

Beyond the Black Box: A Systematic Review of Breast, Prostate, Colorectal, and Cervical Screening Among Native and Immigrant African-Descent Caribbean Populations

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Abstract Cancer screening disparities between black and white groupings are well-documented. Less is known regarding African-descent subpopulations despite elevated risk, distinct cultural backgrounds, and increasing numbers of Caribbean migrants. A systematic search of Medline, Web of Science, PubMed and SCOPUS databases (1980–2012) identified 53 studies reporting rates of breast, prostate, cervical, and colorectal screening behavior among immigrant and non-immigrant Caribbean groups. Few studies were conducted within the Caribbean itself; most work is US-based, and the majority stem from Brooklyn, New York. In general, African-descent Caribbean populations screen for breast, prostate, colorectal, and cervical cancers less frequently than US-born African-Americans and at lower rates than recommendations and guidelines. Haitian immigrants, in particular, screen at very low frequencies. Both immigrant and non-immigrant African-descent Caribbean groups participate in screening less frequently than recommended. Studying screening among specific Caribbean groups of African-descent may yield

data that both clarifies health disparities between US-born African-Americans and whites and illuminates the specific subpopulations at risk in these growing immigrant communities.

Keywords Breast · Prostate · Colorectal · Cervical · Cancer screening · Disparities · Ethnic subpopulations · African American · Afro-Caribbean

Introduction

Cancer remains a major public health concern. Of cancers for which screens exist, prostate cancer (PC), breast cancer (BC), and colon/rectal cancer (CRC) have the greatest incidence and mortality; with more than 600,000 cases, and 35 % of all cancers, occurring in these sites in 2011 [1]. Despite occasionally lower incidence, African-American and Hispanic groups fare more poorly in terms of staging, mortality, and outcomes; disparities are frequently attributed to later detection and poorer prognosis [2]. African-American males are disproportionately likely to be diagnosed with metastatic PC [3] and have more aggressive tumors at each stage [4], although disparities may attenuate for some cancers where access is normalized as in studies of veterans [5]. Nonetheless, African Americans continue to have poorer survival at all stages of most cancers [6] as do Hispanic populations, with recent data indicating additional differences among specific subgroups [7].

Despite some controversy, screenings generally reduce mortality [8–10]. The American Cancer Society currently recommends a clinician breast exam (CBE) every 3 years for average-risk women and annual mammography and CBE for women over the age of 40. It is also recommended that both men and women receive yearly/5 yearly/10 yearly

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CRC screening (depending on the screen) and, until recently it was suggested that men over the age of 50 be offered annual digital rectal exam (DRE) and prostate specific antigen (PSA) tests [11], provided they were informed regarding the benefits and limitations of these methods [12]. PSA screening remains contentious [13, 14], with a recent US Preventive Services Task Force report recommending against this test. However, PSA levels remain influential in risk stratification, with the number needed to screen and number needed to treat to prevent one cancer death approximately 186–220 and 2–5, respectively [15, 16]. Data regarding PC screening among minority men may provide insight into responsiveness to guidelines regarding other intimate examinations.

Screening disparities between broad ethnic groupings are well-recognized. Estimates suggest that 47 % of white men participated in PSA testing in 2008 [2], while the rate was 39 % for African-Americans and 33 % for Hispanics [17]. Estimates for Hispanic CRC screenings are also low: 8 % were estimated to have had a fecal occult blood test (FOBT) in the past year and only 37 % met criteria for one of the three screens in the past 10 years; whites (56 %) and African-Americans (49 %) were higher [17]. Finally, while African-American and white mammography rates have converged, disparities between whites and other groups, such as Hispanics, remain [17]. Less well-recognized are differences in screening *within* major ethnic groups. Despite commonalities in the black experience [18], there is variation *within* black populations. Understanding disparities and illuminating solutions may be facilitated through examining differences *within* black communities. Below, we describe this rationale more fully before conducting a systematic review of cancer screening among African-descent Caribbean populations.

The Rationale for Within-Group Examinations

There are three reasons to examine screening differences among subpopulations of African-descent or black Caribbean groups. The first is conceptual. Historically, disparities research has used broad categories—in the US, typically those of “black” and “white,” or census classifications. Individuals of African descent are placed within overarching “black” groupings [19–21] while heterogeneity *within* black populations is ignored [22]. Culturally, as well as genetically [23, 24], however, these populations are diverse, and include immigrants from Africa, the Caribbean, Central and South America, as well as persons now known as African-Americans [25, 26]. Labels are arbitrary [27, 28] and do not map clearly on to patterns of biological, environmental, or psychosocial risk.

The second reason is practical and reflects changing populations in an increasingly globalized world. Blacks

from the Caribbean constitute the largest subgroup of black immigrants in the US [29], with nearly one million persons of English-speaking West-Indian ancestry and over 500,000 of Haitian ancestry [30, 31]. In New York, Caribbean immigrants constitute 20 % of the foreign-born population [32], with immigrants from Jamaica, Trinidad and Tobago, and Guyana showing increases of 54, 57 and 72 %, from 1990 to 2000 [33]. Although many African-Americans have been in the US for generations, immigrants from the Caribbean and Africa are raised, and currently live, in distinct economic, political, geographic, and cultural environments. Their patterns of risk and exposure vary, and they endorse different values, beliefs, and expectancies regarding cancer-related health. Aggregating across genetic, environmental, and cultural contexts obscures etiologies, thus limiting potential validity and/or the development of appropriate interventions.

The final reason relates to differences in outcome. US studies show that foreign-born blacks have lower cardiovascular disease, cancer, respiratory, and infectious disease, lower hypertension, obesity, and fewer overall chronic conditions than domestic blacks [34, 35]. Conversely, cancer incidence [32], particularly PC incidence, among Caribbean groups is often higher than among African-Americans [36–38], as is mortality for several cancers [39–41]; disparities persist after immigration [42] and these data are consistent with the notion that subpopulations of black Americans differ in fundamentally important ways.

Given that the Caribbean remains among the largest contributors to immigration, documenting and understanding patterns of cancer screening behavior among persons of African-descent from this region is increasingly important. However, despite elevated risk, little is known regarding screening among specific black racial subgroups and it is possible that examinations of within-group differences might offer a more accurate picture of screening among these persons. We thus investigated whether specific Caribbean subpopulations of African-descent varied in cancer screening rates and, if so, which groups are at greatest risk. Finally, we assess the state of the literature and comment on the methodological and sampling considerations that constrain understanding in this area.

Methods

The current review was based on the narrative method [43]. As in recent work implementing this approach (e.g., [44]), we first conducted a systematic search of studies reporting BC, PC, cervical (CC), and CRC screening among African-descent Caribbean groups. Next, the quality of studies meeting inclusion criteria was assessed and a textual synthesis based on key findings developed.

To begin, we conducted a computer-based search using Medline, Web of Science, PubMed and SCOPUS databases, selected because they span both medical and social sciences. Inclusion criteria were: empirical studies, published in the English language, with statistical descriptions of screening frequencies for BC, PC, CC, or CRC screening. Studies had to be conducted among specific African-descent Caribbean groups. Because of our focus on African-descent groups, studies that were *exclusively* characterized in terms of Hispanic populations (e.g., those from countries in South America and/or the Caribbean that are of predominantly Hispanic ethnicity) were excluded as sample characterization in the extant literature makes it difficult to evaluate the extent to which such groups are of African ancestry; being “Hispanic” may or may not imply African ancestry, meaning studies of such populations were potentially less relevant to our focus on screening among African-descent subpopulations from the Caribbean.

