

LOW-INCOME AFRICAN-AMERICAN AND HISPANIC  
CAREGIVERS' KNOWLEDGE, BEHAVIORS, AND PERCEPTIONS  
RELATING TO CHILDREN'S CALCIUM INTAKES: SURVEY  
RESULTS FROM CLIENTS OF URBAN, NEIGHBORHOOD  
LAUNDROMATS

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A thesis submitted to the Graduate School-New Brunswick

Rutgers, The State University of New Jersey

in partial fulfillment of the requirements

for the degree of

Master of Science

Graduate Program in Nutritional Sciences

written under the direction of

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and approved by

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New Brunswick, New Jersey

October, 2008

## ABSTRACT OF THE THESIS

Low-Income African-American and Hispanic Caregivers' Knowledge,  
Behaviors, and Perceptions Relating to Children's Calcium Intakes:  
Survey Results From Clients of Urban, Neighborhood Laundromats

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Limited-resource African-American and Hispanic children were found to have inadequate intakes of calcium. Since increasing their calcium intakes would decrease their risk for health conditions prevalent in these populations, i.e., lead poisoning, dental caries, high blood pressure, and osteoporosis, this study was performed. More specifically, this work sought to determine if urban, New Jersey laundromats were useful venues in which to educate caregivers about calcium

and its importance for their children via the display of “Calcium: Select to Protect” social marketing campaign materials. Also examined were caregivers’ perceptions of factors related to children’s inadequate calcium intakes. This research sought to accomplish these goals via evaluation tools developed using constructs from the Social-Ecological Model, the Stage Theory of Organizational Change, and the Health Belief Model. Limited-resource African-American (n=134) and Hispanic (n=143) caregivers from ten laundromats were surveyed. Newark, NJ laundromats (n=6) served as intervention sites, and Jersey City, NJ laundromats (n=4) served as control locations. Post-intervention, only two of the 72 Newark laundromat clients surveyed reported exposure to the intervention materials, indicating the campaign’s lack of success in this venue. This work’s aims were revised, and the data collected, minus the two participants that reported exposure to the intervention, were used to examine caregivers’ baseline characteristics that may influence their children’s calcium intakes. Few caregivers reported previous exposure to calcium-related materials; however, those receiving WIC reported having had greater exposure to calcium-related materials compared to non-participants  $t(271) = 2.80, p < .01$ . Caregivers exhibited limited knowledge of their children’s calcium requirements, calcium sources, and calcium-related health conditions. Findings from variables drawn from the Health Belief Model showed that caregivers did not perceive their children to be susceptible to inadequate calcium intakes, had insufficient understanding of the benefits of adequate calcium intakes during childhood, and experienced multiple barriers to ensuring their children’s adequate calcium

consumption. These factors may have negatively affected children's calcium consumption, and could be addressed via the effective dissemination of "Calcium: Select to Protect" campaign messages. Further research is needed to improve calcium intakes among low-income African-American and Hispanic children who live in urban environments.

## ACKNOWLEDGEMENT

It is a pleasure to thank the many people who helped make this thesis possible. First, I would like to thank Dr. Debrah M. Palmer, my graduate advisor, who provided encouragement, insight and knowledge, throughout this project. I am also deeply grateful to my other graduate committee members, Dr. Nurgul Fitzgerald and Dr. Daniel Hoffman, for taking time out of their busy schedules to work with me.

I am indebted to Audrey Adler for offering her kind support and guidance. She was always there to talk to me at times of frustration and helped me to see the “light at the end of the tunnel”. I also wish to thank Shailja Mathur for allowing me to utilize her staff for translation. I could not thank Jaymie Santiago, Raquel Acevedo, and Oliver Lozada enough for their contributions to this work. Their presence as translators was invaluable as was the emotional support and camaraderie, and entertainment they provided. Many sincere thanks to Diana Cangemi and Kelly Ryan for providing great company in the office and on road trips and for being there to share a few laughs.

Finally, I would like to express my gratitude to my family and friends for encouraging me to set my academic goals high and for having faith in my ability to accomplish these goals. In particular, my mom, dad, and sister Kim, for their loving support and constant words of encouragement. I am also deeply grateful to my great friends Victoria Kerby and Matthew Lichtiger. I couldn’t have gotten

through the last couple of months without their tasty dinners and motivating words. And last but not least, Bobby T. Brown, for his unwavering love and patience, and for always making me laugh, even at my worst moments. To him I dedicate this thesis.

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## CHAPTER 1: INTRODUCTION

The New Jersey Food Stamp Nutrition Education Program (NJ FSNEP) was established in 1997 to provide nutrition education to Food Stamp Program participants, and children in school systems in which 50% or more children receive free or reduced priced school lunches. NJ FSNEP is a Rutgers Cooperative Extension/New Jersey Agricultural Experiment Station outreach program that works in collaboration with Rutgers Department of Nutrition Sciences at Rutgers University, the University of Medicine and Dentistry of New Jersey, and many county and local agencies. At the time of this project, the program was operating in: Burlington County, Cumberland County, Essex County (UMDNJ Internship Program), Hudson County, Hunterdon County, Middlesex County, Monmouth County, Ocean County, Passaic County, Somerset County, Union County, and Warren County, i.e., approximately half of New Jersey's 21 counties. The goals of NJ FSNEP include:

- Improving the diets and nutritional welfare of participants;
- Increasing participants' knowledge of human nutrition;
- Increasing participants' ability to select and buy food that satisfies nutritional needs;
- Improving participants' practices in food production, preparation, storage, safety and sanitation; and,
- Increasing participants' ability to manage food budgets and related resources such as food stamps.<sup>1</sup>

During the period in which this project was carried out, the majority of NJ FSNEP participants were African-American or Hispanic. Limited-resource African-American and Hispanic families in New Jersey had been found to have inadequate intakes of calcium. The adequacy of calcium intakes among these populations is of concern as consuming the recommended amount of calcium daily may decrease the risk for health conditions that are prevalent in African-American and Hispanic populations such as lead poisoning<sup>2, 3</sup>, dental caries.<sup>4, 5</sup> high blood pressure<sup>6, 7, 8, 9, 10</sup> and osteoporosis<sup>11, 12, 13, 14</sup> It was projected that inadequate calcium intakes may have been related to a lack of understanding of the benefits of calcium consumption and/or the health problems associated with inadequate intakes, as well as a lack of knowledge of calcium-rich food sources. Therefore, the “Calcium: Select to Protect” social marketing campaign was developed by NJ FSNEP with the aim of increasing calcium consumption among New Jersey’s limited-resource African-American and Hispanic urban children, through educating their caregivers.<sup>15</sup>

The “Calcium: Select to Protect” social marketing campaign utilized culturally-appropriate, low-literacy nutrition education materials to deliver information about calcium to caregivers with the end goal of encouraging behavior change. Developed campaign materials included brochures, posters, and physician tear pads. Written materials were available in two versions, an English version that

targeted African-Americans, and a bilingual English/Spanish version that targeted Hispanic audiences.

Courtney M. Santagata, a former graduate student in the Nutritional Sciences Department at Rutgers University, had conducted focus groups with limited-resource African-American caregivers living in New Jersey with the purpose of determining viable venues in which to display “Calcium: Select to Protect” materials and reach the target population. Data collected during these focus groups projected that campaign materials would be successful if placed in locations in which the target audience was required to wait for extended periods of time. Laundromats were specifically mentioned as such allocations. Based on these findings the initial purpose of this research was: (1) to assess caregiver knowledge of the importance of adequate calcium intake during childhood; (2) to assess changes in their children’s consumption of the calcium-rich foods promoted in the intervention brochures; (3) to examine Health Belief Model variables that may ultimately affect the consumption of calcium-rich foods among children; and (4) to determine if laundromats were useful venues in which to reach and educate this population. This research sought to accomplish these goals via an evaluation conducted using constructs from the Social-Ecological Model, the Stage Theory of Organizational Change, and the Health Belief Model.

Following data collection and analysis it was determined that displaying “Calcium: Select to Protect” brochures and posters in laundromats was nearly

100% ineffective, i.e., during the seven months materials were displayed, only two of the 277 people interviewed had noticed them. Since the intervention had essentially no effect on the target population, the data collected was utilized with the revised purpose: (1) to examine the target audience's knowledge of the importance of adequate calcium intake during childhood; (2) to assess the current intakes of calcium-rich foods among the children of these caregivers; (3) to identify potential relationships between African-American and Hispanic ethnicity and children's calcium consumption; and (4) to examine Health Belief Model variables that may ultimately affect the consumption of calcium-rich foods among children of these caregivers.

## CHAPTER 2: LITERATURE REVIEW

This chapter provides a review of the current literature that supports the purpose and necessity of the research conducted. It seeks to examine: the status of calcium intake among children prior to intervention; the literature available linking adequate calcium consumption to the prevention of diseases such as lead poisoning, dental caries, high blood pressure, and osteoporosis; the consumption levels of calcium-rich foods by children; barriers to calcium consumption, including socioeconomic status, lactose intolerance, lack of parental knowledge, and parental influences; campaigns and educational efforts to increase calcium consumption that had previously been performed among children; and, the theories/models that were used as the framework for this research, i.e., the Social-Ecological Model, the Stage Theory of Organizational Change, and the Health Belief Model. The emphasis of this review is on literature that discusses the target population of this research, African-American and Hispanic children; however, when work specific to the target audience was not available, more generalized findings were examined.

### ***Calcium Intake in African-American and Hispanic Children***

Prior to this research, the results of recent surveys indicated that few American children were meeting the dietary recommendations for calcium. The Dietary Reference Intakes (DRI) for calcium in children were; 500 mg for ages 1-3, 800 mg for ages 4-8, and 1,300 for ages 9-18.<sup>16</sup> Data from the USDA Continuing



Survey of Food Intakes by Individuals, 1994-1996 (CSF II) showed that children were not getting enough calcium. As reported by CSF II, the percentage of children aged 3-5 meeting 100 % of the DRI for calcium was less than 57%, and this percentage dropped significantly with age. For example, only 37.7 % of males aged 6-11, 32.2% of males aged 12-19, 29.2 % of females aged 6-11, and 11.7 % of females aged 12-19 were meeting 100% of the DRI for calcium.<sup>17</sup> This inadequacy had been reflected in the objectives set forth in Healthy People 2010. Healthy People 2010 stated that in 1988-1994 only 46% of people aged two years or older were meeting their calcium requirements. Based on this data, one objective expressed in the Healthy People 2010 plan was to “increase the proportion of persons aged 2 years and older who met their dietary recommendations for calcium to 75%.”<sup>18</sup>

Children from certain ethnic groups were even less likely to meet calcium requirements. Calcium intakes among African-American children were particularly low. Data from the Continuing Survey of Food Intakes by Individuals 1994-1996, 1998 (CSFII) and the National Health and Nutrition Examination Survey (NHANES) 1999-2000 showed that African-American children had lower intakes of calcium when compared to non-African-American children. Data from CSFII and NHANES 1999-2000 showed that the median calcium intake of African-American children 4 years and older was less than 100% of the DRI for calcium. In comparison, the median intake of non-African-American children up to 10 years of age was found to meet or exceed the DRI for calcium for their

specific age groups.<sup>19</sup> The difference in calcium consumption among African-American and non-African-American children was further evidenced by the findings of a study by Champagne et al. In this study Champagne evaluated food and nutrient intake data from children and adults living in the lower Mississippi Delta region to national data from the CSFII. Results of this study showed that African-American children, living in both the Delta region and the United States as a whole, consumed less calcium than Caucasian children. African-American children in both the Delta region and the US were found to consume less than 800 mg of calcium per day, whereas Caucasian children were found to consume greater than 900 mg of calcium per day. Overall, less than 30% of African-American children in the Delta region were found to meet the DRI for calcium. Champagne et al. also found that calcium consumption decreased with decreasing income level. Less than 10% of those in the lowest income bracket, i.e., \$0-\$14,999 per year, met the DRI for calcium.<sup>20</sup>

