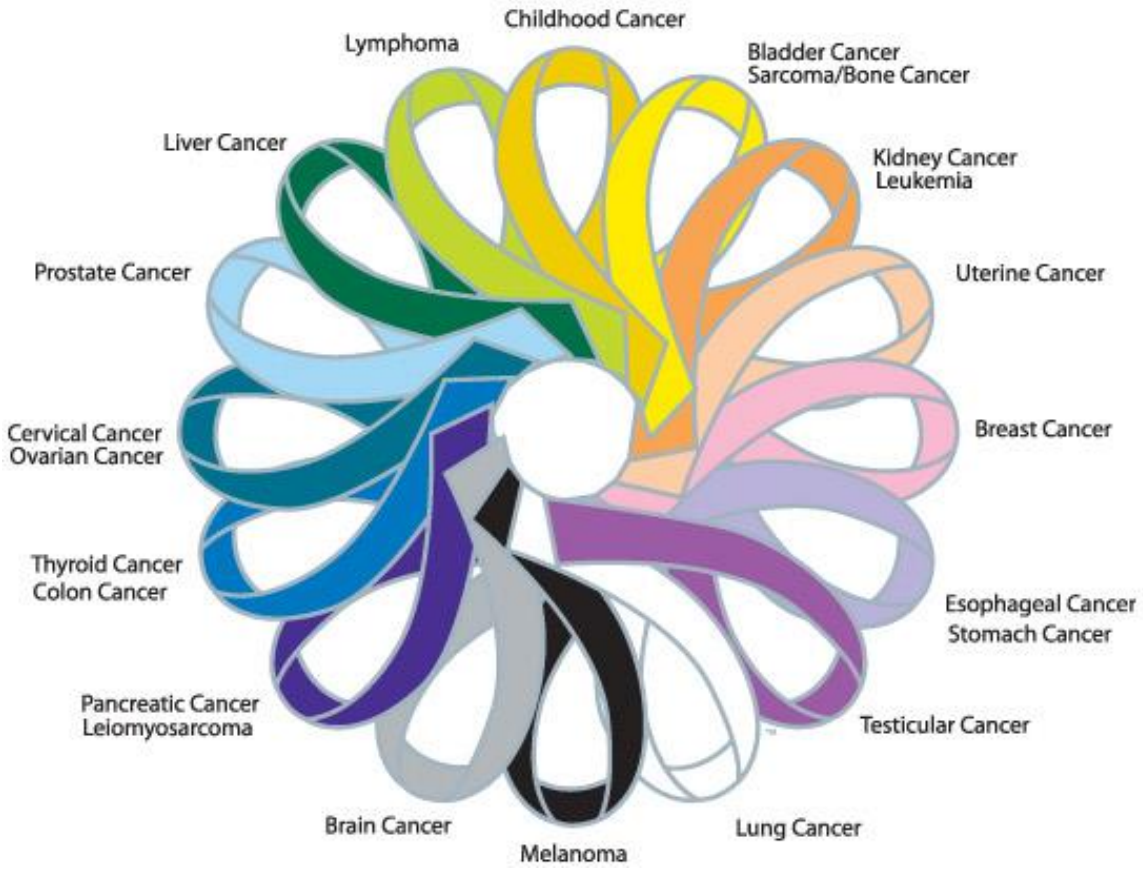
Barbados National Registry

Cancer in Barbados 2013:

Annual Report of the BNR-Cancer



Published and Printed by:

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This report should be cited as:

Rose AMC, Campbell JM, Forde SA, Hambleton I, Greaves N, Prussia P. Cancer in Barbados 2013: Annual report of the BNR-Cancer. The George Alleyne Chronic Disease Research Centre, The University of the West Indies, St Michael, Barbados.

Acknowledgements

This report was prepared by the Barbados National Registry for Chronic Non-communicable Disease (the BNR), headquartered at the George Alleyne Chronic Disease Research Centre (GA-CDRC), The University of the West Indies. The BNR is a Ministry of Health initiative, providing surveillance of the three principal causes of death among Barbadians: stroke, heart attack and cancer. The National Chronic Non-communicable Disease Commission provides oversight of the BNR.

We gratefully acknowledge all patients with cancer and their families who contributed to the BNR-Cancer. This notification process was made possible by the physicians, nursing staff, administrative staff and ancillary personnel of the Queen Elizabeth Hospital, BayView Hospital, parish polyclinics, geriatric and district hospitals, as well as private physicians and diagnostic establishments across the island. Additional thanks and gratitude are extended to all QEH staff within the death records, medical records, laboratory, and haematology departments and the Clara Brathwaite Centre for Oncology and Nuclear Medicine. Their essential collaboration helps to bring ongoing improvements in cancer surveillance.

