	2.6	26	2.9
Radiotherapy	20	2.3	116	13.1
Cryotherapy	16	1.8	22	2.5
Treated abroad, laser therapy or missing data‡	<10	<1.1	<10	<1.1

*Here, "any treatment" means any type of treatment listed from the first to the fourth treatment the patient received, based on dates of treatment received.

†The total numbers in this column is greater than 887, as some tumours may have had the same treatment type more than once, e.g. more than one surgery, or type of chemotherapy.

‡Where numbers are <10, information is grouped in more than one category, to protect patient confidentiality.

Surgery remains the most common form of first (645/887; 73%) and all treatments (668/887; 75%), with three-quarters of cancer patients in Barbados receiving this form of treatment at some point. After surgery, the most common types of treatment in Barbados for cancer are hormone therapy and chemotherapy, together comprising about 20% of first, and about 45% of all treatments. Other types of treatment together comprise less than 15% of first, and about 40% of all treatments, with radiotherapy rarely (2% of the time) being given as a first treatment but more commonly later (13% of all treatments are radiotherapy; Table 4). This is possibly because of the types of cancers which are most common in Barbados, which are prostate, NMSC and breast cancers. The main reason why a patient in Barbados did not have treatment, which accounts for a little over one-third of all patients not receiving treatment, is because of the death of the patient before the start of treatment (Table 5). Out of all 1117 patients diagnosed in 2008, treatment was only refused by 19 (less than 2%).

Table 5. Reasons provided for lack of tumour treatment (N=130), Barbados, 2008

Reason given	Number of tumours	%
Died before treatment	46	35.4
Unknown reason/missing data	21	16.1
Refused treatment	19	14.6
Symptomatic treatment	18	13.9
Defaulted from care	18	13.9
Watchful waiting/postponed treatment	8	6.1

An important measure of the standard for cancer treatment is the proportion of patients who received their first treatment within 4 months of diagnosis. For Barbados in 2008, for the 782 (70%) tumours for which data on date of first treatment were available, 706 (90%) were initially treated within the first 4 months of diagnosis. As removal of an NMSC is a procedure which can be done in a physician's office (and may be done on the same day that the patient first presents with a lesion), this estimate was re-calculated excluding NMSC patients; the proportion of all cancers excluding NMSCs initially treated within 4 months in Barbados in 2008 was 86%

(424/492). Table 6 shows the proportion of tumours diagnosed in key sites which were treated within 4 months of diagnosis. Although many of these estimates appear very high (seven out of the nine shown are over 85%), caution should be taken with their interpretation, as some only represent between one-quarter and one-third of tumours diagnosed in that site (e.g. stomach, blood and respiratory tumours). Further, for at least one-quarter of all tumours, there were simply no data available on date of first treatment. In addition, information on the proportion of tumours being treated within 4 months needs to be considered together with mortality/survival, as if the rate of initial treatment is good and there is also low mortality (or high survival), this implies that the tumours are being treated not only in a timely manner but appropriately, and patients are presenting in adequate time for treatment to be effective. Rapid treatment with low survival rates could mean that either patients are not presenting in time, or that treatment is ineffective or inadequate, or a combination of these.

Table 6. Proportion of tumours diagnosed in Barbados in 2008 for which initial treatment was received within 4 months of diagnosis (N=782)

Site	Total number of tumours	Total number first treated within 4 months	Percentage
All sites combined	**782**	**706**	**90**
Blood and bone marrow	10	10	100
NMSC*	290	282	97
Breast	119	112	94
Colorectal	94	87	93
All other sites combined	62	56	90
Stomach	9	8	89
Cervix and uterus	60	50	83
Respiratory and intra-thoracic	9	7	78
Prostate	129	94	73

*NMSC: Non-melanoma skin cancer.

Note: Numbers with information on first treatment date are very low for blood and bone marrow cancers (representing only about one-quarter of all tumours with this site), stomach cancers (about one-third) and respiratory cancer sites (about one-quarter).