Inadequate calcium consumption was also found to be a concern for Hispanic children. A study by Novotny examined calcium intakes among Asian, White, and Hispanic youth aged 10 to 18. Overall the mean calcium intake for all children in the study was lower than the DRI for calcium. Furthermore, when calcium intake was examined by ethnic group, the Hispanic children were found to consume less calcium compared to Caucasian children. The median intake of calcium by Hispanic children was found to be 896 mg per day vs. 1180 mg/day for Caucasian children.<sup>21</sup> Together, these studies suggest that inadequate

calcium consumption is of concern in all American children but was particularly troublesome among low-income African-American and Hispanic children.<sup>19, 20, 21</sup>

### ***Consumption of Calcium-rich Foods by African-American and Hispanic Children***

Many foods contain some calcium, but larger amounts are primarily concentrated in dairy foods. As such, dairy products provide approximately 75% of the calcium consumed in the United States.<sup>22, 23</sup> Data has shown that African-Americans, Hispanics, and other ethnic minority populations exhibit low dairy consumption.<sup>19, 21</sup> Fulgoni et al. analyzed data from CSFII and NHANES II and found that, on average, African-American children and adults consumed fewer dairy foods than non-African-American children and adults. In this study all African-American subjects failed to meet the 2005 US Dietary Guidelines dairy food recommendation of three daily servings.<sup>19</sup> Another study by Novotny compared calcium intakes from milk in Asian, Caucasian, and Hispanic children. Results of this study showed that among these three ethnicities Hispanic children had the lowest calcium intake from milk.<sup>21</sup>

Some non-dairy foods contain considerable amounts of calcium. Foods such as beans, fish with bones, turnip or collard greens, kale, Chinese cabbage, spinach, sweet potatoes, and broccoli contain moderate amounts of calcium and may be preferred by individuals of certain ethnicities.<sup>22, 23</sup> However, calcium bioavailability from most plant foods is a concern. Many calcium-rich plant foods, such as

beans, spinach, and sweet potatoes, contain high concentrations of oxalate and/or phytate which inhibits calcium absorption.<sup>23</sup> The decreased bioavailability of calcium in these non-dairy foods requires that a greater quantity of these foods be consumed to obtain the same amount of calcium absorbed from dairy foods. For example, to get the same amount of calcium in one cup of milk, one would need to consume eight cups of spinach or five cups of red beans.<sup>24</sup> In contrast, calcium bioavailability from green vegetables that contain low levels of oxalate such as broccoli, turnip or collard greens, kale, and Chinese cabbage is high, e.g., to get the same amount of calcium in one cup of milk, one would need to consume only one cup of cooked collard greens.<sup>11, 25</sup>

Calcium-fortified foods and calcium supplements are other calcium-rich alternatives. Some common calcium-fortified foods include bread, canned and instant pastas, cereals, cereal bars, waffles, pancakes, juices, and soy and rice milk. Calcium-fortified foods are a good alternative to dairy and must provide at least 10% of the RDA for calcium per serving with some foods providing up to 30%.<sup>22, 26</sup>

Calcium supplements are another good source of calcium for children who cannot or will not consume an adequate amount of calcium from dietary sources. The bioavailability of calcium supplements is often comparable or greater than that in dairy products and can supply 300 to 600 mg of calcium per tablet.<sup>11</sup>

Yet data suggests that dairy foods remain the principal source of dietary calcium. Data from the Bogalusa Heart Study showed that children between one and two years of age obtained 83%, teenage girls 77%, and adults between 65% and 72%, of their calcium from dairy products, respectively.<sup>24</sup> Additional data showed that 62% of children did not take a vitamin-mineral supplement every day.<sup>8</sup> Increasing the consumption of calcium-rich non-dairy foods, calcium-fortified foods, and calcium supplements among African-American and Hispanic children who will not or cannot consume adequate amounts of calcium from dairy products may be an important step to increasing the amount of children who are meeting their calcium intake needs.

### ***Increasing Calcium Consumption among Low-Income, African-American and Hispanic Children May Prevent Disease***

Adequate calcium intake may decrease the risk for childhood health conditions that are prevalent among African-American and Hispanic populations, such as lead poisoning,<sup>2, 3</sup> dental caries,<sup>4, 5</sup> and potentially childhood obesity<sup>27, 28</sup> and related conditions, e.g., hypertension.<sup>29, 30</sup> Further, it may decrease the risk for health conditions that present themselves in adult years such as high blood pressure<sup>6, 7, 8, 9, 10</sup> and osteoporosis.<sup>11, 12, 13, 14</sup> Calcium has also been implicated in the prevention of other diseases and conditions that are beyond the scope and focus of this research due to their lack of association with calcium consumption in youth and/or the limited evidence of an association that has been presented to date. These include colon cancer,<sup>31</sup> breast cancer,<sup>32</sup> kidney stones,<sup>33</sup> polycystic

ovary syndrome,<sup>34</sup> ovarian cancer,<sup>35</sup> premenstrual syndrome,<sup>36</sup> insulin resistance syndrome,<sup>37</sup> and obesity.<sup>38</sup> Thus, this discussion will be limited to research regarding the association between adequate consumption of calcium in childhood and lead poisoning, dental caries, high blood pressure, and osteoporosis.

One health condition that may be decreased by adequate consumption of calcium during childhood is lead poisoning. Children in urban areas, such as Newark, New Jersey, where lead is pervasive in the environment, are prone to excessive lead exposure.<sup>39</sup> Although inconclusive, research from both animal and human studies suggest lead absorption may be reduced by adequate calcium intake,<sup>2,3</sup> since lead absorption is decreased when calcium is administered into lead solutions. Other studies have found that animals maintained on a low-calcium diet have greater lead absorption as compared to those on a normal calcium diet. These studies suggest that calcium may prevent lead poisoning in two ways, 1) by directly competing with lead for absorptive sites in intestinal cells; and, 2) by lessening the ability of tissues to absorb lead.<sup>2</sup> Increasing dietary calcium may therefore be a good low-cost prevention strategy to prevent lead toxicity among low-income children.

Another health condition that may be ameliorated by adequate calcium consumption in youth is dental caries. Dental carie prevalence is the most common childhood chronic disease, with the prevalence of dental caries being the highest among Hispanic children.<sup>4, 40</sup> Dental caries occur when oral bacteria ferment carbohydrates and produce acids that dissolve tooth enamel. Research has suggested that recent changes in beverage selections by children have resulted in an increased risk for dental caries. Most notably, milk intakes have dropped and 100% juice and soda intakes have increased. A study by Marshall et al. examined the relationship of these beverage changes to the risk of dental caries among children. Results of this study show that children with carries had greater intakes of soda, 100% juice, and beverages made from powder compared to children without caries. Of particular interest was that milk intakes were lower in children with dental caries. In the Marshall et al study, milk intake was found to be neutral with respect to caries risk;<sup>4</sup> however, another study found milk and milk products to be protective against dental caries.<sup>5</sup> The latter study found that calcium, phosphorus, and other constituents in milk inhibited dental caries by aiding in tooth remineralization, buffering acids, and inhibiting the deminerlization of tooth enamel.<sup>5</sup> Based on these findings, childhood dental caries risk may be decreased by increasing milk consumption while limiting consumption of soda and 100% juice.<sup>4, 5</sup>

The reasons for the disproportionately high rate of dental caries among Hispanic children remain unclear. Research has proposed that the poor oral health of

Hispanic children may be related to cultural preferences for the sugary beverages mentioned above, i.e. soda, juice, etc., putting infants to sleep with a bottle, the transmission of caries-causing bacteria from mother to child, and barriers to dental cares. However, for these proposed etiologies to be definitive further research is needed.<sup>40</sup>

Adequate calcium consumption during childhood may also reduce the risk of hypertension, a common condition in the US. Hypertension affects approximately 24% of the adult population and more than half of those over the age of 65. African-Americans experience an even greater prevalence of hypertension and have approximately twice the risk of hypertension as Caucasians. An inverse relationship between dietary calcium intake and hypertension has been suggested by many epidemiological studies.<sup>6, 7, 8, 9, 10</sup> Clinical studies have confirmed this relationship. One study found that hypertensive subjects that followed a high calcium diet (1400 mg/day) for six weeks decreased their systolic and diastolic blood pressure by eight to nine percent, whereas no change occurred in those on a low calcium diet, i.e., 400 mg/day.<sup>6</sup> A meta-analysis of 42 other clinical studies showed that significant blood pressure reductions can be made by increasing calcium intake to 1,000 to 2,000 mg/day.<sup>7</sup>

Additionally, studies have shown that dietary sources of calcium have a greater and more consistent effect on blood pressure compared to calcium



supplements.<sup>8, 10</sup> Results of the Dietary Approaches to Stop Hypertension (DASH) intervention study showed that hypertensive minority individuals following the DASH combination diet, a dairy-rich diet, had a greater reduction in blood pressure than those following a DASH diet high in fruits and vegetables and low in dairy.<sup>8, 9</sup> Dietary calcium may illicit antihypertensive effects by altering calcitrophic hormones, such as 1,25 dihydroxyvitamin D, that regulate intracellular calcium levels in vascular smooth muscle cells. A high calcium diet suppresses 1,25 dihydroxyvitamin D levels and reduces peripheral vascular resistance and blood pressure.<sup>7</sup> Increasing dietary calcium may also attenuate salt-sensitivity which has been suggested to be an important contributor to hypertension in some individuals.<sup>6, 7</sup>

The association between increased calcium intakes and hypertension may potentially extend to children. Studies by Skinner et al. and Carruth reported a negative relationship between calcium and body fat in children.<sup>27, 28</sup> The Skinner et al. study indicated that children experienced a 0.4% decrease in body fat when they increased their daily calcium intake by either an eight ounce glass of milk or eight ounces of yogurt. These studies proposed that decreased body fat may reduce obesity risk in childhood, and associated health conditions. .<sup>27, 28</sup> Since studies have shown that obese children have a significantly higher blood pressure compared to non-obese children,<sup>29, 30</sup> hypertension risk may be reduced by increased calcium intake. This has particular relevance for African-American and Hispanic children, a population that has experienced the greatest

increase in the prevalence of childhood obesity.<sup>41</sup> Again, if calcium intake is associated with decreased risk for childhood obesity, then an increased calcium intake may potentially lead to a reduction in hypertension among obese African-American and Hispanic children.