We thank the members of our Collaborative Working Group for their feedback and direction throughout the operation of the BNR-Cancer. We also gratefully acknowledge the International Agency for Research on Cancer for their continued support in the areas of on-site training, online support and availability of cancer registration tools and software. Finally, we sincerely thank Mr Morten Ervik for his guidance and technical support, particularly with regard to CanReg5 software queries and troubleshooting.

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Special thanks

Prof. Trevor Hassell, Chairman, National Chronic Non-communicable Disease Commission

Staff in various departments of the Queen Elizabeth Hospital:

Radiotherapy	*Pathology*	*Haematology*	*Death Records*
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The Barbados Cancer Society Breast Screening Programme
All nursing staff and doctors who faithfully notify

Medical professionals in the private sector:

Physicians		*Surgeons*	
Dr Donn Greaves	Dr RK Shenoy	Mr Selwyn Ferdinand	Mr Haresh Thani
Dr Jeetu Nebhnani	Dr Theresa Laurent	Mr Ian Lewis	Mr Christopher Warner
Dr Barlow Lynch	Dr Shirley Jhagroo	Mr V Clarke	Dr J Ramesh
Dr S Smith-Connell	Dr Judy Ward	Mr Trevor Shepherd	Mr Jerry Emtage
And many others		Dr F Rampersaud	

Contents

Executive Summary

This is the second complete year for comprehensive incidence and mortality data on cancers of all sites nationwide in Barbados (see Methods section for full case definition of BNR-reportable tumours). In 2013, 846 tumours diagnosed among 831 persons in Barbados were registered with the BNR, for an incidence rate per 100,000 age-standardised (ASIR) to the WHO world population of 218.2 (95% CI 203.4–233.9). The top cancer sites were prostate (ASIR 98.7; 95% CI 84.4–114.8) and breast (62.9; 52.1–75.4).

For most tumours (581; 69%), treatment information was available, and at least one form of treatment was received for 458 (79%) of these. The main initial treatment received (280; 61%) was surgery, followed by chemotherapy (73; 16%). Of the 123 (21%) untreated tumours, the main reason for lack of treatment was death before treatment could start (67; 55%). Other reasons included symptomatic treatment (21; 17%), a possible marker of late diagnosis, and treatment refusal (14; 11%).

Almost one-third (244; 29%) of all persons diagnosed with cancer in 2013 had died by the end of that same year; 347 (42%) within the first 2 years of diagnosis. Median survival was 50 days from initial diagnosis. Most of these deaths (371; 97%) were from cancer and of these, 275 (74%) were caused by tumours of the gastrointestinal (GI) tract, breast and female genitalia, blood and lymph, and prostate. Three-year survival rates were about 60% for prostate cancer, but poorer (<50%) for breast and other female genital sites, and 25–30% for GI and lymphoid/blood cancers. The lowest survival was observed for pancreatic cancer (only 10% survived to 1 year) while, on the other end of the spectrum, 3-year survival for the rare (just 12 patients) thyroid cancer 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 2013 (and not all of those diagnosed in that year would have died from cancer in 2013). There were 577 deaths from cancer in Barbados in 2013, for an ASMR of 135.6 (124.4–147.7). Just

over half (313; 54%) of all cancer deaths in Barbados in 2013 were from four sites: prostate (108 deaths; 19%), colon (70; 12%), blood and lymph (60; 10%) and breast (59; 10%). The highest ASMR was for prostate cancer (54.6; 44.6–66.3), twice that for the next highest, breast cancer, at 26.5 (19.8–34.9) and more than three times that for the third highest, blood and lymph cancer, at 16.0 (12.0–20.8).

Table ES1. Summary statistics for the BNR-Cancer, 2013

	Cancers (all)	Cancer (in-situ*)	Cancers (malignant)
Population†	277 821	277 821	277 821
Reporting obligations			
No. registrations (tumours)	846	9	837
(% of entire population)	(0.31%)	(0.003%)	(0.40%)
No. registrations (patients)	831	9	822
No. deaths by end 2013	238	0	238
(% of patients registered)	(28.6%)	(0%)	(29.0%)
No. registered by death certificate only	65	0	65
(% of patients registered)	(7.8%)	(0%)	(7.9%)
3-year survival	40.3%	-	-

**Note*: *in situ* behaviour registered for neoplasms of the cervix only.

†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 (Accessed 05 Dec 2017)

Key successes and strategic objectives

Key successes

One of the major successes for the BNR-Cancer has been the start and completion of the second year of data – 2013, with a small reduction in the time to report; from 4 years to less than 3 years. Other achievements since our 2008 report include:

- Participating in Division of Cancer Control and Prevention at the US Centers for Disease Control (CDC) CAT pilot study and attendance at the IACR 2015 conference in Mumbai, India
- In addition to the BNR's participation in the newly formed GA-CDRC/Public Health Research Group, the creation of a BNR Research Group headed Dr Angie Rose, meeting bi-monthly to discuss how the BNR data could be used to impact policy through research
- The completion of a successful evaluation by Public Health England as part of the European Centre for Disease Prevention and Control (ECDC) European Programme for Intervention Epidemiology Training (EPIET)
- Change in the case definition to exclude non-melanoma skin cancers (NMSCs) as well as in situ or uncertain tumours unless of the brain
- An evaluation by the IARC Caribbean Hub, under the management of Caribbean Public Health Agency (CARPHA) and in conjunction with GICR/NAACCR/NCI-SEER which led to the ability to participate in annual NAACCR Webinar training
- The award of a fellowship to the NAACCR conference and the ability to participate in the creation of the first stages of a 'Standard Operating Procedures (SOP) for Cancer Registries in the Caribbean' and supply a poster for review
- Implementation of some of the recommendations from the above reports and the move to integrating CanREG 5 and Access databases into a more streamlined data collection tool

- Hosting of three continuing medical education accredited cancer seminars. The management of cancers of the female genital system (2015) and the management of lymph and blood related cancers (2016) and cancer management best practices (2017)
- Increasing requests for the use of BNR-Cancer data locally and regionally; primarily for presentations and research projects
- The set-up of a cloud-based server as a precursor the creation of secure, web-based electronic notification system for private physicians
- Presentations at both local and regional conferences and meetings on a variety of topics; for example:
    - "Challenges in Cancer Registration: The Barbados Experience". CAOH Conference, Barbados (April 2015)
    - "Trends in stroke and myocardial infarction in Barbados 2009-2013". Caribbean Public Health Agency (CARPHA) conference, Grenada (June 2015)
    - "Cost Assessment Tool (CAT) Pilot Study: Implications from the Barbados National Registry". 37th Annual IACR Meeting, Mumbai, India (October 2015)
    - "Data Quality in A Registry Setting: The Barbados experience". BAR-BHIMA Conference, Barbados (November 2015)
    - "National NCD Commission, BNR 2009-2014: an update". Barbados (February 2016)
    - "Integration into the Health Information System – Why we should work together". BAR-BHIMA Conference, Barbados (November 2017)

Key challenges

The key challenge for the BNR remains timeliness. 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.

As noted in the previous report, part of the notification challenge is due to the 1976 Pathology Act, which restricts release of confidential information from laboratories. This makes it difficult

to obtain information on tumours from private laboratories. However, through relationships with the private labs, we are seeing improvement in this area. The major difficulty in the last registry year's data collection has been obtaining commitment from some private physicians to provide data; together with the limited promotion and publicity of the BNR-Cancer, these have limited full population coverage by 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 of the BNR-Cancer 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 example, for 2013 data the BNR-Cancer team started collecting the data retrospectively from 2015. Over 20,000 records (entries in laboratory books or other minimal-information data repositories) were inspected to provide information on tumours which were likely to have been first diagnosed in 2013. Once the tumour was determined to have been diagnosed in 2013, data were abstracted onto an electronic form. This lengthy, largely paper-based process has taken just under 3 years for 1 year of data collection.

Moving forward: principal objectives for the BNR-Cancer, 2018–2019

- To continue to improve reporting timeliness through the following changes
    - Gaining access to newly rolled-out public health EMR- MedData to improve the collection of data and reduce the challenges of space and accommodation at the Queen Elizabeth Hospital
    - Continuing to streamline the data collection process through consolidation or consideration of new software
    - Completing the creation of a secure, web-based electronic notification system for private physicians

    - Revamping and redistributing a simplified but more thorough case report form (CRF)
    - Continuing to work closely with the Ministry of Health (MoH) to change the notifiable diseases act and to improve access to private physician information through targeted MoH support
- Hosting and improving the profile for BNR seminars on the management of cancers

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 2015 for 2013 (see "Key challenges" in previous section for more information on this lengthy process).

[1] Global Cancer Facts & Figures, 2nd Edition; Acspc-027766.pdf Accessed 08 October 2014. http://www.cancer.org/acs/groups/content/@epidemiologysurveilance/documents/document/acspc-027766.pdf

Data were collected on all malignant neoplasms diagnosed in 2013 with a behaviour code of 3, according to the International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3), as well as in situ neoplasms of the cervix only (CIN 3). 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.