As no relevant work was available prior to 1980, searches were limited to January 1980 to December 2012. We began our search broadly, by combining (a) ethnic key words (e.g., “Caribbean,” “Afro-Caribbean”, “Jamaican,” “Haitian”) and (b) a cancer site term (i.e., breast, prostate, colorectal, cervical), with a combination of both general (e.g., screening) and locality-specific (e.g., mammography, DRE, FOBT) terms (see section “Appendix”). Following

removal of duplicates, 364 papers remained. Abstracts (and then articles) were independently reviewed by two authors to ensure that reports included statistical descriptions of behavioral screening for specific African-descent Caribbean groups rather than (a) aggregating or summarizing across groups, (b) focusing on *implications* for screening, or (c) exclusively concentrating on Hispanic groups that may or may not be of African ancestry. The same authors then extracted information in tabular form regarding (1) the research group, sample size, sampling method, duplicate use of the sample, and study location, and (2) participant characteristics in terms of age, ethnicity, and immigrant versus native status, and (3) the summary measures for the review; percentage of participants who had undergone screening within the specified time frame, and comparisons of rates of screening between groups. Tables were compared, and any discrepancies were resolved by checking the original manuscripts. Additional works were sourced by reviewing citation lists and by contacting authors for “in press” articles. The results of these initial searches together with data regarding exclusions are provided in Fig. 1.

Reports were assessed in several ways. Initially, data were grouped according to different cancer screens, i.e., PC, CRC, BC, and CC. We then conducted four separate syntheses, in which data were extracted and presented in tabular form (see Tables 1, 2, 3, 4). We began each

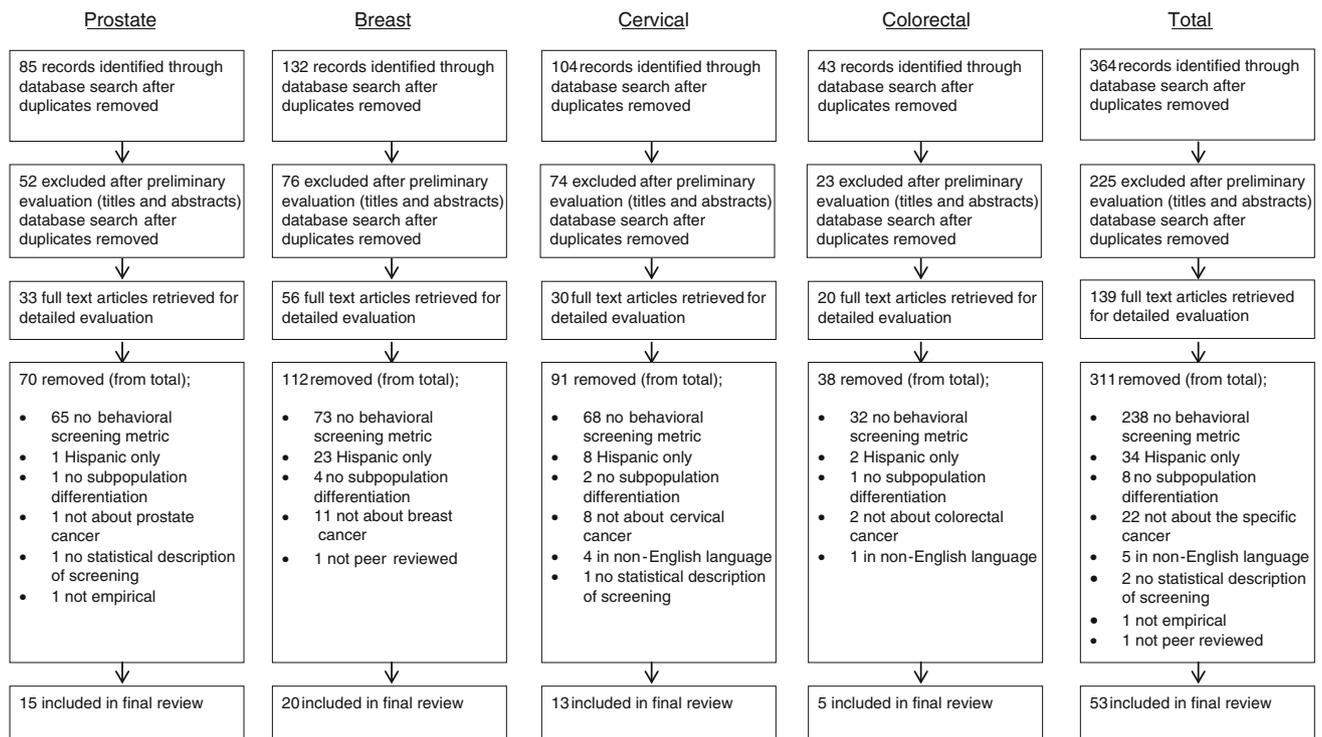


Fig. 1 Flow chart showing the number of studies identified through database searches, the number excluded, and reasons for exclusion, and those included in the final review

Table 1 Summary of studies reporting on prostate cancer screening among Caribbean men

Article	Ethnic composition of sample	Immigrant versus native?	Location	Sampling strategy	Research design	Screening modality	Primary ethnic finding(s)
1 Consedine [66] ^c	180 US-born African-American (40–70), US-born European-American (50–70), and immigrant Jamaican men (40–70)	Mixed	Brooklyn, NY	Convenience	Cross-sectional Quantitative	PSA	Ethnic differences in rates of non-screening, but no specific differences to indicate directionality
2 Lee et al. [62] ^a	(N = 533) US-born white (121), US-born African-American (142), Jamaican (147), and Trinidadian/Tobagonian (123)	Mixed	Brooklyn, NY	Stratified Cluster Sampling	Cross-sectional Quantitative.	DRE	African-American and African-Caribbean men report less DRE than whites
3 Lee, et al. [63] ^a	(N = 533) US-born white (121), US-born African-American (142), Jamaican (147), and Trinidadian/Tobagonian (123)	Mixed	Brooklyn, NY	Stratified Cluster Sampling	Cross-sectional Quantitative.	PSA	African-American, Jamaican and Trinidadian men more likely to be classified as having initiated PSA screening, but less likely to maintain annual screening
4 McNaughton [57]	36 Jamaican male medical consultants aged 40–70 in West Indies	NA	West Indies	Convenience	Cross-sectional Quantitative.	PSA/DRE	41 % had never had a DRE
5 Odedina et al. [67]	3,400 Black men (age 35 +) native born, Africa-born or Caribbean-born	Mixed	Florida	Convenience	Cross-sectional Quantitative.	PSA/DRE	No significant differences in DRE or PSA test frequency in the past year
6 Kleier [65]	143 Haitian men aged 40+ years	Immigrant	Miami, FL, USA	Convenience	Cross-sectional Quantitative	n/a	Nearly 56 % of men had never had a prostate exam
7 Consedine et al. [59] ^a	*Aggregate report: Total N = 713	Immigrant	Brooklyn, NY, USA	Mixed	Cross-sectional Quantitative	PSA/DRE	N/A—aggregate report
8 Consedine et al. [60] ^a	533 US-born European-American, US-born African-American, immigrant Jamaican, and immigrant men from Trinidad and Tobago	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	PSA	Jamaican and Trinidadian men less likely to have had a PSA or report annual PSA testing than US-born European-Americans across 10 years
9 Gonzalez et al. [61] ^a	533 US-born European-American, US-born African-American, immigrant Jamaican, and immigrant men from Trinidad and Tobago	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	PSA	Jamaican and Trinidadian men were more likely than US-born European Americans to report 1 + PSA tests in the last 10 years but only about 25 % as likely to screen regularly

