

Cancer Screening and Cancer Mortality in Nevis, West Indies

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ABSTRACT

Objective: Cancer screening is one approach that can reduce morbidity and mortality through early detection of pre-cancers; however anxiety, fear, and lack of information are important barriers to universal cancer screening in the Caribbean. Nevis is a small island located in the Eastern Caribbean. We report available data on screening prevalence and cancer mortality for four common cancers: cervical, breast, colon and prostate.

Methods: Demographic information, screening utilization (when available) and cancer mortality statistics were obtained from the Charlestown Health Clinic and the annual reports from the Ministry of Health. Moreover, physicians and key stakeholders were interviewed to assess current guidelines for cancer screening as well as to indicate areas of need.

Results: Cervical cancer screening is under-utilized in Nevis. Between 2001 and 2007, the overall prevalence of Pap testing fluctuated minutely (mean: 6.87%, range: 6.06 – 7.41%). Systematic screening for breast, colon, and prostate cancer is not routinely performed, thus utilization rates are not available. Cancer mortality varied slightly between 2002 and 2006; prostate cancer had the highest overall crude mortality rate (30.6 deaths/100 000 persons).

Physician interviews revealed that adherence to US and European cancer screening guidelines are inappropriate for their population of patients. Breast and prostate cancers are frequently diagnosed in these geographic areas before the age when cancer screening is currently recommended.

Conclusion: Cancer is perceived as an important health problem by physicians, key stakeholders and citizens, however cancer screening is under-utilized in Nevis. Future research should focus on generating screening guidelines that are relevant for this population, as well as methods to promote screening.

Pesquisaje de Cáncer y Mortalidad por Cáncer en Nevis, West Indies

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RESUMEN

Objetivo: El pesquisaje de cáncer es un método que puede reducir la morbilidad y la mortalidad mediante la detección precoz de pre-cánceres. Sin embargo, la ansiedad, el miedo, y la falta de información son barreras importantes que se erigen frente al pesquisaje universal del cáncer en el Caribe. Nevis es una pequeña isla situada en el Caribe Oriental. Reportamos datos disponibles sobre la prevalencia del pesquisaje y la mortalidad por cáncer en relación con cuatro tipos de cánceres comunes: el cervical, y el de mamas, colon y próstata.

Métodos: La información demográfica, la utilización de pesquisaje (de hallarse disponible) y las estadísticas sobre la mortalidad por cáncer, se obtuvieron de la Clínica de la Salud de Charlestown, y los reportes anuales del Ministerio de Salud. Además, los médicos y las partes interesadas claves, fueron entrevistados a fin de evaluar las guías actuales para el pesquisaje del cáncer así como para indicar las áreas de necesidad.

Resultados: El pesquisaje del cáncer cervical es subutilizado en Nevis. Entre 2001 y 2007, la prevalencia general de la prueba citológica tuvo una fluctuación mínima (promedio: 6.87%, rango: 6.06 – 7.41%). El pesquisaje sistemático del cáncer de mamas, colon, y próstata no se realiza como

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rutina, y por consiguiente no existen tasas de utilización disponibles. La mortalidad por cáncer varió ligeramente entre 2002 y 2006. El cáncer de próstata tuvo la tasa de mortalidad cruda general más alta (30.6 muertes/100 000 personas).

Las entrevistas médicas revelaron que las guías de pesquiasaje en USA y Europa son inapropiadas para la población de pacientes. Los cánceres de mamas y próstata son diagnosticados con frecuencia en estas áreas geográficas antes de la edad en que se recomienda el pesquiasaje actualmente.

Conclusión: *El cáncer es percibido como un importante problema de salud por los médicos, las partes interesadas claves, y los ciudadanos. No obstante, el pesquiasaje del cáncer es subutilizado en Nevis. Las investigaciones futuras deben centrarse en producir guías de pesquiasaje que sean pertinentes para esta población, así como en métodos de promover el pesquiasaje.*

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INTRODUCTION

Globally, there is a growing cancer burden with approximately 10 million newly diagnosed cases occurring annually and 6 million deaths ensuing. Statistics from the World Health Organization indicate that 70% of these cancer deaths occur in low and middle income countries (1). This persistent disparity in light of effective preventive and early detection measures, such as cancer screening, calls for action and research to be undertaken.

