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Obesity, Type 2 Diabetes, and Dietary Acculturation among Foreign-Born Blacks in New York City

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OBESITY, TYPE 2 DIABETES, AND DIETARY ACCULTURATION AMONG FOREIGN-BORN BLACKS IN NEW YORK CITY

A DISSERTATION

by

MARGRETHE F. HORLYCK-ROMANOVSKY

Concentration: COMMUNITY, SOCIETY AND HEALTH

Presented to the Faculty at the CUNY Graduate School of Public Health and Health Policy in partial fulfillment of the requirements for the degree of Doctor of Public Health

Graduate School of Public Health and Health Policy
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ABSTRACT

Obesity, Type 2 Diabetes, and Dietary Acculturation Among
Foreign-Born Blacks in New York City
by
Margrethe F. Horlyck-Romanovsky

Advisor: Terry T-K. Huang

Abstract (for the overall dissertation)

Background: Black immigration to the US quadrupled between 1980 and 2000, and between 2000 and 2013 it further increased by 56%. The US Census estimates that by 2060, 16.5% of the US Black population will be foreign-born. Half of all foreign-born Blacks (FBBs) in the US, or more than 1.9 million people, are from the Caribbean, and of those, 682,000 were born in Jamaica alone. Besides the Caribbean, there are 1.36 million immigrants from sub-Saharan Africa. In New York City, non-Hispanic black Caribbean and West African immigrants constitute 19% and 4%, respectively, of the total foreign-born population. Research is limited on the health of FBBs, as they are often grouped with African Americans.

In the US, 56.6% of all Black women and 37.1% of Black men are obese, compared to 36.1% and 33.5% for women and men, respectively, in the overall US population. In NYC, obesity prevalence is significantly lower for African FBBs (20.9%) and Caribbean FBBs (28.7%) compared to US-born Blacks (USBBs) (36.4%). In the US Black population Type 2 Diabetes (T2D) is prevalent, 12.7%, compared to 9.4% in the overall population. Self-reported T2D shows
the greatest disparity between the FBBs of African and Caribbean origin. Among those from Africa, 5.6% of women and 6.9% of men report having T2D, compared to 10.6% of women and 9.3% of men from the Caribbean.

This dissertation sought to uncover the intra-ethnic variation in obesity and T2D odds among FBBs and US-born Blacks, as well as comparing the odds between FBBs from Africa and the Caribbean. A qualitative component aimed to identify intergenerational differences in risk profile, cultural practices and acculturation experiences that may contribute to any difference in odds in Ghanaian and Jamaican immigrant families.

**Quantitative methods:** Analyzing the 2009-13 NYC Community Health Survey, weighted multivariate logistic regression analyses examined odds of obesity and diabetes, adjusting for age, gender, education, income, marital status, children <18, BMI (for diabetes only) and duration of residence. Statistical Analysis Software (SAS) version 9.4 (Cary, NC) was used for all statistical analyses.

**Qualitative Methods:** Conducting focus groups and interviews with 25 Ghanaian and 24 Jamaican immigrants, interviews and focus groups used open-ended questions, were digitally recorded and lasted between 45 and 90 minutes. Recordings were transcribed, and transcripts analyzed using Dedoose 7.0. Utilizing Grounded Theory Methodology (GTM), we used in-vivo codes and identified emerging themes. An intake survey collected information about socio-demographics, health behaviors and health outcomes. Statistical analysis was completed with Statistical Package for the Social Sciences (SPSS) version 23.
**Results:** When comparing FBBs to USBBs, FBBs had lower odds of obesity and greater odds of diabetes. FBBs had 1.4 times the odds of diabetes at overweight status, compared to USBBs. Living in the US ≥10 years was not associated with odds of obesity and diabetes.

When comparing African FBBs to Caribbean FBBs, prevalence of obesity and diabetes was lower among African FBBs. African FBBs also had significantly lower odds of obesity but only marginally lower odds of diabetes compared to Caribbean FBBs. Furthermore, African and Caribbean FBB women experienced higher odds of obesity compared to their male counterparts.

For Ghanaian and Jamaican FBBs, the effects of globalization, nutrition transition and remote acculturation were significant contributors to dietary acculturation and health outcomes. Dietary acculturation began in the home country and was perceived as a positive process by the families who participated in the study. In fact, dietary acculturation experienced in Ghana and Jamaica was an active process by which families accessed and provided increased intake of energy, fat, sugar, sodium and animal protein, and more meals away from home. Once in the US, the dietary acculturation experience continued, but was different between youth, parents and grandparents. One surprising finding was that cultural enclaves, which have been shown to protect immigrants against acculturative stress and dietary acculturation, may have different effects on youth and adults.

**Conclusion:** Despite prior findings that FBBs are healthier than USBBs, these three studies demonstrate that the healthy immigrant effect may no longer apply to FBBs in NYC. Most importantly, this dissertation illustrates the heterogeneity of risk within populations of African origin living in the US. FBBs experience lower odds of obesity, but higher odds of T2D than USBBs, yet Caribbean FBBS experience greater odds of both obesity and T2D than African
FBBs. Furthermore, Ghanaian and Jamaican immigrants experienced the effects of dietary acculturation beginning in the home countries and facilitated by globalization of food and transnational families. Intergenerational differences in both populations manifested in the exposures to and acceptance of American foods. These findings point to the danger of drawing conclusions about public health risks by examining all Black populations as one group. In addition, this illustrates that dietary acculturation is a global phenomenon which affects diet and diet-related health before FBB populations migrate to the US.

**Keywords:** Obesity; diabetes; Black; African; Caribbean; immigrant; dietary acculturation; intergenerational; transnational; duration of residence.

**MeSH Terms:** Obesity; Diabetes Mellitus, Type 2; Emigrants and Immigrants; African Continental Ancestry Group; Africa; Caribbean; New York City.
Acknowledgements and Disclosure Statement

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I received permission from the NYC Department of Health to retain full access to the NYC Community Health Survey data, survey years 2009-2013, as well as survey weights created specifically for the five years of data (Chapters 2 and 3). This data, along with the interviews and focus group recordings and transcripts were collected by me and stored in my office at Brooklyn College. If I leave CUNY, the files will be brought to the CUNY Graduate School of Public Health and Health Policy.

Research activities for Aims 1 and 2 were deemed exempt from review by the City University of New York Human Research Protection Program.

Research activities for Aim 3 were approved by the City University of New York Human Research Protection Program, Protocol #2016-1201.
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Chapter 1. Introduction

Black immigration to the US quadrupled between 1980 and 2000, and between 2000 and 2013 it further increased by 56%. In 2013, 8.7% of the US Black population was foreign-born, representing 3.8 million people. (1) The US Census estimates that by 2060, 16.5% of the US Black population will be foreign-born. Half of all foreign-born Blacks (FBBs) in the US, or more than 1.9 million people, are from the Caribbean, and of those, 682,000 were born in Jamaica alone. Besides the Caribbean, there are 1.36 million immigrants from sub-Saharan Africa such as Nigeria, Ethiopia, Ghana and Kenya. (1, 2) Indeed, immigration from Sub-Saharan Africa to the US increased by 137% between 2000 and 2013, suggesting that African immigration may soon surpass Black Caribbean immigration. (3)

1.1. Obesity in Black Populations in the US

In the US, Blacks are more likely to suffer from obesity than any other racial group, as 56.6% of all Black women and 37.1% of Black men are obese, compared to 36.1% and 33.5% for women and men, respectively, in the overall US population. (4) Significant health disparities also exist between sub-ethnic groups within the Black population. In NYC, obesity prevalence is significantly lower for African FBBs (20.9%) and Caribbean FBBs (28.7%) compared to US-born Blacks (USBBs) (36.4%). In a national sample, FBB men from the Caribbean and Africa experience the lowest rates of morbid obesity, 4.6% and 3.7% respectively, compared to 15.1% among USBB men. However, FBB Caribbean men (49.3%) and FBB African men (48.3%) are more likely to be overweight than USBB men (38.6%). (5) Indeed, mean BMI is lower in FBBs than USBBs. (6) This suggests that, for reasons that remain unclear, the BMI distribution among FBBs has not shifted as far to the right of the curve as for USBBs. In fact, the negative
association between foreign-born status and BMI is strongest among FBBs from the Caribbean \( (\beta = -1.41, \ p=0.07) \) compared to all other immigrant groups.\(^{(6)}\) Due to the epidemiological transition in the home countries, risk profiles may also vary between the regions of origin. An international study comparing Jamaicans, Nigerians and African Americans living in the US demonstrated that adjusted annual weight gain was significantly greater in Jamaica (1.37Kg/year) compared to the US (0.52 kg/year) and Nigeria (0.31kg/year). However, Jamaican women were less likely to gain weight than Jamaican men, whereas Nigerian and US women were more likely to gain weight compared to men.\(^{(7)}\) Recent clinical research findings have demonstrated that compared to USBB men, African FBB men living in the US are less likely to be obese, but more likely to have diabetes or pre-diabetes, at lower BMI.\(^{(8, 9)}\) Therefore population-based studies that include FBB men and women from different regions and ethnic groups are warranted.

1.2. Type 2 Diabetes in Black Populations in the US

In the US Black population Type 2 Diabetes (T2D) is prevalent, 12.7%, compared to 9.4% in the overall population. Self-reported T2D shows the greatest disparity between the FBBs of African and Caribbean origin. Among those from Africa, 5.6% of women and 6.9% of men report having T2D, compared to 10.6% of women and 9.3% of men from the Caribbean.\(^{(5)}\) However, a recent study in New York City (NYC) found no significant difference in T2D prevalence between African FBBs (13%), Caribbean FBBs (14%) and USBBs (13%).\(^{(10)}\) The lower risk of obesity paired with a similar or increased risk of T2D suggests that FBBs may have a different T2D risk profile compared to USBBs.
1.3. Acculturation and Eating Habits among FBBs

Immigrants generally have significantly better eating habits and health indicators at the time of entry, but these health indicators deteriorate after several years in the US. (11) However, this effect appears to be less significant among FBBs than other immigrant groups, as duration of residence in the US has generally not been found to be associated with obesity in FBBs. (12) However, despite the lack of association between duration of residence and obesity among FBBs, age at arrival in the US may be associated with health outcomes. According to one study, the healthiest FBB immigrants in terms of physical disability were recent adult immigrants who arrived in the US between the ages of 20-54. Those who arrived as children or adolescents, or as adults over age 55, had higher odds of disability than those who arrived between the ages of 20 and 54. (13) It is unclear what might explain these age effects. It is also unclear whether the null effect of duration of residence in the US is true in different age cohorts. For example, one study showed that, compared to other groups, the prevalence of excessive gestational weight gain was the lowest among FBB teen mothers who had lived in the US <10 years (30%). However, among FBB teen mothers who had lived in the US for ≥10 years, 39.2% experienced excessive gestational weight gain, approaching the rate of 41.35% among USBB teen mothers. (14) Thus, age at arrival may moderate the relationship between duration of residence in the US and health outcomes.

The immigrant presents with socioeconomic, demographic and cultural factors at the time of arrival in the US (e.g., age, gender, education, income, marital status, language, social norms around food etc.). The encounter with US culture in turn represents changes in environmental factors such as affordability and accessibility of ingredients to prepare traditional foods, availability of prepared foods, as well as time and space for food preparation. The exposure to
the host culture also facilitates changes in psychosocial factors and taste preferences, such as value ascribed to traditional foods and US foods. These changes affect dietary intake and may therefore affect health outcomes. However, dietary acculturation is subtle, multidimensional, complex and dynamic. It is a non-linear exchange in which elements of two or more cultures merge. (15) Immigrants and their children adapt to the new culture and selectively adopt foods or foodways of the host country while retaining some practices of their country/culture of origin. (11, 16) The increased affordability of and accessibility of food in the host country may also increase or alter consumption of both mainstream and specific traditional foods, or facilitate modifications of recipes or preparation methods. These shifts alone may be responsible for the increase in calories, meat, fat, starch and sugar characteristic of diets, more so than the mere adoption of American foods. (17, 18) Current acculturation theories regard the active move to a different region or another country as the threshold to change. (11) However, Foodways associated with American culture may already be intrinsic parts of the immigrant identity before the transition to the US. As a result of globalization, trade and foreign investment policies, the global nutrition transition is characterized by imported foods and food brands being more convenient and potentially less expensive than local foods in immigrant countries of origin. (19) Youth may be particularly sensitive to remote acculturation which is facilitated by a number of vehicles, including US media, digital platforms, remittances and tourism. (20) These outside influences contribute to contradictory value systems and cultural identities in which unhealthy imported foods are considered to be of a higher status than healthier fresh, local and traditional foods. (21, 22)

There is some evidence to suggest that FBBs represent unique cultural practices and experiences of acculturation. Identity formation in immigrant families is associated with navigating multiple
domains and contexts. It has been noted that the “strongest indication of being Jamaican is tied to the traditional foods of the island,” and although Caribbean foods may be cooked and served on a daily basis, mothers and grandmothers are not necessarily teaching their children how to cook, possibly to maintain “an element of control or centrality in the family gatherings.”(23) This matrifocal power dynamic is of interest, particularly as two out of every three Jamaican immigrant families have a female head of household.(24) Family structure, much more than location, is a crucial factor in whether children experience a relationship between cooking, food, cultural traditions and ethnic identity. Traditional foods appear to be deeply linked with cultural transmission and the enculturation of young people regardless of whether they grow up in the home country or the diaspora.(25) Nigerian immigrants believe that traditional dietary practices are healthy, foods are consumed in moderation, heavier meals are consumed during the day, and physical activity is a part of everyday life. However, the hectic lifestyle in the US may affect cultural practices and diet, so that “when you’re going to work and you can’t cook, and you don’t have time, it’s a problem.”(26)

Although both African and Caribbean FBBs may seek to distinguish themselves from the African American population, the experience of racism in the US contributes to their health risks.(27) Structural, institutional and personal racism determine contextual factors for FBB families such as residential segregation, food access, educational opportunities and health outcomes.(28) In addition, recent research indicates that acculturative changes in immigrants may be due to increased experiences of racism.(28) Although recent FBB immigrants appear to benefit from the healthy immigrant effect (29), increasing duration of residence has been associated with racism–related stress (30) and increased allostatic load.(31)
Research is needed to further elucidate the cultural contexts that give rise to the unique dietary and health profiles of FBBs of varying origin. (32) Despite economic barriers, limited access to healthy and cultural foods, obesogenic environments, lack of time to cook and sedentary behavior associated with living in the US. (26, 33) Existing survey studies often obscure the health characteristics of FBBs by combining them with USBBs or provide little information on the dynamics of culture. A mixed-method approach focused on FBBs is needed to bridge current gaps in research.

1.4. Enculturation among FBBs

Enculturation is the learning and socialization into the ways of thinking, feeling and behaving within a particular culture or society, which includes language, food preferences, meal behaviors and social interactions. Enculturation is the adoption of one’s own culture compared to acculturation which is the adaptation to another culture. (34, 35) Traditional foods appear to be deeply linked with cultural transmission and the enculturation of young people regardless of whether they grow up in the home country or the diaspora. (25) West African immigrant families in NYC express concern that their children are not socialized in the family’s culture of origin and quickly become acculturated to US foodways. Nigerian immigrants believe that traditional dietary practices are healthy, foods are consumed in moderation, heavier meals are consumed during the day, and physical activity is a part of everyday life, but find that time constraints limit the time available to cook and exercise. (26) However, Ghanaian immigrants in NYC fear that traditional foods may be detrimental for their health because of the high calorie content and the low level of physical activity associated with living in the US. (36)
1.5. Gaps in the Literature

There are significant gaps in the literature on obesity, T2D and dietary acculturation among FBBs living in the US. Population level health disparities research among ethnic immigrant groups has concentrated principally on the largest immigrant groups to the US, i.e. Asian and Hispanic populations. (37) Reasons for the relative paucity of data documenting the health of African and Caribbean FBBs include the fact that all Blacks are often combined as Black or African American in epidemiological studies regardless of origin, genetics and cultural heritage. Furthermore, the few national datasets which do provide detailed information about nativity, age at arrival and country of origin have limited sample sizes representing FBBs from Africa and the Caribbean. These relatively small samples often make it difficult to carry out satisfactory studies and detect significant relationships. Studies which include USBBs and FBBs therefore often combine populations with very different genetic and cultural heritage as one or two groups in epidemiological research. (38) Moreover, most existing research on the health of FBBs from Africa and the Caribbean generalize by region of origin, obscuring the complex cultural heritages of both regions. (39) The difference between obesity prevalence among the overall US Black population (47.8%) (4) and the NYC Black populations also warrants further examination as all Black groups in NYC experience significantly lower obesity rates than the national average (African FBBs, 20.9%, Caribbean FBBs, 28.7%, USBBs, 36.4%, and FBB other, 28.4% respectively). (10)

Furthermore, little is known about dietary habits and acculturation among African and Caribbean FBBs who live in NYC. One qualitative study explored the dietary changes among adult Ghanaians in the Bronx as part of a larger study of the epidemiological paradox, (36) and another studied dietary acculturation and physical activity among adult Nigerian immigrants in an urban
An additional study investigated dietary acculturation in the context of matrifocal families among female Jamaican immigrant youth living in Canada. (23) To the best of my knowledge, none have examined the intergenerational complexity of dietary acculturation among FBBs from the youth, parent and grandparent’s perspectives.

1.6. Importance of this Research

The primary purpose of this dissertation is to examine the intra-ethnic variation in obesity and T2D odds among FBBs from Africa and the Caribbean typically classified as African American/Black; and to uncover some of the differences in risk profile, cultural practices and acculturation experiences that may contribute to any difference in odds. This research is important because a more nuanced understanding of difference in risk profile for sub-ethnic Black or African American groups will enhance our understanding of minority health. Public health and clinical screening criteria developed for target populations defined by race alone may not identify FBBs from Africa and the Caribbean because of their difference in risk profile. Given that the FBB population in the US constitutes a significant share of the US Black population and is expected to increase, a more nuanced understanding of intra-ethnic variation should inform public health screening criteria for specific groups.

1.7. Structure of this Dissertation

This dissertation presents the findings in three separate papers, each paper examining one specific aim. In Chapter 2, I present the results of a multivariate logistic regression analysis investigating how obesity and T2D differs between FBBs and USBBs in NYC. Specifically, this paper compares the odds of obesity and T2D between FBBs and USBBs, and the effect of
duration or residence. Further analyses examine the prevalence and odds of T2D at different BMI. In Chapter 3, a second multivariate logistic regression analysis illustrates how odds of obesity and T2D differ between FBBs from Africa vs. the Caribbean. To further elucidate the complexity of experience and disease risk, in Chapter 4, a qualitative study presents evidence from interviews and focus groups with members of Ghanaian and Jamaican immigrant families that explores cultural, psychosocial, contextual and family factors that underlie the unique dietary acculturation process among FBBs from Ghana and Jamaica. This analysis will also illustrate the ways and the extent to which cultural practices and the acculturation experience are passed on from generation to generation.

1.8. Specific Aims for this Dissertation

**Aim 1:** Investigate how obesity and T2D may differ between FBBs and USBBs in NYC, using data from the NYC Community Health Survey (NYC CHS).

  **Hypothesis 1a.** FBBs have lower odds of obesity and lower odds of T2D than the USBB population.

  **Hypothesis 1b.** Duration of residence affects odds of obesity and T2D among FBBs.

**Aim 2:** Investigate how obesity and T2D may differ between FBBs from the Caribbean vs. Africa living in NYC, using data from NYC CHS.

  **Hypothesis 2a.** FBBs from Africa have lower odds of obesity and lower odds of T2D than FBBs from the Caribbean.

  **Hypothesis 2b.** The effects of duration of residence in the US are different between FBBs of African vs. Caribbean origin.
Aim 3: Understand how cultural practices and the acculturation experience influence dietary patterns of FBBs across generations using in-depth interviews and focus groups with members of FBB families of African vs. Caribbean origin.

Sub-aim 3a. Identify protective cultural, psychosocial, economic, contextual and family factors that underlie the unique dietary acculturation process among FBBs relative to other immigrant groups.

Sub-aim 3b. Understand the ways and the extent to which cultural practices and the acculturation experience are passed on from generation to generation.

1.9. Informing the Agenda of Minority Health and Health Disparities Research

In summary, there is an urgent need to better understand the health of FBBs as they represent one of the fastest growing segments of the US population. Limited findings in the UK, Canada and the US suggest that Black immigrant groups may have distinctly different health outcomes from each other and from USBBs, and that consideration of the unique cultural context of each group is warranted. (12, 33, 40-42) More research is needed in the US in particular, as findings from the UK and Canada may not extend to the US due to different contexts in the host country and because FBBs in each country represent different waves of immigration. Whereas most Caribbean FBBs in the UK migrated there in the 1950s and 1960s, (43) almost two thirds of the Caribbean FBBs in the US migrated after 1980. (44) Similarly, the vast majority of African FBBs immigrated to the US after the 1980s. (45)

A deeper look at FBBs in the US is also aligned with the research framework of positive deviance, as a better understanding of the protective factors and processes in FBBs which may inform new preventive strategies aimed at other groups in the community. (46) The current
dissertation will be one of the first studies to systematically examine the diet-related health of FBBs of Caribbean and African origins. In particular, this research will contribute new knowledge on odds of obesity and T2D in FBBs. In addition, this research will shed light on the unique cultural contexts and experiences of acculturation among FBBs from Ghana and Jamaica and how these may be transmitted, or not, inter-generationally. Findings will significantly inform the agenda of minority health and health disparities research.
Chapter 2. Foreign-Born Blacks Experience Lower Odds of Obesity but Higher Odds of Type 2 Diabetes than US-Born Blacks in New York City

2.1. Introduction

Between 2000 and 2013, non-Hispanic Black (hereafter referred to as Black) immigration to the US increased by 56%. By 2013, 8.7% of the US Black population or 3.8 million people were foreign-born.(1) In 2013, 36% of all foreign-born Blacks were from Africa, and 60% hailed from the Caribbean.(1) In New York City (NYC), 671,333 Black African and Caribbean immigrants constitute 23% of the entire foreign-born population.(47) In addition, the 8th largest and fastest growing group of foreign-born residents in NYC is West Africans (76,710), with a population growth of 60% since 2000.(47) The US Census estimates that, by 2060, 16.5% of the US Black population will be foreign-born.(2)

Limited evidence shows that foreign-born Blacks (FBBs) and US-born Blacks (USBBs) may have different health profiles. A national cross-sectional study (National Health Interview Survey 2000-2013) showed that the odds of obesity were significantly lower for Caribbean (OR=0.51, 95% CI 0.44-0.58) and African (OR=0.41, 95% CI 0.34-0.50) FBBs compared to USBBs.(40) Similar to obesity, FBBs were 25% less likely to have type 2 diabetes (T2D) compared to USBBs (Prevalence=8.9% vs. 11.8%), though odds of T2D were higher among FBBs of Caribbean vs. African origin.(5) A recent study from NYC showed that age-standardized obesity prevalence was significantly lower for Caribbean FBBs (28.7%) and African FBBs (20.9%) compared to USBBs (36.4%). In contrast, the same study showed no significant difference in T2D prevalence between Caribbean FBBs (14%), African FBBs (13%) and USBBs (13%).
However, these analyses did not adjust for socioeconomic, demographic and acculturation variables.(10)

Of note, contrary to findings in other immigrant groups, duration of residence in the US has not consistently been found to be associated with either BMI (6, 48, 49) or T2D among FBBs, suggesting a possibly lower level of dietary acculturation among FBBs in particular.(6) When compared to FBBs living in the US for <5 years, FBBs from the Caribbean, South America and Africa living in the US for ≥15 years experienced increased obesity odds (OR=1.51, CI 1.10, 2.08).(40)

This study sought to investigate how the odds of obesity and T2D differed between FBBs and USBBs in NYC, using five years of data from the NYC Community Health Survey (CHS), 2009-2013. We hypothesized that FBBs would have lower odds of obesity and T2D than the USBBs; the relationship between T2D and BMI would be similar in FBBs and USBBs; and sought to explore whether duration of residence was associated with odds of obesity and T2D.

2.2. Methods

Five years of data from the NYC CHS from 2009 to 2013 were used to examine the relationship between nativity, obesity and T2D in Black population groups in NYC. NYC CHS is a cross-sectional telephone survey with an annual stratified randomized sample of approximately 8,500 adults ≥18 years of age. Sampling is done from land lines and households with only cell phones from the five boroughs in NYC. Computer-assisted telephone interviews are administered in English, Spanish, Russian, and Cantonese/Mandarin. Interpretation services are available for other languages.
2.2.1. Participants

The NYC Department of Health (DOH) provided a de-identified and publicly available dataset and sample weights for combined years 2009 to 2013, with a total sample of 44,886 adult New Yorkers ≥18 years of age, of which 3,701 were FBBs and 6,297 were USBBs. (50) The City University of New York Central Human Research Protection Program deemed this study exempt from review.