Table 1 continued

Article	Ethnic composition of sample	Immigrant versus native?	Location	Sampling strategy	Research design	Screening modality	Primary ethnic finding(s)
10 Kudadjie-Gyamfi et al. [69] ^b	308 US-born European American, US-born African American, English Caribbean, Haitian, Dominican, Puerto Rican, and Eastern European men (44 per group)	Immigrant	Brooklyn/Manhattan, NY, USA	Convenience	Cross-sectional Quantitative	PSA/DRE	Haitian men reported fewer DRE and PSA tests than either US-born European American or Dominican men across prior 10 years
11 Reyes-Ortiz et al. [58]	4,183 men from 7 cities in Latin America (Buenos Aires, Bridgetown, Sao Paulo, Santiago, Havana, Mexico City, and Montevideo)	Native	Various	Multistage, stratified clustered sampling with random selection	Cross-sectional Quantitative	n/a	Between 22 % (Havana) and 52 % (Bridgetown) of men reported a prostate exam in the past 2 years
12 Consedine et al. [46] ^c	180 US-born European-American, US-born African-American, and immigrant Jamaican men (60 per group)	Immigrant	Brooklyn, NY, USA	Convenience	Cross-sectional Quantitative	PSA/DRE	No difference in frequency of self-reported PSA or DRE across prior 10 years
13 Consedine et al. [68] ^b	308 US-born European-American, US-born African-American, English Caribbean, Haitian, Dominican, Puerto Rican, and Eastern European men (44 per group)	Immigrant	Brooklyn/Manhattan, NY, USA	Convenience	Cross-sectional Quantitative	PSA/DRE	Haitian men reported fewer DRE and PSA tests than either US-born European-American or Dominican men across prior 10 years
14 Kudadjie-Gyamfi et al. [70] ^b	308 US-born European-American, US-born African-American, English-Caribbean, Haitian, Dominican, Puerto Rican, and Eastern-European men (44 per group)	Immigrant	Brooklyn/Manhattan, NY, USA	Convenience	Cross-sectional Quantitative	PSA	European-Americans and men who had lived longer in the US had the highest rates, while Haitians and men with a shorter stay had the lowest
15 Shelton et al. [64]	213 men (85 African-American and 70 Caribbean-American) aged 27 to 88 years	Immigrant	Queens, NY, USA	Convenience	Cross-sectional Quantitative	PSA	58 % of total sample and 46 % of the men aged 50+ years had never had a PSA test

PSA prostate specific antigen test, DRE digital rectal examination

* Indicates that the study is an aggregate report drawing from multiple samples and is not counted towards the study totals

^a Report based exclusively or partially on N = 533 men, Brooklyn-based study

^b Report based exclusively or partially on N = 308 men in Brooklyn- or Manhattan-based study

^c Report based exclusively or partially on N = 180 men in Brooklyn- or Manhattan-based study

synthesis with a summary of the numbers of records identified, screened, assessed and finally included [45] (see Fig. 1). Textual synthesis was then implemented to compare findings and consider conflicting results. To minimise bias we report findings from *all* included studies, and grouped research according to whether absolute screening frequencies or group differences were reported. For studies testing group differences we considered those using more

robust sampling to be methodologically advantaged, and thus where there are discrepancies, we place greater emphasis on findings from these reports.

As is discussed below, sampling methods were often based on convenience sampling (40 %), with approximately 60 % of studies using more representative techniques such as stratified cluster sampling. Sample sizes ranged between 36 and 70,775, with 36 different sample

Table 2 Summary of studies reporting on breast cancer screening behavior among Caribbean women

Article	Ethnic composition of sample	Immigrant versus Native?	Location	Sampling strategy	Study design	Screening modality	Primary ethnic finding(s)
1 Consedine [87] ^a	1,364 African-American, English-Caribbean, Haitian, Dominican, Eastern-European, and European-American	Mixed	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	Mamm	English-Caribbean, Haitian, and Eastern-European women less likely to screen systematically over time
2 Kudadjie-Gyamfi, et al. [76]	308 US-born European-American, US-born African-American, English-Caribbean, Haitian, Dominican, Puerto Rican, and Eastern-European women (44 per group)	Immigrant	Brooklyn/Manhattan, NY, USA	Convenience	Cross-sectional Quantitative	CBE	No significant difference in CBE rates using either race or ethnic groupings
3 Consedine et al. [59] ^a	*Aggregate report incorporating data previously published in Consedine et al. [82]	Immigrant	Brooklyn, NY, USA	Mixed	Cross-sectional Quantitative	Mamm/ CBE	N/A—aggregate report
4 Soares et al. [71]	274 women attending breast imaging units at the University Hospital of the West Indies and Radiology West	Native	Jamaica	Convenience	Cross-sectional Quantitative	Mamm	75/155 women having a repeat mammography had previously screened more than a year ago
5 Underwood et al. [73]	178 women aged 30+ years not diagnosed with BC from the US Virgin Islands	Native	US Virgin Islands	Convenience/ purposive	Cross-sectional Quantitative	Multiple	Among women 40+ years, 30 % reported monthly BSE, 67 % reported CBE in past year and 47 % mammography
6 Brown et al. [78]	221 African-American, Caribbean, and African women from 10 Brooklyn-area beauty salons	Immigrant	Brooklyn, NY, USA	Convenience	Cross-sectional Quantitative	Mamm/ BSE	No differences in percentage of women reporting mammogram with past year (c. 60 %) but African-American women reported greater breast self-exam
7 Brown et al. [85] ^a	915 English-Caribbean, Haitian, Dominican, and Eastern-European women	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative.	Mamm/ CBE	Very low mammography rates among immigrant Haitian women. English-speaking Caribbean women and women from the Dominican Republic reported more frequent CBE than Haitian or immigrant Eastern-European women
8 Reyes-Ortiz et al. [58]	6,207 women aged 60+ years from 7 cities in Latin America (Buenos Aires, Havana, Bridgetown, Sao Paulo, Santiago, Mexico City, and Montevideo)	Mixed	Various	Multistage, stratified clustered sampling with random selection	Cross-sectional Quantitative.	Mamm	2-year mammography prevalence ranged from around 10 % in Havana to 35 % in Sao Paulo
9 Garbers and Chiasson [77]	300 African-American and Caribbean women age 40+ years in New York City	Immigrant	New York, NY, USA	Convenience	Cross-sectional Quantitative	Mamm/ BSE	No difference in the 2-year mammography prevalence of African-American versus Caribbean women; low SES Caribbean women complete BSE less frequently