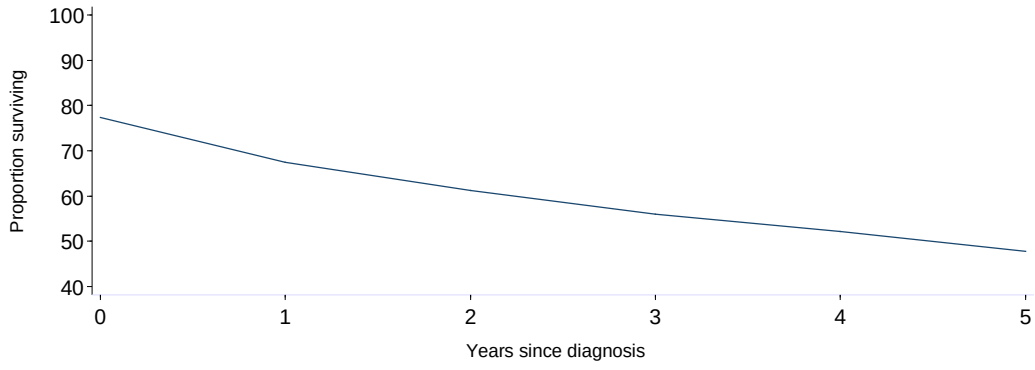
3. Survival

Between 01 January and 31 December 2008, 1117 patients were diagnosed with cancer in Barbados, of whom 252 died that same year (23%; Table 7). By 5 years from diagnosis (i.e. up to 31 December 2013), a total of 498 of all cancer patients diagnosed in 2008 had died, for a 5-year survival rate of 48% (Fig. 2; Table 8). The median time to death for patients who had died by this time was 165 days, or about five-and-a-half months.

Table 7. Number and percentage of deaths from cancer for patients diagnosed in 2008, and survival rate by year, Barbados (N=1117)

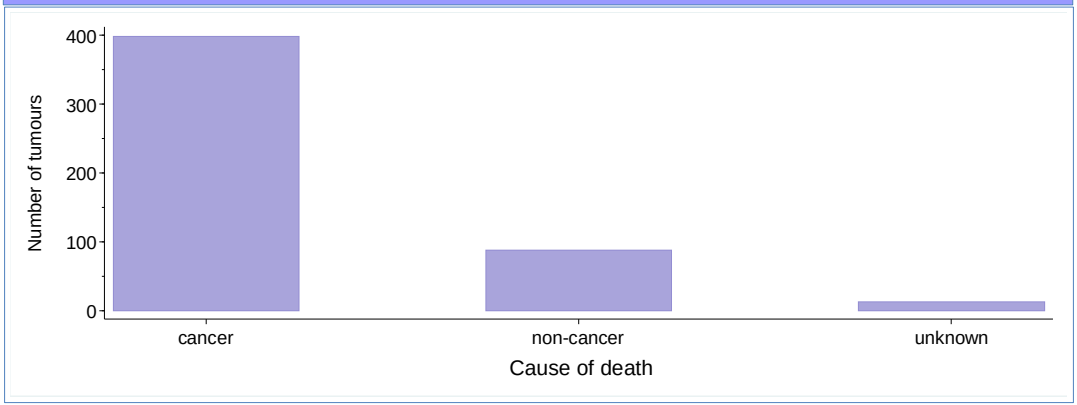
Year	Number of deaths	% dying in each year	Cumulative survival rate (%)
2008	252	22.6	77.4
2009	107	13.0	67.4
2010	59	9.1	61.3
2011	42	8.6	56.0
2012	21	6.8	52.2
2013	17	8.4	47.8

Figure 2. Survival curve for 1117 cancer patients diagnosed in 2008 up to 31 December 2013, Barbados



The vast majority (397 deaths; 80%) of the 498 cancer patients diagnosed in 2008 who died by the end of 2013, died from their cancer (Fig. 3). Fewer than 20% of deaths (88; 18%) were from causes other than cancer, and only 3% (13 patients) died from unknown causes.