2.2.2. Measures

Obesity was defined as BMI of 30 or greater (yes/no), and was calculated from self-reported height and weight. T2D was self-reported (i.e., ever told by a medical professional that the person had diabetes, yes/no). NYC CHS questions did not distinguish between type 1, type 2 and gestational diabetes. Addressing this limitation, women who indicated only having diabetes while pregnant were included in the “no” category. Type 1 diabetes is relatively rare in Blacks. (51)

Race was self-reported as Hispanic, non-Hispanic White, non-Hispanic Black, non-Hispanic Asian/Pacific Islander, and non-Hispanic Other. Only those who self-identified as non-Hispanic Black were included in this analysis. Nativity was defined as FBB vs. USBB where FBB self-identified as Black and born outside the US, and USBB self-identified as Black and born in the US or US territories. Total Black was the total of FBBs and USBBs. Time in the US was defined as time lived permanently in the US, categorized as <10 years or ≥10 years. Age was categorized as 18-24 years, 25-44 years, 45-64 years and 65+ years for descriptive statistics and used as a continuous variable in logistic regression models. Gender was a dichotomous variable, using female as the referent (yes/no). Education was dichotomized as less than high school vs. high
school graduate or more, and household income was dichotomized as <$20,000 vs. ≥$20,000. Marital status was defined as married or living with a partner, versus never married, widowed or divorced. Children <18 in the home was defined as having one or more children <18 years of age living in the home (yes/no). In further analysis of T2D stratified by BMI, BMI was categorized as underweight, BMI<18.5, normal weight, BMI 18.5-<25, overweight, BMI 25-<30 and obese, BMI ≥30 kg/m².

2.2.3. Analysis

The analyses were weighted to account for differences in selection probabilities and non-response. All weights were post-stratified to the NYC adult population based on age, sex, race/ethnicity, and borough of residence based on estimates from the 2010 US Census, as well as phone type.(50)

Descriptive statistics was computed for relevant characteristics of the total Black population including FBBs and USBBs. Chi-square analyses assessed proportional differences in sample characteristics between FBBs and USBBs.

Weighted multivariate logistic regression models predicted odds of obesity and T2D for FBBs and USBBs. Covariates in all models included age, gender, education, income, marital status, children <18 in the home and BMI (T2D only).

The sequence of regression models (parallel models with obesity or T2D as outcome) was as follows. Model 1 examined the relationship between nativity and obesity or T2D, adjusting for age, gender, BMI (T2D only), and socioeconomic and family variables. Models 2 and 3 examined the association between the outcomes and covariates among FBBs and USBBs.
separately to assess the effect of risk factors. Model 4 added the effect of time in the US for FBBs only.

Stratifying by four BMI categories, post-hoc chi square analyses assessed the prevalence of T2D by nativity. Additional stratified multivariate logistic regression models adjusted for age, gender, education, income, marital status and presence of children <18 in the home also assessed odds of T2D for FBBs vs. USBBs by the four BMI categories.

Statistical Analysis Software (SAS) version 9.4 (Cary, NC) was used for all statistical analyses.

2.3. Results

Table 2.1 provides descriptive statistics in total Blacks, FBBs and USBBs. Of the total weighted population 22% self-identified as Black, of which 41.7% were FBB and 58.3% were USBB. FBBs and USBBs were significantly different on all characteristics except gender, education and income. Women represented a majority of the sample, 58.5% of FBBs and 57.1% of USBBs, respectively. The mean age for all Blacks was 44.2 years and was similar between FBBs (46.5) and USBBs (42.6). FBBs were more likely to be between the ages 45 and 64 (39.5% vs. 29.1%) and USBBs were more likely to be between the ages of 18 and 24 (19.4% vs. 8.4%). FBBs were more likely to be married or living with a partner than USBBs (45.1% versus 24.6%), and more likely to have children <18 in the home than USBBs (43.4% versus 38.1%).

The majority of FBBs (79.4%) had been living in the US for ≥10 years.
2.3.1. Odds of obesity

FBBs had lower mean BMI than USBBs, 27.7 (CI 27.4, 28.0) and 28.6 (CI 28.3, 28.9) kg/m$^2$, respectively (p<0.001). FBBs were significantly less likely to be obese than USBBs (28.7% vs. 35.3%, p<0.001), but FBBs were more likely to be overweight than USBBs (37.7% vs. 33.4%, p<0.001).

Table 2.2 shows the logistic regression results with obesity as the outcome. Compared to USBBs, FBBs had significantly lower odds of obesity [OR=0.62 (CI 0.54, 0.72)] after adjusting for covariates (Table 2.2, Model 1). In all analyses age was associated with increased odds of obesity similarly for both FBBs and USBBs, increasing odds by 1.01 per year of age. (Table 2.2, Model 1-4).

When considering gender, FBB women were more than twice as likely to be obese as FBB men [OR=2.26 (CI 1.74, 2.93)]. Similarly, USBB women had almost twice the odds of obesity compared to USBB men [OR=1.72 (CI 1.42, 2.09)].

Lower income was significantly associated with increased obesity odds in the total Black population and among FBBs (OR=1.19-1.47, Table 2.2 Models 1 and 2). However, among USBBs, income was not associated with odds of obesity (Table 2.2, Model 2).

Being married or living with a partner was associated with increased odds of obesity when examining the total Black population [OR=1.27 (CI 1.09, 1.48)], which was stronger among USBBs (OR=1.40 (CI 1.14, 1.70). There was no significant association between marital status and obesity among FBBs.
2.3.2. Odds of Type 2 Diabetes

NYC CHS data showed that compared to USBBs the prevalence of self-reported T2D was significantly higher among FBBs (14.6% vs. 11.9%, p<.001, Table 2.1) and greater adjusted odds of T2D [OR=1.24 (CI 1.01, 1.52), Table 2.3, Model 1].

Table 3 shows the logistic regression results with T2D as the outcome. Odds of T2D increased significantly with age for both FBBs and USBBs, increasing by 1.06-1.07 per year of age. (Table 2.3, Models 1-4)

Among all Blacks odds of T2D were significantly increased in those with income of <$20K [OR=1.25 (CI 1.01, 1.53)]. Among USBBs, those with low income had increased odds of T2D [OR=1.33 (CI 1.01, 1.74), p<.001].

2.3.3. Odds of T2D by BMI status

Compared to normal weight, both overweight and obesity were associated with increased odds of T2D in total Blacks [OR=1.69 (CI 1.27, 2.25) and OR=3.46 (CI 2.61, 4.59), respectively, Table 2.3, Model 1]. Underweight was associated with significantly lower odds of T2D [OR=0.30 (CI 0.11, 0.85)]. Among FBBs overweight was associated with increased odds of T2D [OR=1.51 (CI 0.98, 2.44), Table 2.3, Model 2] approaching statistical significance (p=0.06), whereas obesity status was associated with statistically significantly increased odds of T2D [OR=2.76 (CI 1.76, 4.33), p=0.047]. Underweight was associated with significant and dramatically lower odds of T2D [OR=0.08 (CI 0.01, 0.65)] among FBBs. For USBBs only obesity was associated with significantly increased odds of T2D [OR=4.29 (CI 2.98, 6.16)].

Figures 2.1 and 2.2 show the crude prevalence and adjusted odds of T2D by BMI categories in FBBs vs. USBBs. There is a dose-response relationship between BMI and odds of T2D in both
groups in that as BMI increased so did the odds of T2D. Crude T2D prevalence was higher for FBBs versus USBBs at normal weight (8.6% vs. 5.3%), overweight (14.2% vs. 10.7%) and obesity (22.7% vs. 19.0%) levels. Further, comparing FBBs to USBBs, among FBBs the odds for T2D was 1.66 (CI 1.00, 2.82) (p=0.060) at normal BMI and 1.40 (CI 1.00, 1.95) (p=0.047) in the overweight category.

2.3.4. Odds of obesity and T2D by Duration of Residence

Among FBBs, time in the US ≥10 years was associated with increased odds of obesity [OR=1.37 (CI 0.95, 1.96) approaching statistical significance (p=0.094), Table 2.2, Model 4] compared to time in the US <10 years. Furthermore, time in the US ≥10 years was associated with increasing odds of T2D [OR=1.64 (CI 0.92, 2.93), approaching statistical significance (p=0.094), Table 2.3, Model 4] compared to time in the US <10 years.

2.4. Discussion

To the best of our knowledge, this is the first study to examine the odds of obesity and T2D in FBBs vs. USBBs living in NYC. Obesity prevalence was lower in FBBs compared to USBBs; however, overweight was significantly higher in FBBs. Contrary to the study hypothesis, FBBs had higher odds of T2D than USBBs in NYC. Analyses also showed different patterns of risk factors in relation to obesity and T2D outcomes between FBBs and USBBs.

Obesity odds increased predictably with age in both FBBs and USBBs. Similar to previous research which found that in other immigrant populations, odds of obesity is associated with time in the US among FBBs (6, 40), our findings indicate that FBBs who have lived in the US for ≥10 years have marginally increased odds of obesity relative to <10 years in the US (marginal
significance may be due to the small proportion of FBBs living in the US <10 years). These results may demonstrate a new trend of relatively rapid weight gain and transition from normal weight to overweight or obesity specifically in FBBs from Africa (9, 38, 52) and the Caribbean.(53) Furthermore, the effects of globalization, nutrition transition (19) and “remote acculturation” (54) may contribute to increasing BMI in populations living in both Africa and the Caribbean prior to immigration to the US. Further research with larger samples of new immigrants is warranted.

A striking finding was the greater odds of obesity for lower income FBBs, with no difference in odds by income observed among USBBs. In the US, poverty is associated with greater exposure to obesogenic environments (55), however, the association between income and obesity prevalence is not significant in African American women and negative in African American men.(56, 57) Historically higher income groups in African and Caribbean countries have had the highest odds of obesity, but our findings may mirror recent changes in the countries of origin where odds of obesity are increasing in low-income groups.(58-60)

This study found a wide disparity in T2D prevalence between FBBs and USBBs. The high burden of self-reported T2D of 14.6% among FBBs, compared to 11.9% among USBBs, exceeds previously reported 12.1% prevalence among all NYC Blacks (61) but aligns with more recent rates among Caribbean FBBs (14%), African FBBs (13%) and USBBs (13%).(10) Most concerning is the hidden epidemic of T2D among FBBs obscured by classifying all respondents of African origin as Black or African American. It is important to note that NYC CHS data represent prevalence of self-reported T2D only and that the two population groups are likely to experience even higher rates of T2D as an estimated 30% of T2D is undiagnosed.(61)
Contrary to national findings and our initial hypothesis, FBBs were found to have increased odds of T2D despite lower odds of obesity than USBBs, possibly increasing with longer duration in the US. However, there is emerging clinical research showing that African FBB men have higher odds of T2D, despite lower mean BMI and lower waist circumference compared to USBB men.(9) In addition, T2D prevalence in Black populations in the Caribbean, one of the two main regions of origin of FBBs in NYC (47), is estimated to be 10-17% (62), which is higher than the US national prevalence of T2D among FBBs (8.9%). Thus, the patterns of migration in NYC may partially explain different findings between this study and that of national surveys. It is noteworthy that when compared to USBBs, the heightened risk of T2D was observed at normal and overweight but not obese weight status, although statistically significant only for overweight. This suggests that there may be epigenetic factors that contribute to the susceptibility of T2D among FBBs at relatively lower weight, such as those suspected for Asian Americans.(63, 64)

However, T2D prevention and diagnosis may also be associated with health insurance, healthcare access and utilization which we were not able to address. Health insurance access has previously been reported as lower among FBB men compared to USBB men (65), and this may affect rates of T2D diagnosis and management differently between FBBs and USBBs. Moreover, the importance of genetics, healthcare access and environmental factors such as changes in dietary behaviors and physical activity along the trajectory of migration warrants further research.

One caution in the interpretation of our findings is that immigrants from the Caribbean and West Africa have historically returned home for retirement (66, 67) and high T2D prevalence among older FBBs in the US may be associated with factors unique to transnational immigration. Transnational migration being characterized by movement and settlement across borders where
individuals simultaneously maintain relationships and networks in the country of origin and the new country. (68) Healthy transnationals may return to their country of origin, whereas FBBs with T2D diagnoses may remain in the US for T2D treatment and better access to medical care. (69, 70) This may be the reverse effect of what has been termed the “salmon bias” specifically observed in Hispanic immigration, where less healthy immigrants return to their country of origin, and healthy immigrants remain in the US. (71)

This is one of the largest population-based epidemiological studies comparing FBBs and USBBs. The magnitude of the NYC CHS dataset allowed for the examination of age, income, education, marital status, children <18 in the home, BMI (for T2D only) and time in the US when exploring associations with both obesity and T2D. Several limitations of this study are important to note. The NYC CHS 2009-2013 is cross-sectional and offers no opportunity to explore causal relationships. The survey relied entirely on self-reported data. Self-reported T2D is likely to underestimate the prevalence and disease burden in a population. Self-reported body weight is typically underreported only in overweight/obese participants, though generally by not more than 10%. (72) The NYC CHS uniformly defines those born in the continental US and US territories as US-born. Respondents born in Puerto Rico and the US Virgin Islands were included in the USBBs, but may resemble FBBs more than USBBs (73), however, information about territory of origin was unavailable. Findings are specific to NYC and not generalizable to other urban settings in the US or Black sub-ethnic populations in the US. The relatively small proportion of FBBs who had lived in the US for <10 year may not have provided adequate power to assess the effect of duration of residence for both obesity and T2D.

In conclusion, despite prior findings that FBBs are healthier than USBBs (5), this study demonstrates that the healthy immigrant effect may no longer apply to FBBs in NYC. Compared
to USBBs, overweight FBBs are at significantly increased risk for T2D. There is also a trend for the odds of obesity and T2D to rise with increasing duration of residence in the US. The mechanisms for these differences between FBBs and USBBs warrant further research. Importantly, this study points to the pitfall of combining all Black populations into one category. Future research should examine specific ethnic and cultural backgrounds and the biological and social risk profiles that these differences entail. Failure to do so may bias population estimates and obscure the unique risk profiles of sub-ethnic groups in the African diaspora.
Table 2.1 Characteristics of the New York City Black Population; New York City Community Health Survey 2009-2013

<table>
<thead>
<tr>
<th></th>
<th>Total Black* Weighted %‡</th>
<th>Foreign-Born Black Weighted %‡</th>
<th>US-Born Black Weighted %‡</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>n=9,998†</td>
<td>n=3,701†</td>
<td>n=6,297†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.9%</td>
<td>41.7%</td>
<td>58.3%</td>
<td></td>
</tr>
</tbody>
</table>

**Exposure Variables**

**Nativity**
- Foreign Born: 41.7% (100%)
- US-Born: 58.3% (100%)

**Age**
- 18-24: 14.7% (8.4%) 19.4% (<0.001)
- 25-44: 37.7% (37.9%) 37.3%
- 45-64: 33.4% (39.5%) 29.1%
- 65+: 14.2% (14.2%) 14.3%

**Gender**
- Female: 57.7% (58.5%) 57.1% (0.377)
- Male: 42.3% (41.5%) 42.9%

**Education**
- Less than High School: 14.5% (15.0%) 14.2%
- High School Grad or above: 85.5% (85.0%) 85.8%

**Income**
- <$20K: 46.5% (47.1%) 46.0% (0.050)
- ≥$20K: 44.0% (42.1%) 45.3%
- Don’t know: 9.5% (10.8%) 8.6%

**Marital Status**
- Married/Living w Partner: 33.2% (45.1%) 24.6% (<0.001)
- Never Married/Divorced/Widowed: 66.8% (54.9%) 75.4%

**Children <18 in the home**
- Yes: 40.2% (43.4%) 38.1% (<0.001)
- No: 59.8% (56.6%) 61.9%

**Time in the US (FB only)**
- <10 Years: 20.7%
- ≥10 years: 79.3%

**Outcome Variables**

**Diabetes**
- Diabetes: 13.0% (14.6%) 11.9% (0.007)
- Non-Diabetes: 87.0% (85.4%) 88.1%

**BMI**
- Obese: 32.5% (28.7%) 35.3% (<0.001)
- Overweight: 35.2% (37.7%) 33.4%
- Normal Weight: 30.7% (32.2%) 29.6%
- Underweight: 1.6% (1.4%) 1.6%

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*Total Black is the combination of FBB and USBB, 22% of the total NYC population
† Sample sizes are based on unweighted data.
‡ All weighted proportions reflect New York City population estimates.
Column totals may not total 100 due to rounding.
Table 2. 2 Obesity Odds Foreign-Born Blacks (FBB) and US-Born Blacks (USBB) in NYC, Logistic Regression, Weighted

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>NYC CHS 2009-2013 OR (95% CI) Model 1</th>
<th>NYC CHS OR (95% CI) Model 2</th>
<th>NYC CHS OR (95% CI) Model 3</th>
<th>NYC CHS OR (95% CI) Model 4</th>
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<tbody>
<tr>
<td>Nativity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Born</td>
<td>0.62 (0.54-0.72)***</td>
<td>FBB ONLY</td>
<td>USBB ONLY</td>
<td>FBB ONLY</td>
</tr>
<tr>
<td>US-Born</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Age</td>
<td>1.01 (1.01-1.02)***</td>
<td>1.01 (1.01-1.02)***</td>
<td>1.01 (1.01-1.02)***</td>
<td>1.01 (1.00-1.02)***</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.91 (1.64-2.22)***</td>
<td>2.26 (1.74-2.93)***</td>
<td>1.72 (1.42-2.09)***</td>
<td>2.24 (1.73-2.91)***</td>
</tr>
<tr>
<td>Male</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>1.02 (0.83-1.24)</td>
<td>1.01 (0.74-1.39)</td>
<td>1.00 (0.77-1.30)</td>
<td>1.04 (0.70-1.33)</td>
</tr>
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<td>High School or More</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
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<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$20K</td>
<td>1.19 (1.03-1.38)***</td>
<td>1.40 (1.10-1.78)***</td>
<td>1.09 (0.90-1.31)</td>
<td>1.41 (1.10-1.80)***</td>
</tr>
<tr>
<td>$20K+</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/Living w. Partner</td>
<td>1.27 (1.09-1.48)***</td>
<td>1.13 (0.89-1.44)</td>
<td>1.40 (1.14-1.70)***</td>
<td>1.11 (0.87-1.41)</td>
</tr>
<tr>
<td>Never married, divorced, widowed</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Children &lt;18 in home</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.09 (0.93-1.28)</td>
<td>1.01 (0.78-1.31)</td>
<td>1.16 (0.94-1.42)</td>
<td>1.03 (0.79-1.33)</td>
</tr>
<tr>
<td>No</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Time in the US</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>&lt;10 years</td>
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</tr>
<tr>
<td>≥10 years</td>
<td></td>
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</tr>
</tbody>
</table>

Abbreviations: NYC CHS, New York City Community Health Survey; OR, Odds Ratio; CI, Confidence Interval; FBBs, foreign-born Blacks; USBBs, US-born Blacks.

***p<0.001, **p<0.05, *p<0.10
Table 2. Type 2 Diabetes Odds Foreign-Born Blacks and US-Born Blacks in NYC, Logistic Regression, Weighted

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>NYC CHS OR (95% CI)</th>
<th>NYC CHS OR (95% CI)</th>
<th>NYC CHS OR (95% CI)</th>
<th>NYC CHS OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
</tr>
<tr>
<td>Nativity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Born</td>
<td>1.24 (1.01-1.52)**</td>
<td>FBB ONLY</td>
<td>USBB ONLY</td>
<td>FBB ONLY</td>
</tr>
<tr>
<td>US-Born</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Age</td>
<td>1.06 (1.06-1.07)**</td>
<td>1.07 (1.06-1.08)**</td>
<td>1.06 (1.05-1.07)**</td>
<td>1.06 (1.05-1.08)**</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.95 (0.77-1.17)</td>
<td>0.88 (0.65-1.20)</td>
<td>1.02 (0.77-1.35)</td>
<td>0.88 (0.64-1.21)</td>
</tr>
<tr>
<td>Male</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>1.03 (0.78-1.37)</td>
<td>1.03 (0.67-1.60)</td>
<td>1.03 (0.71-1.47)</td>
<td>0.89 (0.76-1.04)</td>
</tr>
<tr>
<td>High School Graduate +</td>
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<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$20K</td>
<td>1.25 (1.01-1.53)**</td>
<td>1.16 (0.84-1.58)</td>
<td>1.33 (1.01-1.74)**</td>
<td>1.10 (0.79-1.52)</td>
</tr>
<tr>
<td>$20K+</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
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<tr>
<td>Marital Status</td>
<td></td>
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</tr>
<tr>
<td>Married/Living w. Partner</td>
<td>1.05 (0.85-1.29)</td>
<td>1.10 (0.80-1.50)</td>
<td>1.00 (0.75-1.32)</td>
<td>1.09 (0.80-1.50)</td>
</tr>
<tr>
<td>Never married, divorced, widowed</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Children &lt;18 in the home</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children &lt;18 in home</td>
<td>1.01 (0.79-1.28)</td>
<td>0.98 (0.69-1.38)</td>
<td>1.03 (0.75-1.43)</td>
<td>1.01 (0.71-1.43)</td>
</tr>
<tr>
<td>No Children &lt;18 in home</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight &lt;18.5</td>
<td>0.30 (0.11-0.85)**</td>
<td>0.08 (0.01-0.65)**</td>
<td>0.60 (0.20-1.80)</td>
<td>0.08 (0.01-0.69)**</td>
</tr>
<tr>
<td>Normal Weight 18.5-&lt;25</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Overweight 25-&lt;30</td>
<td>1.69 (1.27-2.25)**</td>
<td>1.51 (0.98-2.33)</td>
<td>1.92 (1.32-2.78)</td>
<td>1.54 (1.00-2.38)**</td>
</tr>
<tr>
<td>Obese ≥30</td>
<td>3.46 (2.61-4.59)**</td>
<td>2.76 (1.76-4.33)**</td>
<td>4.29 (2.98-6.16)**</td>
<td>2.64 (1.67-4.16)**</td>
</tr>
<tr>
<td>Time in the US</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>≥10 years</td>
<td>1.64 (0.92-2.93)</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
</tbody>
</table>

Abbreviations: NYC CHS, New York City Community Health Survey; OR, Odds Ratio; CI, Confidence Interval; FBBs, foreign-born Blacks; USBBs US-born Blacks.

***p<0.001, **p<0.05, *p<0.10
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Figure 2. Prevalence of T2D in New York City, Total Population, Foreign Born Black (FBB) and US-Born Black (USBB) New Yorkers. NYC Community Health Survey, 2009-2013.

Crude prevalence estimates are weighted to the NYC population.
Figure 2. 2 Odds of T2D at Normal, Overweight and Obese. Foreign-Born Black (FBB) vs. US-Born Black (USBB) New Yorkers, NYC Community Health Survey, 2009-2013.

Estimates are weighted to the NYC population and adjusted for age, gender, income, education, marital status, children <18 in the home.

*P<0.05
Chapter 3. Obesity and Type 2 Diabetes among Black African and Caribbean Immigrants Living in New York City

3.1. Introduction

According to the US Census it is estimated that by 2060, 16.5% of all Blacks will be foreign-born.(1, 74) In New York City (NYC), the fastest growing group of foreign-born residents is West Africans (N=76,710), with a 60% population growth since 2000. Moreover, non-Hispanic Caribbean Blacks (N=595,740) constitute 19% of the NYC foreign-born population.(47)

Limited evidence shows that African and Caribbean foreign-born Blacks (FBBs) may have different health profiles, but findings thus far are mixed. A national study found that obesity (Body Mass Index (BMI) ≥30) odds were lower for African FBBs (OR=0.41, 95% CI 0.34-0.50) and Caribbean/South American FBBs (OR=0.51, 95% CI 0.44-0.58) compared to US-born Blacks (USBBs), but that the odds were not different between African and Caribbean/South American FBBs.(5, 40) Moreover, no difference in type 2 diabetes (T2D) odds was found between FBBs from Africa vs. the Caribbean/South America.(5) Interestingly, in NYC, obesity prevalence among African FBBs (20.9%) and Caribbean FBBs (28.7%) was significantly different from that among USBBs (36.4%).(10) In contrast, no significant difference in T2D prevalence was found among Caribbean FBBs (14%), African FBBs (13%) and USBBs (13%).(10)

Duration of residence as a measure of acculturation in the US was associated with higher odds of obesity among African and Caribbean/South American FBBs (40), but not among Caribbean FBBs.(6) In contrast, living in the US was not associated with T2D risk in African and
Caribbean/South American FBBs (5) as found among other immigrants. (48, 75) These differences in risk profile illustrate the dangers of categorizing populations by race in epidemiological research. We sought to investigate how the odds of obesity and T2D differed between African and Caribbean FBBs living in NYC. We hypothesized that African FBBs have lower odds of obesity and T2D than Caribbean FBBs. We also explored the association of duration of residence with either outcome.

3.2. Methods

3.2.1. Data Sources, Collection, and Management

This is a cross-sectional secondary analysis of the population-based NYC Community Health Survey (CHS). Five years of NYC CHS data from 2009 to 2013 were combined to examine the relationship between nativity, obesity and T2D in Caribbean and African FBBs living in NYC. The NYC CHS is a cross-sectional telephone survey with an annual sample of approximately 8,500 randomly selected adults, 18 years of age and older. The surveys have been administered annually since 2002. Sampling is done from both land lines and households with only cell phones from the five boroughs of NYC. The computer-assisted telephone interviews are administered in English, Spanish, Russian, Cantonese/Mandarin, and telephone-based interpretation services are available for other languages. (50) The NYC Department of Health and Mental Hygiene provided a de-identified and publicly available dataset and survey weights for combined years 2009 to 2013 with a total sample of 44,886 adults, of which 3,701 were FBBs, 393 were African FBBs and 2,761 were Caribbean FBBs.