Table 2 continued

Article	Ethnic composition of sample	Immigrant versus Native?	Location	Sampling strategy	Study design	Screening modality	Primary ethnic finding(s)
10 Consedine, et al. [83] ^a	1,364 US-born European-American, US-born African-American, English-Caribbean, Haitian, Dominican, and Eastern-European women	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	Mamm	African-Americans reported more frequent mammography than English-speaking Caribbean women who screened more frequently than Haitian women; Haitian women were the lowest screening
11 David et al. [81]	143 Haitian, 80 White, 55 African-American, 26 Caribbean, and 22 Latina women (Total N = 329)	Immigrant	Eastern MA, USA	Area probability sampling	Cross-sectional Quantitative	Mamm	Self-reported lifetime mammography use was similar for Haitian (82 %), African-American (78 %), Caribbean (81 %) and Latina women (86 %) but higher for Whites (94 %)
12 Kudadjie-Gyamfi et al. [86] ^a	1,364 US-born European-American, US-born African-American, English-Caribbean, Haitian, Dominican, and Eastern-European women	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	BSE	46 % of African-American and English-Caribbean, 31 % of Haitian and 84 % of Dominicans reported practicing BSE one or more times monthly
13 Consedine et al. [82] ^a	1,364 US-born European-American, US-born African-American, English-Caribbean, Haitian, Dominican, and Eastern-European women	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	Mamm/ CBE	Haitian women reported fewer CBEs than African-American, English-speaking Caribbean or Dominican women
14 Magai et al. [84] ^a	1,364 US-born European-American, US-born African-American, English-Caribbean, Haitian, Dominican, and Eastern-European women	Immigrant	Brooklyn, NY, USA	Stratified cluster sampling	Cross-sectional Quantitative	Mamm	In multivariate analyses, English-speaking Caribbean and Haitian women were more likely to be categorized to a low screening group (≤ 4 mammograms over 10 years)
15 Mandelblatt et al. [80] ^b	1,420 women from four Hispanic groups (Columbian, Dominican, Puerto Rican, Ecuadorian) and three black groups (US, Caribbean, and Haitian)	Immigrant	New York, NY, USA	Quota sampling using RDD	Cross-sectional Quantitative	Mamm/ CBE	US black (73 %) and Caribbean black (68 %) were more likely than Haitian women (44 %) to report ever having had a mammogram with a similar pattern for 'recent' mammogram. Differences were less pronounced for recent/ever CBE
16 Modeste et al. [74]	265 women aged 20+ years living on Tobago	Native	Tobago	Convenience	Cross-sectional Quantitative	CBE	60 % reported having been taught BSE but only 31 % reported BSE in the prior month and only 37 % reported 2 + exams yearly. Only 23 % reported that a CBE was a routine part of doctor's visits

Table 2 continued

Article	Ethnic composition of sample	Immigrant versus Native?	Location	Sampling strategy	Study design	Screening modality	Primary ethnic finding(s)
17 McFarlane et al. [72]	3,681 women aged 15–49 years in Jamaica	Native	Jamaica	Two stage, stratified cluster sampling	Cross-sectional Quantitative	BSE	More than 50 % of Jamaican women reported having completed BSE at some stage, but only 28 % did so on a regular monthly basis
18 O'Malley et al. [95] ^b	1,420 women from four Hispanic groups (Columbian, Dominican, Puerto Rican, Ecuadorian) and three black groups (US, Caribbean, and Haitian)	Immigrant	New York, NY, USA	Quota sampling using RDD	Cross-sectional Quantitative	Mamm/ CBE	US black (73 %) and Caribbean black (68 %) were more likely than Haitian women (44 %) to report ever having had a mammogram with a similar pattern for "recent" mammogram. Differences less pronounced for recent/ever CBE
19 Kernohan [75]	Subsample of 500/1000 women from four minority ethnic groups (African-Caribbean, Asian, Eastern-European and "Other")	Immigrant	Bradford, UK	Stratified sampling	Cross-sectional Quantitative Intervention	CBE	Only 22 % of women (overall) reported a mammogram prior to the intervention in contrast to 59 % afterwards; Caribbean women reporting a mammogram increased from 20 to 87 (percentages unclear)
20 Fruchter et al. [79]	940 women from five birthplace locations (US black, English-Caribbean, Haiti, Hispanic-Caribbean, and Other)	Immigrant	Brooklyn, NY, USA	Purposive	Cross-sectional Quantitative	BSE	64 % of Haitian women reported no BSE practice, compared to 38 % of English-speaking Caribbean women and 37 % of US-born black women

CBE clinician breast exam, *Mamm* mammography, *BSE* breast self-exam

* Indicates that the study is an aggregate report drawing from multiple samples and is not counted towards the study totals

^a Report based exclusively or partially on N = 1,364 women, Brooklyn-based study

^b Report based exclusively or partially on N = 1,420 women, Manhattan-based study and for which Pap screening data were also collected (see Table 3)

populations in total. Six samples were reported on more than once (46 % of the published works). Additionally, timeframes for screening were considered. Low screening among Caribbean subpopulations have been taken to imply that 12-month estimates may produce large numbers of "non-screeners" and thus prevent the investigation of group differences [46]. Assessing screening in terms of adherence to guidelines may be more appropriate but (a) guidelines change over time and (b) a large number of non-adherent screeners may be generated in minority groups. In the present review, 20 % of studies involved self-reported screening over the past 1–3 years and 36 % reported 10 year screening. A further 15 % used an ever/never metric while 26 % used this metric in combination with questions regarding 'recent' screening (typically defined as screening in accordance with guidelines) while 4 % of studies assessed response to an invitation to screen.

To a lesser degree we assessed papers in terms of whether screening was self-reported or based on medical records. Prior work indicates that the 2-year concordance between self-report and chart measures for screening ranges

from 66 % for DRE [47] to 74 % for PSA [48] to 89 % for "ever" and 87 % for current CRC screening [49, 50]. While the accuracy of self-report is suboptimal, biases tend to be comparable across ethnic groups [51]. Similarly, while individuals may not know that some screens, notably the PSA test, have been conducted [52], self-reports correspond reasonably well with charts [47, 53]. The two studies testing response rates to an invitation to screen [54, 55], still assessed baseline screening with self-report, and the quality of data is comparable to that of other studies. Overall, given the reliance on self-report data in reviewed studies, we place a reduced emphasis on this form of quality appraisal.

Results

Prostate Screening Among Caribbean Men of African-Descent

The initial review identified 85 studies meeting search criteria. Inspection of the abstracts identified 33 studies for

Table 3 Summary of studies reporting on cervical screening behavior among Caribbean women