The final disease discussed which may be ameliorated via adequate calcium intake in youth is osteoporosis. Osteoporosis risk exists at substantial rates in African-American and Hispanic women, although rates are lower than they are for other cultures and ethnicities, e.g., Caucasians and Asians.<sup>42, 43, 44</sup> According to data from NHANES II, nearly 300,000 African-American and 100,000 Mexican American women have osteoporosis, as defined by World Health Organization (WHO) diagnostic criteria. In addition, preliminary results from the National Osteoporosis Risk Assessment (NORA) indicated that osteoporosis may be more prevalent in minority populations than previously thought. Further, data from NORA suggests that hip fracture rates among non-Caucasian populations is nearly identical to that of Caucasians.<sup>22</sup>

Despite some research suggesting that osteoporosis risk factors were limited to black women with low Body Mass Indexes (BMIs) and/or those who smoke, Hispanic women with low BMIs and/or who were inactive, or to minority women who lack early diagnosis or osteoporosis counseling among; the special WHO task force for osteoporosis prevention recommended adequate calcium intakes for all races and ethnicities.<sup>41</sup>

Maintaining adequate an calcium intake throughout childhood has been found to be an important factor in reducing osteoporosis risk later in life.<sup>11, 12, 13, 14</sup>

Approximately 99% of total body calcium is found in the skeleton. If calcium intake is insufficient to offset fecal and urinary losses, calcium is withdrawn from the bone.<sup>45</sup> Over time, a diet that contains an inadequate amount of calcium may result in low bone mass, a contributing factor in the development of osteoporosis. Maintaining an adequate calcium intake throughout childhood, especially during growth periods in infancy and adolescence, allows for the achievement of peak bone mass and a reduction in osteoporosis risk.<sup>11, 46</sup>

The calcium needs of growing children are high. Children, aged two to eight, need two to four times as much calcium per kilogram compared to adults.<sup>46</sup> Thus, calcium intake levels of approximately 800 mg/day are still essential for adequate bone mineral accumulation during the pre-pubertal years. In addition, childhood is an important time to establish healthy eating habits that will support adequate calcium intakes during puberty when the majority of bone formation occurs and calcium requirements are the highest.<sup>47</sup>

Calcium needs for osteoporosis risk reduction are the greatest during preadolescence and puberty. These periods in the life cycle are characterized by increased muscular, skeletal, endocrine, and emotional development. It is during this period that the greatest amount of bone formation occurs. In fact,

approximately 45% of an adult's skeletal volume is formed during the adolescent growth spurt. For these reasons an adequate calcium intake during preadolescence and puberty is essential for the attainment of peak bone mass and the prevention of osteoporosis.<sup>46</sup> Despite its importance, research has shown that the largest gap between recommended calcium intakes and typical calcium intakes occurs during puberty.<sup>47</sup> Currently, less than 30% of males and 12% of females aged 12-19 are meeting the recommended intake of calcium.<sup>17</sup>

In summary, adequate calcium intake during childhood may decrease the risk for health conditions that are prevalent in the target population of this research.

Research has shown that adequate calcium intakes may prevent lead poisoning<sup>2, 3</sup> dental caries, and childhood obesity<sup>27, 28</sup> and related conditions, e.g., hypertension<sup>4, 5, 29, 30</sup>, three negative health conditions that are prevalent among African-American and Hispanic children. Further, it may decrease the risk for conditions that are prevalent in adults of these ethnicities such as high blood pressure<sup>6, 7, 8, 9, 10</sup> and osteoporosis<sup>11, 12, 13, 14</sup>.

### ***Barriers to Calcium Consumption in African-American and Hispanic Low-Income Populations***

Barriers to calcium consumption among African-American and Hispanic low-income children must be identified in order to determine the means by which calcium consumption can be promoted in these populations. Socioeconomic status<sup>20, 48</sup>, lactose intolerance<sup>22, 24, 49, 50</sup>, taste<sup>1, 49, 50</sup>, lack of parental knowledge

<sup>49, 50</sup>, and parental influences<sup>51, 52</sup> have been identified as potential barriers to calcium consumption.

Socioeconomic status is an important predictor of nutritional adequacy. It is therefore not surprising that calcium consumption is lower among lower socioeconomic classes, in which minority populations are over-represented. As mentioned previously, a study by Champagne et al. found that calcium consumption was lower among adults with lower income levels.<sup>20</sup> A study by Salamoun et al. supported this finding while also suggesting that socioeconomic status is an important predictor of calcium consumption in children and adolescents. In this study, socioeconomic status was assessed using several markers including amount of pocket money, type of school (private vs. public), and parents' working status and educational level. Using these markers, Salamoun et al. found that children from a lower socioeconomic status had lower calcium intakes. Furthermore, Salamoun et al. also stated that these findings might have important implications on public health initiatives like ours.<sup>48</sup>

Another barrier to adequate calcium consumption is lactose intolerance, a digestion problem that is a result of low lactase activity in the brush border of the intestine. This low level of lactase causes unpleasant gastrointestinal symptoms when foods that are high in lactose, such as calcium-rich dairy products, are consumed. The presence of intolerance symptoms often leads to the avoidance

of calcium-rich dairy products and therefore may be a contributing factor to inadequate calcium intakes.<sup>22</sup>

Lactose intolerance may be a particularly important contributing barrier to adequate calcium intakes in African-American and Hispanic populations. A high prevalence of lactose intolerance has been observed in African-Americans and Hispanics, at approximately 75% and 53% of the adult population respectively.<sup>22</sup> The high prevalence of lactose intolerance among these ethnicities is likely to cause dairy avoidance and decreased calcium consumption. This relationship has been confirmed by several studies that have found a correlation between lactose maldigestion and low calcium intakes.<sup>22, 49, 50</sup>

Research suggests the occurrence of intolerance symptoms from lactose is dependent on several factors and that can be managed. For example, lactose maldigesters can tolerate up to one cup of milk at one time, i.e., 12 grams of lactose.<sup>22, 24</sup> Lactose intolerance has also been mediated through the consumption of lactose-containing foods with a meal or other foods, or by consuming fermented dairy products such as hard cheeses or yogurt.<sup>22, 11</sup> Other alternatives that have been shown to reduce the effects of lactose intolerance include over-the-counter digestive aids or the consumption of lactose-free and/or low lactose dairy foods, e.g., milks.<sup>11</sup> These dietary management strategies have made it possible for those with lactose intolerance to consume adequate amounts of calcium via the consumption of dairy products.<sup>22</sup>

Lack of parental knowledge is another barrier to children's calcium consumption. Decreased parental knowledge may prevent parents from providing their children with adequate amounts of calcium-rich foods and/or encouraging intake of these foods. Studies by Dore' and Zablah identified barriers to calcium consumption among African-American women in Louisiana. Barriers to calcium consumption identified by these studies included a false perception that they already consumed enough calcium and a lack of knowledge of which products contained calcium. A majority of the women in both studies were aware of the relationship between calcium intake and osteoporosis, but were unaware of the relationship between chronic low calcium intakes and other medical conditions.<sup>49, 50</sup> Both studies confirmed the need for increased awareness of the importance of calcium and its sources.<sup>49, 50</sup> An increased awareness of actual intakes is also needed to increase perceived susceptibility to diseases associated with deficient calcium intake.<sup>50</sup> Although these studies identified barriers to calcium consumption among women, it is likely that these barriers affected their ability to provide their children with adequate amounts of calcium, as well.

Other research has shown that African-American and Hispanic populations often dislike the taste of dairy. African-American women in studies by Dore' and Zablah identified their dislike of the taste of high-calcium foods such as milk, cheese, and yogurt as an important barrier to their calcium consumption.<sup>49, 50</sup> Another study by Auld et al. found that Hispanic groups have a negative reaction

to the taste of milk. In this study Hispanic individuals described milk as being “gross”, “dirty”, or “yucky”.<sup>1</sup> The dislike of dairy products’ taste may decrease calcium consumption if calcium is not obtained from non-dairy sources. In the study by Dore’ African-American women who reported a dislike for the taste of dairy foods had a lower consumption of calcium, i.e., 496 mg/day, compared to those who did not report disliked taste who consumed an average of 530 mg/day.

Parents, particularly mothers, can influence their children’s intake of milk. A study by Fischer of 180 mothers and their 5-year-old daughters showed that mothers’ beverage choices influenced the beverage choice of their daughters. Mothers who drank milk more frequently had daughters who drank more milk and fewer soft drinks.<sup>51</sup> Another study by Fischer found that girls, ages five to nine years, who met the DRI for calcium were served milk more often and had mothers who consumed milk more frequently.<sup>52</sup> This research suggested that family dietary behavior and modeling may be an important predictor of calcium consumption among children.

### ***Campaigns and Educational Efforts to Increase Calcium Consumption***

At the time when this thesis was written, four major campaigns and educational efforts were initiated with the goal of increasing calcium consumption in the United States. These efforts have primarily focused on increasing calcium consumption through the consumption dairy foods. To date, few campaigns or educational efforts have focused on obtaining calcium from a variety of sources,



i.e., calcium-rich non-dairy sources, calcium-fortified foods, and calcium supplements. Many of these efforts were focused on increasing calcium consumption during the pre-teen to teenage years and have ignored the importance of consuming adequate amounts of calcium throughout childhood. Another shortcoming of these efforts is that they have largely failed to address the culturally-specific needs of minority populations.

The first such initiative was the National Milk Mustache, i.e., “Got milk?” campaign, a calcium-related campaign that is supported by the dairy industry. “Got milk?” was launched in October 1993 and is jointly funded by America’s milk processors and dairy farmers, i.e., The Milk Processor Education Program (MilkPEP) in Washington, D.C., and the Dairy Management Inc. in Chicago. The goal of this campaign was to “educate consumers on the benefits of milk and to increase milk consumption.”<sup>53</sup> The campaign included various efforts to reach audiences, from ads that showed celebrities with milk mustaches and recipes that encouraged moms to use milk in recipes, to a Milk Mustache Mobile and 3v3 Shootout Tour that taught consumers throughout the country about the benefits of milk consumption.<sup>54</sup> However, the “Got Milk?” campaign limited its educational message by promoting only one dairy source of calcium, i.e., milk. The goal of the campaign was to promote the sales of dairy products, i.e., they did not focus on increasing calcium consumption through a variety of sources and did not educate the role of adequate calcium intake in preventing illness.

The second calcium-related campaign launched was the National Institute of Child Health and Human Development's (NICHD) "Milk Matters" campaign, which was launched in 1997. The goal of the "Milk Matters" campaign was "to promote calcium consumption among tweens and teens, especially those between the ages of 11 to 15, a time of critical bone growth."<sup>55</sup> The campaign focused on the role of calcium in helping pre-teens and teens develop healthy teeth and bones. It included numerous fact sheets, booklets, posters, and public service announcements that described the importance of milk and calcium for children and teens, how much kids need at different ages, foods that are high in calcium, as well as the importance of physical activity for building strong and healthy bones. Many of the campaign materials were available in Spanish, which allowed the campaign to reach Hispanic Spanish-speaking tweens (9-12 year olds), teens, and their families.<sup>56</sup> The "Milk Matters" campaign website also provided valuable tips and tools to promote adequate calcium consumption and to assist users in overcoming barriers to calcium consumption, such as lactose intolerance and dislike of the taste of dairy. Unlike the "Got Milk?" campaign, "Milk Matters" promoted getting calcium from a variety of sources including dairy, calcium-rich non-dairy foods, calcium fortified foods, and also calcium supplements.<sup>57</sup> Although the content of the "Milk Matters" campaign was comprehensive, it still overlooked the importance of calcium consumption throughout childhood, not just during the pre-teen and teen years. The campaign also failed to address calcium's role outside of tooth and bone health.

The third successive campaign was the National Bone Health Campaign (NBHC), “Powerful Bones. Powerful Girls.”. “Powerful Bones. Powerful Girls” was created in 1998 by a Congressional mandate, to promote optimal bone health in girls aged 9-12. The campaign’s founding partners included the Department of Health and Human Services’ Office on Women’s Health (OWH), the Centers for Disease Control and Prevention (CDC), and the National Osteoporosis Foundation (NOF).<sup>58</sup> The goal of the “Powerful Bones. Powerful Girls.” campaign was for girls “to establish lifelong healthy habits, especially increased calcium consumption and weight-bearing physical activity, to build and maintain strong bones.” The campaign focused on preventing osteoporosis and included paid print and radio advertising for girls and parents, participation in the Radio Disney Live World Tour 2001, and a web site that featured a downloadable calendar to track calcium intake, as well as games and quizzes, calcium-rich recipes, and ideas to help girls get enough weight-bearing exercise.<sup>59</sup> Similar to the “Milk Matters” campaign, the “Powerful Bones. Powerful Girls” campaign promoted the consumption of a variety of calcium-rich foods, including dairy and non-dairy calcium-rich foods, as well as calcium fortified foods.<sup>60</sup> However, its message was limited in that it targeted only pre-teen girls and focused exclusively on the prevention of osteoporosis. In addition, a majority of the campaign’s messages were posted solely on its website, and thus required Internet access for its use.