Cancer screening is one approach that can reduce morbidity and mortality through early detection of asymptomatic cancers and pre-cancerous lesions (2). Moreover, screening is a cost-effective intervention for many of the common cancers, especially when compared to treatment and palliative care. For example, the World Bank estimates that cervical cancer screening, performed every 5 years, costs about \$100 per disability-adjusted life-year (DALY) compared with \$2600 per DALY for cervical cancer treatment (3). Therefore, even a less optimal screening regimen is more beneficial than a cancer diagnosis in terms of costs and disability.

Cancer screening use varies in the Caribbean. For example, the Tobago Prostate Survey is an ongoing screening programme which has successfully screened more than half of the men in the target recruitment population in Tobago (4). This programme has enjoyed high recruitment rates due to the size of the island and the ease of disseminating information about the study. Conversely, Jamaica has a Ministry of Health endorsed Papanicolaou (Pap) screening programme that provides free examinations; interestingly, only 6.3% of Jamaican women aged 25–54 years underwent cervical cytology screening in 2005 despite the fact that this service is widely available (5). This low utilization rate may have occurred due to scant health education programmes as well as inconsistent provider recommendations (5). In general, differences in the utilization of screening services between islands are likely due to several factors, namely, diversity in health promotion programmes, provider recommendations based on national screening programmes, perception of disease risk and client embarrassment (5–7).

Additionally, islands with a strong research infrastructure have the means to proffer recommendations for national

screening guidelines. The Martinique Cancer Registry has recently documented a significant increase in the incidence of breast cancer (8). This change is not simply due to increased mammography use; research has shown that adoption of Western lifestyle habits and diet are likely contributors to this trend. Incorporating health education programmes with screening services could produce meaningful decreases in the incidence of breast cancer in Martinique.

Nevis is a small island located in the Eastern Caribbean. Although cancer is perceived as an important health problem on the island, published information on cancer screening utilization and cancer burden is not readily available, the exception being cervical cytology. Therefore, we characterized the island of Nevis by reporting available data on screening prevalence and cancer mortality for four common cancers: cervical, breast, colon and prostate. Information was also collected on physicians' recommendations concerning the frequency of testing and screening methods for various types of cancer through a physician administered questionnaire. This effort is preliminary to carrying out more in-depth studies that can serve to inform priorities for a national screening programme.

METHODS

This study had three main components. The first component related to the description of the demographics of the population living in Nevis, and of the number of persons who utilized cancer screening services. This was done in an effort to characterize the proportion of people in Nevis who undergo screening over time. The second component involved the collection of information on cancer mortality in order to crudely assess the burden of common cancers. Demographic and mortality data were obtained from the Nevis Ministry of Health and the Department of Finance and Statistics. Data on Pap test screening were obtained from the Charlestown Health Clinic which compiles screening information from the four centres in Nevis that perform Pap tests, namely Charlestown, Gingerland, Butlers and Combermere. The third part of the study involved the interview of physicians and key stakeholders, to assess the current guidelines for cancer screening on the island. An anonymous, self-report questionnaire was administered to physicians practising in the

private and public domain in order to assess their opinions and recommendations concerning cancer screening methods. Frequency of testing, screening method and patient recommendations were assessed by this questionnaire. There were nine physicians (five general practitioners, two gynaecologists and two surgeons) on the island of Nevis that could provide pertinent information for this study. Three of the five general practitioners returned the questionnaire.

This study was approved by the University of Pittsburgh Institutional Review Board. Standards for ethical conduct were maintained throughout the duration of the study.

RESULTS

Characteristics of the population of Nevis

Basic indicators of the Nevis population as reported from the Nevis Ministry of Health are presented in Table 1. Total

Table 1: Basic indicators of the Nevis population*

Category	2001	2002	2003	2004	2005
Total population estimate	11 108	11 108	11 108	11 108	11 108
Total live births	143	150	151	127	134
Birth rate per 1000	12.9	13.5	13.6	11.4	12.1
Total deaths	87	103	85	103	88
Death rate per 1000	7.8	9.3	7.6	9.3	7.9
Total deaths in children 1–4 years	0	2	0	0	0
Total maternal deaths	0	0	0	0	0

*Based on the 2001 Census

births and deaths were relatively stable over the five-year interval. Likewise, maternal deaths and childhood deaths have remained relatively constant during this time. The breakdown of gender-specific age groups from the 2001 Census is provided in Fig. 1. Although these data are only