This study was deemed exempt from review by the institutional Central Human Research Protection Program.
3.2.2. Outcome Variables

Obesity was defined as equal to BMI of 30 or greater (yes/no), and was calculated from self-reported height and weight. T2D was self-reported (i.e., ever told by a medical professional that the person had diabetes, yes/no). The CHS survey questions did not distinguish between type 1, type 2 and gestational diabetes; however, women who indicated only having diabetes while pregnant were included in the “no” category. Type 1 diabetes is relatively rare among Blacks (prevalence=0.2%).(76)

3.2.3. Main Independent Variables

Race was self-reported as non-Hispanic white, non-Hispanic Black, non-Hispanic Asian/Pacific Islander, Hispanic, and non-Hispanic Other. Only those who self-identified as non-Hispanic Black and being born outside the US in a country in the African or Caribbean regions were included in this analysis.

Acculturation variables included nativity, region of origin, and duration of residence in the US. Foreign-born status was defined as having been born outside the US. For FBBs, African or Caribbean region of origin was based on specific countries of birth. African origin was defined as having been born in a country on the African continent (See Table 3.1). Caribbean origin was defined as having been born in a country, island or territory in the Caribbean Basin including Caribbean islands and Central and South American coastal countries with Black populations sharing a similar cultural heritage (77) (Table 3.1). Respondents who indicated having been born in US territories Puerto Rico (N=3) and US Virgin Islands (N=12) were included in the Caribbean sample
given the cultural, socioeconomic and health risk factor characteristics of Caribbean populations compared to populations in the contiguous US. (78)

FBBs who indicated a country of origin outside the US, African and Caribbean regions, or if country of origin was missing, were categorized as FBB Other. FBB Other were included in the total FBB population for descriptive statistics but excluded from logistic regression models. Only those who self-identified as non-Hispanic Black and being born in countries or territories defined as part of the African or Caribbean regions were included in logistic regression models.

Several demographic variables were included in the regression models. Age was included as a continuous value. Gender was a dichotomous variable, using female as the referent (yes/no). Education was dichotomized as <high school/high school graduate vs. some college or more. Income was dichotomized as annual household income of <$20,000 vs. ≥$20,000. Marital status was defined as married or living with a partner vs. never married, widowed or divorced. We also adjusted for having one or more children under the age of 18 living in the home (yes/no). BMI categories (for T2D analyses only) were based on self-reported height and weight and classified as underweight/normal weight (BMI <25 kg/m²), overweight (BMI 25-<30 kg/m²) and obese (BMI ≥30 kg/m²). Respondents whose BMI was <18.5 were included in the Underweight/Normal Weight category due to small sample size (Underweight African FBBs N=11 and Underweight Caribbean FBBs N=32). Time in the US was defined as the time lived permanently in the US, as <10 years vs. ≥10 years.
3.2.4. Data Analysis

The analyses were weighted to account for differences in selection probabilities and nonresponse. All weights were post-stratified to the NYC adult population based on age, sex, race/ethnicity and borough of residence according to the 2010 Census, as well as phone type (landline/cell).(79)

We conducted descriptive statistics for relevant characteristics of the total FBB population, followed by a comparison of African vs. Caribbean FBBs. T-tests and chi-square analyses assessed differences in sample characteristics between African and Caribbean FBBs. Age standardization of prevalence rates of obesity and T2D was performed using the year 2000 projected US population provided by the US Census.(80)

We created weighted multivariate logistic regression models to predict odds of obesity and T2D for African and Caribbean FBBs. Covariates in all models included age, gender, education, income, marital status, presence of children <18 years in the household, BMI (for T2D only) and duration of residence in the US.

The sequence of regression models (parallel models with obesity or T2D as outcome) is as follows. Model 1 examined the relationship between region of nativity (i.e., Africa or the Caribbean) and obesity or T2D, adjusting for age, gender and BMI (for T2D only) and socioeconomic and demographic variables to test whether T2D and obesity odds were explained by difference in family status, income, education or duration of residence in the US. Models 2 and 3 examined African and Caribbean FBBs separately.

Statistical Analysis Software (SAS) version 9.4 (Cary, NC) was used for all statistical analyses. For all analyses, statistical significance was considered at p <0.05.
3.3. Results

Table 3.2 provides descriptive statistics in total FBBs, African, and Caribbean FBBs. Of the weighted total Black population, 41.7% self-identified as Black and foreign-born, and of those 77.5% were Caribbean-born, 10.2% were African-born and 12.4% were born elsewhere (Other). Only those who self-identified as non-Hispanic Black and having been born either in Africa or the Caribbean were included in further analysis.

African- and Caribbean-born Blacks were significantly different on all characteristics except income. Mean age was 43.1±24.0 years for African FBBs and 46.8±24.7 years for Caribbean FBBs (p=0.004). Almost half (48.9%) of African FBBs were between the ages of 25 and 44, and 33.5% were between 45 and 64 years of age, whereas the Caribbean FBBs were equally likely to be between the ages of 25 and 44 and between 45 and 64 (37.2% and 39.6%). Only 7.6% of the African FBBs were older than 65, whereas 14.9% of the Caribbean FBBs were 65 years and older (p=0.008). Women represented 58.5% of total FBBs, but only 39.6% among African FBBs vs. 60.7% among Caribbean FBBs (p<.001).

African FBBs were less likely to have a high school degree or less (37.5%) whereas more than half (52.3%) of Caribbean FBBs were in this category (p<.001). African and Caribbean FBBs had similar income distribution, as approximately half of each group had incomes <$20K, approximately 40% of both groups indicated incomes >$20K. African FBBs were more likely to not know their family income. However, African FBBs were more likely to be married or living with a partner than Caribbean FBBs (55.7% vs. 43.5%, p=0.003), and more likely to have children under the age of 18.
in the home than Caribbean FBBs (56% vs. 42.7%, p=0.001). A majority of both African (63.6%) and Caribbean (80.6%) FBBs had been living in the US for longer than 10 years (p<.001).

3.3.1. Odds of Obesity

NYC CHS data showed that African FBBs had lower mean BMI than Caribbean FBBs (Means=26.9±8.3 and 27.8±8.9 kg/m\(^2\), respectively, p=0.04, Table 3.3). African FBBs were significantly less likely to be obese than Caribbean FBBs (17.6% vs. 30.3%, p<0.001). However, African FBBs were more likely to be overweight than Caribbean FBBs (46.9% vs. 36.5%, p=0.009) (Table 3.3). Compared to Caribbean FBBs, African FBBs had significantly lower age-standardized prevalence of obesity (28.7% vs. 16.2%).

Table 2 shows the logistic regression results with obesity as the outcome. Compared to Caribbean FBBs, African FBBs had significantly lower odds of obesity [OR=0.60 (CI 0.40-0.89), p=0.010] after adjusting for covariates (Table 3.3, Model 1). For Caribbean FBBs, odds of obesity increased significantly with each year of age [OR=1.01 (CI 1.00-1.02), p=0.008]. Women were more than twice as likely to be obese as men [OR=2.24 (CI 1.70-2.95), p<.001]. Having a high school education or less was associated with marginally higher odds of obesity [OR=1.31 (CI 1.00-1.71), p=0.05]. Income, marital status and children <18 in the home were not significantly associated with obesity odds.

African FBB women were more than twice as likely to be obese as African FBB men [OR=2.32, (CI 1.16-4.63), p=0.02] (Table 3.3, Model 2). Similarly, Caribbean FBB women were also more likely to be obese than their male counterparts [OR=2.23 (CI 1.66-3.01), p<.001] (Table 3.3, Model 3).
Living in the US for ≥10 years was not associated with odds of obesity for African or Caribbean FBBs.

Note that analyses were initially conducted without the duration of residence variable (data not shown); however, when entered into the models, time in the US did not cause the other effects to change.

### 3.3.2. Odds of Type 2 Diabetes

NYC CHS data showed that African FBBs had lower overall age-standardized prevalence of T2D than Caribbean FBBs (9.9% vs. 14.4%). After adjusting for covariates, African FBBs still had marginally lower odds of T2D \[ \text{OR}=0.60 \, (\text{CI} \, 0.34-1.05) \, p=0.07 \] than Caribbean FBBs (Table 3.4, Model 1). Other factors significantly associated with odds of T2D included age \[ \text{OR}=1.06 \, (\text{CI} \, 1.05-1.07) \, p<.001 \] and obesity (BMI≥30) \[ \text{OR}=3.42 \, (\text{CI} \, 2.12-5.50) \, p<.001 \]. Gender, education, income, marital status and children <18 in the home were not associated with odds of T2D.

In stratified analyses, obesity was associated with a sevenfold increase in odds of T2D among African FBBs \[ \text{OR}=6.86 \, (\text{CI} \, 1.63-28.81), \, p=0.003, \, \text{Table 3.4 Model 2} \] and more than three times the odds of T2D among Caribbean FBBs \[ \text{OR}=3.28 \, (\text{CI} \, 2.00-5.36), \, p<0.001, \, \text{Table 3.4 Model 3} \]. Living in the US for ≥10 years was not associated with odds of T2D for either African or Caribbean FBBs.

Analyses were initially conducted without the duration of residence variable (data not shown); however, when entered into the models, time in the US did not cause the other effects to change.
3.4. Discussion

This is one of the first studies to examine the odds of obesity and T2D in African and Caribbean FBBs living in NYC. Obesity prevalence was lower among African FBBs compared to Caribbean FBBs; however, overweight was higher among African FBBs. As hypothesized, African FBBs had lower obesity prevalence and odds of obesity than Caribbean FBBs. African FBBs also experienced lower T2D prevalence and marginally lower odds of T2D, which aligns with prior research.(5, 10)

Patterns of socio-demographic risk factors were similar in the two groups with regards to obesity and T2D. Duration of residence in the US was not associated with the odds of obesity or T2D in either population.

This study identified a wide disparity in the prevalence of obesity (16.2% vs. 28.7%) and T2D (9.9% vs. 14.4%) between African and Caribbean FBBs. These findings highlight the importance of avoiding generalized classifications by race and ethnicity in epidemiological research and clinical care settings, as inter-group differences can be stark and may obscure important health disparities and needed intervention strategies for each cultural group.(38)

Odds of T2D increased predictably with age, by 6-9% per year, in both African and Caribbean FBBs. Obesity odds were higher among women than men in both African and Caribbean FBBs. In addition, though not statistically significant, we observed a trend of lower odds of T2D among women in both groups. In fact, these results may demonstrate recent clinical findings showing that African FBB men experience increased odds of T2D at lower BMI.(9, 81) The gender differences in both groups warrant further research with a larger epidemiological sample.

The increased odds of obesity in Caribbean FBBs may illustrate the epidemiological transition and accompanying rapid weight gains and rightward shift of the BMI distribution.(82) This may be due
to the effects of globalization, nutrition transition and remote acculturation resulting from indirect or intermittent cultural contact despite geographic distances.(54) However, the epidemiological transition may not fully explain the dramatic differences in two Black immigrant populations who experience similar circumstances living in the US. African FBBs appear to be “positive deviants” given that they have a more favorable health profile than their Caribbean peers despite facing similar challenges and having access to the same resources.(83) Unfortunately, since African FBBs are typically classified as African American/Black in population health research, we have limited research examining the protective factors that contribute to these findings.(40) Evidence from Sub-Saharan Africa suggests that modulation of the human microbiome and a history of helminth infections characteristic of the African region may be associated with lower odds of obesity, diabetes and metabolic syndrome in African immigrants.(84) Both microbiome and helminth-induced modulation of inflammatory responses appear to be involved in the prevention of insulin resistance and T2D. In fact, recent research has illustrated that both urban and rural populations from different regions of Sub-Saharan Africa experience dramatically different odds of obesity and T2D.(85) More research is needed to explore the underlying causes of positive deviance among African FBBs.

Another hypothesis for the positive deviance among African FBBs might be related to differential effects of acculturation over time. While we did not find an effect of duration of residence, African FBBs are more recent immigrants and tend to live in more concentrated cultural enclaves than Caribbean FBBs in NYC.(47) These enclaves might offer some psychosocial and environmental protection against acculturative stress (86) and make African FBBs more resilient to the stress of immigration.(87) That said, recent research has shown that allostatic load is nonetheless higher for African FBBs who arrive as adults and increases with duration of residence >10 years.(31)
To the best of our knowledge, this is one of the largest population-based epidemiological studies comparing African and Caribbean FBBs. However, several limitations of this study are important to note. The NYC CHS 2009-2013 is cross-sectional and does not allow for exploration of causal and temporal relationships. All data are self-reported. Self-reported body weight may be more underreported among overweight and obese participants, though typically not by more than 10%.(72) Body weight may also be reported differently by different cultural groups.(88) Self-reported T2D data could also underestimate the prevalence, for an estimated 30% of all T2D cases in NYC are undiagnosed.(61) Another limitation is that BMI may no longer serve as a reliable indicator of T2D risk. Low- and middle-income countries in the African and Caribbean regions (e.g., Ghana and Haiti) have demonstrated an increased waist circumference at the same BMI, in addition to an overall rightward shift in the BMI distribution.(89) The NYC CHS data does not provide details about waist circumference; hence, we were unable to examine this factor. Findings are specific to the NYC population and not generalizable to other urban settings in the US or Black sub-ethnic populations in the US or elsewhere.

In conclusion, this study illustrates the potential danger of grouping all Black populations in health research, as risk profiles may differ widely among ethnic subgroups. More research is warranted to better understand why African FBBs have better obesity and possibly T2D profiles than Caribbean FBBs. In addition, the paradox of higher obesity risk and lower T2D risk among FBB women compared to men merits further investigation. Achieving a more nuanced understanding of health disparities will help us develop health promotion and disease prevention strategies appropriately tailored to specific cultural groups.
### Table 3.1 NYC Community Health Survey, 2009-2013: Actual Participant Response Countries, Regions or Identities of Origin Included in the African and Caribbean Regions

<table>
<thead>
<tr>
<th>African Region</th>
<th>Caribbean Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>Anguilla</td>
</tr>
<tr>
<td>Algeria</td>
<td>Antigua</td>
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<td>Bermuda</td>
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<td>British Virgin Islands</td>
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<td>Cote D’Ivoire</td>
<td>Caribbean</td>
</tr>
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<td>Democratic republic of Congo</td>
<td>Cayman Islands</td>
</tr>
<tr>
<td>Djibouti</td>
<td>Cost Rica</td>
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<td>East Africa</td>
<td>Cuba</td>
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<td>Curaçao</td>
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<tr>
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<td>Dominican Republic</td>
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<td>Grenada</td>
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<td>Guadeloupe</td>
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<td>Guyana</td>
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<td>Martinique</td>
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<td>St. Barts</td>
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<td>St. Christopher</td>
</tr>
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<td>St. Croix</td>
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<td>St. Kitts and Nevis</td>
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<td>Sierra Leone</td>
<td>St. Lucia</td>
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<td>Somalia</td>
<td>St. Martin</td>
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<td>St. Thomas</td>
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<td>Sudan</td>
<td>St. Vincent</td>
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<td>Suriname</td>
</tr>
<tr>
<td>Togo</td>
<td>The Island of Dominica</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Trinidad and Tobago</td>
</tr>
<tr>
<td>Uganda</td>
<td>Turks and Caicos</td>
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<td>US Virgin Islands</td>
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<td>Venezuela</td>
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<td>Zimbabwe</td>
<td>Virgin Islands</td>
</tr>
<tr>
<td>Virgin Islands</td>
<td>West Indies</td>
</tr>
<tr>
<td>Virgin Islands</td>
<td>West Indies</td>
</tr>
<tr>
<td>Virgin Islands</td>
<td>West Indies</td>
</tr>
<tr>
<td>Virgin Islands</td>
<td>West Indies</td>
</tr>
<tr>
<td>Population</td>
<td>Total FBB&lt;sup&gt;a&lt;/sup&gt; Weighted %&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>N=3,701</td>
<td>N=393</td>
</tr>
<tr>
<td><strong>Nativity</strong></td>
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</tr>
<tr>
<td>Caribbean</td>
<td>77.5%</td>
</tr>
<tr>
<td>Africa</td>
<td>10.2%</td>
</tr>
<tr>
<td>Other</td>
<td>12.4%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>46.5 ±24.9</td>
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<tr>
<td>18-24</td>
<td>8.5%</td>
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<tr>
<td>25-44</td>
<td>38.9%</td>
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<tr>
<td>45-64</td>
<td>39.5%</td>
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<td>65+</td>
<td>14.2%</td>
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<td><strong>Gender</strong></td>
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<tr>
<td>Female</td>
<td>58.5%</td>
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<td>Male</td>
<td>41.5%</td>
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<td><strong>Education</strong></td>
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</tr>
<tr>
<td>Some college or more</td>
<td>49.4%</td>
</tr>
<tr>
<td><strong>Income</strong></td>
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</tr>
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<td>&lt;$20K</td>
<td>47.4%</td>
</tr>
<tr>
<td>≥$20K</td>
<td>41.4%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>11.2%</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
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<tr>
<td>Married/living w. partner</td>
<td>45.1%</td>
</tr>
<tr>
<td>Never married/divorced/widowed</td>
<td>54.9%</td>
</tr>
<tr>
<td><strong>Children &lt;18 at home</strong></td>
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</tr>
<tr>
<td>Yes</td>
<td>43.4%</td>
</tr>
<tr>
<td>No</td>
<td>56.6%</td>
</tr>
<tr>
<td><strong>Time in the US</strong></td>
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</tr>
<tr>
<td>&lt;10 years</td>
<td>20.6%</td>
</tr>
<tr>
<td>≥10 years</td>
<td>79.3%</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
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</tr>
<tr>
<td>Mean (SD)</td>
<td>27.7 ±8.5</td>
</tr>
<tr>
<td>Obesity, age standardized&lt;sup&gt;g&lt;/sup&gt;</td>
<td>27.5%</td>
</tr>
<tr>
<td>Obese</td>
<td>28.7%</td>
</tr>
<tr>
<td>Overweight</td>
<td>37.7%</td>
</tr>
<tr>
<td>Underweight/normal weight</td>
<td>33.6%</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
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</tr>
<tr>
<td>Diabetes, age standardized&lt;sup&gt;g&lt;/sup&gt;</td>
<td>13.0%</td>
</tr>
<tr>
<td>Diabetic</td>
<td>14.6%</td>
</tr>
<tr>
<td>Non-diabetic</td>
<td>85.4%</td>
</tr>
</tbody>
</table>

Abbreviations: FBB, foreign-born Black; SD, standard deviation; BMI, Body Mass Index.

<sup>a</sup> Total Foreign-Born Black is the combination of FBB from Africa, the Caribbean and other countries including England, Canada, and France etc.

<sup>b</sup> Foreign-Born Black African includes all countries in Africa.

<sup>c</sup> Foreign-Born Black Caribbean includes people from all countries, islands and territories in the Caribbean Basin.

<sup>d</sup> T-tests and χ² Statistics were used to compare characteristics between FBB and USBB.

<sup>e</sup> All weighted proportions reflect New York City population estimates.

<sup>f</sup> Sample sizes are based on unweighted data.

<sup>g</sup> Age standardized to the 2000 US Census Standard Population.

<sup>h</sup> This p-value indicates the statistical significance of the difference in overweight in African and Caribbean FBBs. Columns may not total 100 due to rounding.
Table 3. 3 Obesity Odds African and Caribbean Foreign-Born Blacks in NYC, Logistic Regression, NYC Community Health Survey (NYC CHS), 2009-2013.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>NYC CHS OR* (95% CI) Model 1</th>
<th>NYC CHS OR (95% CI) Model 2</th>
<th>NYC CHS OR (95% CI) Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nativity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African FBBs</td>
<td>0.60 (0.40-0.89)**</td>
<td>African Only</td>
<td>Caribbean Only</td>
</tr>
<tr>
<td>Caribbean FBBs</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Age</td>
<td>1.01 (1.00-1.02)**</td>
<td>1.00 (0.98-1.03)</td>
<td>1.01 (1.00-1.02)**</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2.24 (1.70-2.95)*****</td>
<td>2.32 (1.16-4.63)****</td>
<td>2.23 (1.66-3.01)*****</td>
</tr>
<tr>
<td>Male</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>1.31 (1.00-1.71)*</td>
<td>1.29 (0.57-2.93)</td>
<td>1.32 (0.99-1.75)*</td>
</tr>
<tr>
<td>Some college or more</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$20K</td>
<td>1.33 (1.02-1.75)</td>
<td>1.27 (0.58-2.76)</td>
<td>1.34 (1.01-1.79)</td>
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<td>≥$20K</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
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<td>1.37 (0.83-2.27)</td>
<td>0.34 (0.07-1.82)</td>
<td>1.44 (0.85-2.42)</td>
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<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/living w. partner</td>
<td>1.09 (0.85-1.39)</td>
<td>2.15 (0.96-4.80)*</td>
<td>1.05 (0.81-1.36)</td>
</tr>
<tr>
<td>Never married/divorced/widowed</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Children &lt;18 in home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.04 (0.79-1.36)</td>
<td>0.60 (0.26-1.36)</td>
<td>1.08 (0.82-1.44)</td>
</tr>
<tr>
<td>No</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Time in the US</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10+ years</td>
<td>1.23 (0.85-1.78)</td>
<td>1.19 (0.52-2.75)</td>
<td>1.23 (0.82-1.84)</td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
</tbody>
</table>

Abbreviations: NYC CHS, New York City Community Health Survey; OR, Odds Ratio; CI, Confidence Interval; FBBs, foreign-born Blacks.

***p<0.001, **p<0.05, *p<0.10
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>NYC CHS OR (95% CI) Model 1</th>
<th>NYC CHS OR (95% CI) Model 2</th>
<th>NYC CHS OR (95% CI) Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nativity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African FBBs</td>
<td>0.60 (0.34-1.05)*</td>
<td>African Only</td>
<td>Caribbean Only</td>
</tr>
<tr>
<td>Caribbean FBBs</td>
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<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>1.06 (1.05-1.07)***</td>
<td>1.09 (1.05-1.13)***</td>
<td>1.06 (1.04-1.07)***</td>
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<tr>
<td><strong>Gender</strong></td>
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<td>Female</td>
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<td>0.85 (0.58-1.24)</td>
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<td>Referent</td>
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<tr>
<td><strong>Education</strong></td>
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<tr>
<td>High school or less</td>
<td>1.15 (0.82-1.60)</td>
<td>0.50 (0.17-1.43)</td>
<td>1.22 (0.85-1.74)</td>
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<td>Some college or more</td>
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<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td><strong>Income</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$20K</td>
<td>1.22 (0.88-1.69)</td>
<td>1.36 (0.47-3.95)</td>
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<tr>
<td>≥$20K</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1.08 (0.53-2.21)</td>
<td>2.33 (0.21-26.07)</td>
<td>1.04 (0.50-2.18)</td>
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<tr>
<td>Married/living w. partner</td>
<td>0.97 (0.70-1.34)</td>
<td>1.30 (0.47-3.61)</td>
<td>0.94 (0.66-1.32)</td>
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<tr>
<td>Never married/divorced/widowed</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
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<td><strong>Children &lt;18 in the home</strong></td>
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<tr>
<td>Children &lt;18 in home</td>
<td>0.89 (0.61-1.29)</td>
<td>0.72 (0.25-2.06)</td>
<td>0.91 (0.61-1.34)</td>
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<td>Referent</td>
<td>Referent</td>
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<td>Referent</td>
<td>Referent</td>
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<tr>
<td>BMI 25-&lt;30</td>
<td>1.84 (1.18-2.86)</td>
<td>1.77 (0.46-6.83)</td>
<td>1.88 (1.19-2.97)</td>
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<tr>
<td>BMI ≥30</td>
<td>3.42 (2.12-5.50)***</td>
<td>6.86 (1.63-28.81)**</td>
<td>3.28 (2.00-5.36)***</td>
</tr>
<tr>
<td><strong>Time in the US</strong></td>
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</tr>
<tr>
<td>10+ years</td>
<td>1.40 (0.76-2.56)</td>
<td>1.99 (0.48-8.24)</td>
<td>1.32 (0.69-2.51)</td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
</tbody>
</table>

Abbreviations: NYC CHS, New York City Community Health Survey; OR, Odds Ratio; CI, Confidence Interval; FBBs, foreign-born Blacks; BMI, Body Mass Index.

***p<0.001, **p<0.05, *p<0.10
Chapter 4. Ghanaian and Jamaican Immigrant Families Welcome and Facilitate Dietary Acculturation: A Qualitative Study of Dietary Acculturation in Three Generations of Black Ghanaian and Jamaican Immigrant Families Living in New York City

“How do I say that, because in America there’s like different varieties of food and everybody wants to have a taste of whatever they like. So like back in Africa you didn’t have a choice. Whatever was put in front of you, that’s what you ate. Here, we can buy Domino’s... Pizza... McDonalds, like the $3 burger... Chinese rice.”