Figure 3. Cause of death for 497 cancer patients diagnosed in 2008 who had died by 31 December 2013, Barbados

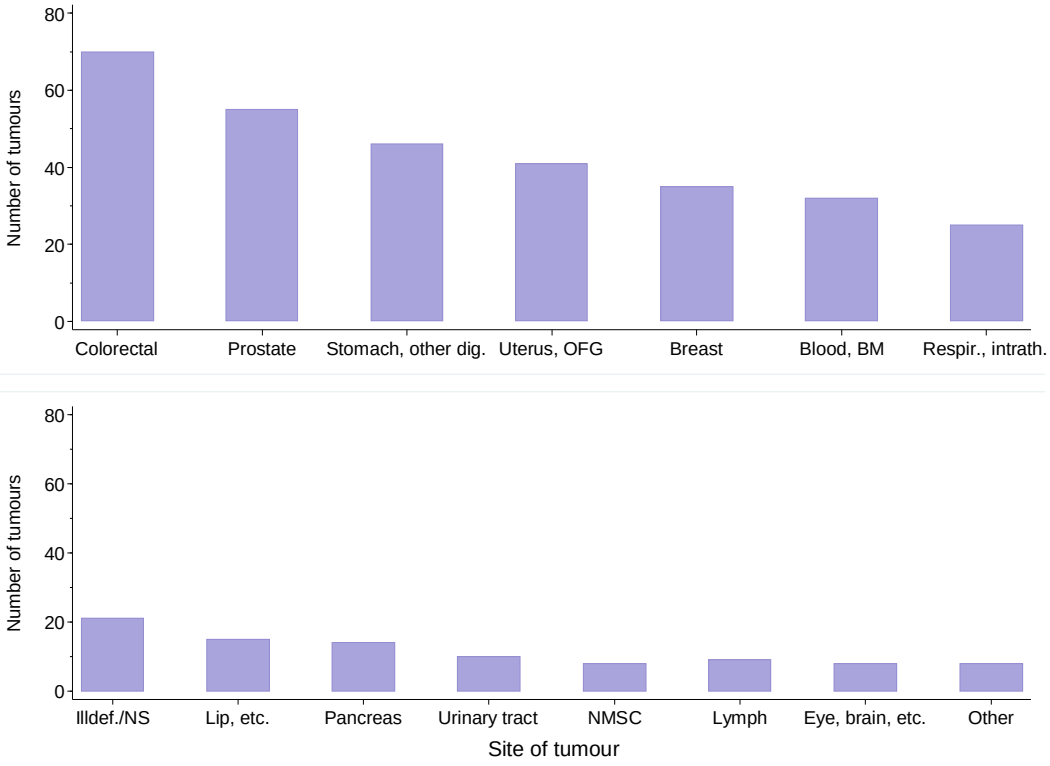


Of the 397 cancer patients diagnosed in 2008 who died from their cancer by the end of 2013, those causing the most cancer deaths were the gastro-intestinal (GI) forms of cancer, responsible for almost one-third (29%) of all cancer deaths (70 colorectal deaths, 25 deaths from stomach cancer and 21 from other digestive tumours; Fig. 4). About one-fifth (19%; 76) of cancer deaths were from female-related tumours (breast, uterus, cervix and other female genital organs), while 14% (55) were from prostate cancer. Overall, almost two-thirds of all cancer deaths (62%; 247) within 5 years of diagnosis were caused by tumours in these three general areas: GI tract, breast and female genital, and prostate; in that order.