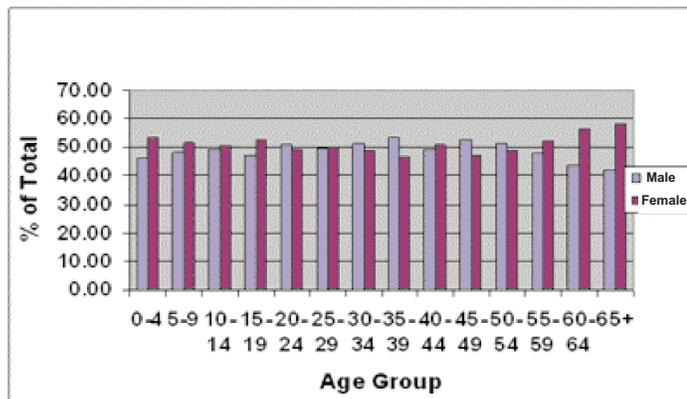


Fig. 1: Demographics of the Nevis population.

available for the year 2001, the crude rates of birth and death are relatively stable, allowing the application of these population data in subsequent years.

In terms of education and family income, data are only available at the Federation level for both St Kitts and Nevis. According to the Pan American Health Organization, the

highest education level attained by most residents is secondary school education (39.2% of all residents); approximately 5% of the population acquired a university education (9). Income levels vary considerably in St Kitts and Nevis; Fig. 2 provides the distribution of family income levels as last reported in 1994. The majority of the population (21.1%) had an annual income between US \$5600 and US \$9300 (9). The distribution of wealth in Nevis may have important

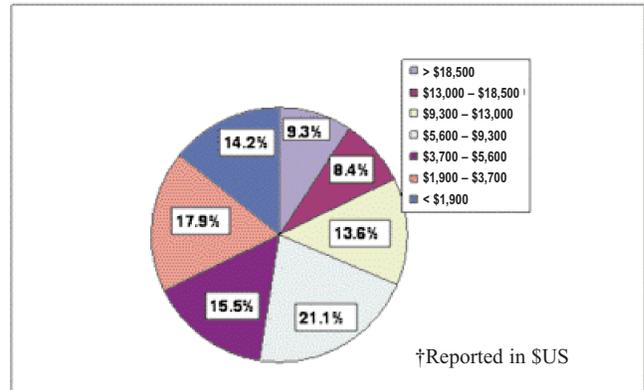


Fig. 2: Distribution of family income, St Kitts and Nevis.

implications for screening; many screening tests (ie mammography) are out of pocket expenses which may limit their use in persons of low socio-economic status.

Cervical and Breast Cancer Screening

As part of the post-natal and family planning services offered by four health clinics in Nevis (Charlestown, Gingerland, Butlers and Combermere), routine Pap smears and self-breast examinations are encouraged by the health staff. Cervical cytology results are routinely recorded and reported in the annual Ministry of Health Statistical Report. Results of clinical breast examinations are not systematically recorded as part of patient care. Importantly, there is no available mammography service in Nevis, forcing women to travel off-island for these services.

The prevalence of cervical cancer screening by age group and calendar year is presented in Fig. 3. In each year, approximately the same percentages of women were screened in each respective age group. Regardless of year, the age group with the highest utilization rates was in the 20–34-year age range. Between 2001 and 2007, the overall prevalence of Pap testing fluctuated minutely. For women over the age of 20 years, the lowest prevalence of cervical cytology screening was observed among women who are 45+ years. In the United States of America, although most cases of cervical cancer are diagnosed in women younger than 50 years old, about 20% of cases are diagnosed in women over the age of 65 years. The age-specific cervical cancer incidence rate statistics for Nevis were not available, but it may be important for older women on the island to continue having regular Pap tests. The majority of tests showed

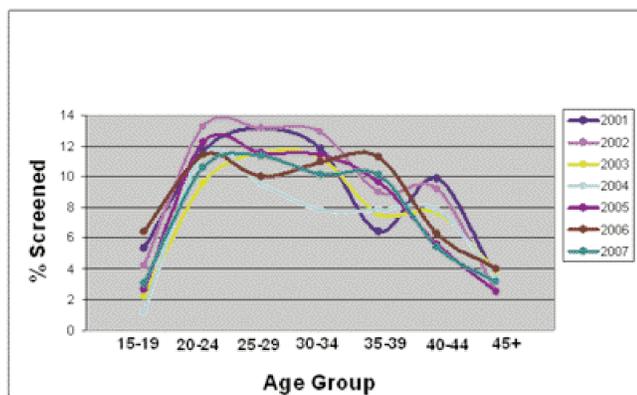


Fig. 3: Prevalence of cervical cytology, 2001–2007.

negative findings (approximately 98% of tests). Atypical and dysplastic results accounted for approximately 1.6% and 0.30% of all tests, respectively (Table 3).