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

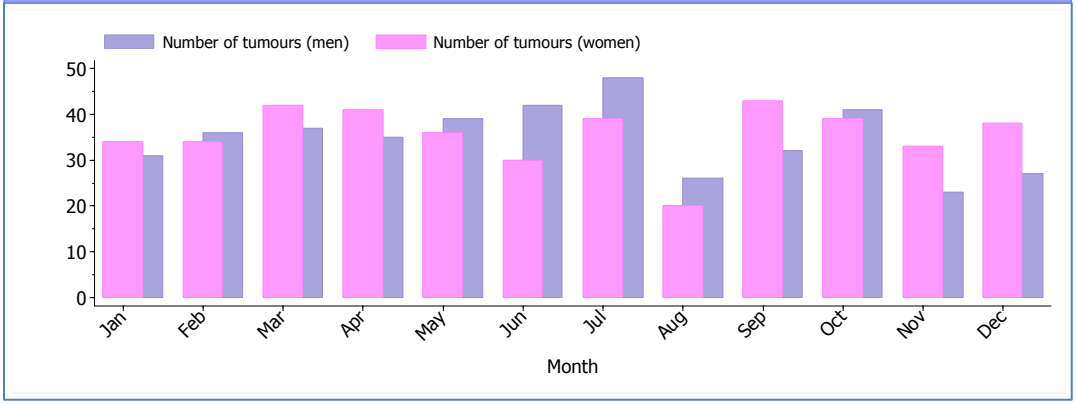
Cancer in Barbados, 2013

1. Incidence

A total of 831 persons (419 men; 412 women) were diagnosed with 846 tumours in Barbados in 2013. Of the 846 tumours, 837 were malignant and 9 were in situ. Fifteen patients (2%) had multiple tumours (ranging from two to six).

Figure 1 shows the number of tumours diagnosed every month in Barbados in 2013 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 218 (95% CI 203.4–233.9).

Figure 1. Number of tumours in male and female cancer patients by month, Barbados, 2013 (N=846)



Approximately half of all tumours diagnosed (429; 51%) occurred in men, for an ASIR of 246.2 (223.3–270.9), marginally statistically significantly higher than ASIR for women (199.7; 180.1–220.9).

Invasive cancers represented 99% (837/846) of all registered tumours, for an ASIR of 219.1 overall (95%CI 203.7–235.4). Half of these (408; 49%) were in women, for an ASIR of 193.9 (174.7–214.7), statistically significantly lower than the ASIR for malignant cancers in men (246.2; 223.3–270.9).

The leading site overall in number of cases was prostate (172; 20%). The second leading site was breast (132 cases; 16%). The top five sites for men and women (comprising 70% of all tumours for each gender), and the top 10 sites overall (88% 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. The leading cancers by ASIR in Barbados in 2013 were prostate and breast cancers (Table 2), both significantly higher than ASIR for any other sites.

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, 2013 (N=603)

Sex	Site	Number of tumours	% of all tumours	ASIR	95% CI
Both		**846**	**100.0**	**218.2**	**203.4–233.9**
Women		**417**	**49.3**	**193.9**	**174.7–214.8**
	Breast	129	30.9	62.9	52.1–75.4
	Colon	52	12.5	26.4	20.0–34.4
	Cervix	43	10.3	22.8	16.3–31.1
	Uterus	35	8.4	16.8	11.7–23.6
	Blood & lymph	32	7.8	17.6	11.7–25.5
Men		**429**	**50.7**	**246.2**	**223.3–270.9**
	Prostate	172	40.1	98.7	84.4–114.8
	Colon	55	12.8	35.2	27.0–45.3
	Blood & lymph	36	8.4	21.2	14.8–29.6
	Rectum	30	7.0	17.4	11.7–25.0
	Respiratory	26	6.1	15.0	9.8–22.1

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, 2013 (N=723; 85% of all tumours)				
Site	**Number of tumours**	**% of all tumours**	**ASIR**	**(95%CI)**
All	**846**	**100**	**218.2**	**203.4–233.9**
Prostate	172	20.3	98.7	84.4–114.8
Breast	129	15.2	62.9	52.1–75.4
Colon	125	14.8	30.3	25.1–36.3
Cervix	43	5.1	22.8	16.3–31.1
Blood and bone marrow	68	8.0	19.0	14.6–24.3
Uterus	35	4.1	16.8	11.7–23.6
Rectum	55	6.5	13.8	10.3–18.1
Respiratory	34	4.0	8.9	6.1–12.5
Urinary tract	32	3.8	8.5	5.8–12.2
Other digestive	27	3.2	6.5	4.2–9.7

2. Treatment summary

Treatment information was available for 581/846 tumours (69%; Table 3). At least one form of treatment was received by 458 (79%) of the tumours for which there was available treatment information (Table 4). There were 103 (22%) tumours for which two forms of treatment were received, 38 (8%) received three and fewer than 10 (<2%) received four different types of treatment (data not shown). One hundred and twenty-three (15%) tumours were not treated, for the reasons provided in Table 5.