The last major calcium campaign launched prior to the writing of this thesis was the “3-A-Day for Stronger Bones” campaign. The “3-A-Day” campaign was launched on January 1, 2003 and was a nutrition-based marketing and consumer education campaign managed by The American Dairy Association/National Dairy Council. The campaign was supported monetarily by the dairy industry.<sup>61</sup> The campaign’s original objectives were to increase per capita consumption of dairy products and to reinforce dairy products as the leading sources of calcium. The message of “3-A Day” targeted mothers of young children and encouraged the consumption of milk, cheese, and yogurt for adequate calcium intake.<sup>62</sup> Although the campaign focused on the importance of adequate calcium intake and promoted a diet rich in calcium, it ignored the importance of non-dairy sources of calcium. Again, research shows that lactose intolerance<sup>22, 49, 50, 24</sup> and the dislike of the taste of dairy<sup>49, 50, 1</sup> have been identified as important barriers to adequate calcium consumption, particularly among minority populations. Non-dairy calcium-rich foods, calcium fortified foods, and calcium supplements are important sources of calcium that may allow individuals facing these barriers to achieve an adequate calcium intake. By focusing solely on dairy products as sources of calcium, the “3-A-Day” campaign has likely not provided the information needed to promote adequate calcium consumption, especially among minority populations. Furthermore, while the campaign has promoted the role of calcium in preventing osteoporosis, it has failed to increase awareness of its health-promoting effects on other health issues, such as high blood pressure.

In summary, four campaigns and educational efforts were previously aimed to increase calcium consumption among children. However, overall, they failed to address: 1) the importance of non-dairy sources of calcium, 2) barriers to calcium consumption common among minorities, including both those who experienced lactose intolerance and/or a dislike of the taste of dairy, 3) the role of calcium in preventing diseases other than osteoporosis, e.g., lead poisoning and high blood pressure, and/or 4) the importance of consuming adequate amounts of calcium throughout childhood, not just during the pre-teen and teenage years. In addition, none of the above discussed campaigns focused on the culturally-specific needs of minority populations such as African-American and Hispanic populations.

### ***Health Interventions in Laundromats***

Laundromats may be a good location to display calcium campaign materials, as individuals are often required to wait for an extended period of time and may use reading materials to pass the time. However, a search in these databases: PubMed, Agricola, CINAHL, and Medline, using the following search terms: “laundromat and education”, “laundromat and nutrition”, and “laundromat and public health” revealed no publications that discussed the use of laundromats as a venue for disseminating public health messages.

## ***Models and Theories Used to Guide Nutrition Education***

### ***Research***

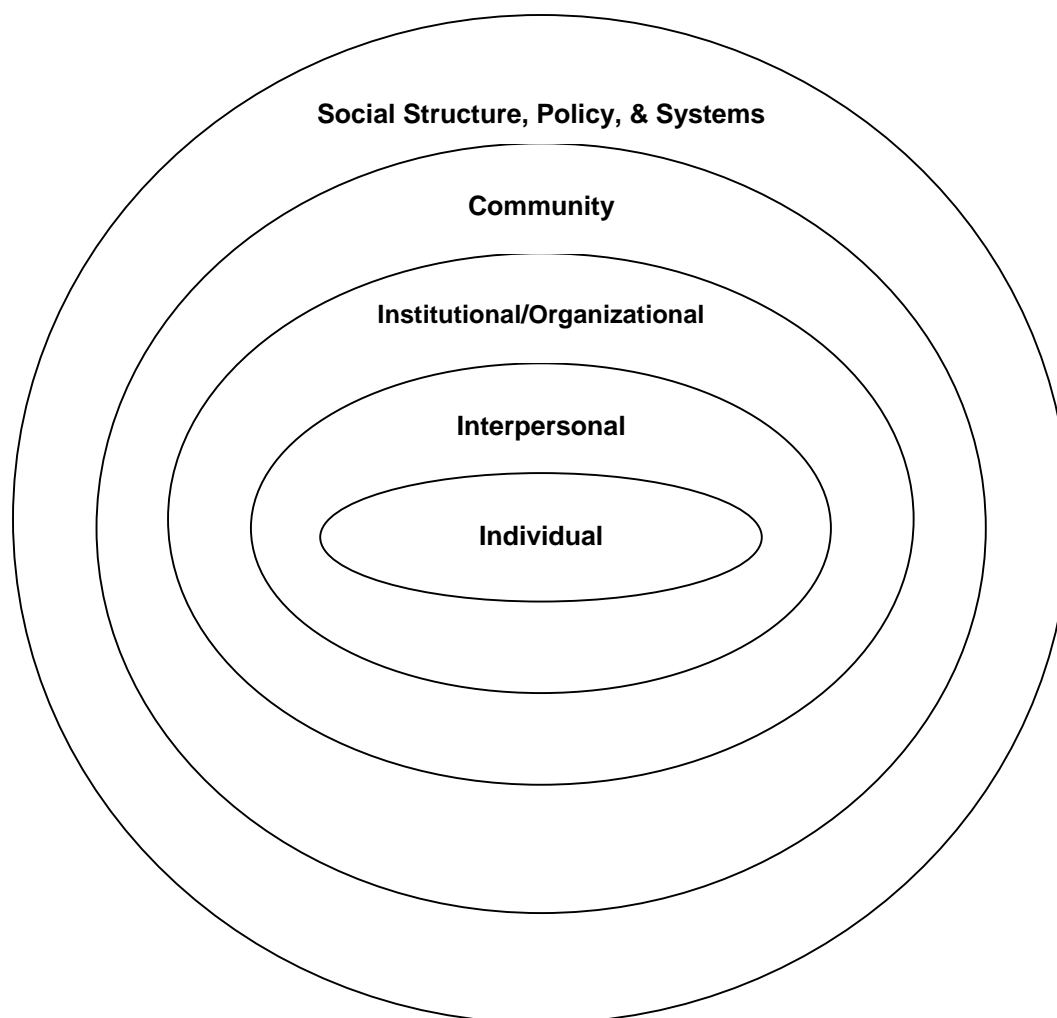
Three models and theories were utilized as a framework for the planning and evaluation of this project. The main model used to inform this project was the Social Ecological Model. Two additional theories were integrated into the framework of the Social Ecological Model to evaluate change within laundromats as an organization and within the individual. These theories included the Stage Theory of Organizational Change and the Health Belief Model. Each model or theory and how it is used to inform this project is discussed below as well as nutrition education research that has used the model or theory to inform their intervention.

### ***The Social-Ecological Model and Its Use in Nutrition Education***

The main model used to inform this project was the Social Ecological Model. The Social-Ecological Model is a framework that describes individual change within the context of social elements within an environment. The model is characterized by an emphasis on behavioral influences that go beyond the individual, such as public policy and the community. The model includes five spheres that influence the behavior of an individual: (1) social structure, public policy, and systems; (2) community; (3) institutional/organizational; (4) interpersonal; and (5) individual.<sup>63</sup> The spheres are nested within each other with

the broadest being the social structure, public policy, and systems sphere and the narrowest being the individual sphere as seen in Figure 2.1.<sup>64</sup>

**Figure 2.1: Spheres of the Social-Ecological Model**



The Social-Ecological Model has been recommended as a theory-based framework for planning and evaluating nutrition education programs and social marketing campaigns.<sup>63, 65, 66, 67</sup> The Social Ecological Model is particularly useful

for health promotion campaigns such as nutrition education programs because it encourages a multifaceted approach and targets environmental, behavioral, and social policy changes that help individuals adopt healthy behaviors.<sup>65, 68</sup> The display of “Calcium: Select to Protect” materials in Newark laundromats attempted to promote behavior change by affecting two spheres of influence within the Social Ecological Model, the institutional/organizational sphere, and the individual sphere. As such, only these two spheres of the model will be discussed in detail. The Stage Theory of Organizational Change and the Health Belief Model are integrated into the ecological framework to identify and evaluate change within each sphere and will be discussed separately.

### ***The Stage Theory of Organizational Change***

The Stage Theory of Organization Change was integrated into the framework of the Social Ecological model to evaluate change within the institutional/organizational sphere.<sup>69</sup> The institutional/organizational sphere of the Social-Ecological Model includes rules, regulations, and policies that influence organizational behavior. Organizations and institutions can include businesses, schools, churches, public agencies, and service organizations. The Social Ecological Model states that organizational behavior change can affect individual behavior by shaping the environment within which the individual makes decisions. Behavior change within organizations and institutions often occurs when new programs or policies are adopted. Behavioral change within



organizations and institutions can be evaluated by measuring the effectiveness of the new program or policy and the extent to which it has been institutionalized.<sup>63</sup>

The Stage Theory of Organizational Change explains how new programs are integrated into an organization. In this research, a four-stage model of organizational change was used. In this four stage model, the organization moves consecutively through four stages. The four stages of the model in order from first to last stage are:

1. **Awareness Stage:** The organization receives information about a problem or potential problem that needs to be addressed.
2. **Adoption Stage:** Decision makers within the organization agree to adopt a program that is designed to address the problem sensed in the awareness stage.
3. **Implementation Stage:** Resources are allocated and the program is implemented. Organizational members react to the implementation and changes in roles occur.
4. **Institutionalization Stage:** The organization moves beyond implementation and the goals of the program are internalized by the organization. The organization identifies barriers to the institutionalization of the program and develops strategies for overcoming these barriers. The program is continued.<sup>69</sup>

Many research-based programs involving the target population have been based on the Social Ecological Model at the institutional/organizational level. One such

program is the North Carolina's Black Churches United for Better Health Research Project. In this project, 24 African-American churches in California participated in a program designed to increase fruit and vegetable consumption among rural African-American adults. The intervention developed was based on an ecological model of change, and included activities such as: planting victory gardens and fruit trees on church grounds, "5-a-day" educational sessions conducted by a team of trained church members, cooking and food preservation classes, and the serving of fruits and vegetables at church functions.<sup>66</sup>

Another program implemented at the institutional/organizational level of the Social Ecological Model was a community-based social marketing campaign entitled the Lowfat Milk Campaign. The campaign was based in the Washington Heights area of New York City, a low-income, inner-city Latino community. It strived to encourage members of the community to change their preference for whole milk to low-fat milk; however, it did so by persuading local grocers who stocked whole milk to begin stocking low-fat milk.<sup>70</sup>

### ***The Health Belief Model***

Like the Stage Theory of Organizational Change, the Health Belief Model was integrated into the framework of the Social Ecological model to evaluate change within the individual sphere. The individual sphere of the Social-Ecological Model includes individual characteristics and cognitive factors that influence

behavior. These can include knowledge, attitudes, beliefs, and personality traits.<sup>63</sup> At the individual level, change is often detected by looking at measures of cognitive decisions and thought processes. Evaluation of change within an individual can be informed by theories that examine behavior change at the individual level, such as The Health Belief Model.<sup>70</sup>

The Health Belief Model attempts to explain and predict health behavior by focusing on the attitudes and beliefs of individuals. The Health Belief Model implies that a person will change a health related behavior if that person:

1. Believes a negative health condition can be avoided;
2. Believes by taking action, he/she will avoid a negative health condition;
- and,
3. Is confident in his/her ability to perform the recommended health action.<sup>70</sup>

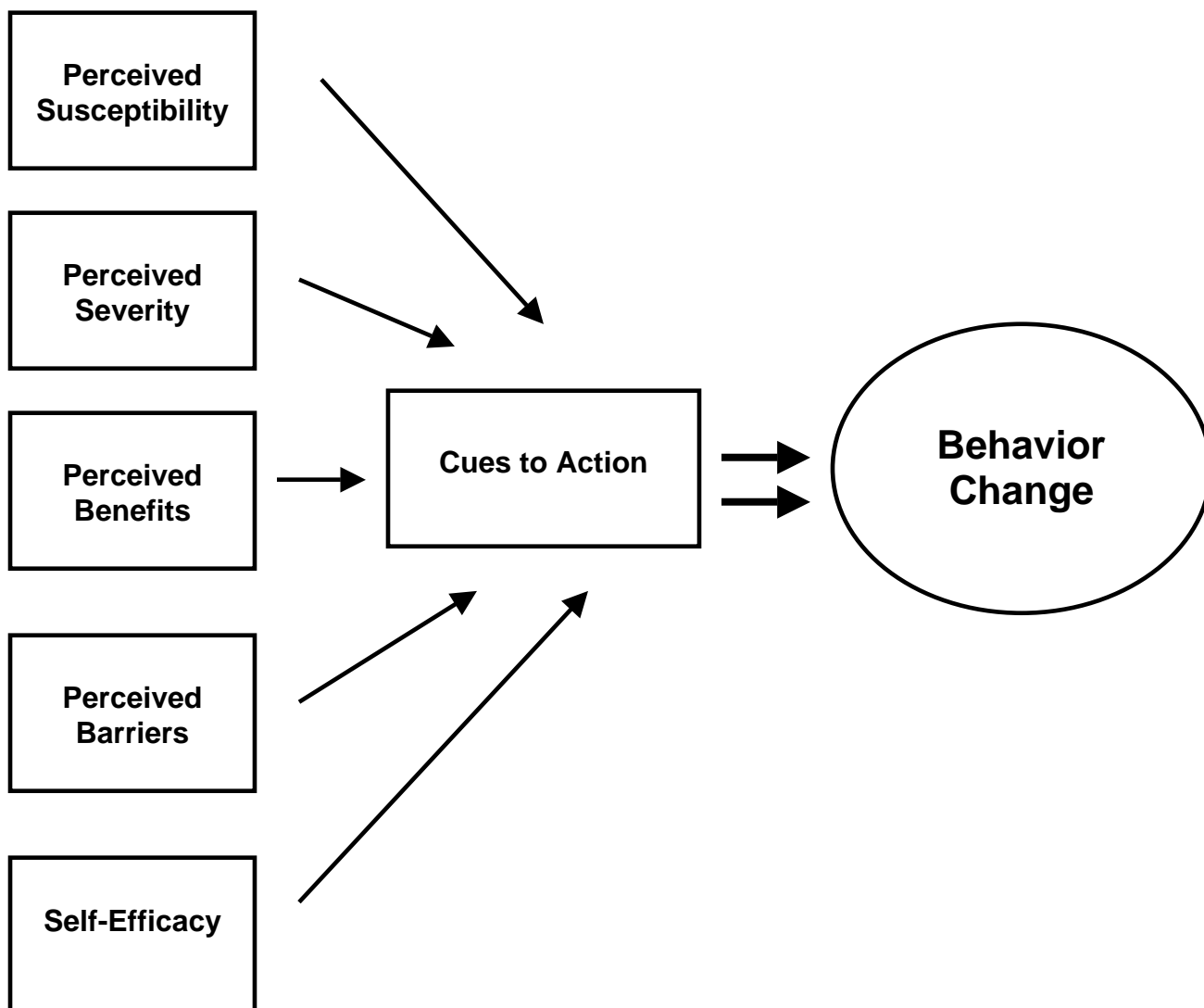
Constructs central to the Health Belief Model include the following:

- Perceived susceptibility: “one’s opinion of chances of getting a condition.”
- Perceived severity: “one’s opinion of how serious a condition and its consequences are.”
- Perceived benefits: “one’s belief in the efficacy of the advised action to reduce risk or seriousness of impact.”
- Perceived barriers: “one’s opinion of the tangible and psychological costs of the advised action”

- Self efficacy: “confidence in one’s ability to take action”
- Cues to action: “strategies to activate readiness”<sup>71</sup>

Below is a depiction of these constructs and their relationship to action by the individual.

**Figure 2.2: The Health Belief Model Constructs and Their Relationship to Behavior Change Among Individuals**



The Health Belief Model has been used to guide nutrition education and interventions targeted towards African-American and Hispanic populations. One intervention, aimed at promoting healthful dietary behaviors to reduce risk of cardiovascular disease and cancer in a primarily African-American and Hispanic university staff, was tailored around the constructs of the Health Belief Model. The intervention aimed to change dietary behavior by modifying specific health

beliefs, including perceived benefits and perceived barriers, while also increasing nutrition knowledge related to cardiovascular disease and cancer prevention. Participants attended eight, one-hour sessions, each addressing different constructs of the Health Belief Model. Participants increased their perceived benefits of healthy nutrition practices and their nutrition knowledge. They also significantly decreased their total calorie, fat, saturated fat, and cholesterol intake. The success of this theory informed intervention suggests the value of using the Health Belief Model as a framework for similar interventions.<sup>72</sup>

The constructs of the Health Belief Model have also been used to guide community-related interventions and to develop nutrition education materials. One such intervention is “Omega-3 for Baby and Me” which targeted pregnant through the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Denver, Colorado. The goal of the “Omega-3 for Baby and Me” intervention was to increase the consumption of docosahexaenoic acid, i.e., (DHA)-rich foods, during pregnancy to consequently decrease the risk for premature delivery and low-birth weight babies. The Health Belief Model was used to guide focus groups with the target population, and to determine perceived motivators and barriers to behavior change. This information was then used to develop low-literacy materials that not only increased knowledge about the importance of DHA-rich foods during pregnancy, but that also addressed the skills and motivators participants’ needed to successfully change their behaviors. Data has not been published on the outcome of this intervention, but by using the

Health Belief Model to identify potential barriers and to address them, the materials developed for “Omega 3 for Baby and Me” are likely to be successful in promoting the consumption of DHA-rich foods during pregnancy.<sup>73</sup>

## ***Summary***

This chapter provided a review of the literature that supported the research conducted and described herein. Overall, it highlighted the importance of calcium consumption among African-American and Hispanic children, i.e., their prevalence of inadequate intakes; and, the consequences this deficiency may have on children’s health, e.g. increased risk of lead poisoning, dental caries, high blood pressure, and osteoporosis. Possible contributors to inadequate intakes of calcium by African-American and Hispanic children were discussed, including issues related to socioeconomic status, lactose intolerance, lack of parental knowledge, and parental influences. Previous campaigns and educational efforts to increase calcium consumption were reviewed with the purpose of informing the intervention conducted. Finally, the theories and models that were utilized as the framework for the planning and evaluation of this project were summarized. These included the Social-Ecological Model, the Stage Theory of Organizational Change, and the Health Belief Model.

## CHAPTER 3: METHODOLOGY

### ***Phase I***

The original purpose of this research was: (1) to assess caregiver knowledge of the importance of adequate calcium intake during childhood; (2) to assess changes in their children's consumption of the calcium-rich foods promoted in the intervention brochures; (3) to examine Health Belief Model variables that may ultimately affect the consumption of calcium-rich foods among children; and (4) to determine if laundromats were useful venues in which to reach and educate this population. To do this, laundromats were recruited in two urban New Jersey areas, Newark and Jersey City. Newark was chosen to be the experimental city and Jersey City was chosen to be the control city.

After recruitment, theory-informed surveys were administered to Newark laundromat owners/managers and laundromat clients in both cities. The laundromat owner surveys sought to assess demographic variables, variables that may predict owner/manager campaign commitment, as well as their perception of the campaign intervention. The surveys conducted with laundromat clients assessed caregiver knowledge of calcium and its importance during childhood, their children's consumption of calcium-rich foods, and the Health Belief Model variables mentioned above.



Following the collection of these surveys the campaign intervention was initiated. The campaign intervention consisted of the display of “Calcium: Select to Protect” brochures and posters in participating Newark laundromats. A researcher visited these locations every two weeks to restock materials as needed. In total, the materials were on display for seven months. The time period for display was November 2006 through May 2007.

Post-intervention, Newark laundromat owners completed an additional survey that assessed their perception of the implementation of the campaign as well as its effectiveness. Laundromat clients were also approached at this time to complete the initial survey. These surveys were used to assess any post-intervention changes in caregiver knowledge of calcium and its importance during childhood, children's consumption of calcium-rich foods, and the Health Belief Model variables measured.

### ***Survey Development***

The two surveys used in this research project were developed by Debrah Palmer Keenan, Associate Extension specialist at Rutgers University, Diana Cangemi, a graduate student in the Nutritional Sciences at Rutgers University, and Alison Bigwood, a graduate student in the Nutritional Sciences at Rutgers University and author of this thesis. Survey questions were reviewed and revised by a research and development team that was comprised of the following nutrition professionals:

- Audrey Adler, Project Coordinator for Research and Development, FSNEP
- Shailja Mathur, Senior Program Coordinator, FSNEP
- Judy Giunta, Senior Program Coordinator, FSNEP
- Kelly Ryan, Graduate Assistant Child Nutrition Education Program

Oversight and graduate student in Nutrition Sciences at Rutgers University

### **The Social-Ecological Model**

Survey development was heavily influenced by the Social-Ecological Model, a model that conceptualizes the social world as five spheres of influence. The five spheres of influence are: (1) social structure, policy, and systems; (2) community; (3) institutional/organizational; (4) interpersonal; and (5) individual.<sup>63</sup>

This research was aimed at affecting two of these spheres: (1) the institutional/organizational sphere, i.e. laundromat owners/managers; and, (2) the individual sphere, i.e. laundromat clients. Surveys were developed to evaluate change within each of these spheres. Each survey was informed by a separate theory. The survey used to detect change within the institutional/organizational sphere was developed using the Stage Theory of Organizational Change. The Health Belief Model informed the survey used to identify change within the individual sphere.

## **Development of the Laundromat Manager Survey and the Stage Theory of Organizational Change**

The institutional/organizational sphere of the Social-Ecological Model includes “rules, regulations, policies, and informal structures (e.g. worksites, schools, religious groups)”.<sup>63</sup> This research aimed to change the rules, regulations, and policies of Newark laundromats to include providing client nutrition education.

The Stage Theory of Organizational Change informed the development of the survey used to evaluate change within this sphere. A four-stage model of the Stage Theory of Organizational Change was used as it sought to explain how a new program is introduced into an organization. The four stages in this model include the awareness stage, adoption stage, implementation stage, and institutionalization stage.

The laundromat owner/manager survey consisted of demographic questions as well as questions aimed at assessing Newark laundromats’ stage progression. The survey was divided into two parts. One part was administered prior to campaign initiation (Appendix 1) and the other was administered post-intervention (Appendix 2). Tables 3.1 and 3.2 show how each survey question evaluated pertinent variables in accordance with the Stage Theory of Organizational Change.