Youth, Male, Ghanaian

“It was ok because when they got here. They knew most of the food items. Not that they knew the food itself but like the cereal, the pop tarts, the hot pockets, all the stupid things, they were used to it already.”

Mother, Jamaican

“That's the only difference up here, them more into your health and tell you how to go about eating. What is healthy. But in Jamaica now, you just eat.”

Grandfather, Jamaican
4.1. Introduction

4.1.1. Background

Black immigration to the United States (US) quadrupled between 1980 and 2000, and between 2000 and 2013 it further increased by 56%. In 2013, 8.7% of the US Black population was foreign-born, representing 3.8 million people.(1) The US Census estimates that by 2060, 16.5% of the US Black population will be foreign-born.(2) In New York City (NYC), the fastest growing group of foreign-born residents is West Africans (76,710), with a population growth of 60% since 2000.(47) Ghanaians (27,400) represent a third of West Africans in NYC. Non-Hispanic Black Caribbean immigrants (595,740) constitute 19% of the entire NYC foreign-born population. Jamaicans (169,235) alone represent 5.5% of all foreign-born New Yorkers.(47) Existing studies often obscure the characteristics of foreign-born Blacks (FBBs) by combining them with US-born Blacks (USBBs) and provide little information on the dynamics of culture as they are enveloped into the African American population.(90) The FBB Ghanaian and Jamaican immigrant populations were chosen for this study because they are the largest groups of FBBs from the African and Caribbean regions to NYC.(47)

FBBs from Africa and the Caribbean have historically been healthier than USBBs and experienced lower odds of diet related disease such as obesity and type 2 diabetes (T2D).(5, 40) However, there is reason to believe that this trend is changing as recent studies have identified increased risk of T2D in FBBS from Africa (8) and the Caribbean despite lower BMI.(7) Immigrants generally have significantly better health and dietary habits at the time of entry than after living in the US for 10 or 15 years due to acculturation.(40) Acculturation is the process of cultural change and adaptation that takes place when members of different cultural groups come into prolonged contact.(91)
Dietary acculturation is the “process that occurs when members of a minority group adopt the eating patterns/food choices of the host country”;(11) and eating habits, food procurement habits, cultural beliefs and practices around cooking and eating are affected.(92) A higher level of dietary acculturation is associated with increased intake of energy, fat, sugar, sodium and animal protein,(17) and eating more meals away from home.(15) A lower level of acculturation associated with a healthier diet appears to be more enduring among FBBs than other immigrant groups.(12) For example, the high frequency of consumption of “traditional” foods among FBB Jamaicans living in Florida was thought to be associated with a low level of acculturation and better health outcomes.(12) Similarly, in a national sample of African immigrants in the US New Immigrant Survey (2003) those who experienced moderate dietary change after immigration were more likely to have poorer self-rated health compared to those with low dietary change. In contrast, high dietary change was not associated with self-rated health.(93) However, findings among FBBs including African and Caribbean FBBs are inconsistent. Limited findings in the UK and the US suggest that Black immigrant groups may have distinctly different acculturation experiences, dietary behaviors and health outcomes from each other, and that consideration of the unique cultural context of each group is warranted.(12, 33, 40-42)

In NYC, African and Caribbean FBBs tend to settle in ethnic enclaves. African enclaves are found in Manhattan (Central Harlem) and the Bronx and the north shore of Staten Island, whereas Caribbean enclaves are found primarily in Brooklyn and Queens.(47) Enclaves are defined as urban areas where minority communities maintain ways of life largely separate and different from the ways of life in the general surrounding community.(94) Ethnic enclaves may offer some psychosocial and environmental protection against acculturative factors.(86) However, a recent study among West African immigrants in the Bronx, NYC found that despite availability of
cultural food ingredients and social support, time constraints made it difficult for them to cook traditional foods every day. (36) In another NYC study, West African parents reported that youth succumbed to the social pressures of their peers and the temptation to purchase fast food and soda because of these food items’ status, availability and affordability. (36) Compared to the US, fast food and sugar sweetened beverages were significantly more expensive in Ghana and were considered luxury items for special occasions or reserved for the affluent. (36) In Canada, Black Jamaican immigrant youth found that they and their mothers were the ones to facilitate acculturation through the adoption of international foods (e.g. Italian and Chinese) into the family meals despite the availability of cultural foods in the neighborhood. (23)

Traditional foods are deeply linked with the enculturation of young people regardless of whether they grow up in the home country or the diaspora. (25) Enculturation is the process of socialization which teaches what modes of thinking, feeling and behaving are considered appropriate for a member in a particular culture or society. (34) An aspect of enculturation is cultural transmission, defined as the transfer of a society or culture’s cultural norms and knowledge from one generation to another. (95) Cultural transmission includes life skills such as cooking and other household chores. These are tied to identity formation as cultural groups identify with the foods endemic to their group. As an example, the “strongest indication of being Jamaican is tied to the traditional foods of the island.” (23) African immigrant groups are also deeply tied to their cultural foods, but find that dietary acculturation is part of the immigrant experience. Nigerian immigrants in NYC found that the hectic lifestyle in the US affected cultural practices and diet, so that “when you’re going to work and you can’t cook, and you don’t have time, it’s a problem.” (26) Similarly, Jamaican immigrant families may cook and serve traditional foods on a regular basis. However, mothers and grandmothers are not necessarily teaching their children how to cook, possibly to
maintain “an element of control or centrality in the family gatherings.” (23) This matrifocal power dynamic is of interest both in terms of enculturation and acculturation, particularly as two out of every three Jamaican immigrant families have a female head of household. (24)

We sought to further elucidate the cultural contexts that give rise to the unique dietary and health profiles of FBBs of varying origin, (32) despite economic barriers, limited access to healthy and cultural foods, neighborhood environments, lack of time to cook and sedentary behavior associated with living in the US. (26, 33)

This work is less focused on specific ingredients and more focused on the complexity of dietary acculturative changes in nutrient content, portion sizes, cooking and eating practices, and how they may affect health outcomes. Nevertheless, it is necessary to define what is meant by US and American foods as we use this terminology throughout this paper. US foodways and specifically NYC foodways are multicultural and convey the rich heritage of the many immigrant groups who have settled in the US. Therefore, American foods include fast foods such as pizza, hamburgers, French fries, tacos, Chinese fried rice, as well as bacon and eggs, apple pie, corn on the cob, fried chicken and biscuits, macaroni and cheese, whether they are produced by local restaurants or international chain restaurants. Furthermore, American foodways also include packaged foods such as cold cereals, breakfast tartlets, Jell-O desserts, sugar sweetened beverages, boxed macaroni and cheese, cookies and pastries, chips, fruit juices, deli meats, hot dogs, cheese, etc. Most importantly, US or American foodways are equated with increased intake of plant cooking oils, sugar/high fructose corn syrup, rice, wheat, corn, chicken, dairy, and processed and packaged foods prepared from these ingredients. Perhaps it is less about the food items themselves and more about the affordability, convenience and proliferation of foods in the US which promote the
increased intake of energy, fat, sugar, sodium and animal protein,(17) and more meals eaten away from home.(15)

Foodways associated with American culture may already be intrinsic parts of the immigrant identity through remote acculturation (54) which takes place before the transition to the US. As a result of globalization, international trade and foreign investment policies, the global nutrition transition is characterized by imported foods and food brands being more convenient and more desirable than local foods in immigrant countries of origin.(19) This contributes to contradictory value systems and cultural identities in which unhealthy imported foods are considered to be of a higher status than healthier fresh, local and traditional foods.(21)

Ghanaian and Jamaican families tend to be transnational.(96, 97) Transnational families are defined as maintaining kinship networks and family ties across borders while members live in more than one country. In addition, temporary and permanent migration and resettlement movements of families or parts of families are not unidirectional but imply “fluid relationships between family members in two or more countries.”(98) Family members of transnational families living in the US often work multiple jobs to accumulate enough money to cover living expenses for themselves in the US as well as send back remittances to family members in the home country. Grandparents, spouses and children may remain in the home country for several years, and are only brought to the US once practically, legally and financially possible.(98) Previous acculturation literature has primarily focused on the family as the unit of enculturation, with limited exploration of intergenerational cultural transfer and acculturation experiences. Intergenerational conflict has often been illustrated as the youth growing up in the US and acculturated into US norms and values, who find themselves pitted against parents, grandparents and other adult relatives bound by traditional values from the country of origin. Instead,
transnational families represent a more nuanced social structure and intergenerational relationships extended over two or more countries where youth and adults navigate the necessary cooperation, caring and changing relationship norms over time. (99) Intergenerational studies examine the content and quality of relationships between different generations, including contact, exchanges, roles, conflicts etc. (100)

We found a gap in the literature examining the intergenerational variation in dietary acculturation among FBB populations in the US. Several studies have explored the adult acculturation experience of FBBs in NYC, and included the adult perspective on the youth experience. (26, 36, 52) However, only one study has examined the experience from the youth perspective among young Jamaican immigrants in Canada. (23) To the best of our knowledge none have interviewed three generations within the same immigrant group.

4.1.2. Purpose

We sought to gain a deeper understanding of the individual and family level manifestations of dietary acculturation in Ghanaian and Jamaican New Yorkers of different ages. Using focus groups and interviews, this study explored dietary acculturation, obesity and Type 2 diabetes (T2D) among FBBs from Ghana and Jamaica. The purpose of this qualitative study was to explore how: (a) cultural practices and the acculturation experience influence dietary patterns of Ghanaian and Jamaican immigrants across generations; (b) identify protective cultural, psychosocial, economic, contextual and family factors that underlie the unique dietary acculturation process among FBBs relative to other immigrant groups; (c) understand the ways and the extent to which cultural practices and the acculturation experience are passed on from generation to generation. This paper will focus on the intergenerational differences of dietary acculturation experiences within
Ghanaian and Jamaican transnational families in the various stages of living in the home countries, immigrating to, and living in the US.

4.2. Methods

4.2.1. Outreach

To recruit Ghanaian and Jamaican immigrant families we used several modes of recruitment. Flyers and posters (See appendices A.1 and A.2) were distributed on bulletin boards in public educational institutions, community based organizations and local businesses in African and Caribbean cultural enclaves in Brooklyn, Manhattan and the Bronx. Materials were also distributed via social media (Facebook and Instagram), university list-serves, personal outreach and the snowball method whereby participants referred others to participate. Recruitment in the Ghanaian community was also facilitated by a Ghanaian community organizer. Potential participants met the inclusion criteria if they self-identified as Black; currently living in NYC; were of either Ghanaian or Jamaican heritage, and members of a family with at least one young person between the ages of 13 and 27, where one or more family members/generations had immigrated to the US from either Ghana or Jamaica.

4.2.2. Screening and enrollment of participants

Potential participants completed a screening survey which was administered online (Survey Monkey, See Appendix B), in person or over the phone; or participants were pre-screened immediately prior to focus groups or interviews by community partners or research staff. Participants were chosen through purposeful sampling based on their role as youth, parent or
grandparent in either population group, and their personal Ghanaian and Jamaican immigrant experience including foodways, family dynamics and acculturation.

A total of 79 potential participants completed the screening online or in person of which 18 were disqualified based on age, race, family status or ethnic origin. Twelve participants did not return phone calls to schedule a focus group or interview and two did not attend a scheduled event. A total of 25 Ghanaians and 24 Jamaicans participated in a focus group or interview based on availability.

4.2.3. Locations

Focus groups and interviews with Ghanaian participants were held at Ghanaian restaurants, an African grocery store and a mosque in the Bronx, in addition to Brooklyn College. Focus groups and interviews with Jamaican study participants were held at Brooklyn College, a local public library, community based organizations, and participants’ homes.

4.2.4. Protocol

Prior to each research activity the study purpose and protocol were explained to each participant. Parental consent in addition to child assent (See Appendix C), was obtained for participants under the age of 18 years, and informed consent was obtained for adults 18 years of age and older. (See Appendix D) To ensure confidentiality and privacy, each participant was assigned a unique identifying code, which included the date of the interaction, their cultural background (Ghanaian vs. Jamaican), family number and their generational group (youth, parent or grandparent) (See Appendix E). Members of the same family were coded with the same family number. At the beginning of interviews/focus groups a brief survey with demographic, immigration history, health and nutrition behavior questions was administered to each participant either on a desktop computer
or on paper. (See Appendix F) Intake survey questions (See Table 4.1) were modeled from the NYC Community Health Survey instrument to mirror quantitative analysis in a larger study. Interviews and focus groups were audio recorded and participants were informed that all information should and would be kept confidential. To compensate for participant time, all participants received a $20 gift card to a local or online retailer of their choice.

4.2.5. Data collection

Research team members administered consent forms, intake survey and incentives, and co-facilitated research activities. The same researcher, trained in qualitative methods, facilitated all interviews and focus groups. One or more research team members were present to facilitate consent, intake and note taking. The semi-structured interviews and focus groups followed an interview guide with open-ended questions (See table 4.3 and Appendix G) and were digitally recorded. Between December 20, 2016 and February 12, 2017, we conducted 4 focus groups (average n=3, min 2/max 5) and 5 individual interviews with Ghanaian participants and 5 focus groups (average n=3, min 2/max 6 per group) and 5 individual interviews with Jamaican participants. Interviews and focus groups lasted an average of 50 minutes.

4.2.6. Privacy and confidentiality

Participants were given the opportunity to conduct the interview or focus group in locations of their choice. Whenever possible the research team reserved a private room for the duration of consenting, interview/focus group and distribution of incentive. At the beginning and end of each research activity all focus group participants were reminded to protect the privacy and respect confidentiality of anything shared by other participants.
Study procedures were approved by the City University of New York Human Research Protection Program, Protocol #2016-1201.

4.2.7. Data analysis

All recordings were transcribed verbatim by research staff or professional transcription agencies. Three focus group and two interview recordings which contained Jamaican Patois were transcribed and translated by native Jamaican transcriptionists.

Intake data was dichotomized or categorized. Chi-square analyses assessed differences in sample characteristics between Ghanaian and Jamaican participants. (See Table 4.3)

The qualitative data analysis utilized the Grounded Theory Methodology (GTM), which is a complex, dynamic, iterative process in which data collection and analysis alternate. Data collected through in-depth interviews and focus groups informed analysis which in turn formed concepts to pursue in subsequent interviews or focus groups.(101)

The six research team members all participated in initial coding of transcripts and generating a codebook. We used in-vivo codes, i.e. actual words of participants to label concepts/code and compare data. All focus group and interview transcripts were coded by the first author. One additional research team member coded separately and then compared coding choices until consensus was reached. Throughout the process, the research team wrote memos, (written records of inspirations, thoughts and analytical insights), which moved the analysis forward.(101) As coding and analysis progressed, diagrams were drawn up as visual representations of the possible relationships between concepts which helped illustrate the data relative to the emerging themes.(102, 103)
Emerging themes and code definitions were discussed among research team members and in some cases included in subsequent interviews and focus groups, or discussed with advisory members from each community. Saturation was reached when no new data emerged from additional interviews and focus groups, and a rich understanding of each research question was reached.

Statistical analysis of intake data was completed with Statistical Package for the Social Sciences (SPSS) version 23.

Transcribed interviews and focus groups were coded and analyzed with Dedoose version 7.5.

4.3. Research Findings

4.3.1. Participant characteristics

We entered this exploration through the lens of dietary practices in transnational Ghanaian and Jamaican families. Most Ghanaian families in our sample included two parents and one or few children, or grandparents with adult children and grandchildren living in the US and Ghana. For most Ghanaian youth participants, their grandparents, although important in their dietary enculturation, were living back home or had died. Jamaican families were likely to include three generations and extended family living in the US with some transnational characteristics, and were often led by a single female head of household who was also the main meal provider. Ghanaian families were somewhat difficult to define due to informal extended family relations formed in the cultural enclave. For example, women would speak of their children, including nieces and nephews and the children of other families who they would feed and in the case of the young girls, teach to cook. Throughout this project we came to think of family as individuals who are
connected through a wide web of “extended family” and strong kinship bonds by blood, legal or informal relation as seen in both groups.

Most Ghanaian and Jamaican youth were brought up in the home country, while one or both parents were living and working in the US. One parent, grandparent or other relative had been responsible for bringing them up according to the home country’s social and cultural norms. This ensured significant enculturation in Ghanaian/Jamaican culture including respect for elders, appreciation for family relationships, life skills including cooking and cultural foodways. Ghanaian parents also noted that youth who grew up back home were more likely to prefer cultural foods from the home country, have a greater appreciation for the collective, eat whatever was served and demonstrate better self-discipline than youth raised in the US. In both cultural groups, family units in the home country tended to be larger, with multiple generations living in the same household or living near each other, and mealtimes often implied social experiences.

Table 4.2 provides selected characteristics of individual Ghanaian and Jamaican participants. Women represented 76% of Ghanaians and 50% of Jamaicans. The mean age was 36.9 for Ghanaians and 43.1 for Jamaicans. Most participants in each group were youth between the ages of 13 and 27, representing 52% of Ghanaians and 41.7% of Jamaicans. Ghanaians had lower educational attainment, as more than a third had a high school education or less, compared to 20.8% of Jamaicans.

Ghanaians were mostly low to middle income, as 52% indicated incomes <$40K, whereas 20.8% of Jamaicans had incomes <$40K. In terms of marital status, 42.9% of Ghanaians and 45% of Jamaicans were married or living with a partner. Most of the Ghanaians (50%) and Jamaicans (59.1%) who immigrated to the US arrived at the age of 18 or older. Approximately 10% (n=2) of
each group was born and raised in the US, i.e. did not immigrate and were part of the youth study population.

In terms of health and dietary behaviors, most Jamaicans (78.3%) and Ghanaians (66.7%) reported at least 30 minutes of exercise per month. When asked about fruit and vegetable consumption the day before the interview/focus group, more than half of Jamaicans ate 2 or more servings of fruits and vegetables, compared to 20% of Ghanaians. A third of Ghanaians (33.3%) did not consume any fruits and vegetables, compared to 4.3% of Jamaicans.

Consumption of sugar-sweetened beverages was similar in the two groups; however, more Jamaicans (61.9%) reported drinking one or more sugar sweetened beverages per day compared to Ghanaians (52.9%).

In terms of eating out, more than a third (34.8%) of Jamaicans ate 3 or more meals away from home each week compared to 15% of Ghanaians. In addition, 45% of Ghanaians never ate meals away from home compared to 17.4% of Jamaicans. Less than a third of Ghanaians, or 30.4%, was obese compared to 34.8% of Jamaicans. In contrast, 40% of Ghanaians and 30.4% of Jamaicans were overweight. Concerning T2D, 8% of Ghanaians (n=2 grandparents) and 12.5% of Jamaicans (n=1 parent and n=2 grandparents) had been told by a medical professional that they had diabetes.

4.3.2. Qualitative Findings

Dietary acculturation experiences were found to be taking place in the home country, due to store availability, marketing and media influences as well as foods and financial remittances sent by relatives living in the US. Or influences which were found in the US were encountered within the home, such as home cooked meals, packaged snack foods and cereals, or outside the home,
including school lunch, chips, beverages and fast food. Significant intergenerational differences and preferences were identified within each of these realms.

4.3.3. Dietary Acculturation in the Home Country

Most youth participants in both groups had lived in Ghana and Jamaica until they were brought to the US in early adolescence or adolescence. Parents and grandparents in both groups had lived in the home countries until adulthood.

Establishing food habits in Ghanaian and Jamaican families happened in the larger context of globalization and the nutrition transition. The influence of media and product placement in advertisements, films, television and online media in the home country was noted by youth and adults in both groups. Youth and adult Jamaicans alluded to the influence of US cable TV programming and commercials widely available in Jamaica as strong acculturating influences.

Jamaican youth also referred to specific television programming aimed at young consumers which promoted contemporary US social norms such as desirability of slender women. When asked about the source of her insights and norms about healthy diets and body weight a young Jamaican woman suggested a possible source:

“I don’t know, maybe ... because growing up, my mum had cable and I used to watch a lot of MTV. That was my station. And they would have these little true life documentaries and you see all these different things that people are going through here and you hear about the bulimics, the anorexia, stuff like that. But it’s just added knowledge but I don’t know consciously if I was swayed in any way by watching these American station, I'm not sure.”

Youth, female, Jamaican
Jamaican participants acknowledged the signs of globalization and the nutrition transition as more and more supermarkets offered wide selections of US foods back home.

“You walk into a supermarket in Jamaica and you think that you are in Pathmark or you in C-Town. Everything is imported, you walk in there and it’s the same thing you see in there and it’s cheaper in some of those stores.”  

Grandfather, Jamaican

The proliferation of US fast food chains as they established franchises in the home country have changed the food scene so much so that one grandfather likened it to Brooklyn.

“When I go back to Jamaica, now there are fast food. You have KFC, you have Wendy’s, and you have Burger King and all those things now. […] So, the Jamaicans, they are more relying on the fast food there now. The kids are not eating properly in Jamaica, I think right now.”  

Grandfather, Jamaican

In addition, big box stores provide imported foods in larger quantities at lower prices, outcompeting locally produced Jamaican foods.

“I always remember them. It was a big grey store, it is a huge store filled with goods and stuff, is like a Wal-Mart, but only for food items.”  

Youth, Male, Jamaican

These manifestations of the global nutrition transition in Jamaica was welcomed and seen by some as progress, efficiency and a move towards achieving higher living standards.

“And everything you can just pick up in that supermarket. You can go home and in 2 seconds you fix something. Everything is processed food now, it takes two seconds, and you put it in a microwave.”  

Grandfather, Jamaican

Signs of the nutrition transition and globalization were less apparent in conversations with Ghanaian participants. Ghanaian youth noted that supermarkets are an urban phenomenon but that
rural residents in Ghana may have healthier diets than urban residents as a result of limited access to processed foods. However, they also explained that eating healthy in the city may be a conscious choice for some despite the proliferation of processed foods. This in itself is a manifestation of dietary acculturation progressing beyond the highly processed foods, possibly reviving rural foodways and adopting healthy eating habits.

“Because the cities have more processed foods and stuff and then the villages don’t have that so they get to, actually, eat healthier. But the people from the city eat healthy as a choice.”

Youth, Female, Ghanaian

4.3.3.1. Barrels of Food and Financial Remittances

Youth who grew up in transnational families also had additional unique exposures to US food culture. Not only were youth and adults experiencing US foods on vacations to the US but also foods brought by visitors. Parents and grandparents who lived in the US also represented US food culture, by shipping barrels of non-perishable foods to the family members who remained in the home country. These dietary capsules represented the success, purchasing power and financial stability of adults living in the US. For parents and children who were separated by migration, barrels are an expression of caring. Despite geographic separation, youth were provided access to coveted consumer goods and packaged foods and allow the adults to extend the US experience to their children who are living back home.

“I wanted them to become familiar with American foods because I had the ability to.”

Grandfather, Ghanaian
Barrels and remittances also played a significant role in food security and financial stability. Most food items were staples such as rice, cooking oil, canned vegetables, canned meats, dried beans etc. and other household items such as laundry detergent, cleaning supplies, etc.

“Right, he [my dad] used to send barrels to us back home. That’s why I was saying like our lives wasn’t like some parts in Jamaica are really hard. We have people that will go to bed without food. I’ve never experienced that. [...] We had excess we used to be able to give away so we were blessed like that.”

Mother, Female, Jamaican (grew up in Jamaica, came to the US as an adult)

Monetary remittances provided purchasing power and enabled families in the home country to purchase necessities as well as more expensive American products, e.g. cereals, cookies, breakfast tartlets. The financial stability of the relative in the US was thereby passed on the family in the home country as a sign of their purchasing power and connection to the US.

“So, I’m trying to keep them happy at home. So, I sent the money to allow them to have all these stuff that will keep kids home. So, in response I send the money to tell them to go buy that that that that [Cornflakes and other packaged foods]... I send them the money, so I take safe care of them. So, when they came here, it’s the same thing. So now they do for their own children what the daddy did for them.”

Grandfather, Ghanaian

This demonstrates how the dietary acculturative experiences were injected into daily life in the home country by the parents, before youth were able to migrate to the US. Furthermore, it may also illustrate how these dietary practices extend to future children of those who immigrate.

Memories of barrels with US foods and other consumer goods brought smiles to the faces of many Jamaican participants of all ages. Perhaps as significantly, the adults see the barrels as an acculturative tool so that when the youth do arrive in the US they are familiar with brands, flavors and food types. As one Jamaican mother of two expressed it:
“It was ok because when they got here. They knew most of the food items. Not that they knew the food itself but like the cereal, the pop tarts, the hot pockets, all the stupid things, they were used to it already.”

Mother, Jamaican

One Jamaican grandmother who recently joined her children and grandchildren the US after having brought up her last grandchild in Jamaica, spoke of packing and shipping up to three barrels per month to friends and family. However, on a recent visit she had noticed that due to the availability of the same foods in Jamaica, it may no longer be viable to purchase foods in the US and pay for shipping. Instead she was debating whether to make the purchases locally during a visit or send the money.

“I say to myself, I don't need to send a barrel. I really don't need to send a barrel. I just need money to spend. If you go down with $300 US, the things them that [daughter’s name] usually pack two barrel with, you can get it down there and it cost less because you don't have to clear it [in customs]. You don't have to pay to ship it.”