As well as causing the most cancer deaths, cancers in these three general areas had poor prognoses, measured by an estimate of the cumulative 5-year survival rate. This was approximately 50% for each of the female and male genital sites, and particularly poor for colorectal cancer, with a 5-year survival of 31% (Table 8). The survival rate for stomach cancer was less than half this, at only 13%. Other poor survival rates were observed for blood and bone marrow cancers (16%) and respiratory cancers (12%). Pancreatic cancer is known for its very poor survival; in Barbados by the end of 1 year all 15 patients (100%) who had been diagnosed with

this cancer in 2008 had died. On the other end of the spectrum, 5-year survival for NMSC was 86% and for mesothelial cancer was 100% (<10 patients; data not shown).

Figure 4. Site of cancer for 398 fatal tumours diagnosed in 2008 which caused death within 5 years, Barbados



Note: "Stomach, other dig." = stomach and other digestive organs; "Uterus, OFG" = uterus and other female genital organs; "Blood, BM" = blood and bone marrow; "Respir., intrath." = respiratory and intrathoracic; "Illdef./NS" = ill-defined or unspecified; "Lip, etc." = lip, oral cavity and pharynx; "NMSC" = non-melanoma skin cancer; "Eye, brain, etc." = eye, brain and other central nervous system; "Other" = all other sites combined.

Table 8. Five-year survival from cancer for patients diagnosed in 2008, for main sites (diagnosed in 85% of patients), Barbados (N=946)			
Site	**Total number of patients**	**Total number of deaths**	**5-year survival rate (%)**
All sites combined	**1117**	**498**	**47.8**
NMSC*	228	24	85.7
Cervix and uterus	93	35	51.0
Prostate	208	77	49.5
Breast	142	45	47.4
Colorectal	146	87	32.9
Blood and bone marrow	42	33	15.8
Stomach	32	27	13.4
Respiratory and intra-thoracic	40	35	11.8
Pancreas	15	15	0.0

*NMSC: Non-melanoma skin cancer.

4. Mortality

Mortality is the number of deaths from cancer in a given year (regardless of the year of diagnosis), divided by the population number and then multiplied by 100,000 to provide an annual rate. As this report covers BNR-Cancer data from the first year (2008) of data collection only, mortality estimates can only be made from data collected from the national civil register. The information in this section therefore contains estimates calculated using non-registry data.

National civil register data show that there were 489 deaths from cancer in Barbados in 2008; 228 (47%) in women and 261 (53%) in men. The highest number of these deaths, representing one-fifth of all deaths from cancer in Barbados in 2008, was for prostate cancer (100; 20%), followed by colorectal cancer (66; 14%) and breast cancer (49 deaths; 10%).

The age-standardised mortality rate (ASMR; WHO world population) per 100,000 population for all cancer sites in Barbados in 2008 was 114.3 (Table 9).

Table 9. Number and percentage of the top 10 cancer sites, and age-standardised mortality rate per 100,000 population (ASMR) with 95% confidence intervals (95%CI), Barbados, 2008 (N=424; 87% of all tumours)

Site	Number of tumours	% of all tumours	ASMR	(95%CI)
All	**489**	**100**	**114.3**	**(104.0–125.5)**
Prostate	100	20.4	49.5	(40.1–60.6)
Breast	49	10.0	23.1	(16.8–31.2)
Colorectal	66	13.5	16.0	(12.3–20.5)
Uterus and cervix	29	5.9	14.0	(9.2–20.6)
Stomach and other digestive	55	11.2	11.8	(8.8–15.7)
Other female genital	24	4.9	11.1	(7.0–16.9)
Blood and bone marrow	37	7.6	8.4	(5.9–11.9)
Respiratory and intra-thoracic	29	5.9	6.9	(4.6–10.1)
Pancreas	17	3.5	4.2	(2.4–6.8)
Unknown primary site	16	3.3	4.1	(2.2–7.0)

**Note*: the remaining 65 tumours were distributed among the following nine sites, each with <15 tumours: lip, oral cavity and pharynx; bone; NMSC; mesothelial; male genital; urinary tract; eye, brain, other CNS; thyroid and other endocrine glands, lymph and other/ill-defined.