Table 3. Number and percentage of tumours diagnosed for which the patient received treatment, Barbados, 2013 (N=846)		
Treatment information	**Number of tumours**	**%**
Known to have had treatment	458	54.1
Unknown whether had treatment	265	31.3
Known to have not had treatment	123	14.5

Table 4. Number and percentage of each type of first and any treatment* given for tumours diagnosed in Barbados, 2013 (N=458)				
Treatment type	**Number of tumours (1st treatment)**	**%**	**Number of tumours (any treatment†)**	**%**
Surgery	280	61.1	294	64.2
Chemotherapy	73	15.9	170	37.1
Hormone therapy	45	9.8	82	17.9
Palliative care	32	7.0	35	7.6
Radiotherapy	20	2.3	69	15.1
Treated abroad, immune therapy or missing data‡	<10	<2.0	10	2.0

*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 458, 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 (280/458; 61%) and all treatments (294/458; 64%), with almost two-thirds 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 chemotherapy (16% of first, and about 37% of all treatments), followed by hormone therapy (10% of first, 18% of all) and palliative care (7% of first and 8% of all treatments). The latter is perhaps a reflection of the timing of initiation of palliative care, as these results suggest the use of palliative care as an end-of-life intervention as opposed to at one which starts at the point of

diagnosis. Radiotherapy was rarely (2% of the time) given as first treatment, more commonly being given later (15% of all treatments are radiotherapy; Table 4). This is possibly because of the types of cancers which are most common in Barbados (prostate and breast). The main reason why a patient in Barbados did not have treatment, which accounts for half of all patients not receiving treatment, is because of the death of the patient before the start of treatment (Table 5). The reason for persons dying before treatment is likely to be multi-factoral; however, this could also represent the interplay between complex or inefficient care pathways operating alongside a need for health education/ health promotion interventions which emphasise early detection and behaviour change in the timing of seeking care.

Out of all 458 patients diagnosed in 2013 for whom this information was available, treatment was only refused by 14 (3%).

Table 5. Reasons provided for lack of tumour treatment (N=123), Barbados, 2013

Reason given	Number of tumours	%
Died before treatment	67	54.5
Symptomatic treatment	21	17.1
Refused treatment	14	11.4
Defaulted from care	<10	<8.1
Watchful waiting/postponed treatment	<10	<8.1
Unknown reason/missing data	<10	<8.1

An important measure of the standard for cancer treatment is the time from diagnosis to first treatment. For Barbados in 2013, the median treatment delay for all tumours for which treatment was received was 42 days (range: 0–621 days). Table 6 shows the median delay to initial treatment for tumours diagnosed in key sites. Although for four (cervix, lip, respiratory and prostate) the delay appears large (>60 days), caution should be taken with their interpretation, as the number of tumours with information on first treatment date are very low for respiratory (representing only about 29% of all tumours with this site) and prostate (30%) cancers. In contrast, however, this information was available for 70% of cervical tumours and

78% of tumours of the lip, oral cavity and pharynx. The 4-month delay for cervical cancer treatment is particularly concerning.

For 12% of all treated tumours, there were simply no data available on date of first treatment. In addition, information on the median time to treatment needs to be considered together with mortality and survival, as if the time to initial treatment is short 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 patients are still not presenting in time, that treatment is ineffective or inadequate, or a combination of these.

Table 6. Median delay to initial treatment for tumours diagnosed in Barbados in 2013 for which treatment was received, by site (N=782)

Site	Total number of tumours	Median time to first treatment (days)	Range (days)
All sites combined	**403**	**50**	**1–621**
Cervix	30	122	5–330
Lip, oral cavity and pharynx	14	90	4–287
Respiratory and intra-thoracic	10	89	1–161
Prostate	52	75	2–385
Uterus	19	59	5–193
Breast	95	50	1–621
Blood and bone marrow	30	47	1–270
All other sites combined	40	41	1–392
Urinary tract	13	32	13–290
Colorectal	100	24	1–267

3. Survival

Between 01 January and 31 December 2013, 831 patients were diagnosed with cancer in Barbados, of whom 238 died that same year (29%). Three years after diagnosis (i.e. up to 31 December 2016), almost half (381; 46%) of all cancer patients diagnosed in 2013 had died (see

survival estimates in Fig. 2). The median time to death for patients who had died by this time was 90 days, or 3 months. Survival was worse for men than women (Fig. 3).