Grandmother, Jamaican

Both Ghanaian and Jamaican participants spoke of frequent travel between the US and the home countries for business and family reunion, and particularly about the US foods they would bring to the home country, the traditional foods they would be served in the home country as well as the foods they would bring back to NYC.

4.3.4. Dietary Acculturation in NYC

Dietary acculturation continued as individuals and families immigrated to the US. Young Ghanaians had arrived in the US to enter high school, ages 14-18. Young Jamaicans had arrived in
the US in early adolescence, ages 10 and up. A majority of parents and grandparents in both
groups had arrived as adults.

Reuniting transnational families was not always easy. Parents who petitioned for their children to
come to the US had high expectations of resilience and formed cultural identities, in addition to the
ability to perform usual life skills and household tasks such as cooking, cleaning and laundry.

“Me, I’ve grown up with my grandmother so I know how to cook.”
Youth, Male, Ghanaian

Jamaican youth described the culture shock associated with getting to know a parent who had been
absent for many years.

“I didn’t meet my mum until let’s say what age was I maybe about 15, 16 somewhere
around there so I didn’t meet my mum. So, and that was something that was also it was like
a rebellion against her as well. Like who are you to try to tell me what to do? You haven’t
been there for most of my life so far...”
Youth, Male, Jamaican

In addition, they would often have to fit in to new family structures with step parents and step
siblings.

“Even though I live there I still kind of feel like I’m just here temporarily so sometimes I
may not really want everything that she [my step mom] prepares.”
Youth, Female, Jamaican

Additional acculturative stressors that were mentioned by the youth included adjusting to the foods
in the US, acclimating to the US educational system and adopting new social norms which stand in
stark contrast to the home countries, such as the lack of respectful interactions between students
and teachers, peer-to-peer interactions (e.g. bullying among youth), and everyday interactions with others.

4.3.4.1. Food in the US is Aplenty, Available and Affordable, but is it Clean?

A majority of Ghanaian and Jamaican immigrants regardless of age described the most striking difference between food in the home countries and the US: the availability and relative affordability of both fresh and prepared foods.

“...there are so many things I can afford when I work hard I can afford here the liberty, the freedom, and the food and the chicken!”  
Mother, Ghanaian

“[The food], it’s cheaper, it’s not different, it’s cheaper.”  
Mother, Ghanaian

Participants also noted that the lower cost of ingredients for home cooked meals may have led to increased amounts of food prepared and therefore larger portion sizes.

Ghanaians and Jamaicans of all ages expressed concern about the healthfulness of US foods. Food from back home was considered clean, organic and produced without hormones, fertilizers and pesticides. In contrast, US foods were considered unclean, likely genetically modified and produced with hormones, fertilizers and pesticides.

“... usually when you go to the store you see tomatoes that last like weeks. So, tomatoes are not supposed to last like that. So, they inject like whatever they put in it and it just lasts, so that’s not good.”  
Youth, Male, Ghanaian

Although these concerns were shared in all interviews and focus groups they were mostly applied to food found in the supermarkets and grocery stores, whereas few connected these concerns to
prepared foods. When a group of Ghanaian youth was asked about the ingredients in the pizzas from a popular franchise, they all agreed that:

"No, I’m not even thinking about them when I eat Domino’s. [...] I want to make sure the person that made my food that he washes his hands." Youth, Male, Ghanaian

4.3.4.2. Cooking and Eating in New York City

Contrary to the home countries, where meals are typically cooked daily, home cooking became less frequent in NYC. The stress and time constraints due to working several jobs and living farther from school and work contributed to everyone cooking less frequently and less elaborately.

In many families, food shopping and cooking took place on the weekends, and leftovers and take-out made up daily meals during the week. The practice of eating meals together was often abandoned in NYC, in part because of busy schedules where family members are home at different times of the day.

“In America, I remember her cooking and I would just warm up the leftovers but when I turn I believe 11, I would just like okay I need fresh food so I called my aunt and ask her how to make barbecue chicken and ever since then, I've been the main cook in the house, so I'll cook and leave the food out and my mom would come home and eat it, but we eat separately.” Youth, Female, Jamaican

And even in families where members are home at the same time, meals are heated and consumed in solitude whenever each person is hungry and/or has time.

“You know what’s strange, because on like special occasion, there will be a family dinner, other than that, when the food is cook, you share out and everybody go to their own little space and eat. “ Youth, Male, Jamaican

“But now, anyone can eat any time they want, anywhere they want.” Youth, Female, Ghanaian
The Ghanaian practice of eating by hand from a communal dish was abandoned in NYC because of fear of transmission of disease and social norms around touching another person’s food. Although Ghanaian youth and adults may continue to eat with their hands at home and in African restaurants, parents and grandparents portioned out food on individual plates.

“You see, here, if they saw you you’re eating with your hand, maybe some people will be laughing at you. You know you are getting some disease or something. You have to eat it with the spoon, or some with the fork and knife. Here you get a separate plate.”

Youth, Male, Ghanaian

The social pressure because of what may be considered an unsanitary way of eating, removed this deeply embedded Ghanaian cultural practice from both the public and private spheres. A group of young men explained that food is consumed and hence distributed according to each person’s affinity with eating with one hand.

“We only eat with our hands at home. We only eat with our hands back home. You know what; some people will put their hand like this. You have to be smart. Like this one is very fast, if you bring the food he can eat it plenty [quickly].”

Youth, Male, Ghanaian

Several male youths also referred to the religious and social significance of sharing food from the same bowl for friendships and social cohesion.

“It depends, it’s because it says in the Qur’an, it says if you eat with someone like your friend or something, you’re going to get blessings. You’re going to get blessings because like you have to show to your friends like you want to eat with them. My grand mom, she always told me [...] I can’t eat by myself.”

Youth, Male, Ghanaian

The resulting physical and emotional distance from others as well as the difference between a communal and shared meal experience to an isolated meal experience may increase portion sizes and allow for seconds.
Jamaican youth who joined families with step parents and busy schedules sometimes found themselves unwelcome and further isolated in the new home. Arriving as teens or young adults, with formed cultural identities, they sought the cultural foods of their childhood and home country rather than venturing into the world. However, they may not have encountered the exact same foods as back home. One way they asserted their independence was to reject the cultural foods served by the step parent even though the foods may have aligned more with the young person’s identity.

“...even though I live there I still kind of feel like I'm just here temporarily so sometimes I may not really want everything that she [my stepmom] prepares.”

Youth, Female, Jamaican

Meal patterns eroded in several other ways as foods were readily available inside and outside the NYC home. In the home countries participants were used to fewer daily meals and no snacks; in NYC, everyone appeared to expect three meals a day in addition to snacks and sweetened beverages.

4.3.4.3. Adults and Youth Develop Different Preferences

As life in NYC provided access to more options for snacks, ready-to-eat foods and take-out meals, youth had little patience to wait for cooked foods, which required time to prepare. Youth ate boxed cereals with cold milk as a snack, fast food, packaged baked goods such as honey buns, soda, chips, cookies and juice or soda.

One grandfather felt that youth dedicated what he called “time” to eating certain foods, a way to express how his children and grandchildren would not want to wait for cooked food, but eat something that he did not consider to be real food (e.g. cornflakes). Instead, parents and
grandparents in both groups as well as some youth preferred cooked foods and would wait for the foods to be prepared.

“We all eat the same food. The different food that we [eat] you have these kids, they eat lot of stuff], [...] we don't have time for, but they do have time for. It's not easy, all the time you gonna stand in the kitchen cooking for them. They have the corn flakes, they have all these juice, cereal, they go for it!”

Grandfather, Ghanaian

Interestingly, the foods this grandfather listed as taking away from eating real, cooked food were the very same foods he used to ship in barrels to his children as they were growing up in Ghana.

One snack food consumed outside of regular meals was present in both Ghanaian and Jamaican conversations. The ubiquitous and affordable “Chinese fried rice” is available from local American Chinese restaurants in many inner-city neighborhoods. Considered a snack, both youth and adults would eat it, but youth more often than adults.

“I eat it once in three months; my kids eat it all the time.“

Mother, Ghanaian

Youth often expressed that they liked “some” traditional foods, but not others which their parents considered comfort foods such as ground provisions, yams, cassava and green plantains were typically not on the list of favorites. In fact, two young Ghanaian women who grew up in the US noted:

“There were certain things that I *did* like. And she [my mom] could only cook that much, like that stuff more. Plantain, I think it’s universal. So, it's kind of like okay. I love it when she makes the sweet one though, not the hard one, the yellow one, I like the sweet taste.”

Youth, Female, Ghanaian
“Like whatever was for lunch if you're hungry and you don't want to eat it for dinner, and also, I don’t really like African food. So like if she was making like Fufu I'll be like chicken wings can I get some chicken wings I don’t want this Fufu.”

Youth, Female, Ghanaian

When asked whether they ate the same foods as other family members, particularly other generations, participants would insist that they ate the same foods. However, there were small but significant differences between what different generations ate, in what amounts, how often and when.

Mothers of Ghanaian and Jamaican youth who grew up in the US would pre-emptively prepare and serve “American” foods, effectively promoting dietary acculturation in youth.

“I think she automatically assumed before we came like grow up like not knowing that we wouldn’t like it, I don’t know. I really don’t know. Like I mean at some point like I wanted like cheese and I didn’t love like fufu.”

Youth, Female, Ghanaian

Mothers in both groups both anticipated and accommodated changed food preferences in their children and therefore prepared what was perceived as “American” foods for the youth while still preparing traditional foods for themselves.

“She [my mother] would cook predominantly Ghanaian food for them [my parents] to eat but she would make us American food.”

Youth, Female, Ghanaian

Ghanaian and Jamaican youth both preferred rice in any form over starchy roots, tubers and fruit and for Ghanaian youth, rice was preferred over the more traditional fufu (Mashed plantains and cassava). In addition to rice, Jamaican youth were also very fond of wheat-based dumplings; both fried (a biscuit-like deep fired dough ball) or boiled. The fondness of rice extended to other cultural cuisines, so much that rice was seen as a common ground or safe choice by youth and...
adults in both groups regardless of the food culture. In comparison, starchy roots, tubers and fruits such as plantains represented comfort foods for most adults from both groups. Youth also had a preference for a diet that was higher in fat and sugar. One Ghanaian grandfather who was facing T2D and hypertension felt compelled to address this and convey the healthy eating practices he had learned from medical professionals.

“That’s the most disturbing things. Because right now, the way we [are] protecting ourselves from all these type of things [diet related diseases], this generation, the young generation they are not into that. [...] When my son drinks a tea, sometimes I have a taste of the tea just to see how much sugar. See, if the sugar is too much I talk to him, "hey be careful, it's too much for you." [...] So, I have to educate him and let him understand the consequences of too much sugar. When he eats rice, when I found out it’s too oily, I complain about it.“

Grandfather, Ghanaian

4.3.4.4. Eating Out in NYC

Fewer meals at home also meant more meals away from home, consumed at school, at work, in fast food restaurants and Ghanaian or Jamaican take-out places.

Youth from both groups gained independence from adults when then moved to NYC. Due to the busy work schedules of parents, and the availability of food in the urban setting, youth were given

Youth, Female, Jamaican

Youth from both groups gained independence from adults when then moved to NYC. Due to the busy work schedules of parents, and the availability of food in the urban setting, youth were given
money to purchase food after school. They often identified the foods liked to eat outside the home as pizza, burgers, fast food, chips and soda, and Chinese fried rice.

This financial independence allowed youth to feel empowered to make choices and demonstrate maturity.

“I think about going to buy food show that, you know, sort of maturity say they can go and purchase their own food... that's just my assumption.”  Grandfather, Jamaican

A universal theme was that youth sought greater variety of foods and parents accommodated this desire both at home and outside. The variety and affordability of food options available in the US were often indicated as desirable by youth juxtaposed with the absence of choices in the home country.

“In America, there's like different varieties of food and everybody wants to have a taste of whatever they like. So, like back in Africa you didn't have a choice. Whatever was put in front of you, that's what you ate. Here, we can buy Domino's... Pizza... McDonalds, like the $3 burger... Chinese rice.”  Youth, Male, Ghanaian

Adults found comfort in eating traditional foods often whereas youth were unwilling to eat the same foods repeatedly. In fact, some did not see Ghanaian or Jamaican food as special. It was simply food. Furthermore, youth and adults did not consider food from Ghanaian or Jamaican food restaurants as eating out. Jamaicans in particular were intent on getting real (hot) breakfast daily, even if it meant picking it up from a local Caribbean restaurant.

“I think it's just that I have a preference to like Jamaican food. Because like even when I was filling out the questionnaire it says take out and I am like, I don't really consider going to Jamaican restaurant food take out but technically it is. So, I'm like, I do the 3-4 times a week. I'm like that sounds bad but it's still Jamaican food, so my go-to early morning is like I eat porridge or like ackee and saltfish or something...and that you know counting it might be a lot but it's because I didn't have time to make it at home.”  Youth, Male, Jamaican
Eating out among Jamaican and Ghanaian immigrant families would instead constitute eating American, Italian, Chinese or “buffet style” restaurants for special occasions.

“All times ... like we would go to eat out if it was somebody's birthday, like birthdays were big [...] Cheesecake Factory, anything that wasn’t our food. And we still do that when we’re all together.”

— Youth, Female, Ghanaian

Jamaican youth would be looking for variety in the restaurant choices whereas adults were more focused on the relief from cooking.

“As for my parents’ choice when they want to be lazy, "oh y'all want pizza or Chinese food?" That’s basically it. Or if they want to be fancy, we go to a Korean restaurant they order from. Yeah instead of them cooking themselves, they want someone else to cook for them.”

— Youth, Male, Jamaican

Ghanaian families mostly considered eating out an unnecessary expense which could be avoided by having food available at home. This was particularly noteworthy because several families either owned or worked in African restaurants.

“Yes, because we didn’t teach them to go out and eat we always make sure we have something at home and eat. Only once in a while we go out because we have to save money. We don’t want to be homeless.”

— Mother, Ghanaian

“But once in a while you go to African restaurant and then buy whatever you want over there. Sometimes you don’t want to cook there and then you go and buy that one over there.”

— Mother, Ghanaian

Cultural enclaves of immigrant communities in New York City often develop in low-income neighborhoods where other low-income and immigrant groups settle as well. Characterized by a proliferation of fast food places these neighborhoods provided ample opportunities to purchase
inexpensive and socially desirable fast food. Given busy schedules and parents working several jobs, youth were not likely to prepare food before leaving for work or school. So, unless an adult caregiver was home and available to prepare and pack a lunch, Jamaican youth were likely to resort to affordable fast food lunch options.

“Lunch, well since my grandmother is home right now, she usually packs something for me to eat from home, so I eat that but before that I was eating like McDonalds Wendy’s whatever is in the area.”

Youth, Male, Jamaican

Youth clearly preferred burgers and fries or pizza from national fast food restaurant chains. Some food purchases may only have been regarded as snacks whereas real food could only be had at home. Many parents discouraged fast food.

“He [my father] doesn’t like eating that food. If he sees us he starts lecturing us like, “You shouldn’t be eating this food, it’s not healthy, it’s not good for us, we could get fat.” So, we just listen to him and we stop eating.”

Youth, Male, Ghanaian

Although critical of the fast food choices, it was unclear whether their parents offered suggestions for healthier lunch and snack options.

4.3.4.5. School Lunches

Parents encouraged youth in both cultural groups to eat school breakfast and lunch. According to youth in both groups, back home in Ghana and Jamaica children would bring money to school to buy a daily hot meal. Youth attending public school in NYC were encouraged to eat school breakfast and lunch. This active encouragement to consume a multicultural “American” menu which included pizza, tacos and fried rice may be primarily financially motivated as many were
eligible for free or reduced-price meals. However, it was perhaps also an effort to make youth accustomed to the new country of residence and its common foods.

“My father said that I should try it, maybe I’ll like it. Then I started trying, then now I started eating school lunch.”

Youth, Male, Ghanaian

“Because in America like when you go to school, like they give different kinds of food, like you could choose what you want and they give it to you.”

Youth, Male, Ghanaian

In addition to parental encouragement to eat school lunch, youth also recognized that food experiences at school facilitated a multicultural dietary change, although they were perceived as American foods.

“When you go to school and you have pasta shells, you have taco day, you have all these things so this is what I’m eating regularly because most of the time you spend in that at school, so this is what you feed. So that’s my palate, your palate wants hamburgers because that’s what they’re feeding you in school.”

Youth, female, Ghanaian

4.3.4.6. Acculturation beyond Pizza and Chinese Fried Rice

Multiple external factors contributed to an increased level of acculturation. Higher education, higher income, increased social mobility, enhanced food access and exposure to current US social norms around healthier food and the connection to better health affected youth and adults in both groups, despite significant variation within each group.

Dietary acculturation evolved beyond the increased consumption of energy, fat, sugar, sodium and animal protein, and eating more meals away from home characteristic of the initial stages of acculturation. This continued evolution of dietary practice and health awareness was characterized
by seeking out better food inside the cultural enclave, outside the immediate neighborhood, eating more fruits and vegetables, dismissing fast food, and returning to healthier versions of cultural foods from the home country. Youth and adult participants noted an increased awareness of the connection between food and the community’s struggles with weight gain, hypertension and T2D. Sources of nutrition and health education ranged from online documentaries, television personae (Dr. Oz and Oprah) to the NYC Department of Health and Cornell Cooperative Extension’s community based nutrition education programs as well as medical professionals, faith community leaders and elders in the respective communities.

“We have a lot of programs here [where] we teach about moderation. Eat your food but [in] moderation. [...] So, if the youth know what their health is all about then [they] can also reduce the rate of [...] diabetes in the community [...] And so, they are breaking the cycle now.”

Mother, Ghanaian

“I think my parents are different, my mom watches Dr. Oz. My dad has books on vegetables also my dad played sports when he was younger so I think that also influence the way that I was brought up. But yeah, I guess they just educated themselves on the proper nutrition”

Youth, Female, Ghanaian

“That awareness has come from my family and from watching documentaries. There’s this documentary called Food Inc. you need to watch that to learn about how they do the meats and stuff.”

Youth, Female, Jamaican

Those who lived, worked or went to school outside the cultural enclave may also be exposed to, seek, and welcome greater dietary variety.

Duration of residence may affect dietary acculturation, so that the longer someone had lived in the US the more likely they were to make more modifications to traditional foods and experience a decrease in the frequency of cooking specific cultural foods.
“I mean my parents have been here for a long time, we don’t really make... I don’t want to say we don’t make Ghanaian food. But they’ve found a way to make Ghanaian food with American products.”

Youth, female, Ghanaian

Two young Ghanaian women who had gone away for college but had returned to live in minority neighborhoods indicated traveling to other parts of the city to purchase “healthier” and “better” products, e.g. fruits, vegetables and organic products at major retailers outside the cultural enclave such as Costco, BJs, Trader Joe’s and Whole Foods. While they noted that some special ingredients were available in multicultural markets, they did not see the need for specific stores to cook cultural foods and felt that ingredients were readily available in regular supermarkets.

“So, it's not like we might need something that you can only get in Ghana. [...] They now have powdered Fufu now you don’t have to go and fetch plantain and cassava. Its America now, so there is no specialty foods. [...] There is nothing really that I would say you couldn’t get from the supermarket.”

Youth, Female, Ghanaian

Jamaican youth and adults also noted the wide availability of cultural foods in mainstream supermarkets and multicultural communities throughout NYC. Those who had lived outside NYC knew that this was a relatively isolated phenomenon found in cities with concentrated ethnic communities.

Participants from both populations identified a higher level of dietary acculturation which manifested itself in greater awareness of food quality and health implications of unhealthy food. Several noted that after attending high school and college, their children or grandchildren who grew up in the US had dramatically improved diets. Young Jamaican men would learn to cook the foods they had come to identify with and appreciate once they graduated high school or college.

“It’s very funny, all my grandchildren born here. When they were born, you could never give them anything close to Jamaican food, they born underneath the television, they watch
the television and they see the [commercials] and that’s fries, fries, fries, morning, noon and night, all them want is fries.

Fish? No. Fries, fries, one bag of fries, fries, fries and surprisingly at age 15, the first one, he would never go to McDonalds for anyone, going through college, pass through college, he realizes that it’s no good for him. Now, he’s eating our Jamaican fish, vegetables, fruits, at 15, he changed totally, 360 [degrees].”

Grandfather, Jamaican

Although fast food may have dominated their childhood and youth, improved dietary practice, increased consumption of fruits and vegetables as well as physical activity became part of adulthood.

One Jamaican grandfather said about his grandchild who recently had started to learn to cook.

“I would say, he start’ to see the light. He start’ to see the difference between [?] food that is no good and real food.”

Grandfather, Jamaican

Diet-related disease awareness was apparent in youth and adults in both groups, as Ghanaian and Jamaican communities faced increasing rates of obesity, T2D and hypertension. Although knowledge of disease etiology varied greatly, everyone identified food sources such as sugar, high fructose corn syrup, fats, oils, starchy foods, salt and seasoning blends as some of the main contributors to diet-related disease. Ghanaian and Jamaican parents and grandparents appreciated the access to healthcare, screening, treatment and health education.

Ghana is cash and carry you have to pay before they treat you. But here when ... when you take out a test the insurance will take care of the pay but if we have that in Ghana we wouldn’t be here. So, you know at times we have ill health too to go to hospital we have opportunity to go to hospital and you have your own doctor.”

Mother, Ghanaian
“The thing about it now you have more accessibility to the information because you have it on the radio, they have it on the TV and when you go to the doctor, you have it at the doctor office they make sure to play it and tell you what is it.

That's the only difference up here, them more into your health and tell you how to go about eating. What is healthy. But in Jamaica now you just eat.”

Grandfather, Jamaican

Jamaican mothers were particularly focused on weight loss and avoiding the diet-related diseases and co-morbidities of their parents and friends but found it difficult to maintain a healthy weight because of their favorite foods.

“I have to watch my sugar and when I look at the scale. I look at she I'm like oh, I have my mother's genes; I'm gonna be fat like her (laughs) so I started watching what I eat what I drink.”

Mother, Jamaican

“...you get frustrated because you try to maintain this balanced diet and keep the weight off because a weight is a contributing factor but then when you don’t see the results you get discouraged and you just go back to whatever put a lot of gravy on that rice. Rice, rice, rice every day.”

Mother, Jamaican

Youth in both groups were acutely aware of genetic risk factors. However, they also expressed that they may not be privy to family medical history. Ghanaian grandparents were less likely to have shared their health status and for those who had passed away, their grandchildren did not know the cause of death. Unlike previous generations, Jamaican grandparents and Ghanaian and Jamaican parents seemed to more freely share health concerns with their children, thereby increasing awareness of genetic predispositions and increased risks.

“I have to watch my sugar and when I look at the scale. I look at she I'm like oh, I have my mother’s genes; I'm gonna be fat like her (laughs) so I started watching what I eat what I drink.”

Mother, Jamaican

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In addition, adults were motivated to model healthy behaviors and strategies for preventing or managing obesity, T2D, hypertension etc.

“My mother is kind of more selective because she watches her weight a lot so [...] sometimes she make’ her own fish just to eat while we are eating like chicken or something.”

Youth, Male, Jamaican

4.4. Discussion

To the best of our knowledge, this is the first study to examine, contrast and compare the intergenerational differences in dietary acculturation experiences among FBB Ghanaian and Jamaican immigrant families living in NYC.

We identified two major themes that warrant further exploration: Dietary acculturation is desired and welcomed into families in the home country and immigrant families in the US. It is a continuum which begins in the home country, continues as the migrant moves to the US and evolves as the immigrant adopts emerging social norms around food and health in the US.

This study offers a new perspective on dietary acculturation in which both youth and adults in transnational families actively seek, introduce and facilitate foodways that increased intake of energy, fat, sugar, sodium and animal protein; and eating more meals away from home regardless of cultural background. Although there are significant differences in the food environment and exposure to US influences in Ghana and Jamaica, the active participation in the acculturative process is similar. Previous research posits that dietary acculturation is a dynamic and non-linear exchange in which elements of two or more cultures merge.(15) Our findings demonstrate that the merging of multiple cultures is actively initiated and facilitated by both youth and adults.
In the home countries, youth and adults are affected by globalization and the nutrition transition differently in urban and rural settings. Cable TV, commercial product placement and the presence of US food products in fast food franchises, supermarkets and big box stores make urban Jamaica resemble the US. Young women may be more likely to align with US mainstream body image norms and what is perceived as healthier eating habits. Social norms from higher income countries such as the US have been shown to affect particularly women and those with higher education to pursue fitness, health and a slim body. (104)

The presence of global product in the home country contributes to what has been identified as remote acculturation, (54) acknowledging that acculturation no longer begins at the point of entry into the US, but commences prior to immigration. (104, 105) These effects are less prominent in Ghana than Jamaica, although supermarkets in urban areas of Ghana carry international and US products, and US food products in general are perceived as more desirable and of higher status than local foods.