This survey, as well as the research protocol designed for its implementation, including a Memorandum of Understanding (Appendix 3), Informed Consent

Form (Appendix 4), and Authorization from Non-Rutgers Site Form were approved by the Institutional Review Board for the Protection of Human Subjects in Research (IRB) of the Rutgers University Office of Research and Sponsored Programs on April 20, 2006 (protocol number E06-370). Minor amendments to the protocol and the Authorization from Non-Rutgers Site Form, including the translation of all pertinent materials into Spanish, were made at later dates; the final protocol used and the Authorization from Non-Rutgers Site Form, are found in Appendices 5 and 6, respectively.

<b>Table 3.1: Laundromat Owner/Manager Pre-Survey Question Asked, Rationale for Each Question, and Component of the Stage Theory of Organizational Change</b>		
<b>Question</b>	<b>Rationale for Question</b>	<b>Component of the Stage Theory of Organizational Change</b>
13. Please name some foods that are high in calcium.	Tested owners' awareness of what foods contain high amounts of calcium.	Awareness Stage
14. Do you believe that most children get enough calcium each day?	Tested owners' awareness of the problem of inadequate intake of calcium among children.	Awareness Stage
15. Please list some health conditions children may be at risk for if they do not get enough calcium.	Tested owners' awareness of the diseases that may be prevented by adequate calcium intake during childhood.	Awareness Stage
16. Do you believe that putting our brochures and posters out for your clients to read will make them want to give their child more calcium?	Tested the owners' perceptions regarding if calcium intakes would increase among children if the campaign was adopted.	Adoption Stage
17. How easy do you feel it will be to keep these brochures and posters on display?	Tested owners' perceptions of how easy it would be to adopt the campaign.	Adoption Stage

<b>Table 3.2: Laundromat Owner/Manager Post-Survey Question Asked, Rationale for Each Question, and Component of the Stage Theory of Organizational Change</b>		
<b>Question</b>	<b>Rationale for Question</b>	<b>Component of the Stage Theory of Organizational Change</b>
1. Did your clients take the brochures?	Tested the owners' perceptions of the success of the dissemination of campaign brochures.	Implementation Stage
2. Did you or your staff see people looking at the posters?	Tested the owners' perceptions of the success of campaign poster viewing.	Implementation Stage
3. How easy was it to keep the calcium materials on display?	Tested the ease of campaign implementation.	Implementation Stage
4. Please describe any difficulties you had:	Identified any difficulties in campaign implementation.	Implementation Stage
5. Please describe any changes that were made in how or where the posters and brochures were displayed or given out:	Identified any changes in campaign implementation.	Implementation Stage
6. Will you leave the posters up?	Tested the owners' intents to institutionalize the campaign.	Institutionalization Stage
7. Will you continue to display the brochures?	Tested the owners' intents to institutionalize the campaign.	Institutionalization Stage
8. Would you recommend working with us to other businesses? Why or why not?	Tested the owners' participation satisfaction, which would likely correlate with campaign institutionalization.	Institutionalization Stage

### **Laundromat Client Survey Development and the Health Belief Model**

The individual sphere of the Social-Ecological Model includes “individual characteristics that influence behavior such as knowledge, attitudes, beliefs, and personality traits”.<sup>63</sup> Phase I of this research attempted to affect the individual

sphere of the Social-Ecological Model by educating laundromat clients through the placement of “Calcium: Select to Protect” brochures and posters in laundromats. The theory used to evaluate change within the individual sphere was the Health Belief Model.<sup>71</sup>

The laundromat client survey evaluated change within the individual sphere of influence and consisted of demographic questions, as well as questions based on the information contained in the “Calcium: Select to Protect” brochure (Appendix 7). The survey also included a food frequency questionnaire to assess their children’s intake of the calcium-rich foods promoted in the campaign brochures (Appendix 8).

With the exception of demographic questions and questions regarding the clients’ exposure to the campaign materials, the laundromat client survey questions were based on the constructs of the Health Belief Model. Constructs measured included:

- Perceived susceptibility of their children to a disease that may be prevented by adequate calcium intake.
- Perceived severity of the symptoms of these diseases.
- Perceived benefits of adequate calcium intake during childhood.
- Perceived barriers to adequate calcium intake in their children.
- Self-efficacy to ensure that their children get adequate calcium in their diet.

The survey content was designed solely for the target audience of this research, parents/caregivers of children.

The following table depicts the laundromat client survey questions and how each question addressed the constructs of the Health Belief Model. The demographic, knowledge questions, or questions measuring exposure to “Calcium: Select to Protect” materials that appeared on the survey are not included in this table (Table 3.3). The laundromat client research protocol, including an Informed Consent Form (Appendix 9), client survey, and food frequency questionnaire were approved by the Institutional Review Board for the Protection of Human Subjects in Research (IRB) of the Rutgers University Office of Research and Sponsored Programs on April 20, 2006 (protocol number E06-371). Minor amendments were made to the originally approved protocol, as explained in this thesis’ methods; and, modifications, including the translation of all pertinent materials into Spanish, were made to the Informed Consent Form, the client survey and the food frequency questionnaire, at later dates. The final protocol, surveys and food frequency questionnaires can be found in Appendices 10, 7 and 8, respectively.



<b>Table 3.3: Laundromat Client Survey Question Asked, Rationale for Each Question, and Construct of the Health Belief Model Evaluated*</b>		
<b>Question</b>	<b>Rationale for Question</b>	<b>Construct of the Health Belief Model</b>
6. How do you think getting enough calcium helps your child?	Tested clients' knowledge of the benefits of adequate calcium intake to their children.	Perceived benefits
7. How worried are you that one or more of your children are not getting enough calcium?	Degree of worry reflects clients' perceptions of the severity of the consequences associated with the inadequate consumption of calcium by their children.	Perceived severity
8. Do you think not getting enough calcium is harmful?	If clients thought that not getting enough calcium is harmful to their children, they perceived the consequences of inadequate calcium intake to be severe. Otherwise, they did not think the consequences were severe.	Perceived severity
9. Do you believe that your child gets enough calcium each day?	If clients thought their children did not consume enough calcium daily, they would believe that their child was susceptible to a calcium-related disease. Otherwise, they would not believe that their child was susceptible.	Perceived susceptibility
15. Do you have any trouble making sure your child gets enough calcium?	Included to detect barriers affecting the ability of clients' to ensure that their children consumed an adequate amount of calcium daily.	Perceived barriers
16. Do you know how to find out how much calcium is in a food?	Not being able to determine if a food contains calcium would be a barrier to ensuring that their children consumed enough calcium daily.	Perceived barriers

<b>Table 3.3: Laundromat Client Survey Question Asked, Rationale for Each Question, and Construct of the Health Belief Model Evaluated, Continued*</b>		
<b>Question</b>	<b>Rationale for Question</b>	<b>Construct of the Health Belief Model</b>
17. Do you avoid food from the milk group?	High levels of lactose intolerance had been noted among the target population. It was hypothesized that lactose intolerance among caregivers would be a barrier to adequate intakes of calcium-rich foods by children because fewer dairy foods would be kept in the home.	Perceived barriers
18. Do any of your children avoid foods from the milk group?	Avoidance of dairy foods by children would likely decrease daily calcium intake. Dairy foods are the richest sources of calcium.	Perceived barriers
22. How sure are you that you are able to choose calcium-rich foods?	If clients were not confident in their ability to choose calcium-rich foods they would be unable to change their food buying practices to include more calcium-rich foods for their children.	Self-efficacy/Perceived barriers
23. How sure are you that you are able to use the food label to choose calcium-rich foods?	The ability to use the food label is important in identifying non-dairy sources of calcium. If clients were not confident in their ability to use the food label they would be unable to identify and buy a wide variety of calcium-rich foods.	Self-efficacy/Perceived barriers
24. How sure are you that you are able to obtain calcium-rich foods?	Limited-resource clients may have been unable to buy dairy foods because of their rising costs. Limited transportation may have also made it difficult for clients to buy and store dairy foods before perishing. These barriers may have decreased clients' confidence in their ability to have calcium-rich foods available in the home.	Self-efficacy/Perceived barriers

<b>Table 3.3: Laundromat Client Survey Question Asked, Rationale for Each Question, and Construct of the Health Belief Model Evaluated, Continued*</b>		
<b>Question</b>	<b>Rationale for Question</b>	<b>Construct of the Health Belief Model</b>
25. How sure are you that you are able to get your child to eat calcium-rich foods?	Even if clients had knowledge of calcium-rich foods and kept them in the home they could not ensure that their children were getting enough calcium if they would not eat the foods. A decreased confidence in their ability to get their children to eat calcium-rich foods may have inhibited clients from changing their behavior according to the suggestions contained in the campaign materials.	Self-efficacy/Perceived barriers
26. How much control do you think you have over whether your child consumes calcium-rich foods?	If clients were not confident that they had control over their children's consumption of calcium-rich foods, altering the clients' knowledge of calcium-rich foods and food buying behaviors would not affect their children's intake of calcium-rich foods.	Self-efficacy/Perceived barriers

\* Note: The questions contained in this table represent the questions contained on the finalized client survey.

## ***Recruitment***

Newark, NJ was chosen as the experimental city for Phase I of this research because of its urban nature and its high number of African-American and Hispanic limited-resource residents. Jersey City, NJ was chosen as the control city because it was similar to Newark, NJ in that it was urban and had a large African-American and Hispanic limited-resource population. Newark and Jersey City were also located in counties with a similar number of households receiving

food stamps. According to the NJ FSNEP website, 33,062 families had participated in the food stamp program in Essex county in 2003, where Newark is located; and, 24,982 families had participated in Hudson county, where Jersey City is located.<sup>74</sup>

Statistician Dr. Dirk Moore (UMDNJ) was consulted to determine an appropriate sample size of both laundromats and laundromat clients. Initially, it was thought that a sample size might be determined using a power equation. However, under the guidance of Dr. Dirk Moore it was determined that a power equation could not be used due to the lack of similar studies assessing knowledge of calcium and caregiver teaching practices i.e. teaching the skills needed to provide their children with adequate amounts calcium-rich foods. The absence of similar studies made it impossible to determine an appropriate standard deviation for knowledge change and change in calcium intake, important components for a power equation. Phase I of this research is therefore a pilot study, and the recruitment goal was to obtain the greatest number of participating laundromats and laundromat clients possible, based on the constraints of the project.

### **Recruitment of Laundromats**

Laundromats in Newark and Jersey City were identified by searching on America Online Superpages and Verizon Superpages using the terms “self-service laundromat” and “Newark, NJ” or “Jersey City, NJ”. The lists generated from both sites were cross-referenced and a comprehensive list was compiled for

each city. A total of 154 laundromats were identified in Newark and 131 laundromats were identified in Jersey City.

Laundromat recruitment began by calling the listed Newark laundromats and describing the campaign, using a prepared script (Appendix 11). The script briefly introduced the purpose of the campaign while emphasizing its value to caregivers and children in the area. However, this method proved to be ineffective for the following reasons:

1. The owner/manager was often not present in the laundromat. In many locations the employees stated the owner stopped in to check on the laundromat at unscheduled times. Therefore, there was no particular time when the owner/manager could be reached via telephone.
2. Some laundromat employees did not speak English.
3. Many laundromat employees were disinterested in hearing about the campaign and hung up the phone before it could be described.

Because of these obstacles the recruitment strategy was changed, i.e. laundromats in Newark and Jersey City were recruited by visiting the laundromats in person without a scheduled appointment. To enhance recruitment in Hispanic locations, a Spanish-speaking paraprofessional FSNE staff member traveled to sites with the researcher, and performed translations as needed.