Figure 2. Kaplan-Meier survival estimate for cancer patients diagnosed in 2013, Barbados

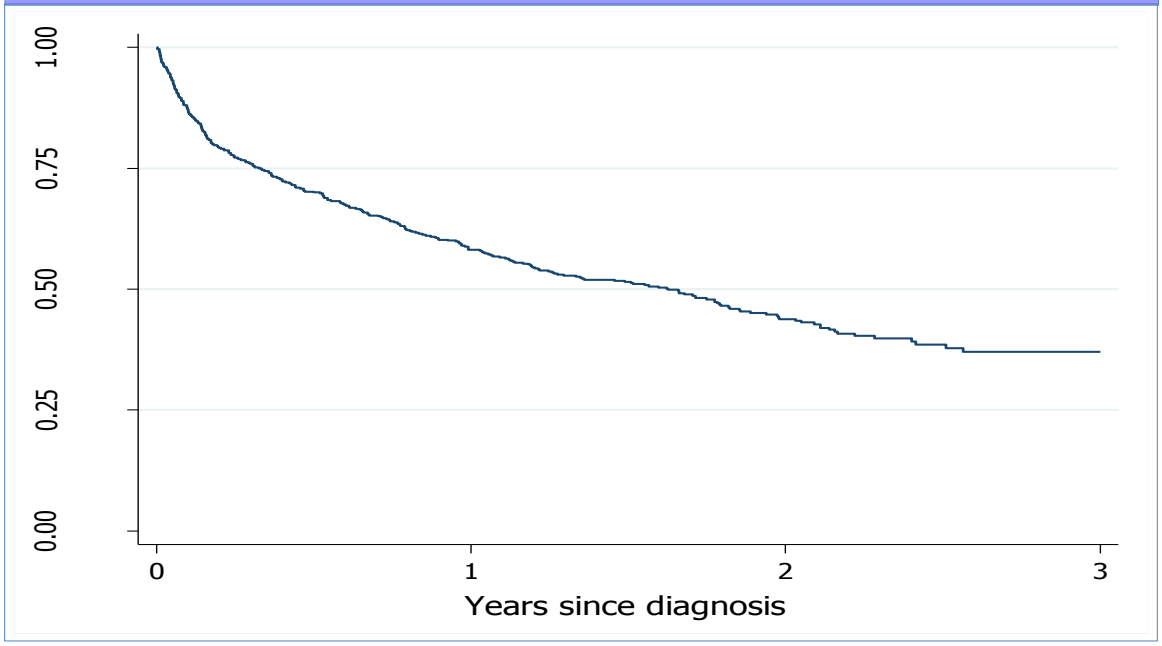
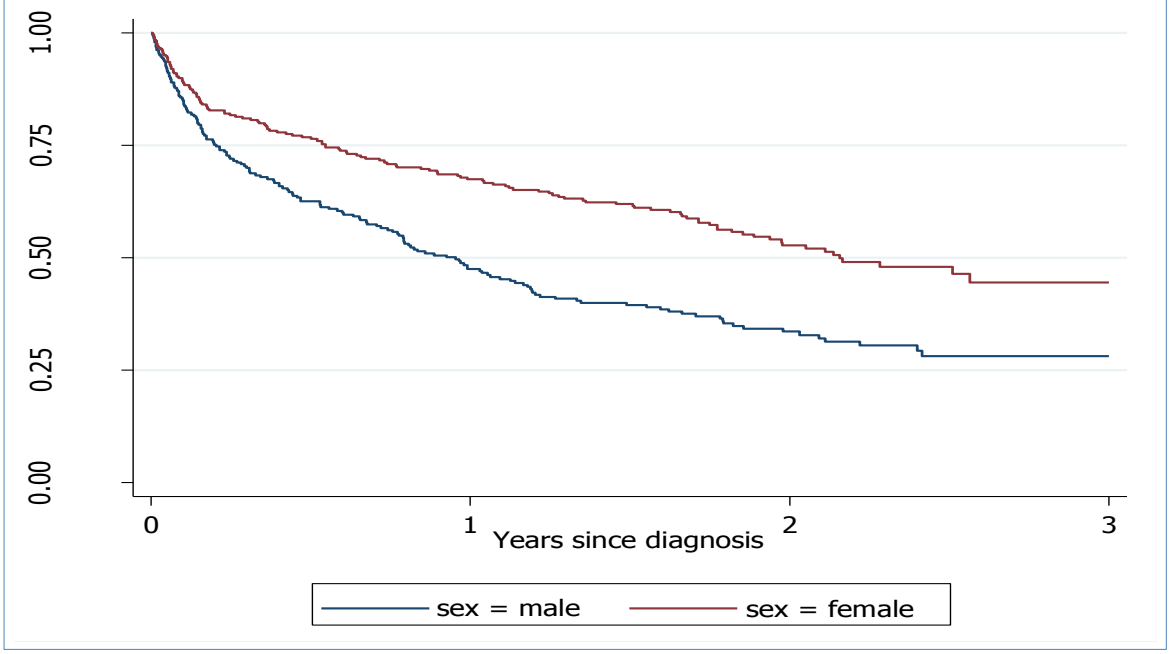
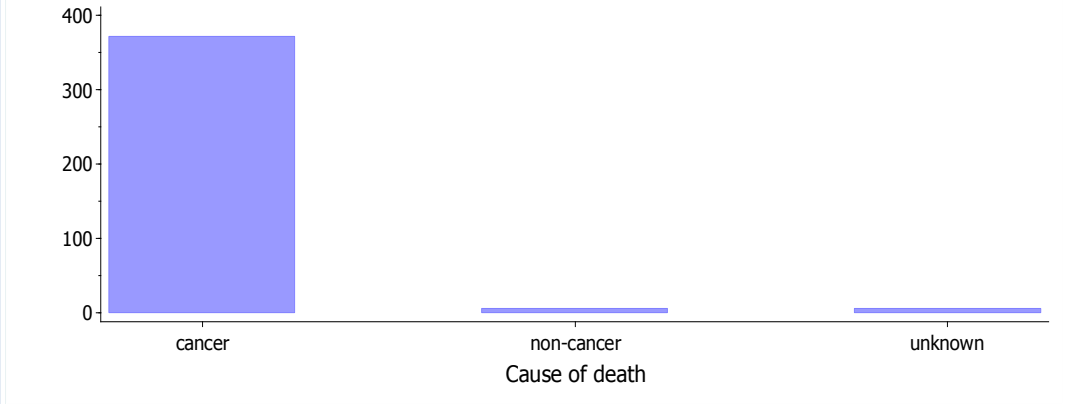