The highest ASMR in Barbados in 2008 was seen for prostate cancer, followed by breast and colorectal cancers. Like the ASIR, the ASMR for prostate was significantly higher than that for all other cancer sites.

Screening is available for both prostate and colorectal cancer in Barbados. Although it may be expensive for the latter, this is an area where improvements (increases in PSA and colorectal screening) could lead to improvements in outcomes. Research into the different cancer treatments available for different types of cancer in Barbados, and the uptake of treatment by patients, is urgently needed to fully understand the reasons for the poor outcomes being experienced.

5. Appendices: Appendix 1. Definitions and references

1. Statistics

*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 popu-lation. 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.

2. Cancer

Cancer is caused by both external factors (tobacco, chemicals, radiation, and infectious organisms) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism), and its uncontrolled spread can lead to death. These causal factors may act together or in sequence to initiate or promote carcinogenesis (i.e. the development of cancer), which requires multiple steps that occur over many years. Cancer is treated with:

- Surgery
- chemotherapy
- radiotherapy
- hormonal therapy
- immunotherapy

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Appendix 2: Members of the BNR-Cancer Collaborative Working Group, the BNR Professional Advisory Board and the BNR Technical Advisory Group

The Collaborative Working Group (2010–2014)

Name	Affiliation
Tracey Blackman	Data Manager, BNR
Professor Patsy Prussia	Clinical Director, BNR-Cancer
Dr Lynda Williams	Registry Consultant, BNR-Cancer
Professor Ian Hambleton	Statistician, CDRC
Dr Suzanne Smith Connell	Radiation Oncologist, QEH
Ms Rhea Harewood	Registrar, BNR-Cancer
Ms Jacqueline Campbell	Senior Data Abstractor, BNR-Cancer
Ms Angie Rose	BNR Director

The Professional Advisory Board of the BNR (2012-2015)

Prof. Trevor Hassell (Chair)	Chairman of the National Commission for Chronic NCDs
Dr Tomo Kanda	Specialist Advisor on NCDs, PAHO/WHO
Dr Joy St John	Chief Medical Officer, MoH
Dr Kenneth George	Senior Medical Officer of Health, MoH
Dr Dexter James	CEO of the QEH
Dr Richard Ishmael	Consultant cardiologist, QEH
Dr RK Shenoy	Consultant radiotherapist, 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
Prof. Anselm Hennis	Director, CDRC
Ms Angela Rose	Director, BNR (2009–2015); Head, NCD Surveillance, CDRC
Ms Tracey Blackman	Data Manager, BNR
Mrs Tanya Martelly	Registrar, BNR (2012–2015); Director, BNR

The Technical Advisory Committee of the BNR (2011-2013)

Name	Affiliation
Dr Michael Campbell (Chair)	Chairman, Ethics Committee, QEH
Dr Euclid Morris	Lecturer – Faculty of Medical Sciences
Mrs Noreen Merritt	President, Diabetes Association of Barbados
Ms Hyacinth Grimes	President, Myeloma, Lymphoma & Leukaemia Foundation of Barbados
Dr Stephen Moe	President, Heart & Stroke Foundation of Barbados
Mr Aubrey Blackett	President, Cancer Support Services
Ms Yvonne Lewis	Vice President, Cancer Support Services
Dr Dorothy Cooke-Johnson	Honorary Secretary, Barbados Cancer Society
Ms Harriet Brathwaite	Corporate Communication Specialist, Sagicor
Dr Kenneth George	Senior Medical Officer of Health, MoH
Mr Mitchell Clarke	Chief Nursing Officer, MoH
Ms Louise Bobb	DSS (Ag), QEH
Dr RK Shenoy	Consultant Radiotherapist, QEH
Prof. David Corbin	Consultant Neurologist, QEH; Clinical Director, BNR–Stroke
Dr Rudolph Delice	Consultant, QEH; Clinical Director, BNR–Heart
Prof. Patsy Prussia	Honorary Consultant Pathologist, QEH; Clinical Director, BNR–Cancer
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