Colon and Prostate Cancer Screening

Screening for colon cancer involves one or more of the following techniques: sigmoidoscopy, colonoscopy, digital rectal examination (DRE) and faecal occult blood test (FOBT). Prostate cancer screening involves DRE as well as prostate specific antigen (PSA). Although the general practitioners and surgeons perform these tests on their patients, routine information is not collected and summarized in the annual statistical report distributed by the Ministry of Health.

In an attempt to encourage screening for prostate cancer, the Gingerland Clinic recently (2008) initiated a men's health clinic. Depending on the receptivity of this clinic, this programme will be extended to other health centres in Nevis. Currently there are no statistics available on the number of men screened by PSA or DRE at the Gingerland Clinic.

Cancer Mortality

The most complete and current data on cancer mortality derives from the death certificates that report cancer as both the underlying and main cause of death. Information on the specific age at time of death, was not available, hence age-specific cancer mortality rates could not be presented. Crude death rates for certain cancers are presented in Table 2. No appreciable patterns in the cancer mortality rates between 2002 and 2006 were discerned, however prostate cancer is responsible for the majority of cancer-related deaths in the time period (30.6 deaths per 100 000 persons).

Physician Questionnaires – Screening Policy and Value

A questionnaire was administered to three of the five general practitioners working on the island. The general screening recommendations of these three physicians somewhat varied (Table 4). In general, physicians agreed that regular mam-

Table 2: Registered cancer deaths[†] stratified by year

Cancer Type	2002	2003	2004	2005	2006	2002–2006
	Crude Death Rate per 100 000 Pop*					
Breast	27.0	18.0	9.0	9.0	9.0	14.4
Cervix [‡]	9.0	9.0	---	---	---	9.0
Colorectal	9.0	9.0	27.0	9.0	9.0	12.6
Pancreas	9.0	9.0	18.0	9.0	27.0	14.4
Prostate	36.0	63.0	36.0	0.00	18.0	30.6

[†] Identified by death certificate

[‡] Average Mortality Rate for 2002–2003 only

* Based on the 2001 Census

--- indicates statistic not reported

Table 3: Results of cervical cytology

Year	Cumulative Screening Prevalence No. (%)	Negative No. (%)	Atypical No. (%)	Dysplastic No. (%)
2001	306 (7.41)	297 (97.06)	9 (2.94)	0 (0.0)
2002	306 (7.41)	297 (97.06)	6 (1.96)	3 (0.98)
2003	276 (6.69)	271 (98.19)	5 (1.81)	0 (0.0)
2004	250 (6.06)	250 (100)	0 (0.0)	0 (0.0)
2005	273 (6.61)	268 (98.17)	2 (0.73)	3 (1.10)
2006	306 (7.41)	303 (99.02)	3 (0.98)	0 (0.0)
2007	270 (6.54)	263 (97.41)	7 (2.59)	0 (0.0)

[†] Screening data from 4 of the 6 health clinics in Nevis: Charlestown, Gingerland, Butlers, and Combermere.

Remaining two health centres (Cotton Ground and Brown Hill) do not perform screening.

mographic screening should begin at least by the age of 40 years; one physician felt that mammography should begin in the 20–30-year age range. Opinions diverged on the length of time between mammograms; answers ranged from annual mammograms to screening every three years. Physicians unanimously agreed that annual Pap smears should begin at age 30 years, although two physicians felt that screening should begin at 16 years of age. Laboratory screening for HPV is not done at the population level in Nevis, therefore physicians cannot practically recommend this test to patients. For colorectal cancer screening, all physicians agreed that some method of screening should be initiated in the fourth decade of life, however the method of screening varied. Moreover, the general practitioners agreed that colorectal screening should be annual once men turn 50 years of age. Finally, annual prostate cancer screening by digital rectal exam (DRE) and/or prostate specific antigen (PSA) was recommended by all three physicians starting at age 40 years.