Figure 3. Kaplan-Meier survival estimate for cancer patients diagnosed in 2013, Barbados, by sex



The vast majority (371 deaths; 97%) of the 381 cancer patients diagnosed in 2013 who had died by the end of 2016, died from their cancer (Fig. 4).

Figure 4. Cause of death for 381 cancer patients diagnosed in 2013 who had died by 31 December 2016, Barbados



Of the 371 cancer patients diagnosed in 2013 who died from their cancer by the end of 2016, those causing the most cancer deaths were the gastro-intestinal (GI) forms of cancer, responsible for almost one-third (30%) of all cancer deaths (81 colorectal deaths, 12 deaths from stomach cancer and 23 from other digestive tumours; Fig. 5).

It should be noted that some stomach and digestive tract tumours classically present at more advanced stages with there being few symptoms that prompt patients to seek care. Hence high numbers of these cancers may speak to the need to address high risk factors such as *Helicobacter pylori* within the population. In addition, there is need to examine the availability of prevention and early detection/diagnostic facilities such as endoscopy in the context of cancer control interventions present on the island.

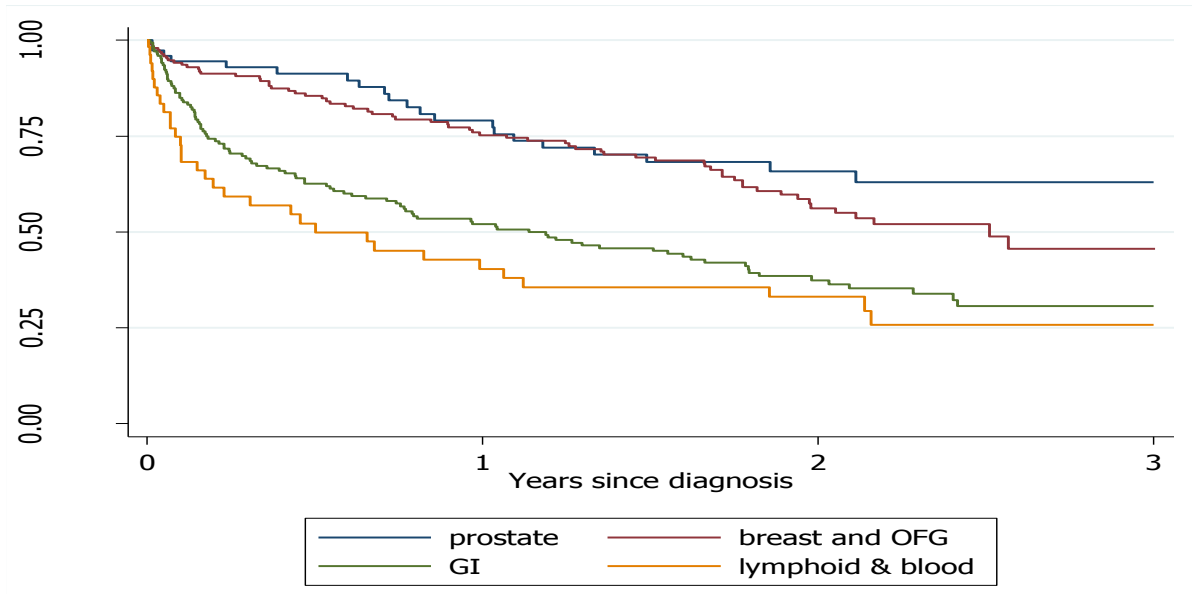
About one-fifth (21%; 79) of cancer deaths were from female-related tumours (uterus, cervix, breast, and other female genital organs), while about one-tenth (11%) were from lymphoid/blood (41) and prostate cancer (39). Overall, almost two-thirds of all cancer deaths (63%; 234) within 3 years of diagnosis were caused by tumours in these four general areas: GI tract, breast and female genital, lymphoid/blood, and prostate; in that order.

Figure 5. Site of cancer for 371 fatal tumours diagnosed in 2013 which caused death within 3 years, Barbados

Note: "Uterus, OFG" = uterus and other female genital organs; "Stomach+other GI" = stomach and other digestive organs; "Lymph/blood" = lymphoid and blood; "Respiratory" = respiratory and intrathoracic; "PSU (unk)" = primary site unknown (ill-defined or unspecified); "Head & neck" = lip, oral cavity and pharynx; "Other" = all other sites combined.

As well as causing the most cancer deaths, cancers in these four main areas had poor prognoses, measured by an estimate of the Kaplan-Meier 3-year survival rate. This was only over 50% for prostate cancer, and particularly poor for GI and lymphoid/blood cancers, each with a 3-year survival between 25 and 30% (Figure 6). Pancreatic cancer is known for its very poor survival; in Barbados by the end of 1 year 18/20 patients (90%) who had been diagnosed with this cancer in 2013 had died (data not shown). On the other end of the spectrum, 3-year survival was 100% for thyroid and >60% for mesothelial cancer (data not shown).