In transnational families, where one or more members live in the US, barrels with food and consumer goods as well as financial remittances sent back to the home countries constitute perhaps the most significant remote acculturative tools yielded by family members. (106) The economic significance of remittances to families in the home countries also should not be underestimated both individually and collectively. In 2016, the value of annual remittances (electronic transfers and goods primarily from the US, Canada and Great Britain) to Jamaica constituted approximately US$ 2.4 billion or 17% of the gross domestic product (GDP). (107) In Ghana the value of remittances was estimated to be US$ 2.04 billion, or 4.8% of GDP. (107)
The contents of barrels and US food products increase both food security and brand exposure. Economic growth in both markets and influx of remittances increase access to and consumer desire for the global brands making their way into Ghanaian and Jamaican supermarkets, big box stores and fast food franchises. Brand loyalty plays a significant role in dietary acculturation and market analyses assess that consumers in emerging economies are more brand conscious than developed economies. These market trends may be partly informed and driven by the acculturative care packages sent by transnational family members, in combination with local environmental, media and social media exposures. Adults in both groups are relatively unaffected by the global trends for their own consumption, but often seek to anticipate and appease youth’s preferences and provide access to global and US brands and food items whenever possible. Once families are living in the US, youth who grow up in cultural enclaves are encouraged to experience and consume more US foods through school lunches, snacks and fast food restaurants.

Mothers play a particularly active role in the acculturation of youth. Home cooked meals are actively modified in anticipation of youth’s mainstream US food preferences. Because of busy schedules, home cooked meals are often prepared in bulk on the weekends and consumed by each person whenever they have time and are hungry during the week. Shifting away from collective to individualistic eating practices in both groups may inadvertently lead to more frequent meals and increased portion sizes. Furthermore, the separation from communal eating experiences may lead to social isolation and limited enculturation into the culture of origin of the individual.

The cultural enclave appears to have differential effects on youth and adults. Youth are more likely to seek food and eating experiences that are different from their culture of origin whereas adults appreciate the availability of known foods and ingredients. The relatively inexpensive and social desirability of fast food and beverages may also increase consumption among immigrant youth.
This may lead to poorer dietary habits and increased risk of obesity and T2D among youth. In contrast, those who grow up in more diverse and affluent neighborhoods are exposed to more diverse food environments and social norms around food.

In addition, we found that Jamaican and Ghanaian participants do not consider their own cultural foods purchased from a take-out place or restaurant to be “take-out” but rather the equivalent of home cooked food. Hence, the relative affordability and availability of culturally specific foods in NYC cultural enclaves may lead to increased and more frequent consumption of foods high in fat, carbohydrates, animal protein and sugar. Known as the “festival food syndrome”, foods that were one only eaten on special occasions in the home country appear more regularly in the immigrant diet, increasing the risk of diet-related disease. (17)

Healthy diets and social norms promoted through faith-based organizations, major television programs, workplaces as well as nutrition and health education programs in the community are particularly apparent. Adults are acutely aware of their own and their children’s risk of diet related disease. Many parents and grandparents are moving along the dietary acculturation continuum by adopting and promoting a diet richer in plant foods, in part re-incorporating some of the healthier foods from “back home”, and decreasing intake of processed and fast food. This progression mirrors the characteristics of the latter stages of the nutrition transition in its progression from relative food security and increase in diet-related disease to a focus on health promotion. (109) As defined by the nutrition transition, the rapid progression in the world’s emerging economies from receding famine and food insecurity paired with significant physical labor, to the increased risk of chronic disease associated with global availability of processed foods; and the final stage where desired societal characteristics and behavior change to address diet-related disease. (110) We argue that dietary acculturation parallels this progression as people migrate from rural to urban settings,
and from emerging economies such as Ghana, or middle-income countries such as Jamaica, to the US or other developed economies. Transnational families from Ghana and Jamaica make conscious choices to acculturate into US foodways. As access and affordability of healthier foods improves in the urban settings in the US and the home countries, healthier food practices may also become part of the acculturation continuum. This presents an opportunity to use US-based FBBs to educate and positively influence transnational families in the US and back home.

4.4.1. Limitations

Although this study generated some important insights regarding the intergenerational difference in dietary acculturation experience within Ghanaian and Jamaican immigrant families, there are some limitations that should be noted. The rich variety of family models and transcultural significance of extended family as well as formal and informal kinships found in both Ghanaian and Jamaican communities expanded our perception of what family is. We spoke to youth, as well as parents and grandparents of youth represent the generational groups regardless of specific family relationship.

Parents and grandparents were less willing to participate due to busy schedules, concerns about confidentiality, perceived limited benefits from contributing to research activities, immigration status concerns, general outreach fatigue, and some felt that the $20 incentive was too small.

Due to the qualitative nature of this study, findings cannot be generalized beyond the study participants. Ghanaian and Jamaican FBBs who participated in this study may not be representative of the Ghanaian and Jamaican communities who live in NYC or elsewhere.

Our recruitment materials and initial conversations with participants contained questions regarding body weight, diabetes, fruit and vegetable consumption etc. and may have influenced participant
thinking and response. Questions about fruit and vegetable consumption as well as meals away from home did not necessarily capture actual consumption since the terminology and concepts were not universally understood. In fact, plant foods which are staple items in Ghanaian and Jamaican meals were not captured in fruit and vegetable consumption questions because they are either integral components of stews and soups, or they are considered “starchy foods” (e.g. yams, cassava, eddoes, plantains) and not fruits or vegetables.

It is important to note any discordance in cultural, ethnic and racial background between the research team and the study population. Research participants all self-identified as Black, although many expressed that they preferred to identify as Ghanaian (or African) or Jamaican (or Caribbean or West Indian). The first author and primary interviewer identified as White and Danish. Racial discordance may be perceived as a limitation in qualitative research, but it also allows the researcher to ask for clarification and participants to provide explanations which might otherwise be left unexplored if both were of same cultural background. To ensure objectivity, remain culturally mindful and maintain sensitivity to race-related dynamics, the culturally diverse study team included a female Black Ghanaian community organizer and five research associates who self-identified as Black, and of Jamaican, Trinidadian, Guyanese or Haitian origin.

Despite these limitations, the present research contributes to a more detailed understanding of the intergenerational differences and similarities in dietary acculturation experience among Ghanaian and Jamaican immigrant families.

4.5. Conclusion

In conclusion, the results from this study demonstrate that dietary acculturation begins in the home country, is perceived as a positive process by the families who participate in it, and an.
active and deliberate progression by which the families provide the most desirable food for their families as made possible by increased income, access and social mobility. (110) The dietary acculturation process differs significantly by generation, where youth appear to embrace the foods available outside the home, and parents and grandparents are more likely to prefer home-cooked meals and outside meals aligned with the family’s food culture of the country of origin. However, parents may also contribute to the acculturation through remittances sent to the children as they grow up in the home country as well as American foods prepared as part of everyday meals once they live in the US. The cultural enclave protects youth and adults differently from the effects of dietary acculturation. Youth seek the choices available in the mainstream variety of fast food over African or Jamaican food for meals outside the home, and youth do not find that ethnic markets are crucial to maintaining cultural diets. In contrast, parents and grandparents seek out cultural food sources, which enable them to cook and eat authentic food both at home and outside the home. In addition, the high prevalence of obesity, hypertension and diabetes, including complications such as amputations and renal failure serve as motivators for adults to focus on weight loss and consumption of more fruits and vegetables and less starch and food overall. Future research should explore the significance of active engagement in and facilitation of the dietary acculturation process as family members introduce US foods and social norms into their own lives and the lives of families who remain in the home country.

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Table 4. 1 Intake Questions

(Answer choices) or [Fill in the blank]

1. Please indicate your unique 12-digit identifying number (The research team will provide you with this) [___]

2. What is your gender? (Male; Female; Other; Prefer not to answer)

3. What is your age? [___]

4. What is your race/ethnicity? (Please select all that apply): (American Indian/Alaska Native; Asian / Pacific Islander; Black/ African American; Hispanic / Latino; White / Caucasian; Prefer not to answer)

5. What is the highest level of education you have complete or the highest degree you have received? (Elementary / Primary school; Middle/ Secondary (Lower/Upper) school; Less than high school or equivalent (e.g. GED) or A-levels; Some college but no degree; Associate degree; Bachelor degree; Master degree; Doctoral degree; Other; Prefer not to answer)

6. Would you say in general that your health is: (Excellent; Very Good; Good; Fair; Poor; Don’t know; Prefer not to answer)

7. About how tall are you without shoes? (For example, if you are 5 feet and 4 inches, write 5'4") [___]

8. About how much do you weigh without shoes? (Please indicate pounds or kilograms) [___]

9. How often do you drink sugar sweetened beverages? This would include soda, juice, sweetened ice tea, fruit punch, sports drinks, sweetened coffee or tea. (Never; Less than one per day; One per day; More than one per day; Don’t know; Prefer not to answer)

10. On average, how many times per week do you eat meals that were prepared in a restaurant? Please include eat-in restaurants, carry out restaurants and restaurants that deliver food to your house. [___]

11. Thinking about nutrition...how many total servings of fruit and/ vegetables did you eat yesterday? A serving would equal one medium apple, a handful of broccoli, or a cup of carrots. [___]

12. During the past 30 days, other than your regular job, did you participate in any physical activities or exercises such as running, golf, gardening, sports, hiking, swimming, bicycling, or walking for exercise? (Yes; No; Don’t know; Prefer not to answer)

13. Have you ever been told by a doctor, nurse, or other health professional that you have diabetes? (Yes; No; Don’t know; Prefer not to answer)

14. How many people currently live in your household? [___]

15. How many generations live in your household? [___]

16. Where did each of your family members grow up? (Jamaica; Ghana; United States; Somewhere else; Don’t know)

17. Of the family members who were born abroad, at what age did they come to live permanently in the US? (As a child, under age 5; As a child between ages 5 and 18; As an adult, over age 18; Did not immigrate; Don’t know)

18. Of these income groups, which best represents your family income in the last 12 months? (No income; Less than $20,000; $20,000-$39,999; $40,000-$59,999; $60,000-$79,999; $80,000-$99,999; $100,000 or more; Don’t know; Prefer not to answer)

19. What best describes your marital status? (Married; Widowed; Divorced; Separated; Never married; Living with a partner; Prefer not to answer)
Table 4.2 Characteristics of Black Ghanaian and Jamaican Focus Group and Interview Participants, New York City, 2016-2017

<table>
<thead>
<tr>
<th></th>
<th>Ghanaian</th>
<th></th>
<th>Jamaican</th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youth</td>
<td>19.8 ±5.4</td>
<td>52.0%</td>
<td>22.0 ±3.8</td>
<td>41.7%</td>
<td>0.720</td>
</tr>
<tr>
<td>Parents</td>
<td>52.5 ±4.9</td>
<td>24.0%</td>
<td>45.5 ±4.8</td>
<td>25.0%</td>
<td>0.002</td>
</tr>
<tr>
<td>Grandparents</td>
<td>66.2 ±8.8</td>
<td>24.0%</td>
<td>67.6 ±6.9</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Family Generation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youth</td>
<td>13</td>
<td>52.0%</td>
<td>10</td>
<td>41.7%</td>
<td>0.720</td>
</tr>
<tr>
<td>Parents</td>
<td>6</td>
<td>24.0%</td>
<td>6</td>
<td>25.0%</td>
<td></td>
</tr>
<tr>
<td>Grandparents</td>
<td>6</td>
<td>24.0%</td>
<td>8</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>76.0%</td>
<td>12</td>
<td>50.0%</td>
<td>0.059</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>24.0%</td>
<td>12</td>
<td>50.0%</td>
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<tr>
<td><strong>Education</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School or less</td>
<td>17</td>
<td>68.0%</td>
<td>5</td>
<td>20.8%</td>
<td>0.002</td>
</tr>
<tr>
<td>Some college or more</td>
<td>6</td>
<td>24.0%</td>
<td>18</td>
<td>75.0%</td>
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</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>8.0%</td>
<td>1</td>
<td>4.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - $39,999</td>
<td>13</td>
<td>52.0%</td>
<td>5</td>
<td>20.8%</td>
<td>0.001</td>
</tr>
<tr>
<td>≥ $40k</td>
<td>3</td>
<td>12.0%</td>
<td>15</td>
<td>62.5%</td>
<td></td>
</tr>
<tr>
<td>Do not know/Prefer not to answer</td>
<td>9</td>
<td>36.0%</td>
<td>4</td>
<td>16.7%</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Married/Living with partner</td>
<td>9</td>
<td>42.9%</td>
<td>10</td>
<td>47.6%</td>
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<tr>
<td>Widowed/Divorced/Separated/</td>
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<td>57.1%</td>
<td>11</td>
<td>52.4%</td>
<td></td>
</tr>
<tr>
<td>Never Married</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age at Arrival</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt;5</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0.834</td>
</tr>
<tr>
<td>5-18</td>
<td>11</td>
<td>45.8%</td>
<td>7</td>
<td>29.2%</td>
<td></td>
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<tr>
<td>&gt;18</td>
<td>11</td>
<td>45.8%</td>
<td>14</td>
<td>58.3%</td>
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<tr>
<td>Did not immigrate</td>
<td>2</td>
<td>8.3%</td>
<td>3</td>
<td>12.5%</td>
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</tr>
<tr>
<td><strong>Health Behaviors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise (30 min./month)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>66.7%</td>
<td>18</td>
<td>78.3%</td>
<td>0.374</td>
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<tr>
<td>No</td>
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<td>33.3%</td>
<td>5</td>
<td>21.7%</td>
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<tr>
<td><strong>Fruit/Vegetable Servings/Day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>5</td>
<td>33.3%</td>
<td>1</td>
<td>4.3%</td>
<td>0.027</td>
</tr>
<tr>
<td>1 Serving per day</td>
<td>7</td>
<td>46.7%</td>
<td>10</td>
<td>43.5%</td>
<td></td>
</tr>
<tr>
<td>2 + Servings per day</td>
<td>3</td>
<td>20.0%</td>
<td>12</td>
<td>52.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Sugar Sweetened Beverages/Day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>None</td>
<td>2</td>
<td>11.8%</td>
<td>0</td>
<td>0.0%</td>
<td>0.270</td>
</tr>
<tr>
<td>&lt;1</td>
<td>6</td>
<td>35.3%</td>
<td>8</td>
<td>38.1%</td>
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</tr>
<tr>
<td>≥1</td>
<td>9</td>
<td>52.9%</td>
<td>13</td>
<td>61.9%</td>
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<tr>
<td><strong>Take Out Meals/Week</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>45.0%</td>
<td>4</td>
<td>17.4%</td>
<td>0.171</td>
</tr>
<tr>
<td>≤1</td>
<td>3</td>
<td>15.0%</td>
<td>6</td>
<td>26.1%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>25.0%</td>
<td>5</td>
<td>21.7%</td>
<td></td>
</tr>
<tr>
<td>Self-Rated Health</td>
<td>3+</td>
<td>15.0%</td>
<td>8</td>
<td>34.8%</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>----</td>
<td>--------</td>
<td>---</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>6</td>
<td>27.3%</td>
<td>5</td>
<td>20.8%</td>
<td>0.891</td>
</tr>
<tr>
<td>Very Good</td>
<td>9</td>
<td>40.9%</td>
<td>9</td>
<td>37.5%</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>6</td>
<td>27.3%</td>
<td>8</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>1</td>
<td>4.5%</td>
<td>2</td>
<td>8.3%</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
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</tbody>
</table>

**BMI***

<table>
<thead>
<tr>
<th></th>
<th>Mean BMI</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese</td>
<td>6</td>
<td>30.0%</td>
<td>8</td>
</tr>
<tr>
<td>Overweight</td>
<td>6</td>
<td>30.0%</td>
<td>7</td>
</tr>
<tr>
<td>Normal weight</td>
<td>8</td>
<td>40.0%</td>
<td>7</td>
</tr>
<tr>
<td>Underweight</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
</tr>
</tbody>
</table>

**Diabetes (Ever told by a doctor)**

|            | Yes | 8.0%  | 3   | 12.5%| 0.603|
|------------|-----|-------|-----|------|
| No         | 23  | 92.0% | 21  | 87.5%|

*Data reflects actual responses. Missing data is not included. *Column total may not equal 100% due to rounding. 
*BMI categories were based on self-reported height and weight. BMI for youth ages 13-20 was classified according to CDC Body Mass Index-for-Age Percentiles charts, where underweight BMI = <5th percentile, normal BMI = 5th-<85th, overweight BMI = 85th-<95th percentile and obese BMI = ≥95th percentile. BMI for adults was classified as underweight BMI= <18.5, normal BMI =18.5-<25 kg/m², overweight BMI =25-<30 kg/m² and obese BMI ≥30 kg/m².
### Table 4.3: Interview and Focus Group Script: Questions and Probes

<table>
<thead>
<tr>
<th>Question</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tell us a little bit about what being a [INSERT Ghanaian/Jamaican] immigrant family living in New York City means to you.</td>
<td></td>
</tr>
<tr>
<td>2. When we think of food, we often think of the finished meal, but getting food sometimes means farming and gardening, or it means walking a long or short way to the store, or it may mean eating what you can get from the corner store. If you were to think of your childhood, how did you and your family get food? [allow for multiple family settings/locations]</td>
<td>a. -and when you think of cooking and eating, who cooked it, where did they cook and when? &lt;br&gt;b. -and when you think of eating, where and when would you eat and with whom?</td>
</tr>
<tr>
<td>3. If you think of your family, household and community now, where do you get food?</td>
<td>a. -and when you think of cooking now, who cooks the food, where and when do they cook? &lt;br&gt;b. -and when you think of eating meals now, how are they similar and how are they different from the [INSERT Ghanaian/Jamaican] meals in the past?</td>
</tr>
<tr>
<td>4. How are the meals of your [INSERT parents / children / grandchildren] similar to or different from your meals?</td>
<td>a. Can you explain why that might be?</td>
</tr>
<tr>
<td><strong>Up to now, we have been talking about past and current food practices. This last set of questions pertains to health.</strong></td>
<td></td>
</tr>
<tr>
<td>5. How would you describe your own health?</td>
<td>a. How would you describe the health of your [INSERT Ghanaian/Jamaican: Parents, grandparents, children, or grandchildren]?</td>
</tr>
<tr>
<td>6. In our research we have found that</td>
<td>a. The Ghanaian immigrant community may be at lower risk of having diabetes/sugar and being obese than both Black Caribbean and African Americans &lt;br&gt;OR &lt;br&gt;b. The Jamaican immigrant community may be at greater risk of having diabetes/sugar than African Americans, but that Jamaicans in NYC are less likely to be obese &lt;br&gt;c. Can you help explain these differences? &lt;br&gt;d. How do you think that these health outcomes differ between older generations and younger generations of [INSERT Ghanaian/Jamaicans/Jamaicans]?</td>
</tr>
<tr>
<td>7. What are some of the other health issues that affect your [INSERT Ghanaian/Jamaican] family and community?</td>
<td></td>
</tr>
<tr>
<td>8. Why do you think these particular issues affect your community?</td>
<td></td>
</tr>
<tr>
<td>9. What is there about [INSERT Ghanaian/Jamaican] food culture, health and family dynamics that we did not ask but you think we should know about?</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 5. Conclusion

5.1. Summary of Results

This dissertation consists of three separate but interrelated studies examining how obesity and T2D differed between FBBs and USBBs living in NYC and, within the foreign-born, how obesity and T2D compare between African and Caribbean FBB New Yorkers. Furthermore, to uncover how the dietary acculturation experience varies between FBB groups, a qualitative study illustrated how cultural practices and the acculturation experience may influence dietary patterns of FBBs from Ghana and Jamaica across generations.

This is one of the first studies to illustrate the heterogeneity of Black African and Caribbean immigrant populations who are typically classified as African Americans in epidemiological research and clinical care settings. It is often assumed that Blacks of all ethnic, historical and genetic background have similar risk profiles as African Americans. This study demonstrates that intra-group differences can be stark and confirms that classifying by race may obscure important health disparities among cultural groups.(38)

In aim 1, the first study examined the odds of obesity and T2D among FBBs and USBBs in NYC. Mean BMI was lower among FBBs than USBBs, suggesting that the distribution of BMI among FBBs was further to the left of that among USBBs. As hypothesized, the prevalence and odds of obesity were significantly lower among FBBs compared to USBBs. Similar to previous findings, FBBs who had lived in the US for more than 10 years had marginally increased odds of obesity. One notable finding was that low-income FBBs were at greater odds of obesity, whereas income did not affect odds of obesity among USBBs. Although poverty is associated with greater odds of obesity in the US population overall, this association is not significant in African American women
and negative in African American men.(19, 20) This is an important finding in NYC, as FBBs may experience greater risk of obesity due to the stress of poverty, acculturation and exposure to obesogenic environments in the neighborhoods where they live.(18) These findings may also reflect recent changes in the regions of origin where odds of obesity are increasing in low-income groups.(21-23)

Contrary to national findings and our initial hypothesis, FBBs were found to have increased odds of T2D despite lower odds of obesity than USBBs. Further analyses revealed that FBBs had greater odds of T2D at overweight status compared to USBBs. Duration of residence for FBBs was not associated with increased odds of T2D. These epidemiological findings corroborate recent clinical findings which have shown that African FBB men living in the US have higher odds of T2D, despite lower mean BMI compared to USBB men.(9, 81)

In addressing Aim 2, the second study compared the odds of obesity and T2D in African and Caribbean FBBs. The results uncovered a wide disparity in the prevalence of obesity (16.2% vs. 28.7%) and T2D (9.9% vs. 14.4%) between African and Caribbean FBBs. However, overweight was higher among African FBBs than Caribbean FBBs. As hypothesized, African FBBs had lower odds of obesity than Caribbean FBBs. African FBBs also experienced marginally lower odds of T2D, which aligns with prior research. Socio-demographic risk factors were similar in the two groups with regards to obesity and T2D. The extent of time living in the US was not associated with the odds of obesity or T2D in either population.

Obesity odds were higher among women than men in both African and Caribbean FBBs. This gender difference in both groups reflects current gender disparities in Ghanaian and Jamaican populations in the home country, and warrants further research with a larger epidemiological
sample. In addition, though not statistically significant, we observed a trend of lower odds of T2D among women compared to men in both groups. These results reflect recent findings showing that Caribbean (111) and African FBB men experience increased odds of T2D at lower BMI.(9, 81)

In addition, the obesity and T2D disparities between African and Caribbean FBBs may also reflect obesity and T2D trends in the home countries independent of living in the US. For example, in Jamaica (1.37 kg/year), average annual weight gain is significantly greater than in the US (0.52 kg/year) and Nigeria (0.31 kg/year).(7) Furthermore, age-standardized T2D prevalence in Sub-Saharan Africa and Caribbean Black populations is 4.5% and 11.5-21.5%, respectively.(25) In comparison, 11.8% of the US Black population has T2D.(112) However, T2D rates are difficult to compare across continents as an estimated 75% of T2D cases in Sub-Saharan Africa are undiagnosed, and an estimated 33.4% of T2D cases in the Caribbean and NYC are undiagnosed.(62) Under-diagnosis may be a result of inadequate access to healthcare providers in the home country and/or when arriving in the US. Hence, the patterns of migration in NYC may partially explain different findings between this study and that of national and international surveys.

It is remarkable that when compared to USBBs, the elevated risk of T2D in FBBs was observed at normal and overweight. This suggests that there may be other contributors such as epigenetic or microbiome factors that lead to the predisposition of T2D among FBBs at relatively lower weight, such as those hypothesized for Asian Americans.(26, 27) The importance of genetics, healthcare access and environmental factors such as changes in dietary behaviors and physical activity along the trajectory of migration also warrants further research.
One caution in our findings is that immigrants from the Caribbean and West Africa have historically returned home for retirement. (29, 30) This study revealed a relatively high T2D prevalence among older FBBs in the US which may be related to factors unique to transnational migration. Healthy transnationals may return to their country of origin for retirement at a younger age, whereas FBBs with T2D diagnoses may remain in the US for better access to medical care. (31, 32) This may increase the prevalence of T2D in FBBs living in the US.

Aim 3 demonstrated that for Ghanaian and Jamaican FBBs, the effects of globalization, nutrition transition (16) and remote acculturation (17) were significant contributors to dietary acculturation. These factors may indeed have contributed to BMI and T2D risk in both Africa and the Caribbean, but the more significant presence of American stores and proliferation of products in Jamaica may explain the increased odds of both obesity and T2D in Caribbean FBBs compared to African FBBs. Findings illustrated that dietary acculturation began in the home country and was perceived as a positive process by the families who participated in the study. In fact, dietary acculturation experienced in Ghana and Jamaica was an active process by which families accessed and provided increased intake of energy, fat, sugar, sodium and animal protein, (17) and more meals away from home. (15) These dietary changes were a result of increased access to processed foods in supermarkets, shipping barrels and fast food restaurants in the home country made possible by migration, increased income, and social mobility. (110)

Once in the US, the dietary acculturation experience continued, but was different between youth and adults. The unique intergenerational perspective allowed for an exploration of diverse acculturation experiences. One surprising finding was that cultural enclaves, which have been shown to protect immigrants against acculturative stress and dietary acculturation, may have different effects on youth and adults. (87, 94) In fact, youth chose fast food or other ethnic foods
over African or Caribbean food respectively when eating meals outside the home. In contrast, parents and grandparents purposely sought out African or Caribbean cultural food sources mirroring their own food culture, which allowed them to cook and/or eat authentic Ghanaian or Jamaican food both at home and outside the home. These intergenerational differences are important to include in the planning of public health initiatives.