Article	Sample	Immigrant versus native?	Location	Sampling strategy	Study design	Screening modality	Primary ethnic finding(s)
1 Felix et al. [40]	Data obtained from the Charlestown Health Clinic which compiles screening data from the centers in Nevis that perform Pap tests (Charlestown, Gingerland, Butlers and Combermere)	Native	Nevis	Mixed	Cross-sectional Quantitative	Pap	Pap test frequency very low among Caribbean women from Nevis, with test prevalence ranging from 2 to 14 % across ages
2 Kobetz et al. [89]	940 women of Haitian descent who spoke English and Creole, were aged 40+ years and without a cancer history	Immigrant	Miami, FL, USA	Purposive	Cross-sectional Quantitative.	Pap	67 % Reported 1 + lifetime Pap tests; Of those 630 women who had previously screened, 44 % reported 1 + Pap test in past three years
3 Reyes-Ortiz et al. [94]	6357 women aged 60+ years from 7 cities in Latin America (Buenos Aires, Havana, Bridgetown, Sao Paulo, Santiago, Mexico City, and Montevideo)	Native	Various	Multistage, stratified clustered sampling with random selection	Cross-sectional Quantitative	Pap	2-year prevalence of Pap smear use across the seven cities ranged from 21 % in Bridgetown to 45 % in Mexico City
4 Reyes-Ortiz et al. [58]	6,708 women aged 60+ years from 7 cities in Latin America (Buenos Aires, Havana, Bridgetown, Sao Paulo, Santiago, Mexico City, and Montevideo)	Native	Various	Multistage, stratified clustered sampling with random selection	Cross-sectional Quantitative	Pap	2-year prevalence of Pap smear use across seven cities ranged from 23 % in Bridgetown to 46 % in Mexico City
5 Bessler et al. [90]	367 Clinic-attending women, aged 25 to 54 years from three health districts in the Parish of Trelawny, Jamaica	Native	Parish of Trelawny, Jamaica	Convenience	Cross-sectional Quantitative	Pap	Overall, 11 % had never had a Pap smear and only 38 % had a Pap in the last year
6 Tsui et al. [93]	70,775 women aged 18+ years from the NHIS; 9,863 (14 %) were foreign-born, with Mexico (27 %), Europe (15 %), Southeast Asia (11 %), and the Caribbean (11 %) accounting for largest numbers of foreign-born women	Immigrant	Various, USA	Population-based (NHIS)	Cross-sectional Quantitative	Pap	Foreign-born women 3X as likely as US-born women to have no Pap history (18 % vs. 5 %). In MV analyses, 11 % Caribbean women (v. 6 % of US-born women) reported never having screened

Table 3 continued

Article	Sample	Immigrant versus native?	Location	Sampling strategy	Study design	Screening modality	Primary ethnic finding(s)
7 Green, et al. [92]	700 Women aged 40+ years living in four cities in eastern Massachusetts who were Haitian (278), African American (156), Latina [72], or White (142)	Immigrant	MA, USA	Probability sample	Cross-sectional Quantitative.	Pap	3-year prevalence of Pap smears were lower among Haitian (78 %), and non-Hispanic White (74 %) compared to African-American (87 %) and Latina (92 %) women
8 McCaffery et al. [91]	71 Women from Greater Manchester including 16 African Caribbean	Immigrant	Greater Manchester, UK	Purposive	Cross-sectional Quantitative	Pap	16/16 African Caribbean women recruited for this study reported having previously had at least one smear test
9 Mandelblatt et al. [80] ^b	1,420 women from four Hispanic groups (Columbian, Dominican, Puerto Rican, Ecuadorian) and three black groups (US, Caribbean, and Haitian)	Immigrant	New York, NY, USA	Quota sampling using RDD	Cross-sectional Quantitative	Pap	US (95 %) and Caribbean black (92 %) more likely than Haitian women (74 %) to report ever having a Pap. US black (82 %) and Caribbean black (83 %) were more likely than Haitian women (69 %) to report a recent Pap
10 McFarlane et al. [72]	3,681 Women aged 15–49 years in Jamaica	Native	Jamaica	Unclear	Cross-sectional Quantitative	Pap	51 % Reported Pap testing at least once during their lives but only 15 % reported being tested in the previous year
11 O'Malley et al. [95] ^a	1,420 Women from four Hispanic groups (Columbian, Dominican, Puerto Rican, Ecuadorian) and three black groups (US, Caribbean, and Haitian)	Immigrant	New York, NY, USA	Quota sampling using RDD	Cross-sectional Quantitative	Pap	US black (95 %) and Caribbean black (92 %) were more likely than Haitian women (74 %) to report ever having a Pap. US black (82 %) and Caribbean black (83 %) were more likely than Haitian women (67 %) to report a recent Pap
12 Kernohan [75]	Subsample of 500/1,000 women from four minority ethnic groups (African-Caribbean, Asian, Eastern-European and "Other")	Immigrant	Bradford, UK	Stratified sampling	Intervention Quantitative	Pap	Only 67 % of women (overall) reported a Pap smear prior to the intervention in contrast to 87 % afterwards; Caribbean women reporting a Pap increased from 132 to 159

Table 3 continued

Article	Sample	Immigrant versus native?	Location	Sampling strategy	Study design	Screening modality	Primary ethnic finding(s)
13 Fruchter et al. [79]	940 women from five birthplace locations (US black, English-speaking Caribbean, Haiti, Hispanic Caribbean, and Other)	Immigrant	Brooklyn, NY, USA	Purposive	Cross-sectional Quantitative	Pap	49 % (177/361) Haitian women reported no prior Pap test, compared to 52/228 (23 %) of English-speaking Caribbean women and 28/264 (11 %) of US-born black women

Pap Papanicolaou test

^a Report based on N = 1,420 women, Manhattan-based study for which breast screening data were also collected (see Table 3)

which a full review was warranted. Of the 85, 70 studies were excluded; 65 did not report a behavioral screening metric, one involved a Hispanic population only, one had no subpopulation differentiation, one was non-empirical, one was not about PC, and one did not include statistical descriptions of PC screening frequencies. Inspection of articles and reference lists ultimately resulted in 15 studies providing statistical reports of behavioral PC screening among African-descent samples (see Fig. 1).

Of the 15 studies, 10 reported on screening behavior over the prior 10 years, two assessed screening over the past 1–2 years, and the remaining 3 used ever/never or ever/never/recent metrics. Samples ranged in size from 36 to 4,183 participants. As in other examinations of Caribbean groups [56], 13/15 studies used US-based, immigrant samples, and most (9/15) were convenience based; most (12/15) studies were concentrated in major immigrant destinations, the boroughs of New York and Miami. Two studies provided data from the Caribbean [57, 58]. Troublingly, 10/15 articles were from the same research group and 5/15 reports [59–63] drew from the same sample. Below, these data are grouped according to measures and design.

Absolute Screening Rates

When considering absolute rates of screening, it is clear that Caribbean men of African descent screen less frequently than is recommended. One Caribbean based report looking at 36 Jamaican medical consultants aged 40–70 years found that 41 % had never had a DRE, and 39 % had never had a PSA test [57], and another report describing prior screening among 213 African-American and Caribbean men [64] found that 46 % of those aged 50+ years had never had a PSA. A study of 143 Haitian men aged 40+ years in Miami found nearly 56 % reported

never having had a PC examination [65]. Lastly, a study of more than 4,000 men from seven cities in Latin America (Buenos Aires, Bridgetown, Sao Paulo, Santiago, Havana, Mexico City, and Montevideo), found between 22 % (Havana) and 52 % (Bridgetown) of men reported undergoing a PC examination in the past 2 years [58]. While this work indicates low screening among Caribbean men, with differences in screening varying as a function of location, there are no sub-population comparisons, thus relative rates are not considered.

Between Group Differences: Convenience Samples

More informative are those studies assessing group differences. For example, a convenience study of 180 men in Brooklyn found no differences between US-born European-Americans, US-born African-Americans or Jamaican men in 10 year PSA or DRE frequency [46]. However, a different report from the same data found ethnic effects among those who reported never having had a PSA test [66]. Similarly, a recent report comparing US-born-, African-born- and Caribbean-born black men in Florida, found no differences in screening over the past year between immigrant and US born blacks [67], although overall screening rates were low (<30 %). Importantly, these studies used convenience sampling and may thus not represent population rates. Assessment of screening over the past year [67] is likely to identify a large number of non-screeners [46], and thus obscure within group variation.