During visits to Newark sites, the campaign was described to whoever identified themselves as being “in charge” of the laundromat at that time, i.e. the laundromat owner or manager. The “Calcium: Select to Protect” brochure and poster was shown to laundromat owner or manger and the research protocols (Appendix 5 & 10) were discussed. If the owner was present and agreed to participate, they were then asked to sign a Memorandum of Understanding describing the purpose of the campaign, the content of the brochures and posters, and the terms of participation (Appendix 3). The Memorandum of Understanding stated that participating laundromats were responsible for displaying at least one “Calcium: Select to Protect” poster and 20 brochures at all times in locations that clients could see them. The Memorandum of Understanding also authorized the participating laundromat as a site for researchers to come in and do in-person interviews with laundromat clients.

After signing the Memorandum of Understanding, participating Newark laundromat owners signed a Consent Form seeking approval for their participation in a two-part survey (Appendix 4). One survey was to be completed before the intervention started and the second after the intervention ended. The Consent Form included the contact information for the research team, as well as the information for the Office of Research and Sponsored Programs at Rutgers University. An Authorization from Non-Rutgers Site Form was also signed by each participating laundromat owner in Newark (Appendix 6). Participating Newark laundromat owners were given one “Calcium: Select to Protect” brochure

to keep and review. If the person present at this visit was the laundromat manager all above forms and the brochure were left with the manager and were to be reviewed and signed by the laundromat owner.

The approach for working with Jersey City laundromat owners was that same as that used in Newark but was limited in scope to interviewing clients in their laundromat. An Authorization from Non-Rutgers Site Form was obtained from each participating laundromat owner in Jersey City (Appendix 6).

### **Laundromat Client Recruitment**

Laundromat clients were recruited in participating Newark and Jersey City laundromats to complete the developed survey. Due to the initial low rate of survey participation, incentives were added to increase the rate of client recruitment. P-Saurus Dinosaur hand puppets and stress balls created to look like cows were chosen as incentives because they were left over from other FSNEP programs and were available in large quantities. Laundromat clients who agreed to participate in the study and completed a survey were given the incentives. The recruitment of laundromat clients was identical for the initial and post-intervention surveys.

### ***Laundromat Client Survey Pilot Study***

To determine the face validity of the developed laundromat client survey and food frequency questionnaire, a pilot study was conducted at J&C Days laundromat in Newark on July 27, 2006. A team of four researchers traveled to the laundromat and recruited laundromat clients to complete the pilot survey (Appendix 12). Laundromat clients were notified of the purpose of the study. If laundromat clients indicated willingness to participate the researcher read the client the Consent Form (Appendix 9), and asked them to sign it. After their consent was received, the researcher read the client the survey questions and recorded their answers. A convenience sample of thirteen laundromat clients participated in the survey pilot.

Results of the pilot study showed that some questions on the laundromat client survey were confusing to participants and needed to be reworded, e.g. the question, “Are you the primary caregiver of a child or children?” was changed to “Do you take care of a child/children regularly?” This was done because the research team noted that non-primary caregivers, e.g., aunts, grandmothers, in-home day care workers, etc., greatly influenced the calcium intake of any children they regularly cared for, thus they became part of the campaign target. Some questions also required the expansion of response choices, e.g. the response choice for “Do you think not getting enough calcium is harmful?” was changed from yes and no, to not harmful, slightly harmful, so harmful that you need a doctor’s care, so harmful that you need to go to the hospital, and so



harmful that you might die. This change was needed because results of the pilot study show no variation in participant responses, i.e. all participants answered yes. Therefore, response choices were changed to indicate degree of concern. In addition, it was decided that the food frequency questionnaire needed to be revised from the format used, i.e. reading off foods from the questionnaire and asking participants to tell the researcher how often their child ate these foods. This food frequency format led participants to over-report their children's intake of calcium-rich foods. To increase the validity of the food frequency questionnaire and prevent leading, two different methods of administering the questionnaire were developed.

The first method was termed the closed-ended food frequency questionnaire and was administered using the original technique. The researcher named the foods listed on the food frequency questionnaire and the participant was asked to tell the surveyor if their child ate the food and how often. In addition, the participant was asked to name the brand and type of some of the foods named. This enabled the researcher to determine if the food was indeed calcium-rich. For example, if a participant said that their child ate cereal that was calcium-fortified two times a week but named the brand Apple Jacks their child was not really consuming a calcium-fortified food. Participants were also asked to name all the calcium-rich foods they knew. This added question allowed the researcher to determine if the participant could identify calcium-rich foods without the researcher naming them.

The second method of administering the food frequency questionnaire was termed the open-ended food frequency questionnaire. In this method, the researcher asked the participant to name all the calcium-rich foods their child ate. For each food named the participant was asked how often their child ate that food. For some foods the participant was asked to name the brand or type of food consumed. Incorrect responses, i.e. foods named that do not contain calcium, were recorded in empty slots of the questionnaire to prevent the participant from knowing their response was incorrect. This also enabled the researcher to note the incorrect response for future analysis. Participants of the open-ended version of the food frequency questionnaire were also asked to name any calcium-rich foods their children did not eat. This question allowed the participant to name all the calcium-rich foods they knew, regardless of their children's like/dislike of the food.

To increase the ease with which data could be recorded by the researcher, the food frequency questionnaire was altered such that the African-American version and the Hispanic version could be recorded on the same form.

Finally, to promote and encourage the use of Food Stamps by qualified individuals a question was added to the demographic section such that participants who indicated they were currently not receiving food stamps were asked if they were interested in finding out about getting them. Participants who

were interested were given a flyer that stated what Food Stamps are, how to determine qualification for Food Stamps, the location of the nearest Food Stamp office, and what information must be submitted to obtain Food Stamps. Separate flyers were created for Newark (Appendix 12) and Jersey City (Appendix 13) and were translated into Spanish for use with Hispanic audiences (Appendices 14 and 15).

### ***Survey Administration***

After the pilot study and the completion of the laundromat client survey changes both surveys were administered to participants. The following sections describe how each survey, the laundromat owner/manager survey and the laundromat client survey, were completed.

#### **Newark Laundromat Owner/Manager Survey Administration**

The pre-survey along with a self-addressed stamped envelope was mailed to the person contacted during recruitment, i.e. the Newark laundromat manager or owner, and was completed and returned to the researcher. The same individual completed the post-survey after campaign materials were on display for seven months. The post-survey was completed in person with each laundromat manager or owner.

## **Laundromat Client Survey Administration**

FSNE paraprofessionals, bilingual in English and Spanish were trained to administer the translated laundromat client survey interview. Either a project researcher or a FSNE paraprofessional approached all available individuals at participating laundromats who appeared to meet the study criteria. Hispanic individuals were approached by Hispanic FSNE paraprofessionals, whenever possible. All surveys that were conducted with Spanish-speaking participants were administered by a Hispanic bilingual FSNE paraprofessional. When the FSNE paraprofessional was busy with other survey participants, a researcher approached the Hispanic individual, but only attempted the completion of a survey if the individual spoke English well.

Clients approached were notified of the purpose of the study and were asked if they would like to participate. If the client indicated willingness to participate, the researcher read the client the Consent Form (Appendix 9), asked the client to sign it, and proceeded with the survey. The researcher or FSNE paraprofessional read all survey questions to the participant and recorded the client's responses. If a client declined to participate in the survey, he or she was thanked for their time and another laundromat client was approached. Surveys conducted with laundromat clients who did not parent or care for a child regularly were politely terminated.

Surveys were collected prior to the intervention from April 2006 to September 2006. Post-intervention surveys were collected from May 2007 to July 2007. No attempt was made to contact the same individuals that completed the initial survey.

## ***Phase II***

Analysis of the client surveys revealed that only two individuals reported having been exposed to the campaign materials. Thus, the negligible number of study participants that had been affected by the intervention made it impossible to statistically analyze any changes in caregiver knowledge of calcium's importance during childhood, or to determine changes in their child's intake of the calcium-rich foods promoted in the campaign materials. As a result this thesis' aims were revised, and the data collected, minus the data from the two individuals who had noted campaign exposure, was used as a baseline for examining the target audience's: (1) knowledge of the importance of adequate calcium intake during childhood; (2) intake of calcium-rich foods among their children; (3) potential relationships between African-American and Hispanic ethnicity and children's calcium consumption; and, 4) variables that should be considered, as described in the previous section entitled 'Laundromat Client Survey Development and the Health Belief Model', when the Health Belief Model will be used to guide an intervention.

### ***Study Limitations***

Laundromat clients surveyed were African-American or Hispanic individuals present at recruited sites who agreed to be interviewed. Therefore, the study population was a convenience sample, which may result in the limited ability to generalize the results reported to other African-American and Hispanic populations.

Bias may have also been introduced by the ethnicity of the research team. Although all of the subjects were African-American or Hispanic, several Caucasian researchers were utilized to recruit participants and administer surveys. An article by Flores et al. discussed this source of bias and stated that a researcher of another race or ethnicity may be viewed with suspicion by the participant and may lead the participant to withhold and alter information.<sup>40</sup> This reaction by the subject may lead to a significant distortion of the data. To limit this distortion the researchers utilized three Spanish speaking Hispanic individuals to recruit and administer surveys to Hispanic participants whenever possible. However, time and monetary restrictions made it impossible to obtain a diverse team of investigators that would be large enough to ensure that an investigator that understood the culture, education, and literacy of each participant would be available when needed. An African-American researcher was not available and thus no surveys with African-American participants were conducted with an investigator of their ethnicity. This may have lead to the

distortion of data collected from these participants.

Study participants completed a food frequency questionnaire to determine their children's intake of the calcium-rich foods. The calcium-rich foods contained on the questionnaire were limited to those mentioned in the campaign materials as it was initially to be used to determine campaign effectiveness. Thus, the food frequency questionnaire was unable to assess children's consumption of other foods that contain significant amounts of calcium. In addition, intakes of the foods measured on the questionnaire were likely inflated as over reporting is inherent to all food frequency questionnaires.

### ***Data Analysis***

Descriptive statistics were used to assess demographic variables pertaining to the laundromats and their owners/managers, as well as the clients surveyed. Descriptive statistics were also used to examine variables designed to assess knowledge variables pertinent to adequate calcium intake during childhood and associated health effects; the variables from the Health Belief model that were included on the survey; and, consumption of calcium-rich foods among African-American and Hispanic children. T-tests were used throughout when variables were suspected to potentially explain differences among study sub-populations, e.g., to examine differences on select variables between those who were participating in public assistance programs and those who were not. Correlations

were used to examine potential relationships between African-American and Hispanic ethnicity and children's calcium consumption.



## CHAPTER 4: RESULTS

### ***Phase I***

Phase I of this project was aimed at assessing the effectiveness of “Calcium: Select to Protect” campaign materials displayed in laundromats in educating the target population. Of the 89 laundromats contacted, a total of ten laundromats were recruited for this study. Six were in the experimental city (Newark), and four were in the control city (Jersey City, NJ). From these locations a total of 137 laundromat study participants, who were caregivers of children in limited-resource African-American and Hispanic urban populations (n=67 from Newark; n= 70 from Jersey City), were surveyed. The survey sought: (1) to assess caregiver knowledge of the importance of adequate calcium intake during childhood; (2) to assess changes in their children’s consumption of the calcium-rich foods promoted in the intervention brochures; (3) to examine Health Belief Model variables that may ultimately affect the consumption of calcium-rich foods among children, i.e. perceived benefits, perceived severity, perceived susceptibility, perceived barriers, and self efficacy.; and (4) to determine if laundromats were useful venues in which to reach and educate this population. Subsequently, “Calcium: Select to Protect” materials were displayed in Newark laundromats.