5.2. Limitations

Some limitations exist within each of the three studies and should be addressed in future research. In the NYC CHS analyses for T2D, age was a significant predictor of odds of T2D; however, age at diagnosis was not included in the data, and little is known about the age of onset of T2D in FBBs. Duration of residence has previously been identified as an important risk factor for dietary acculturation. The lack of detailed information on duration of residence in the NYC CHS data also did not allow for meaningful exploration of effect of duration of residence in greater detail than the dichotomous duration of residence variable (<10 or ≥10 years). Furthermore, the small number of FBBs who had lived in the US for fewer than 10 years may have further limited the power to detect a difference. The relatively small sample size for African FBBs in Aim 2 may have limited the power and ability to detect significant relationships and additional differences between African and Caribbean FBBs. One further limitation, when comparing the analyses for Aim 1 and Aim 2 is that the total FBB population examined in Chapter 2 includes an additional group of immigrants who migrated to the US from Canada, Great Britain, France, Germany etc. These FBBs are included in the analysis in Chapter 2, but may be distinctly different from the Caribbean and African FBBs examined in Chapter 3.
The recruitment process for interview and focus group participants in Aim 3 was comprehensive, but those who chose to participate may be different from those who did not. The qualitative interview questions explored the participants’ memories of their diet and foodways over time in the home country and the US. Unfortunately, no such data were available in the cross-sectional NYC CHS dataset to corroborate possible manifestations identified in the qualitative work. Although dietary history recall is relatively unreliable, future studies should include details about dietary history, which would allow for the exploration of dietary changes over time. Furthermore, the NYC CHS dataset does not include other unique profile information such as family history of disease and regional origin. It is therefore often not possible to explore the unique risk profiles among African or Caribbean population groups.

Our initial definition of family units was based on a family as a domestic group consisting of youth, parents and grandparents related by blood, sexual relations or legal ties. However, the rich variety of family models, significance of extended family and forms of formal and informal kinship found in both Ghanaian and Jamaican communities made this perspective limiting. In addition, recruitment of three generations from one family unit was difficult because very few families had members who represented three generations living in NYC. Many Ghanaian youth also noted that their grandparents were either living in Ghana or deceased, whereas Jamaican youth were more likely to have grandparents spread out between Jamaica, Canada and the US. More young people were more willing to participate compared to parents and grandparents who were less likely to participate. People who chose not to participate noted that they had limited time, and/or the $20 incentive was too small. Ghanaian adults may also have been reluctant to participate due to language barriers, fears of religious profiling, perceived limited benefits from contributing to research activities, and general outreach fatigue. Due to the rapid increase in the
Ghanaian immigrant population, the NYC Department of Health, local researchers and local medical providers have targeted this community to assess health status which may have led to some survey fatigue.\textsuperscript{(113)} The fear of deportation for both documented and undocumented immigrants was brought up during initial contact with several participants due to the impending presidential executive orders issued in January, 2017.\textsuperscript{(114)} Most of the research activities were conducted prior to the signing of these executive orders.

In both the NYC CHS data and the intake survey for the qualitative study, health behaviors and conditions were self-reported. This may introduce some inaccuracies in reporting as terminology is not universally understood, as was observed in discussions about fruits and vegetables and meals away from home. Both Ghanaians and Jamaicans appeared to only report fruits and vegetables consumed alone, and did not include fruits and vegetables which were part of soups and stews in their reported daily consumption. Furthermore, self-reported height, weight and T2D diagnosis only indicated information known by the participant and hence did not capture undiagnosed T2D.

For the qualitative study, certain key words in our recruitment materials and initial conversations with participants may have influenced participant thinking and response. However, the questions may also have enriched the conversations because participants were already cued into some of the topics of interest in the study.

In the qualitative study we acknowledge the racial discordance between the research participants and the principal investigator. All participants self-identified as Black or African American, although many expressed that they preferred to identify as Ghanaian (or African) or Jamaican (or Caribbean or West Indian). The principal investigator who self-identifies as a White, Danish, immigrant woman and trained in qualitative methods, was perceived by many participants as
“American”. To ensure objectivity, remain culturally mindful and maintain sensitivity to race-related dynamics in the interviews and focus groups the study team included a female Black Ghanaian community organizer and five research associates who self-identified as Black, and of Jamaican, Trinidadian, Guyanese or Haitian origin. Although racial discordance may be a limitation or challenge in qualitative research, one benefit is that it allows the researcher to ask for clarification and explanations which might otherwise be left unexplored because it is assumed to be a shared experience among people of similar ethnic and cultural background or racial identity. (115)

The qualitative findings about dietary acculturation and intergenerational differences in Ghanaian and Jamaican immigrants in Aim 3 cannot be generalized beyond the study participants. Ghanaian and Jamaican FBBs who participated in this study are members but may not be representative of the FBB Ghanaian and Jamaican communities in NYC.

5.3. Implications for Further Research

This dissertation identifies several areas for future research pertinent to improving health, healthy food access and healthcare access for immigrant populations. It also serves to further diversify conversations about race and health.

First, researchers and public health professionals should recognize some of the significant challenges faced by minority populations in general and Black populations specifically. This includes but is not limited to isolation; structural, cultural, institutional and interpersonal racism; religious profiling of Muslim and other faith communities; xenophobia and the prejudices towards immigrants; as well as specific stereotyping of African immigrants. Future quantitative and qualitative data collection should also employ comprehensive recruitment strategies and
interpretation services to ensure representative samples of emerging immigrant communities. Such research may contribute significantly to diversifying the conversation around race and health, and to addressing issues of racism directly linked to health behaviors and outcomes.

Second, given that 37.8% of the NYC population (47) and 22% of the New York State population are immigrants (116), future data collection in the NYC CHS and other complex population surveys should incorporate more detailed information about immigration history, including but not limited to age at arrival which would allow for analysis related to duration of residence. In addition to personal health data, information outlining history of family health would further inform the exploration of genetic profiles and prediction of risk based on family history. The definitions and presentations of dietary variables should also be reconsidered in the context of a multicultural society to better capture actual dietary quality and diet behaviors.

Third, as the process of dietary acculturation unfolds globally and locally new conceptual frameworks are needed to decode and illustrate the personal, local and international dynamics in multiple settings. New models should view dietary acculturation as a continuum with no endpoint and focus on how it evolves over time and within/across multiple simultaneous geographic spaces.

Fourth, the differences in dietary acculturative experiences in youth and adults warrant further exploration as child and teen health are significant predictors of adult health. The mechanisms leading to what was termed “dietary acculturation beyond pizza and Chinese fried rice,” where healthier foods were dominant must be explored in future research. How does the public health field take on an active role in dietary acculturation? Future longitudinal research should assess the level of dietary acculturation experience prior to immigration and the effect of the various acculturative influences as populations remain in the home location, migrate within countries or
regions, and/or emigrate to other world regions. An important aspect of future research should explore the potential for conveying healthy practices and positive reinforcement in the dietary acculturation process. As family members introduce US foods and social norms into the lives of transnational families in the US and the home country, the possibility of simultaneously fostering increased food security and consumption of healthier foods remains a real possibility.

Fifth, epidemiological analyses should explore the differences in risk profile by gender in subethnic populations since women appear to have greater risk of obesity but lower risk of T2D. This difference is aligned with a growing body of evidence,(117) but little is known about the sex-dimorphic variation in risk between ethnic populations. Further research would inform gender-specific T2D prevention and treatment efforts.

Lastly, the best way to study the effect of dietary acculturation across continents and time would be to enroll and follow a cohort in the home countries as they send immigrants to the US and family members may remain back home. The significance of the microbiome cannot be ignored as acculturation, diet and disease are closely linked to the composition of the microbiome and modulations over time and geographic location. Future research should examine changes in the immigrant microbiome and how it relates to “traditional” foods such as tubers and other starchy fruits and vegetables in contrast with rice, wheat and sugar predominant in the US food system.
5.4. Public Health Significance

This dissertation contributes to the agenda of minority health, immigrant health and health disparities research by illustrating the complexity of risk profiles in sub-ethnic populations in the African diaspora. Moreover, this work identifies urgent health priorities specific to Black immigrant populations who are experiencing significantly increased risk of T2D at lower BMI than the USBB population. In addition, Ghanaian and Jamaican immigrants who experience the prolonged effects of dietary acculturation as it begins in the home country and continues after immigrating to the US, may in fact escalate their risk of diet related disease.

Most alarming in this work is the hidden epidemic of T2D among FBBs, obscured by classifying all respondents of African origin as Black or African American. Screening guidelines for BMI, waist circumference and T2D should reflect the complexity of risk profiles within the classic racial categories. First and foremost, the difference in risk profile and potential of under-diagnosis of T2D in FBBs points towards more standardized screening for T2D at all ages within FBB communities. Given the different T2D risk by body weight between USBBs and FBBs from Africa and the Caribbean, future screening guidelines and outreach programs should screen all community members for T2D regardless of weight status. The risk differences by gender and weight status also warrant further attention in prevention efforts and the clinical care setting.

Recent findings have also demonstrated that current T2D screening criteria such as hemoglobin A1c may be less effective in African men, (8) which could potentially lead to significant under-diagnosis and delayed intervention.

Contrary to USBB communities who may fear or mistrust medical providers (118), FBBs appear to be well influenced by and trust primary, secondary and tertiary prevention efforts. In addition,
most youth and adult FBBs from the Caribbean and Africa seem to have access to and seek regular medical care. Adults highlighted the access to quality medical care as one reason for immigrating to and remaining in the US. Given the increased odds of T2D at lower BMI in FBBs, the social norms around accessing medical care present an opportunity for early intervention both among youth and adult FBBs. Screening efforts should target pre-diabetes and T2D independent of weight as well as weight management interventions at lower BMI before the full onset of obesity.

Food access inequalities persist in cultural enclaves locally and in developing nations globally. It is important to note that the dietary acculturation progression beyond eating fast food, increasing sugar, fat and processed foods may stagnate at that point if access to better and healthier food in the country of origin and the neighborhoods where immigrants settle is limited. Youth’s food preferences in the cultural enclave point to the importance of providing better access to healthier food options in inner city neighborhoods.(119) Food policy initiatives should direct resources to increasing availability and affordability of fruits and vegetables, more balanced meals and healthier snack options in ways that compete with current fast food options in price, status and desirability. Such changes will be crucial to promoting healthier diets and lower risk of diet-related disease in the US-born and foreign-born alike. Furthermore, innovative and culturally competent nutrition education and food standards for communal meals served in community centers, schools and workplaces should provide and complement improved food access in low-income neighborhoods.

Although dietary quality was not directly assessed in the quantitative analyses, the increased odds of T2D and obesity paired with the qualitative findings point to significant dietary acculturation over time, particularly among young people. Their narratives identified school lunch as an important part in the formation of young people’s dietary preferences. In New York City alone,
850,000 meals are served daily to students from pre-K to 12th grade. Of all NYC public school students, 51% are born to mothers who are immigrants (47). In 2017, NYC announced that school lunch would be free for all students regardless of income, (75% of all public-school children in NYC are already eligible). Free lunch is the result of extraordinary collaborative efforts by school food advocates, the NYC Department of Education, legislators and the office of SchoolFood to reduce stigma, combat food insecurity, enhance academic achievement and improve overall health.(120) However, the quality of food and diversity of food options depend on the funding provided for these meals. Few public health programs have the opportunity to interact with up to 1 million members of the target population for breakfast and lunch for at least 180 days a year. School meals must therefore be seen as a public health priority and a prime opportunity to feed, educate and expose children to healthy food options. This unique opportunity is unmatched in its reach.

The juxtaposition of cultural foods (Ghanaian or Jamaican) vs. American foods often implies that the cultural foods are inherently healthier than American foods or foods purchased in the US. This assumption is perhaps based on an idealized notion of cultural foods from the home country as superior, cleaner and healthier than American foods, although little is known about the actual dietary quality of foods served in the home or in Ghanaian and Jamaican restaurants and take-out places. Both Ghanaian and Jamaican participants expressed concern about whether the portion sizes, amounts of starch and calories in their cultural foods were appropriate for the lifestyle in NYC, characterized as busier yet more sedentary, compared to the lifestyle in the countries of origin. The insight that food from the culture of origin, if obtained from a restaurant or take-out place, was not actually considered eating out/take-out surprised even some of the study participants. This is particularly concerning because youth in both groups were more likely to eat
out than adults. Since eating out is associated with approximately 200 additional daily calories (121), it is possible that the effect of eating ≥3 meals per week will result in significant weight gain over a relatively short time. Young immigrants may therefore face poorer health outcomes than their parents and grandparents. Future studies should examine the actual food practices in subpopulations and seek to assess the dietary intake from all sources. Additionally, if cultural restaurants and other food outlets are important sources of food in everyday life, public health initiatives should consider training chefs and food preparation staff in restaurants to modify recipes, serve smaller portions and allow for differentiated portion sizes. Such modifications would enable consumers to make healthier choices and as an added bonus decrease the cost of ingredients and food waste for the restauranteur.

Among Ghanaian and Jamaican youth and adults, community-based nutrition and health education initiatives appear to be effective in affecting knowledge and attitudes. This was specifically highlighted when delivered in conjunction with T2D screening, diagnosis and treatment. Families with one or more members who had been diagnosed with pre-diabetes or T2D were acutely aware of the risk factors and dietary practices required to either prevent or delay progression to or manage the condition. Therefore, significant resources should be dedicated to youth and peer education programs that help translate this insight into decreasing consumption of overall calories, sugar-sweetened beverages, fast food and snack foods, and increasing the consumption of whole grains, fruits and vegetables. Youth in both groups and Jamaican mothers expressed concern about weight gain and their predisposition for diet related chronic disease affecting their parents and grandparents both in the US and the home countries. These groups also showed an interest in learning to eat healthier in general and learning to cook healthier versions of traditional foods. This presents an opportunity for future nutrition education programs to target young adults. Utilizing
social media and online platforms to appeal to the audience and capitalize on the popularity of, for example, YouTube instructional videos and accessibility of online resources. Improved cooking skills affect food and nutrition knowledge, self-efficacy and dietary intake. The greatest effects of healthy cooking education are seen among vulnerable and low-income populations which may in turn affect the risk of diet-related disease and promoting better health. (122)

The effect of media and social norms in the US and abroad cannot be underestimated. Food policy initiatives should include comprehensive reform to food advertisement and product placement especially as it pertains to establishing which desirable foods become iconic American foods. Ghanaian and Jamaican youth and adults expressed an interest in healthier eating, but noted the consumer preferences informed by corporate marketing efforts, particularly US cable television in Jamaica. In contrast to some of the healthier dietary practices among immigrants to the US, the food items purchased for barrels and snacks for youth living back home or in the US were still unhealthy packaged sweetened cereals, cookies, fruit juices, etc. Future public health initiatives should foster collaborations with the food industry to develop more, healthier packaged food options. Globalization and the nutrition transition have detrimental effects on public health overall because imported, refined and processed foods have displaced traditional diets which may be richer in locally produced foods with higher nutrient density. (19, 123, 124)

5.5. Conclusions

In conclusion, despite prior findings that FBBs are healthier than USBBs (5), the three studies in this dissertation demonstrate that the healthy immigrant effect may no longer apply to FBBs in NYC. Most importantly, this dissertation illustrates the heterogeneity of risk within populations of African origin living in the US. FBBs experience lower odds of obesity, but higher odds of T2D
than USBBs, and Caribbean FBBS experience greater odds of both obesity and T2D than African FBBS. These findings point to the danger of drawing conclusions about public health risks by examining all Black populations as one group.

The integrated quantitative and qualitative findings uncovered key details about the health and acculturation experience among three generations of African and Caribbean FBBS. Ghanaian and Jamaican immigrants experience similar dietary acculturation beginning in the home countries and facilitated by transnational families. Intergenerational differences in both populations manifest in the exposures to, desire for and acceptance of American foods. In addition to traditional foods served in the home and purchased from restaurants, youth are exposed to school meals, neighborhood fast food and American foods served specifically in the home, whereas parents and grandparents prefer their own cultural foods both at home and away from home. These findings also show promise to inform the development of future culturally tailored public health interventions at the individual, family, community, municipal and policy levels in the US and internationally.

More research is necessary to examine specific ethnic and cultural backgrounds and the biological, behavioral, social, and cultural risk profiles that these differences entail. A more nuanced understanding of intra-ethnic health disparities and variations in the dietary acculturation experience will help inform health promotion and disease prevention strategies specific to these cultural groups. Failure to recognize the multiplicity and variation in experience and health outcomes of sub-ethnic groups in the African diaspora may bias epidemiological estimates and obscure unique risk profiles of specific ethnic groups. Future public health initiatives should
recognize the opportunity to identify unique risk profiles and address the need for novel policies and practices to improve health for everyone.
Appendices
Appendix A.1. Recruitment Flyer, Ghanaian Families

GHANAIAN IMMIGRANT FAMILIES
Needed for Research Project

Researchers from The CUNY Graduate School of Public Health and Health Policy and Brooklyn College are exploring the relationship between food, culture, and health within Ghanaian immigrant families.

- Did you, your parents or your grandparents emigrate to the US. from Ghana?
- Are there young people ages 13 to 23 in your family?
- Is your family interested in sharing your story in a focus group?
- Compensation: $20 gift card for each person per focus group.
- Fill out the survey here to see if you qualify: www.surveymonkey.com/r/Ghanaian
- Or give us a call!

Please contact us if you are interested in participating or would like more information.

Margrethe Horlyck-Romanovsky, MPH
BCfoodstudies@brooklyn.cuny.edu
(718) 951-5000, ext. 2746
Appendix A.2. Recruitment Flyer, Jamaican Families

JAMAICAN IMMIGRANT FAMILIES Needed for Research Project

Researchers from The CUNY Graduate School of Public Health and Health Policy and Brooklyn College are exploring the relationship between food, culture, and health within Jamaican immigrant families.

- Did you, your parents or your grandparents emigrate to the U.S. from Jamaica?
- Are there young people ages 13 to 23 in your family?
- Is your family interested in sharing your story in a focus group?
- Compensation: $20 gift card for each person per focus group.
- Fill out the survey here to see if you qualify: www.surveymonkey.com/r/Jamaican
- Or give us a call!

Please contact us if you are interested in participating or would like more information.

Margrete Horlyck-Romanovsky, MPH
BCfoodstudies@brooklyn.cuny.edu
(718) 951-5000, ext. 2746
Appendix B. Online Screening Survey

Caribbean and African Food & Culture Study Invitation

Greetings!

Thank you for your interest in our research study. My name is Margrethe Horlyck-Romanovsky. I am a doctoral student at the City University of New York, Graduate School of Public Health and Health Policy.

The purpose of this research study is to better understand how culture and immigration influence the diet and health of Black immigrant families from the Caribbean and Africa living in New York City.

We are seeking families in which one or more generations were born either in the Caribbean or Africa and their 13-23 year old children or grandchildren who are growing up in the United States. We use focus groups and in-person interviews and all answers are kept confidential.

Should your family be eligible to complete the study, each participant will receive a $20 gift card for one 90-minute focus group. Each person may be invited back for a one-hour interview and receive an additional $20 gift card.

Please have an adult age 18 or older complete this short survey to see whether you and your family are eligible.

Thank you for your time and interest. The survey should take 4 minutes or less for you to complete.

Sincerely,
Margrethe Horlyck-Romanovsky, DrPH Candidate
Principal Investigator
CUNY Graduate School of Public Health and Health Policy
Caribbean and African Food & Culture Study Invitation

* 1. What is your age?
- ○ 12 years old or younger
- ○ 13 to 17 years old
- ○ 18 to 23 years old
- ○ 24 years old or older
- ○ Prefer not to answer
Caribbean and African Food & Culture Study Invitation

2. What is your race/ethnicity? (Please select all that apply.)

- American Indian / Alaska Native
- Asian / Pacific Islander
- Black / African American
- Hispanic / Latino
- White / Caucasian
- Prefer not to answer
- Other (please specify)
Caribbean and African Food & Culture Study Invitation

3. Other than the United States, which region of the world do you or your family identify with most?

- Asia
- Africa
- Caribbean / West Indian
- Central America
- Europe
- South America
- Prefer not to answer
- Other (please specify)

[Blank space for input]
**4. Which Caribbean / West Indian culture(s) do you or your family identify with? (Please select all that apply.)**

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<td>Anguilla</td>
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Other (please specify)
**Caribbean and African Food & Culture Study Invitation**

5. Did one of your grandparents, one of your parents, or you grow up in Jamaica?

- [ ] Yes
- [ ] No
- [ ] Prefer not to answer
**6. Where did each of your family members grow up?**

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<th></th>
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Caribbean and African Food & Culture Study Invitation

* 7. Based on the answers you provided, you and your family are eligible to participate in our research study.

Would you be willing to participate in a 1-hour long in-person interview or a 90-minute focus group session?

☐ Yes

☐ No
8. Which African culture(s) do you or your family identify with? (Please select all that apply.)

- Ghana
- Angola
- Benin
- Burkina Faso
- Burundi
- Cameroon
- Cape Verde
- Central African Republic
- Chad
- Democratic Republic of the Congo
- Djibouti
- Egypt
- Equatorial Guinea
- Eritrea
- Ethiopia
- Gabon
- Gambia
- Algeria
- Guinea Bissau
- Guinea
- Ivory Coast
- Kenya
- Lesotho
- Liberia
- Libya
- Madagascar
- Malawi
- Mauritania
- Mauritius
- Morocco
- Mozambique
- Namibia
- Niger
- Nigeria
- Republic of the Congo
- Reunion
- Rwanda
- Senegal
- Seychelles
- Sierra Leone
- Sao Tome & Principe
- Somalia
- South Africa
- South Sudan
- Sudan
- South Sudan
- Swaziland
- Tanzania
- Topo
- Tunisia
- Uganda
- Western Sahara
- Zambia
- Zanzibar
- Zimbabwe

Other (please specify):

[Blank space for input]
Caribbean and African Food & Culture Study Invitation

* 9. Did one of your grandparents, one of your parents, or you grow up in Ghana?
   ○ Yes
   ○ No
   ○ Prefer not to answer
**10. Where did each of your family members grow up?**

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* 11. Based on the answers you provided, you and your family are eligible to participate in our research study.

Would you be willing to participate in a 90-minute focus group or a 1-hour interview?

- [ ] Yes
- [ ] No
Caribbean and African Food & Culture Study Invitation

Unfortunately, you are not eligible to participate in our research study.

If you are under the age of 18, please ask an adult member of your family to complete the survey.

Thank you for your time and effort.
If you have any questions, please do not hesitate to contact us.

Sincerely,
Margrethe Horlyck-Romanovsky, DrPH Candidate
Principal Investigator
The CUNY Graduate School of Public Health and Health Policy and Brooklyn College
BChsudstudies@brooklyn.cuny.edu
718-951-5000 ext. 2746
* 12. Based on the answers you provided, you and your family may be eligible to participate in our research study. Please provide your contact information below and one of our researchers will contact you for further information. If you are under the age of 18, please have an adult provide their contact information instead.

Name:  

Email Address (only provide an email address that you check regularly):  

Phone Number:  
Caribbean and African Food & Culture Study Invitation

Thank you for your time and effort. Should you change your mind and decide to participate or have any questions, please do not hesitate to contact us.

Sincerely,
Margrette Heryck-Romanovsky, MPH
Principal Investigator
The CUNY Graduate School of Public Health and Health Policy and Brooklyn College
BCfoodstudies@brooklyn.cuny.edu
718-951-5000 ext. 2746
*13. Please provide your name and contact information and a researcher will contact you to set up a time for an interview or a focus group session. If you are under the age of 18, please have an adult provide their contact information instead.

Name: 

Email Address: 

Phone Number: 
14. When would it be convenient for you to meet with us? (Please select all times that apply.)

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<td>6:00 PM - 8:00 PM (Evening)</td>
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</table>
Caribbean and African Food & Culture Study Invitation

Thank you for your interest in this study. If you have any questions, please do not hesitate to contact us.

We look forward to speaking with you!

Sincerely,
Margrethe Honyck-Romanovsky, MPH
Principal Investigator
The CUNY Graduate School of Public Health and Health Policy and Brooklyn College
BCFoodstudies@brooklyn.cuny.edu
718-951-6000 ext. 2746
Appendix C. Child Assent Form

THE CITY UNIVERSITY OF NEW YORK
Graduate School of Public Health and Health Policy
ADOLESCENT (AGE 13-17) ASSENT / PARENTAL PERMISSION FOR CHILD (AGE 13-17)
TO PARTICIPATE IN A RESEARCH STUDY

Title of Research Study: Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City (Qualitative)
Principal Investigator: Margrethe Horlyck-Romanovsky, DrPH Candidate, CUNY GSPHHP
Faculty Advisor: Terry T-K. Huang, PhD, Professor, CUNY GSPHHP
Research Sponsor: N/A

You are being asked to participate in a research study because you have acknowledged that you self-identify as Black and you are or are related to (Check one):

☐ A Caribbean immigrant from Jamaica or other English speaking Caribbean country/state/territory.

☐ An African immigrant from Ghana or an other English speaking African country/state/territory.

Purpose: The purpose of this research study is to gain a better understanding of diet and cultural practices in Black Caribbean and African immigrant families across generations and how this may relate to health in their communities in New York City.