In terms of screening value (Table 5), all three practitioners reported that cancer screening is an important preventive measure; in general, they felt screening after the age of 40 years for breast, colorectal and prostate cancers was more important than screening before age 40 years.

Table 4: Distribution of physicians according to screening policy-screening methods and intervals by age group (n of physicians = 3).

Age Group	n (%)	Interval	n (%)	Interval	n (%)	Interval	n (%)	Interval
Breast Cancer	Mammography		Clinical Breast Examination		Breast self-Examination		Other	
20–30	1 (33%)	4–5 years	1 (33%)	annual	2 (66%)	-monthly -daily	---	----
30–40	1 (33%)	2 years	0 (0%)	----	1 (33%)	every morning	----	----
40–50	3 (100%)	2 years 1–2 years 3 years	1 (33%)	annual	2 (66%)	monthly	---	----
50–60	3 (100%)	annual	1 (33%)	annual	2 (66%)	monthly	---	----
over 60	2 (66%)	annual	1 (33%)	annual	2 (66%)	monthly	---	----
Cervical Cancer	Pap Smear		HPV testing		Other			
16–30	2 (66%)	annual	---	-----	-----			
30–40	3 (100%)	annual	---	-----	-----			
40–50	3 (100%)	annual	---	-----	-----			
50–60	3 (100%)	-annual -every 2 years	---	-----				
over 60	3 (100%)	-annual -every 2 years	---	-----				
Colorectal Cancer	Sigmoidoscopy		Colonoscopy		Digital Rectal Examination		Fecal Occult Blood Test	
40–50	0 (0%)	---	2 (66%)	-1–5 years -every 4 years	1 (33%)	annual	1 (33%)	annual
50–60	1 (33%)	annual	2 (66%)	-1–3 years -every 4 years	1 (33%)	annual	1 (33%)	annual
over 60	1 (33%)	annual	1 (33%)	annual	0 (0%)	---	1 (33%)	annual
Prostate Cancer	Digital Rectal Examination		Prostate Specific Antigen		Other			
40–50	1 (33%)	annual	2 (66%)	-1–2 years -every 4 years	---	-----		
50–60	2 (66%)	annual	3 (100%)	-1–2 years -every 4 years	---	-----		
over 60	1 (33%)	-annual -every 4 years	1 (33%)		---	-----		

DISCUSSION

The purpose of this study was to document current cancer screening practices and cancer-related mortality on the island of Nevis. Trends in cancer screening, incidence and mortality have been reported for other Caribbean countries and island territories, however published data for Nevis is not available.

Based on qualitative interviews with key stakeholders and physicians, two important barriers to widespread screening in Nevis exist; lack of emphasis in health promotion programmes to stress the importance of cancer screening as well as the lack of a national screening programme. Health education is extremely important in cancer screening agendas; knowledge about the determinants of certain cancers as well as the behaviours that promote or prevent

disease have implications for cancer screening use. Although good health education programmes exist in Nevis, the majority focus on HIV/AIDS awareness. In terms of provider recommendations, Nevisian physicians rely on guidelines set forth by the United States of America (USA), however this is not systematically reinforced. Moreover, these general recommendations may not be applicable for this population. An earlier onset of cancer, often in a more advanced form, has been hypothesised by physicians in Nevis, however data to support this theory are not available. Importantly, this trend of early cancer incidence has been documented in other studies of Caribbean populations. For example, the incidence of prostate cancer among men in Tobago (age 40–49 years) was 1000-fold greater than the incidence reported in the National Cancer Institute's Surveillance, Epidemiology