We next assessed several studies that, although also using convenience samples, sampled with greater specificity, and included multivariate analyses of 308 men from seven ethnic groups;—US-born European-Americans, African-Americans, men from the English-Caribbean, Haitians, Dominicans, Puerto Ricans, and Eastern-

Europeans. These papers found that Haitians reported fewer DRE and PSA tests than either US-born European-Americans or Dominicans [68, see also 69, 70].

Between Group Differences in Methodologically Advantaged Studies

Finally, we considered several studies based on a more rigorous US-based sample examining patterns of PSA screening among 533 US-born European-Americans, US-born African-Americans, immigrant Jamaicans, and immigrant Trinidad and Tobagonians, aged 45–70 years in Brooklyn, New York. Overall, PSA screening was low, with more than 25 % never having had a PSA and fewer than 50 % reporting infrequent screening (less than once/year). The remaining 25 % reported screening annually as per guidelines. Men from Jamaica and Trinidad and Tobago were less likely to adhere to annual PSA [60, 62], and DRE [63] screening than European-Americans. Other analyses from this sample suggest that although Jamaican and Trinidadian/Tobagonian men were more likely than whites to report at least one PSA test in the last 10 years, they were only about 25 % as likely to maintain regular screening [61].

Overall, the above studies indicate that Caribbean men of African descent tend to report less frequent PC screening than African-Americans or European-Americans. However, there are exceptions and it should be noted that most studies used convenience sampling methods and are US based—thus documenting the behavior of immigrant groups (see Table 1). Studies using more robust sampling and/or methods indicate that Caribbean immigrant men screen less frequently for PC, with Haitian men at greater risk than men from other groups.

Breast Screening Among Caribbean Women of African Descent

The initial review identified 132 studies meeting the search criteria. Inspection of the abstracts identified 56 studies for which a full review was warranted. Of the 132, 112 were excluded; 73 did not report a behavioral screening metric, 23 described Hispanic populations, 4 did not provide group level breakdowns, 11 were not about breast cancer, and one was not peer-reviewed (see Fig. 1). Inspection of articles and reference list examinations resulted in 20 studies providing statistical reports of BC screening among Caribbean samples of African descent (see Table 2).

Of the 20 studies identified, 8 reported on screening over the prior 10 years, 2 assessed screening over the past 1–2 years, and the remaining 10 used ever/never or ever/never/recent metrics. Samples ranged in size from 178 to 3,681, and, as in the PC studies, most (15/20) employed immigrant samples and were US-based (14/20). Most

studies were conducted in the boroughs of New York (13/20), particularly Brooklyn (10/20), with the remaining works from other US locations (1/20), the UK (1/20), and the Caribbean (5/20). Again, most reports, particularly those utilizing more rigorous sampling were from a limited range of research groups in Brooklyn and Manhattan. Design-wise, BC reports were somewhat more robust with only 7/20 being convenience or purposive sample-based and the remainder utilizing more representative strategies.

Absolute Screening Rates

Of the 6 studies looking at absolute screening rates, 4 were conducted in the Caribbean, one was from the US, and one was from the UK. BC screening data from the Caribbean are few and difficult to interpret because of scattered screening programs, incomplete records, and access issues. However, like prostate screening, data indicate that women from the Caribbean screen at low frequencies. For example, a study of 274 women from two medical centres in Jamaica found that 32 % were first time screeners. Of the 155 repeat screeners for whom prior screening dates were available, 48 % had previously screened more than 1 year ago [71]. Similarly, a large-scale Jamaican health survey [72] found that 55 % of women reported having completed a BSE but that only 28 % reported screening on a regular monthly basis, while a small convenience study [73] found moderate rates of past-year mammography (47 %) and CBE (67 %) in the US Virgin Islands. Two reports describing data from a study of over 6,000 women aged 60+ years from the Health, Well-Being and Aging in Latin America and the Caribbean Study (SABE) from 7 cities in Latin America (described above) found that 2-yearly mammography prevalence ranged from around 10 % in Havana to 35 % in Sao Paulo. Another small study conducted in Tobago found that 60 % of women had been taught BSE but only 31 % had practiced in the past month and only 37 % reported more than two BSEs yearly; only 23 % of women reported that CBE was a routine part of doctor's visits [74]. Finally, a single UK-based study among African-Caribbean, Asian, Eastern-European and "Other" women (N = 500) found that, only 22 % reported prior screening [75].

Between Group Differences: Convenience Samples

Of interest, the 3 studies that investigated screening differences between groups with convenience sampling found no differences in self-reported CBE [76], or mammography frequency between African-American, Caribbean [77] and African women [78]. While these studies each report similar findings despite assessing different time frames, (10 years, ever/recent and adherence to guidelines, respectively), studies using more robust methodologies did

Table 4 Summary of studies reporting on colorectal screening behaviors among Caribbean men and women

Article	Sample	Immigrant versus native?	Location	Sampling strategy	Research design	Screening modality	Primary ethnic finding(s)
1 Consedine et al. [96]	245 White, African-American, and immigrant Caribbean community-dwelling men and women (aged 45–75 years)	Immigrant	Brooklyn, NY	Convenience	Cross-sectional Quantitative	Sigmoid Barium Enema FOBT Colon	Jamaicans and African-Americans more likely than Whites to have never undergone FOBT. African-Americans more likely to have never had a colonoscopy than European-Americans
2 Gwede et al. [97]	62 Men and women aged 50+ years in three groups (African-American, English-speaking Caribbean, Haitian)	Immigrant	Hillsborough County, FL, USA	Convenience	Cross-sectional Quantitative	Colon	Only 15 % of Haitians had had a colonoscopy versus 50 % for English-Caribbeans and African-Americans. No (0 %) sigmoidoscopy among Haitians versus 30 % for English-Caribbeans and 23 % for African-Americans
3 Afable-Munsuz et al. [98]	418 Cubans sampled as part of NHIS	Immigrant	Various, US	Population based	Cross-sectional Quantitative	Various	Screening rates higher among foreign born portion of sample
4 Robb et al. [54]	4,303 Persons (of 17,333) who indicated interest in sigmoidoscopy (97 % White, 1 % Black and 2 % Asian)	Immigrant	6 UK FS Trial Centers (Glasgow, Leeds, Harrow, Birmingham, Welwyn Garden City and Leicester)	Quota sampling	Cross-sectional Quantitative	Sigmoid	Mixed sample of African and Caribbean blacks were no less likely than whites to receive a sigmoidoscopy in response to an invite
5 Gorin [55]	950 Hispanic women attending a free CBE or Pap smear clinic	Immigrant	Manhattan, NY, USA	Convenience	Cross-sectional Quantitative	FOBT	Hispanic women from the West Indies (most Dominican Republic) more FOBT than Hispanic women from North, South, or Central America

Colon colonoscopy, *Sigmoid* sigmoidoscopy, *FOBT* fecal occult blood test

find consistent differences in screening rates as outlined below.

Between Group Differences in Methodologically Advantaged Studies

The remaining 10 studies had more representative sampling methods. For example, an early study of 940 women in Brooklyn [79] found that 64 % of Haitians reported no BSE practice, compared to 38 % of English-speaking Caribbean women and 37 % of US-born black women. Two large studies using the same sample (N = 1,420) found that Haitian women were less likely to report ever

having had a mammogram than US black, and Caribbean women [21, 80]. More recently, multivariate analysis showed that women from Montevideo screened less frequently than all others; [58], while a study in Eastern Massachusetts found less frequent mammographic screening among Haitians women than US-whites [81].