Figure 6. Three-year Kaplan-Meier survival rates from cancer for patients diagnosed in 2013, for four general sites (diagnosed in 85% of patients), Barbados (N=947)



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 second year (2013) 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 577 deaths from cancer in Barbados in 2013; 280 (49%) in women and 297 (51%) in men. The highest number of these deaths, representing one-fifth of all deaths from cancer in Barbados in 2013, was for prostate cancer (108; 19%), followed by colorectal cancer (70; 12%), lymphoid and blood (60; 10%) and breast cancer (59 deaths; 10%).

The age-standardised mortality rate (ASMR; WHO world population) per 100,000 population for all cancer sites in Barbados in 2013 was 135.6 (Table 7).

Table 7. 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, 2013 (N=524; 91% of all tumours)				
Site	**Number of tumours**	**% of all tumours**	**ASMR**	**(95%CI)**
All	**577**	**100**	**135.6**	**(124.4–147.7)**
Prostate	108	18.7	54.6	(44.6–66.3)
Breast	57	9.9	26.5	(19.8–34.9)
Colorectal	88	15.3	19.8	(15.7–24.7)
Blood and bone marrow	60	10.4	16.0	(12.0–20.8)
Cervix	30	5.2	13.1	(8.7–19.2)
Stomach and other digestive	49	8.5	11.1	(8.1–14.9)
Uterus	20	3.5	9.1	(5.5–14.5)
Unknown primary site	42	7.3	9.2	(6.6–12.8)
Respiratory and intra-thoracic	36	6.2	8.9	(6.2–12.5)
Pancreas	34	5.9	8.1	(5.5–11.5)

**Note*: the remaining 53 tumours were distributed among the following nine sites, each with <15 tumours: lip, oral cavity and pharynx; bone; 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 2013 was seen for prostate cancer, followed by breast and colorectal cancers. Like the ASIR, the ASMR for prostate and breast cancers were significantly higher than those for each of the 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

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 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.

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

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
Ms 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)

Name	Affiliation
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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Ms Tracey Blackman	Data Manager, BNR
Mrs Tanya Martelly	Registrar, BNR (2012–2015); Director, BNR