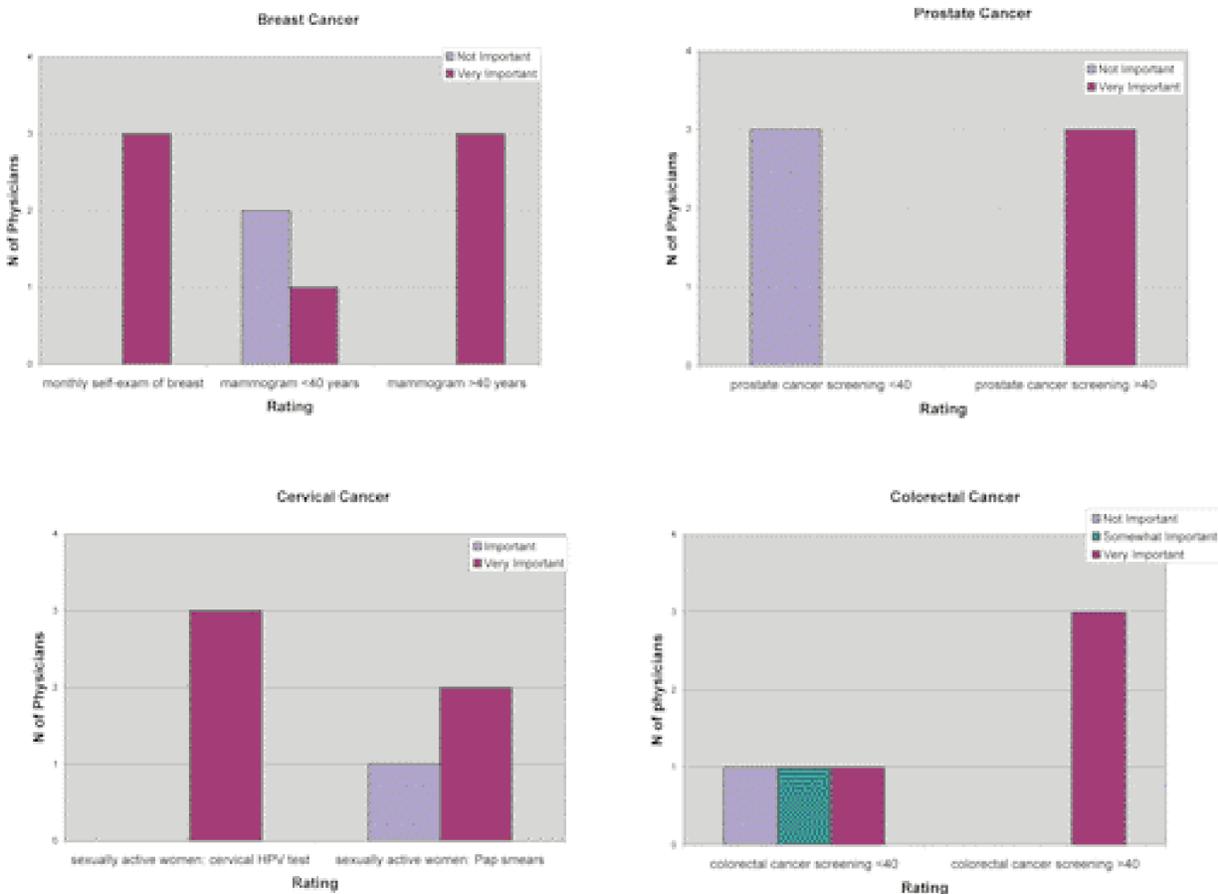


Fig. 4: Physician screening value.

and End Results (SEER) database for African-American men of the same age (10). Reasons underlying an earlier onset of disease in Caribbean populations most likely hinge upon gene-environment interactions (11). Although dietary factors are one of the few attributes consistently associated with prostate cancer in epidemiologic surveys, it is unlikely that ethnic variation in diet is the sole contributor to differences in prostate cancer incidence and mortality (12). Mallick *et al* found a functional polymorphism in the *GSTT1* gene to be associated with prostate cancer risk in a hospital-based sample of Guadeloupean prostate cancer cases (10). Genetic susceptibility and persistent exposure may work synergistically to induce early onset cancers.

Without formal screening protocols, methodical recording of cancer screening utilization is difficult to implement. In this study, screening data was only obtained for cervical cancer. The screening rate in this population is much lower when compared to screening rates in developed countries. For example, in the USA and Canada, women older than age 18 years had Pap test compliance rates of 86.7% and 75.5%, respectively. In Nevis, the overall prevalence of Pap testing fluctuated from 6.06% to 7.41% between 2001 and

2007. Rates were lowest for women in the 45-year and older age group, indicating an important demographic where screening should be increased. Although exposure to the HPV virus may decline with age, sequelae from earlier infection may become apparent in this age range, *ie* onset of dysplastic changes in the cervix, requiring continual screening into later ages. The results of the cervical cytology screening are presented in Table 3; in general, the majority of the cytology results were negative. Atypical and dysplastic lesions comprised less than 3% of all tests in a given year. We were unable to obtain information on the follow-up of the abnormal smears but detailed review of these data could yield information on treatment outcomes and the probability of future invasive cervical cancer.