The finding that Haitian women are low screeners has been replicated in a series of reports based on a geographically representative sample of 1,364 older women from six ethnic groups in Brooklyn, New York which have provided extensive data on BC screening over the past 10 years among specific groups of Caribbean women. One report showed that women from the English-speaking

Caribbean, together with Haitian, Dominican, and immigrant Eastern-European women reported fewer mammograms than the US-born groups, and that Haitians screened less frequently than English-speaking Caribbean or Dominican women [82]. A similar report found that African Americans reported more frequent mammography than English-speaking Caribbean women who, in turn, screened more frequently than Haitian women [83]. Another report noted that the proportion of never screening women was greatest among Haitians (20 %), was low among Dominicans (4 %) and was comparable among US-born African-Americans (8 %) and women from the English-speaking Caribbean (7 %) [84]. A fourth report from this survey found particularly low mammographic screening among Haitian women and, a separate analysis of the 915 immigrant women, demonstrated that the number of years spent in the US was a predictor of mammography and CBE in multivariate analysis [85]. For BSE, a fifth report found that adherence to guidelines differed between groupings, with only 12 % of Haitians practicing monthly BSE as opposed to 22 % of African-Americans and 30 % of English-Caribbeans sampled. Further, 27 % of Haitians reported never conducting BSE's compared with 21 % of African Americans, and 36 % of Caribbeans [86]. Finally, the most recent report from this data indicated that English-Caribbean and Haitian women were less likely to screen repeatedly over time than European-Americans [87].

Overall, these works suggest that Caribbean women of African descent, particularly Haitians, screen less frequently than other women (and less frequently than is desirable). Differences between English-speaking Caribbean and African-American women were mixed, but as in the prostate data, where differences exist, Caribbean women, particularly Haitians, are disadvantaged.

Cervical Screening Among Caribbean Women of African Descent

The initial review of cervical screening identified 104 studies meeting the search criteria. Inspection of the abstracts identified 30 studies warranting full review. Of the 104, 91 were ultimately excluded; 68 did not report a behavioral screening metric, 8 described Hispanic populations only (see [88]), two did not provide group level breakdowns, one did not provide adequate statistics, 8 were not about CC and four were in Spanish or French language. Inspection of articles and reference lists resulted in 13 studies providing statistical reports of behavioral CC screening among African descent samples of Caribbean women (see Table 4). Most studies (8/13) were among immigrant samples, although, in contrast to other screens, a smaller proportion (7/13) were based on convenience or purposive sampling. Of the 13 studies, 5 assessed screening

across a 1–3 year timeframe, and the remaining 8 used ever/never or ever/never/recent metrics. Samples ranged in size from 16 to 70,775.

Absolute Screening Rates

Six studies reported absolute screening rates among Caribbean sub-groups. One study found that among 940 women of Haitian descent, 67 % reported previous screening, and 44 % reported screening in the past 3 years [89]. Despite having a Ministry of Health endorsed program providing free Pap screens, only 6 % of Jamaican women aged 25–54 years underwent cervical screening in 2005 [90]. Conversely, in a UK based study, all 16 African-Caribbean women reported having previously had at least one smear test [91], while a Jamaican study found that while approximately 50 % of Jamaican women had received a Pap smear at least once, only 15 % had screened in the past year [72]. A UK based intervention study reported that prior to intervention, 81 % of African-Caribbean women reported a prior Pap smear, with 98 % reporting screening post intervention [75]. Finally, the one study of CC screening that did not rely on self-report and instead used data from the four centers in Nevis that perform Pap tests (Charlestown, Gingerland, Butlers and Combermere) found Pap testing rates of approximately 6–8 % between 2001 and 2007 [40].

Between Group Differences: Convenience Samples

Of the seven studies looking at between group differences, all used robust sampling methods as opposed to convenience sampling.

Between Group Differences in Methodologically Advantaged Studies

The earliest of these studies showed that approximately 25 % of English-speaking Caribbean immigrants (N = 228) reported no prior Pap test, compared to 10 % of US-born black women (N = 264) [79]. A study of 1,420 women found that US black and Caribbean black women were more likely to report ever having had a Pap than Haitian women [80]. Similarly, a study in Massachusetts found that Pap smear rates were lower among Haitian than African-American, English-Caribbean, or Hispanic women [92], while a recent analysis from NHIS data showed that the adjusted prevalence of never having had a Pap was 11 % among Caribbean women compared to 6 % among US-born women [93]. Finally, data from the seven-city, SABE study suggest that between 23 % (Bridgetown) and 46 % (Mexico City) of women had a Pap smear in the past 2 years [58]. A related report [94] found 2-year prevalence

of Pap smear use ranging from 21 % in Bridgetown to 46 % in Mexico City.

The above synthesis indicates that although the overall frequency of CC screening was low, differences between Caribbean women of African descent and African-American women are scattered. While there are few cervical screening data for immigrant Caribbean women, Haitians again reported the fewest screens [80, 95].

Colorectal Screening in Caribbean Subpopulations of African Descent

The initial review identified 43 studies meeting search criteria. Inspection of the abstracts identified 20 studies for which a full review was warranted. Of the 43, 38 were excluded; 32 did not report a behavioral screening metric, two described Hispanic populations, one did not provide a group level breakdown, two were not about CRC and one was in French; thus we examined five studies documenting colorectal screening among Caribbean men and women of African-descent (see Table 4). Of those included, 1/5 assessed screening over the past year, and 1/5 assessed screening over the past 10 years. One used an ever/never metric and 2/5 collected data regarding responses to an invitation to screen. Samples ranged in size from 62 to 4,303. All studies were of immigrant samples with 4/5 being US-based and the remaining study being UK-based; 3/5 utilized convenience sampling methods while 2/5 utilized more robust and representative strategies (see Table 4).

Absolute Screening Rates

Of the five studies identified, all reported between group comparisons, three of which used convenience samples.

Between Group Differences: Convenience Samples

Despite using different time frames—i.e., 10 years [96], ever/recent [97] or uptake of an invitation to screen [55], all three studies using convenience sampling methods reported similar findings, namely, that Jamaican immigrants and Haitians screen less frequently. Interestingly, Dominicans appear to screen more frequently. For example, the most recent of these reported that Jamaican immigrants were more likely to have never had an FOBT than African- or European-Americans [96]. One small study found that 15 % of Haitian participants reported having ever had a colonoscopy compared to 50 % for English-speaking Caribbeans and African-Americans; no Haitian-born respondents reported a previous sigmoidoscopy compared to 30 % for English-speaking Caribbeans and 23 % for African-Americans [97]. Data from a study of

950 Hispanic women attending free clinics in Manhattan found that those from the West Indies (primarily the Dominican Republic) were more likely to complete an FOBT than women from North, South, or Central America [55].

Between Group Differences in Methodologically Advantaged Studies

Of the two studies using more representative sampling strategies, one used data from the NHIS and found that approximately 1/3 of the 418 Cubans sampled were current with CRC screening, however screening rates were higher in the foreign born portion of the sample [98]. Secondly, a large UK-based study of 4,303 persons expressing interest in sigmoidoscopy found that the African and Caribbean portion of the sample (1 %), were as likely to accept an invitation to receive a sigmoidoscopy as whites [54]. Two of the five studies investigating CRC screening assessed rates of acceptance of an invitation to screen, but nonetheless rely on self-report for baseline screening rate estimate; data quality is thus equivalent to that of other self-reported studies.