Procedures: If you agree to participate in this study, we will ask you to do the following:
• Provide basic information about yourself through an electronic/paper survey asking about your name, age, gender, race/ethnicity, income, education, height, weight, diet, physical activity, health status, number of people and generations in your household, marital status, and the country(ies) where you, your parents and your grandparents grew up.
• Participate in one or more focus groups with one or more research team members. Focus groups will be 1-2 hours and compensated $20 per person.
• Focus groups will take place at a time convenient for you in a quiet and private location at Brooklyn College or other location to be determined.
• Parents/grandparents and young people will participate in separate groups.
• Focus group questions will be open ended and focus on you and your family’s history of immigration, food shopping, cooking and eating, and your perception of your own diet and health, and the health of your family.
• Focus groups will be audio recorded for us to write down exactly what you tell us. After the focus group is over, what was recorded will be transcribed either by project staff or sent to an outside transcription service. The files will be coded with the 12-digit numbers assigned to each participant, and no one handling the file will have access to your name or any other identifying information. Audio files and the transcriptions will be returned to the research team for analysis.
• We may ask you to participate in a 1-hour follow-up interview based on the analysis of focus group data, as you may be able to provide additional information or clarification. You are in no way obligated to agree to or return for an interview. However, if you agree, and we decide we would like to speak with you again, research staff may schedule a follow-up interview through your preferred method of contact (email, phone call, text message). You will decide whether you want to give us permission to contact you. Any follow-up interview will be compensated $20.

CUNY Universal IRB Protocol: 2016-1201, Approved: 10/18/2016-10/18/2017
Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City: Informed Consent, ChildPage 1 of 4
**Time Commitment:** Your participation in this research study is expected to last for a maximum of 2 hours with the potential to be invited back for a one-hour interview.

**Potential Risks or Discomforts:** Some of the questions the researchers ask you may be upsetting, or you may feel uncomfortable answering them. If you do not wish to answer a question, you can skip it and go to the next question. Feel free to ask the facilitator to turn the recorder off at any point during the focus group. This will not in any way interfere with your participation in the study. You are encouraged to inform the Principal Investigator should you experience emotional distress as part of the focus group. Given that we are collecting identifying information there is a potential for breach of confidentiality. However, we will make our best efforts to maintain confidentiality of any information that is collected during this research study, and that can identify you.

**Potential Benefits:** There is no direct benefit to participating in this study, however, the information you provide may inform the scientific understanding of the relationship between diet, cultural foods and health outcomes in Caribbean and/or African immigrant communities in the US. These findings may benefit your community in the future.

**Payment for Participation:** Participants will receive one $20 gift card for each 1 to 2-hour focus group or 1-hour in-depth interview they participate in. The gift card will be distributed at the end of the focus group/interview.

**Confidentiality:** Given that we are collecting identifying information there is a potential for breach of confidentiality. We will make our best efforts to maintain confidentiality of any information that is collected during this research study, and that can identify you. During the focus groups or interview we will use your first name or a nickname of your choice. This will allow research team to group responses from the same person, however, names will be replaced with your 12-digit unique identifier and will not identify the person to anyone else. We will disclose this information only with your permission or as required by law. We will protect your confidentiality by separating identifiable information from screening, intake and focus group responses and saving all identifying information (name, address, phone number and email) on a separate, dedicated password protected external hard drive stored in a separate locked drawer in the principal investigators office at Brooklyn College. All other responses, audio recording(s) and transcribed focus groups will be de-identified and coded with an 12-digit identifying code unique to you and saved on a second dedicated, password protected external hard drive stored in a separate, locked drawer in the Principal investigator’s office at Brooklyn College. The unique 12-digit identifying code and your name only will be stored on a third dedicated, password protected drive stored in a separate, locked drawer in the principal investigators office at Brooklyn College. Only the Principal Investigator, Faculty Advisor and Research Assistants will have access to your data. Audio files may be transferred to professional transcription agency, however, the files will not contain any identifiable information about you. The research team, authorized CUNY staff, and government agencies that oversee this type of research may have access to research data and records in order to monitor the research. Research records provided to authorized, non-CUNY individuals will not contain identifiable information about you. Publications and/or presentations that result from this study will not identify you by name, voice or other personal identifying information.

I hereby give consent for the research team to audio-record the focus group with me, the participant named below:  Yes □   No □

Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City- Informed Consent, ChildPage 2 of 4
Participants’ Rights:
- Your participation in this research study is entirely voluntary. If you decide not to participate, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled.
- You do not have to participate even if your parent/guardian has given you permission to do so.
- You can decide to withdraw your consent and stop participating in the research at any time, without any penalty.
- You have the right to review the recording(s) taken as part of this research to determine whether they should be edited or erased in whole or in part.
- If you are a CUNY employee, your willingness to participate in this research study, or your request to withdraw from the research study, will not affect your employment with CUNY.
- If you are a CUNY student, your willingness to participate in this research study, or your request to withdraw from the research study, will not affect your grades or academic standing with CUNY.
- Participants must agree to to maintain confidentiality of information discussed or shared by others.

Please initial here if you agree to maintain confidentiality:

______ I agree to maintain the confidentiality of the information discussed by all participants and researchers during the focus group session.

If you cannot agree to the above stipulation please see the researcher(s) as you may be ineligible to participate in this study.

On the checklist below, please indicate if you would permit the researchers to contact you for participation in follow-up interviews in this study.

______ I agree to allow the researchers to contact me for follow-up interviews in this study.

______ I do not agree to allow the researchers to contact me for follow-up interviews in this study.

Signature of Participant: 
I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give my consent to participate in this study. I will be given a copy of this consent form to keep.

________________________________________
Printed Name of Participant

________________________________________ Date

CUNY Universal Integrated IRB Protocol: 2016-1201, Approved: 10/18/2016-10/18/2017
Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City- Informed Consent, ChildPage 3 of 4
Signature of Parent(s) or Legal Guardian:
If you give permission for your child to participate in this research study, please sign and date below. You will be given a copy of this form to keep. I understand that my child does not have to participate, or he/she can withdraw at any time, even if I have given my permission.

Printed Name of Parent or Legal Guardian   Signature of Parent or Legal Guardian

Date

*******************************************************************************

Signature of Individual Obtaining Assent and Parental Permission

Printed Name of Individual Obtaining Assent / Parental Permission

Signature of Individual Obtaining Assent / Parental Permission

Date

Questions, Comments or Concerns: If you have any questions, comments or concerns about the research, you can talk to one of the following researchers:

- Margrethe Horlyck-Romanovsky (PI), Margrethe.Horlyck-Romanovsky81@sphmail.cuny.edu or bfoodstudies@brooklyn.cuny.edu 718-951-5000, ext. 2746
- Terry Huang, Faculty Advisor, terry.huang@sph.cuny.edu 646-664-8358

If you have questions about your rights as a research participant, or you have comments or concerns that you would like to discuss with someone other than the researchers, please call the CUNY Research Compliance Administrator at 646-664-8918. Alternately, you can write to:

CUNY Office of the Vice Chancellor for Research
Attn: Research Compliance Administrator
205 East 42nd Street, New York, NY 10017

Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City- Informed Consent, Child
Appendix D. Adult Consent Form

THE CITY UNIVERSITY OF NEW YORK
Graduate School of Public Health and Health Policy
CONSENT TO PARTICIPATE IN A RESEARCH STUDY (Adult)

Title of Research Study: Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City (Qualitative)
Principal Investigator: Margrethe Horlyck-Romanovsky, DrPH Candidate, CUNY GSPHHP
Faculty Advisor: Terry T-K. Huang, PhD, Professor, CUNY GSPHHP
Research Sponsor: N/A

You are being asked to participate in a research study because you have acknowledged that you self-identify as Black or African American and you are or are related to (Check one):

☐ A Caribbean immigrant from Jamaica or other English speaking Caribbean country/state/territory.

☐ An African immigrant from Ghana or an other English speaking African country/state/territory.

Purpose: The purpose of this research study is to gain a better understanding of diet and cultural practices in Black Caribbean and African immigrant families across generations and how this may relate to health in their communities in New York City.

Procedures: If you agree to participate in this study, we will ask you to do the following:

- Provide basic information about yourself through an electronic/paper survey asking about your name, age, gender, race/ethnicity, income, education, height, weight, diet, physical activity, health status, number of people and generations in your household, marital status, and the country(ies) where you, your parents and your grandparents grew up.

- Participate in one or more focus groups with one or more research team members. Focus groups will be 90 minutes and compensated $20 per person.

- Focus groups will take place at a time convenient for you in a quiet and private location at Brooklyn College or other location to be determined.

- Parents/grandparents and young people will participate in separate groups.

- Focus group questions will be open ended and focus on you and your family’s history of immigration, food shopping, cooking and eating, and your perception of your own diet and health, and the health of your family.

- Focus groups will be audio recorded for us to write down exactly what you tell us. After the focus group is over, what was recorded will be transcribed either by project staff or sent to an outside transcription service. The files will be coded with the 12-digit numbers assigned to each participant, and no one handling the file will have access to your name or any other identifying information. Audio files and the transcriptions will be returned to the research team for analysis.

- We may ask you to participate in a 1-hour follow-up interview based on the analysis of focus group data, as you may be able to provide additional information or clarification. You are in no way obligated to agree to or return for an interview. However, if you agree, and we decide we would like to speak with you again, research staff may schedule a follow-up interview through your preferred method of contact (email, phone call, text message). You will decide whether you want to give us permission to contact you. Any follow-up interview will be compensated $20.

Time Commitment: Your participation in this research study is expected to last for a maximum of 2 hours with the potential to be invited back for a 1-hour interview.

CUNY Universal Integrated IRB Protocol: 2016-1231, Approved: 10/18/2016-10/18/2017
Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City- Informed Consent AdultPage 1 of 4
Potential Risks or Discomforts: Some of the questions the researchers ask you may be upsetting, or you may feel uncomfortable answering them. If you do not wish to answer a question, you can skip it and go to the next question. Feel free to ask the facilitator to turn the recorder off at any point during the focus group. This will not in any way interfere with your participation in the study. You are encouraged to inform the Principal Investigator should you experience emotional distress as part of the focus group. Given that we are collecting identifying information, there is a potential for breach of confidentiality. However, we will make our best efforts to maintain confidentiality of any information that is collected during this research study, and that can identify you.

Potential Benefits: There is no direct benefit to participating in this study, however, the information you provide may inform the scientific understanding of the relationship between diet, cultural foods and health outcomes in Caribbean and/or African immigrant communities in the US. These findings may benefit your community in the future.

Payment for Participation: Participants will receive one $20 gift card for each 1 to 2-hour focus group or 1-hour in-depth interview they participate in. The gift card will be distributed at the end of the focus group/interview.

Confidentiality: Given that we are collecting identifying information there is a potential for breach of confidentiality. We will make our best efforts to maintain confidentiality of any information that is collected during this research study, and that can identify you. During the focus groups or interview we will use your first name or a nickname of your choice. This will allow research team to group responses from the same person, however, names will be replaced with your 12-digit unique identifier and will not identify the person to anyone else. We will disclose this information only with your permission or as required by law. We will protect your confidentiality by separating identifiable information from screening, intake and focus group responses and saving all identifying information (name, address, phone number and email) on a separate, dedicated password protected external hard drive stored in a separate locked drawer in the principal investigators office at Brooklyn College. All other responses, audio recording(s) and transcribed focus groups will be de-identified and coded with an 12-digit identifying code unique to you and saved on a second dedicated, password protected external hard drive stored in a separate, locked drawer in the principal investigator’s office at Brooklyn College. The unique 12-digit identifying code and your name only will be stored on a third dedicated, password protected drive stored in a separate, locked drawer in the principal investigators office at Brooklyn College. Only the Principal Investigator, Faculty Advisor and Research Assistants will have access to your data. Audio files may be transferred to professional transcription agency, however, the files will not contain any identifiable information about you. The research team, authorized CUNY staff, and government agencies that oversee this type of research may have access to research and records in order to monitor the research. Research records provided to authorized, non-CUNY individuals will not contain identifiable information about you. Publications and/or presentations that result from this study will not identify you by name, voice or other personal identifying information.

I hereby give consent for the research team to audio-record the focus group with me, the participant named below: Yes ☐ No ☐
Participants’ Rights:
- Your participation in this research study is entirely voluntary. If you decide not to participate, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled.
- You can decide to withdraw your consent and stop participating in the research at any time, without any penalty.
- You have the right to review the recording(s) taken as part of this research to determine whether they should be edited or erased in whole or in part.
- If you are a CUNY employee, your willingness to participate in this research study, or your request to withdraw from the research study, will not affect your employment with CUNY.
- If you are a CUNY student, your willingness to participate in this research study, or your request to withdraw from the research study, will not affect your grades or academic standing with CUNY.
- Participants must agree to to maintain confidentiality of information discussed or shared by others.

Please initial here if you agree to maintain confidentiality:

______ I agree to maintain the confidentiality of the information discussed by all participants and researchers during the focus group session.

If you cannot agree to the above stipulation please see the researcher(s) as you may be ineligible to participate in this study.

On the checklist below, please indicate if you would permit the researchers to contact you for participation in follow-up interviews in this study.

______ I agree to allow the researchers to contact me for follow-up interviews in this study.

______ I do not agree to allow the researchers to contact me for follow-up interviews in this study.
**Signature of Participant:**
I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give my consent to participate in this study. I will be given a copy of this consent form to keep.

<table>
<thead>
<tr>
<th>Printed Name of Participant</th>
<th>Signature of Participant</th>
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<tr>
<td>Date</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Printed Name of Individual Obtaining Consent</th>
<th>Signature of Individual Obtaining Consent</th>
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<td></td>
<td></td>
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<tr>
<td>Date</td>
<td></td>
</tr>
</tbody>
</table>

**Questions, Comments or Concerns:** If you have any questions, comments or concerns about the research, you can talk to one of the following researchers:

- Margrethe Horlyck-Romanovsky (PI), Margrethe.Horlyck-Romanovsky81@sphmail.cuny.edu or bfoodstudies@brooklyn.cuny.edu 718-951-5000, ext. 2746
- Terry Huang, Faculty Advisor, terry.huang@sph.cuny.edu 646-664-8358

If you have questions about your rights as a research participant, or you have comments or concerns that you would like to discuss with someone other than the researchers, please call the CUNY Research Compliance Administrator at 646-664-8918. Alternately, you can write to:

CUNY Office of the Vice Chancellor for Research  
Attn: Research Compliance Administrator  
205 East 42nd Street, New York, NY 10017
Appendix E. Unique Identifier Construction

Participant codes

Participant data will be coded with a 12-digit unique identifier. The identifier is created as follows:

1. Day (of first focus group/interview) __
2. Month (of first focus group/interview) __
3. Year (of first focus group/interview) __
4. Culture (Jamaica 01, Ghana 02) __
5. Two-Digit Family Code __ (Number of family enrolled in consecutive order regardless of culture.)
6. Two-Digit Generation (01, 02, 03, 04) __ (Numbered backwards where the child is 01, parent is 02, grandparent is 03. For two members of the same generation from the same family, e.g. two children or two parents, replace 0 with 1 or 2).

Example unique identifier created for a participant in a focus group on December 31, 2016 with Jamaican youth, representing the 23rd family unit: 311216_012301

All records will be kept separately. The key to matching up names and intake survey information or focus group/interview transcript is stored on a password protected external storage drive/jump drive.
Appendix F. Online Intake Survey

Caribbean and African Food & Culture Research Project: INTAKE

Thank you for participating in our research study.

Before we can begin, please provide some basic information about yourself including age, gender, race/ethnicity, income, marital status, education, number of people and generations in your household, your health and the health of your family.

If you do not wish to answer a question you can choose “prefer not to answer” and go to the next question.

* 1. Please indicate your unique 12-digit identifying number
   (The research team will provide you with this)
2. What is your gender?

- Male
- Female
- Other
- Prefer not to answer
3. What is your age?
4. What is your race/ethnicity? (Please select all that apply.)

- American Indian / Alaska Native
- Asian / Pacific Islander
- Black / African American
- Hispanic / Latino
- White / Caucasian
- Prefer not to answer
* 5. What is the highest level of education you have completed or the highest degree you have received?

- Elementary/Primary school
- Middle/Secondary (Lower/Upper) school
- Less than high school degree or A-Levels
- High school degree or equivalent (e.g., GED) or A-Levels
- Some college but no degree
- Associate degree
- Bachelor degree
- Master degree
- Doctoral degree
- Other
- Prefer not to answer
6. Would you say in general that your health is:

- [ ] Excellent
- [ ] Very good
- [ ] Good
- [ ] Fair
- [ ] Poor
- [ ] Don't know
- [ ] Prefer not to answer
Caribbean and African Food & Culture Research Project INTAKE

7. About how tall are you without shoes? (For example if you are 5 feet and 4 inches, write 5'4")

8. About how much do you weigh without shoes? (Please indicate pounds or kilograms)
9. How often do you drink sugar sweetened beverages? This would include soda, juice, sweetened ice tea, fruit punch, sports drinks, sweetened coffee or tea.

- Never
- Less than one per day
- One per day
- More than one per day
- Don't know
- Prefer not to answer
10. On average, how many times per week do you eat meals that were prepared in a restaurant? Please include eat-in restaurants, carry out restaurants and restaurants that deliver food to your house.
11. Thinking about nutrition...how many total servings of fruit and/vegetables did you eat yesterday? A serving would equal one medium apple, a handful of broccoli, or a cup of carrots.
12. During the past 30 days, other than your regular job, did you participate in any physical activities or exercises such as running, golf, gardening, sports, hiking, swimming, bicycling, or walking for exercise?

- Yes
- No
- Don't know
- Prefer not to answer
13. Have you ever been told by a doctor, nurse, or other health professional that you have diabetes?

- Yes
- No
- Don’t know
- Prefer not to answer
14. How many people currently live in your household?

15. How many generations live in your household?
16. Where did each of your family members grow up?

<table>
<thead>
<tr>
<th></th>
<th>Jamaica</th>
<th>Ghana</th>
<th>United States</th>
<th>Somewhere else</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myself</td>
<td></td>
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<tr>
<td>Mother</td>
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<td>Grandmother (Mother's side)</td>
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<td>Grandfather (Mother's side)</td>
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<td>Grandfather (Father's side)</td>
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<td>Child #3</td>
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</table>
17. Of the family members who were born abroad, at what age did they come to live permanently in the US?

<table>
<thead>
<tr>
<th></th>
<th>As a child, under age 5</th>
<th>As a child between ages 5 and 18</th>
<th>As an adult, over age 18</th>
<th>Did not immigrate to the U.S.</th>
<th>Don't know</th>
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<tbody>
<tr>
<td>Myself</td>
<td></td>
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<tr>
<td>Mother</td>
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<td>Child #3</td>
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</table>
18. Of these income groups, which best represents your family income in the last 12 months?

- No income
- Less than $20,000
- $20,000-$39,999
- $40,000-$59,999
- $60,000-$79,999
- $80,000-$99,999
- $100,000 or more
- Don't know
- Prefer not to answer
<table>
<thead>
<tr>
<th>19. What best describes your marital status?</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Married</td>
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<tr>
<td>☐ Widowed</td>
</tr>
<tr>
<td>☐ Divorced</td>
</tr>
<tr>
<td>☐ Separated</td>
</tr>
<tr>
<td>☐ Never married</td>
</tr>
<tr>
<td>☐ Living with a partner</td>
</tr>
<tr>
<td>☐ Prefer not to answer</td>
</tr>
</tbody>
</table>

Caribbean and African Food & Culture Research Project INTAKE
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<th>Caribbean and African Food &amp; Culture Research Project INTAKE</th>
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Thank you for your time!

You are now eligible to participate in the next part of the research study.
Appendix G. Focus Group/Interview app Script: Questions and Probes

THE CITY UNIVERSITY OF NEW YORK
CUNY Graduate School of Public Health and Health Policy

FOCUS GROUP / INTERVIEW SCRIPT

Title of Research Study: Diet, Obesity and Type 2 Diabetes in US Born and Foreign Born Blacks Living in New York City (Qualitative)
Principal Investigator: Margrethe Horlyck-Romanovsky, DrPH Candidate, CUNY GSPHHP
Faculty Advisor: Terry T-K. Huang, PhD, Professor, CUNY GSPHHP

Participant ID #: __________________________

1. [INSTRUCTION FACILITATOR: Introduce yourself and the research project]
   Say “Hello, my name is __________, I am with the CUNY Graduate School of Public Health and Health Policy”:

   “Today we will be talking about [Insert Jamaican/Ghanaian] food and health, what it means to you to be a member of an [Insert Jamaican/Ghanaian] immigrant family living in the US in terms of food, health and family relationships. All answers will be kept confidential. The $20 gift card(s) will be given out at the end of the interview/focus group.”

   “We have some questions and I am sure you have a lot to share, so think of this as a conversation. If something comes to mind feel free to bring it up.”

   “We are going to audio record the interview/focus group so that we will not have to take many notes and can focus on listening to what you have to share. No one will hear the interview/focus group other than the research team and the participants. You do not have to answer any questions you do not wish to answer or are uncomfortable answering, and you may stop at any time. If you want to turn the tape recorder off at any time, feel free to say so.”

   [INSTRUCTION FACILITATOR: if conducting an interview, say] “The interview will take approximately one hour.”

   [INSTRUCTION FACILITATOR: if conducting a focus group, say] “The focus group will take approximately 90 minutes”

   [INSTRUCTION FACILITATOR: If conducting FOCUS GROUP, say:] “All information shared in this focus group must be kept confidential and not be shared outside of this room at any point in time. On the informed consent form you all agreed to maintain confidentiality. If you cannot agree to this, please see the researcher(s) before we start.”

2. [INSTRUCTION FACILITATOR: Get verbal and signed consent for recording.]
   “Before we start I am going to turn off my cell phone, [do so in front of participant(s)]. Can I ask that you turn off your cell phone(s) so that we can focus on the interview/focus group?”

   “Thank you!”

   “Would you like to start?”

   [INSTRUCTION FACILITATOR: If yes, continue with the interview. If no, thank the persons and end conversation.]
3. [INSTRUCTION FACILITATOR: Turn on the recorder.]

4. [INSTRUCTION FACILITATOR: State the following information after you turn on the recorder]:
   • Facilitator (your) name
   • Participant First Names
   • Date and location

5. [INSTRUCTION FACILITATOR: Say]
   “Do you have any questions before we start?”
   [INSTRUCTION FACILITATOR: If yes, answer any questions.
   If no, continue with the interview/focus group.]

   “OK, let's start.”

   [INSTRUCTION FACILITATOR: In all questions, allow for and probe for multiple family settings/alternative family structure]

   Introduction
   A. Tell us a little bit about what being a Jamaican/Ghanaian [insert specific culture] immigrant family means to you.

   B. When we think of food, we often think of the finished meal, but getting food sometimes means farming and gardening, or it means walking a long or short way to the store, or it may mean eating what you can get from the corner store. If you were to think of your childhood, how did you and your family get food? [allow for multiple family settings/locations]

   C. -and when you think of cooking and eating, who cooked it, where did they cook and when?
   D. -and when you think of eating, where and when would you eat and with whom?

   Current
   E. If you think of your family, household and community now, where do you get food?
   F. -and when you think of cooking now, who cooks the food, where and when do they cook?
   G. -and when you think of eating meals now, how are they similar and how are they different from the [INSERT Jamaican/Ghanaian] meals in the past?
   H. How are the meals of your [INSERT Parents / Children] similar to or different from your meals?
       a. Can you explain why that might be?
Up to now, we have been talking about past and current food practices. This last set of questions pertain to health...

I. How would you describe your own health?
   a. How would you describe the health of your [INSERT Jamaican/Ghanaian: Parents, grandparents, children, or grand children]?

J. In our research we have found that
   a. [INSERT: The Jamaican immigrant community may be at greater risk of having diabetes/sugar than African Americans, but that Jamaicans in NYC are less likely to be obese]
      OR
   b. [INSERT: The Ghanaian immigrant community may be at lower risk of having diabetes/sugar and being obese than both Black Caribbean and African Americans]
   c. Can you help explain these differences?
   d. How do you think that these health outcomes differ between older generations and younger generations of [INSERT Jamaicans/Ghanaians]?

K. What are some of the other health issues that affect your [INSERT Jamaican/Ghanaian] family and community?

L. Why do you think these particular issues affect your community?

M. What is there about [INSERT Jamaican/Ghanaian specific culture] food culture, health and family dynamics that we did not ask but you think we should know about?

N. Do you have any questions for us?

6. Say: “Is there anyone else who you would recommend we speak to regarding our research? If so, please give them this flyer and we hope to hear from them.”

7. Say: “Do you have any questions about the research? If you have questions about the project or your participation you may call our principal investigator, Margrethe Horlyck-Romanovsky at 718-951-5000, ext. 2746.

If you have questions about your rights as a research participant, or if you wish to voice any problems or concerns to someone other than the researchers, please call the CUNY Research Compliance Administrator at 646-664-8918.”

“Thank you again for participating in our project. We hope to be able to share the results in the Spring or Summer of 2017.”

8. [INSTRUCTION FACILITATOR: Turn off the recorder.]
9. [INSTRUCTION: Give respondent(s) incentive and get signature on “Receipt of Incentive”]

CUNY Universal Integrated IRB Protocol: 2016-1201, Approved: 10/18/2016-10/18/2017
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