Crude cancer mortality in Nevis (Table 2) differs from the cancer mortality profile in the USA. Breast cancer is the second leading cause of cancer-related deaths in women in the USA with an age-adjusted mortality rate of 25.5 deaths/100 000 women. Nevisian women had a crude breast cancer mortality rate of 14.4 per 100 000 women between 2002 and 2006. This rate may be an underestimate as women in Nevis generally travel out of the country for breast cancer care. In

a recent examination of the GLOBOCAN database, Philips *et al* found that breast cancer was the most common cause of cancer-related death in six diverse populations of Caribbean women, with rates similar to those in the USA (13). These populations differ from Nevis in that screening facilities are widely available which may represent disease detection differences.

Data on cervical cancer deaths in Nevis were only available for 2002 and 2003. Based on this short time interval, the average mortality rate for cervical cancer was 9.0 per 100 000 women which is higher compared to the USA (2.6 deaths/100 000 women) (14). Assuming that years where deaths from cervical cancers were not reported actually reflect years in which cervical cancer deaths did not occur, the Nevisian mortality rate for the time period 2002–2006 closely reflects that of the USA (3.6 deaths/100 000 women). Philips and colleagues noted that cervical cancer mortality rates may be higher in Caribbean countries due to the known infectious aetiology of this disease (13).

The crude prostate cancer mortality rate in Nevis is slightly higher than the age-adjusted prostate cancer mortality rate in the USA (30.6/100 000 men (2002–2006) and 27.9/100 000 men (2000–2004), respectively), however this difference may become negligible after adjustment. Importantly, other studies in Caribbean populations have demonstrated high incidence and mortality rates associated with prostate cancer (15–17). Finally, colorectal mortality rates are higher in the USA (23.5/100 000 persons *versus* 12.6/100 000 persons) which may reflect a difference in risk factors associated with this cancer. Evidence from the Martinique Cancer Registry suggests that colorectal cancer has increased significantly in both sexes between 1981 and 2000.

This transition is likely to stem from the adoption of western behaviour, habits and lifestyle (8). This pattern may be very relevant in Nevis where frequent contact with the African Caribbean diaspora in North America and the United Kingdom as well as with tourists from the USA and Europe may influence lifestyle risk factors.

Physician recommendations are extremely important for promoting screening amongst patients. In a recent focus group survey of Haitian immigrants' screening practices, Francois *et al* reported that the physician-patient relationship is of key importance in the promotion of health services. More specifically, although there was mixed knowledge and fear concerning colon cancer screening, the majority of patients reported they would participate in screening if recommended by their doctor (18). Additionally, screening recommendations are more likely to be practised especially if the cost is offset by provision in a Health Insurance Scheme.

Although preferred methods of screening differed between the three physicians, all stressed the significance of screening in sexually active populations as well as older age groups.

Qualitative interviews with key stakeholders revealed important gaps in cancer care (data not shown). The health

services planner at the Ministry of Health stated that access to Pap tests is not the sole limiting factor in uptake; importantly, fear of the result may cause women to go unscreened. Breast cancer is viewed as a more "acceptable" cancer when compared to cervical cancer; as such, screening recommendations are more likely to be practised. The health information officer cited the lack of cancer registration as a fundamental gap in the health infrastructure of Nevis. Although cancer registration would allow for the description of trends and inform screening recommendations, a registry is not likely to be established in the near future. Finally, the Minister of Health for Nevis acknowledged that cancer is a top health priority in Nevis, however, more research is needed to update screening policy recommendations. A priority in the Ministry is prevention, due to the high costs and inconvenience associated with treatment.

In conclusion, this study demonstrates that cancer is an important health problem in Nevis and efforts to expand screening services need to be undertaken. To our knowledge, we are the first to report cancer-related data for the island of Nevis. Based on this descriptive study, it is apparent that a valuable cancer screening programme must include guidelines that are relevant to this population; moreover educational programmes need to be implemented to maximize the response of citizens. It is also important to note that screening in settings with few resources can still produce considerable changes in the incidence and mortality related to several cancers. In a population-based case-control study of cervical neoplasia, women at high-risk for cervical cancer were identified based on four risk factors (age, socio-economic status, smoking history and number of pregnancies) and subsequently screened (19). By targeting high-risk women, the number of Pap tests performed was reduced by 60% in this population. Vital to this technique is the discriminate nature of selecting high-risk women to be screened; this procedure can be modified and adapted to the Nevisian population for various cancers.

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