Discussion

Rates of Caribbean migration and the potential for major ethnic screening rate differences to be obscured by sample heterogeneity combine to suggest that understanding patterns of cancer screening among persons of African-descent from the Caribbean is increasingly important. As expected, our review of published studies documenting screening for breast, prostate, cervical and colorectal cancer among immigrant and non-immigrant African-descent groups from the Caribbean revealed considerable variation in screening rates among specific subpopulations. In addition to revealing a systematic tendency for men and women from these groups to under-screen, Caribbean subpopulations tended to screen (even) less frequently than African-American samples.

Although preliminary, this review and synthesis provides evidence for several interim conclusions and offers clear direction for empirical research. First, data suggest that subsuming distinct Caribbean subpopulations within undifferentiated “African American” or “Black” groupings is not warranted. Research-wise, greater specificity in both sampling and sample description are needed, as are studies employing more rigorous and representative sampling strategies. Although some null findings were evident, the absence of differences were more common in convenience sample-based designs. More representative studies tended to indicate that men and women from specific

African-descent Caribbean populations screen less frequently than samples of African-Americans. Further, the available data are clear in demonstrating that persons from the Caribbean screen substantially below recommended levels. Low screening was evident among both native Caribbean samples as well as among immigrants residing in healthcare contexts where services are more readily available (i.e., the United States or United Kingdom). Again, however, further work is needed. Although there are numerous barriers to research based in the Caribbean (see below), future studies would benefit from using standardized and contextually-sensitive instrumentation to systematically contrast screening frequencies in native versus non-native Caribbean groups.

This review highlights on-going issues in the operationalization of both ethnic group membership and outcomes. Ethnically, access issues and small samples often result in persons with different origins being aggregated within “English-Caribbean” or “immigrant black” groups and studies vary in how screening is assessed; almost all published studies of screening among Caribbeans are self-report based and variations in the timeframe that is used (e.g., ever/never, past 12 months, etc.) make comparisons difficult. Consequently, designs that systematically assess screening according to guideline-relevant timeframes and nativity-type data are sorely needed.

Finally, it is worth noting that only 13 % (PC), 25 % (BC), 33 % (CC) and 0 % (CRC) of the identified studies were conducted in the Caribbean, with most work conducted in a small number of major US cities and the UK. Similarly, a large proportion of articles, particularly in BC and PC screening work, reflect the efforts of a small number of research groups working in Brooklyn and Manhattan. Given the impact of socio demographic and structural variables (i.e., context) on screening behavior, this represents a serious limitation. While patterns of screening among immigrant Caribbean groups can inform resource decisions and policies within the healthcare provision systems of new environments, they may or may not offer data relevant to screening in contexts of origin. Immigrants are, by definition, a heavily self-selected grouping. As such, the available data may reveal the behavior of a subset of individuals and/or reflect the “expression” of particular ethnic or cultural characteristics in a novel context. Work conducted in Caribbean contexts is urgently needed.

Collaborative research initiatives with well designed investigations involving the study of native and immigrant African Caribbean populations could prove to be a good start in addressing these ongoing issues. One such example is the African Caribbean Cancer Consortium (AC3) [99, 100] a collaborative group of three connected networks of US, Caribbean and African investigators with a common

goal in addressing biological, environmental and behavioural factors related to cancer risk and outcomes in African descended populations. Cancer research can be promoted in native and immigrant Caribbean populations by leveraging the expertise and resources within and between low- and high-resource countries. Capacity-building efforts in the Caribbean that involves the development of cancer registries would provide more accurate cancer identification and set the stage for screening and research prioritization in Caribbean populations. Scientific training venues that promote interactions between US and Caribbean research scientists would facilitate knowledge-transfer [99, 100] and designs involving both native and immigrant Caribbean populations would define more clearly the impact of ethnic origin and screening behaviour on cancer risk and outcomes; these are all core issues currently being addressed by the research members of the AC3 [101–107]. Ultimately benefits will be realized by both US (African American and immigrant Caribbean) and native Caribbean populations leading to further definition of priority areas for intervention, screening, policy development and, ultimately, cancer control.

Limitations and Future Directions

Along with the limitations of the data mentioned above, methodologically, a few comments are also of note. First, our review was restricted to publications in the English language appearing in Medline, Web of Science, PubMed and SCOPUS. Although only 1.4 % of initially identified abstracts were excluded because of being in another language (see Fig. 1), the exclusion or non-identification of non-English-language publications may have inflated our estimates regarding the absence of Caribbean-based work. Second, across the four screen types identified in the initial searches, nearly 70 % of studies were excluded because they lacked a description of screening behavior. Although a proportion of these exclusions reflect interests in non-behavioral processes, the remainder tended to be studies only assessing knowledge and subjective barriers, which could readily incorporate self-reported screening metrics. More broadly, and despite their increasing representation in Western populations, there are comparatively few data regarding the cancer screening behaviors of either Caribbean immigrants or Caribbean natives. Although literatures addressing BC and PC screening are growing, our review identified very few studies of CRC screening behavior in Caribbean groups. Finally, publication bias is always a concern in such reviews, and while we took steps to minimise this, there is always the possibility that unpublished data have not been included.

New Contribution to the Literature

In addition to being of importance to health within the Caribbean itself, improved transport and communication together with an increasingly globalized workforce suggests that rates of Caribbean immigration will continue. US data show that the Caribbean remains among the largest contributors to immigration, with more than 100,000 new residents arriving annually. Given such patterns, documenting and understanding patterns of cancer screening behavior will become increasingly important.

In contributing to this key area of public health research, our systematic review of published, English-language studies makes several specific contributions. First, it highlights the critical dearth of cancer screening work being conducted among African-descent populations in the Caribbean, particularly in CRC screening for which only five studies were identified. Across the four cancer screens considered here (50+ studies), nearly 80 % of the published work we reviewed was conducted among immigrants to the US or the UK, with less than one-fifth of studies actually being conducted within the Caribbean.

Second, our review is clear in suggesting that despite some variation across samples, screening for breast, prostate, colorectal, and cervical cancers is routinely lower among Caribbean men and women than among other groups of African descent; while we were limited by the number of studies conducted within the Caribbean (below), there was no systematic evidence of this pattern varying between native and immigrant health contexts. Thus, our review provides further evidence that subsuming distinct Caribbean subpopulations within undifferentiated racial groupings is not warranted. Future work would benefit from increasing the methodological rigor with which samples are derived and ethnic group membership operationalized.

Appendix : Search Strategy: PubMed

Limits: 1980–2012 and English Language

1. Caribbean OR Jamaican OR Afro-Caribbean OR Haitian
2. Screening
3. Prostate
4. PSA OR Prostate Specific Antigen OR DRE OR digital rectal examination
5. 1 and 2 and 3 and 4.
6. Colorectal
7. Sigmoidoscopy OR FOBT OR Faecal Occult Blood test OR Colonoscopy OR Barium Enema
8. 1 and 2 and 6 and 7

9. Breast
10. Mammogram OR CBE OR Clinical Breast Exam OR BSE OR Breast Self-Exam
11. 1 and 2 and 9 and 10
12. Cervical OR Cervix
13. Papanicoiaou OR Smear OR Pap OR Cervical Cytology
14. 1 and 2 and 12 and 13.

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