Post intervention, 140 surveys (n=72 from Newark; n= 68 from Jersey City) were administered in an attempt to ascertain any changes that had resulted from the

intervention. Data analyses revealed that only two of the study participants surveyed in Newark, the intervention site, had seen the campaign materials. Furthermore, both study participants only recalled seeing the “Calcium: Select to Protect” poster, which contained far less nutritional information than the corresponding brochure. These study participants observed the poster at Launderama, a high volume chain laundromat in Newark, NJ that served a primarily Hispanic population. One study participant had seen the poster at the Launderama on Market Street, and the other had seen the poster at the Launderama on Chestnut Street. In both locations the poster had been displayed next to the change machine.

The negligible number of those surveyed who had observed the intervention materials precluded the ability of this study to statistically analyze increased caregiver knowledge of the importance of adequate calcium intake during childhood and increased intake of calcium-rich foods among their children resulting from the intervention. However, the minimal number of study participants that reported exposure to the intervention materials reflected the campaign’s lack of success in this venue. Therefore this work’s aims and data analysis plans were revised and were utilized as baseline data to examine the target audience with regard to the variables assessed in the completed surveys.

## ***Phase II***

Post Phase I, this thesis's aims and data analysis plans were revised. Again, the data from the two people who had seen the campaign materials was removed and the remaining data collected was combined. The resulting data from the remaining participant surveys was used: (1) to examine the target audience's knowledge of the importance of adequate calcium intake during childhood; (2) to assess the current intake of calcium-rich foods among the children of these caregivers; (3) to identify potential relationships between African-American and Hispanic ethnicity and children's calcium consumption; and (4) to examine Health Belief Model variables that may ultimately affect the consumption of calcium-rich foods among children of these caregivers. This section opens with a brief overview of the descriptive information for laundromats, as well as the study populations' demographic data.

## ***Demographic Data***

### **Laundromat Demographic Data**

Descriptive data regarding laundromats included their locations, and the number of clients interviewed in each. Ten study laundromats (Table 4.1), were used for the recruitment of those interviewed for this research. On average,  $23 \pm 8$  laundromat clients were recruited from each Newark location and  $35 \pm 5$  clients

were recruited from each Jersey City location. The number of participants recruited from each location was fairly evenly distributed within each city, i.e., the number interviewed was within two standard deviations of the average recruited in each of the two cities, i.e.,  $23 \pm 8$  in Newark and  $35 \pm 5$  in Jersey City.

<b>Table 4.1: The Frequency and Percent of Total Participants Recruited from Newark and Jersey City Laundromats Included in the “Calcium: Select to Protect” Campaign</b>		
	<b>Frequency</b>	<b>%</b>
<b>Newark, NJ (n = 137, 50%)</b>		
Angel Laundromat	12	4
J & C Days Laundromat	32	12
Launderama (Chestnut St.)	28	10
Launderama (Market St.)	28	10
Pueblo Laundromat	18	7
Summer Laundromat	19	7
<b>Jersey City, NJ (n = 138, 50%)</b>		
640 Laundromat	40	15
Central Suds LLC	31	11
Lovely Laundry	38	14
Mira Laundromat	29	11

Surveys were administered only to those owners/managers of the six laundromats that, according to the Phase I protocol, were to be the experimental sites; therefore, no results regarding the four Jersey City sites were available to report. The two Launderama laundromats were owned and operated by a Hispanic woman; the remaining campaign locations were singly owned/operated. Four of the laundromats were operated by women, three Hispanic and one Black; of the remaining two, one was operated by a White man, and the other was operated by a Hispanic man. Two of the laundromats were run solely by the owner/manager, while the remaining sites had one to two staff.

Owners/managers reported that their laundromat clientele were either predominantly Hispanic (n=2), predominantly Hispanic and Black (n=1), or predominantly Hispanic, Black and White (n=3).

The original campaign pilot protocol had been designed to investigate whether having a child, having a nutrition-related health condition, knowing one's clientele, or having a history of community involvement, or doing volunteer work, would predict increased owner/manager campaign commitment that would consequently result in increased campaign effectiveness. Since the campaign was ineffective, no results are available to reflect on this hypothesis. However, observation of both the owner/managers' attitudes, as well as their commitment to displaying campaign materials did not appear consistent with the above conjecture, e.g., two of the owner/managers had four of the five above attributes, yet one was assessed as having operated the best campaign site, while the other was observed as the worst. It had also been hypothesized that if owners/managers thought the campaign would be effective and/or easy to administer they would best support it. Again, observation suggested no relationship between campaign commitment over time and these variables.

Results from data collected at the conclusion of the campaign intervention indicated that four of the five owners/managers, i.e., those responsible for five of the Laundromats, believed that their clients had both taken the campaign brochures and looked at the posters; the other said she didn't know.

When asked how easy the campaign was to implement, the owner/manager of the laundromat that was observed to be the least compliant to the campaign protocol, stated that it was hard; while all others said that it was easy. When asked about the difficulties owners/managers had experienced in implementing the campaign, only two responded, indicating that brochure and brochure holder theft, as well as poster graffiti had thwarted campaign implementation. No protocol changes were recommended. In summary, when asked, all five owner/managers indicated they would recommend working with Rutgers to other businesses; four said they would be willing to continue displaying brochures; and, three indicated they would be willing to leave the posters in place.

### **Laundromat Client Demographic Data**

Demographic and socioeconomic variables, information about laundromat patronage, participation in federal aid programs, and exposure to calcium-related materials were examined. The study population was comprised of 207 (75%) females and 68 (25%) males. Study participant ages ranged from 18 to 67, with the average age being  $34 \pm 10$  years. All participants identified themselves as either non-Hispanic, Black ( $n=134$ ) or Hispanic ( $n=141$ ). All study participants cared for at least one child, with the average number of children cared for ranging from 1-5, with the mean being  $2 \pm 1$ . The average age of the children cared for was  $7 \pm 4$  years.

Fifty-four study participants (20%) reported they received WIC, and 32 (12%) reported receiving food stamps. Twenty-nine (91%) of those receiving food stamps revealed the amount of their benefits, and indicated they received between \$84 and \$490 in food stamps monthly, with the average amount reported to be  $\$207.00 \pm 106.53$ , an average of  $\$103.68 \pm 33.70$  per household member.

Nine clients (3%) reported that the day they were interviewed represented the first time they had frequented the laundromat. The remaining 266 (97%) people interviewed indicated the average amount of time they typically spent in the laundromat ranged from 0.25-5.50 hours, with a mean of  $1.8 \pm 0.8$  hours; and, that they visited the laundromat as many as 104 times per year, with the average number of visits reported to be  $41 \pm 19$  times a year.

### **Laundromat Client Exposure to Calcium-Related Materials**

Although none of the study participants included in these analyses, i.e. Phase II, had seen the campaign materials used for this study, 79 (29%) reported having had exposure to calcium-related materials such as billboards, brochures, posters, tear pads, etc. Most, i.e. 194 (71%) participants, reported having had no exposure to such educational messages or materials; and two said they “didn’t know” if they had ever been exposed to such materials.

The most popular materials participants reported having seen were educational brochures. These had been seen either at doctors' offices (n=32), WIC offices (n=8), hospitals (n=5), pediatricians' offices (n=3), gynecologists' offices (n=2), and dentist's offices (n=1). Only the Food Pyramid (n=5) and "3-A-Day" campaign brochures (n=5) were mentioned by name. Some materials seen were identified as brochure advertisements, i.e., brochures about Boniva (n=1) or vitamins (n=1).

Participants reported having received educational calcium messages via television commercials (n=6). Only "3-A-Day" commercials were mentioned by name (n=2). Advertisements in magazines, newspapers, and via radio were additional ways by which participants reported having received exposure to calcium related materials. Magazine advertisements named promoted the "Got Milk" (n=3) or "3-A-Day" (n=1) campaign, calcium supplements (n=3), or calcium's link to weight loss (n=1). One participant, each, reported exposure to a newspaper advertisement or radio advertisement about calcium.

Public billboards were another method of exposure. The only location given for the billboard was a bus (n=1), while others could not remember the location of the billboard they had seen (n=2). Posters and flyers were the last method by



which participants reported having been exposed to calcium-related materials. The poster was seen at the doctor's office ( $n=1$ ), and the flyer was seen at the school athletic trainer's office ( $n=1$ ).

Those participating in the Food Stamp Program and WIC reported having seen more calcium-related materials than non-participants. Those receiving Food Stamps ( $n=32$ ) saw  $0.38 \pm 0.49$  materials, whereas non-participants ( $n=243$ ) saw only  $0.29 \pm 0.49$ . Likewise, those receiving WIC ( $n=54$ ) reported having seen  $0.46 \pm 0.57$ , while those not receiving WIC saw  $0.26 \pm 0.46$ . T-tests revealed that the differences between those receiving Food Stamps and those who were not were not statistically significant; however, the difference between those receiving WIC versus those who did not, was, i.e.,  $t(271) = 2.80$ ,  $p < .01$ . Additionally, WIC participants were found to name a lesser number of the four most common foods erroneously named to contain calcium, i.e. fruit, low calcium vegetables, cereal not fortified with calcium, and juice not fortified with calcium, compared with non-participants,  $t(186) = -2.16$ ,  $p < .05$ .

## ***Caregiver Knowledge***

### **Children's Milligram Requirement for Calcium**

The DRI for calcium is 500 mg for children aged one to three, 800 mg for children aged four to eight, and 1,300 mg for children aged nine to 18. Caregivers did not know their child's/children's daily requirement(s) for calcium. Most caregivers

stated that they did not know the calcium requirement for their child's age group. Of the participants who said they did, their mean responses indicated they did not, i.e., responses were far below the actual requirement. Out of all the caregivers surveyed only one gave the correct response. This caregiver cared for a child between the ages of one and three.

<b>Table 4.2: Caregiver Knowledge of Their Children's Daily Requirement for Calcium</b>					
	<b>Frequency</b>	<b>%</b>	<b>Mean <math>\pm</math> SD (mg)</b>	<b>Minimum (mg)</b>	<b>Maximum (mg)</b>
<b>Caregivers of Children Aged One to Three (n=130, 47%)</b>					
Did Not Know Requirement	108	83			
Claimed to Know Requirement	22	17	132 $\pm$ 287	2	1000
<b>Caregivers of Children Aged Four to Eight (n=150, 55%)</b>					
Did Not Know Requirement	127	85			
Claimed to Know Requirement	23	15	160 $\pm$ 308	1	1000
<b>Caregivers of Children Aged Nine to Eighteen (n=124, 45%)</b>					
Did Not Know Requirement	103	83			
Claimed to Know Requirement	21	17	210 $\pm$ 356	2	1000

## Calcium Sources

Caregivers knew few calcium sources. The average number of calcium-rich sources correctly named was  $2.9 \pm 1.5$ . Caregivers named more dairy sources (mean =  $2.1 \pm 1.1$ ) than non-dairy sources of calcium (mean =  $0.74 \pm 1.0$ ).

Caregivers also named incorrect calcium sources (mean =  $1.3 \pm 1.5$ ). Specific calcium-rich food sources, and incorrect sources named are listed below in Tables 4.6, 4.7 and 4.8, which display responses to questions regarding which calcium-rich foods children were reported to eat.

## Calcium-Related Health Conditions

When asked what health conditions the child or children they cared for would be at risk for if they did not receive enough calcium, the health conditions named by greater than 10% of the participants regarded only bones or teeth. Below is a table of the responses (Table 4.3).

<b>Table 4.3: Caregiver Knowledge of Health Conditions Related to Inadequate Intakes of Calcium</b>		
<b>Response</b>	<b>Frequency</b>	<b>%</b>
Weak Bones	50	18
Osteoporosis	43	16
Broken Bones	34	12
Loss of Teeth	30	11
Cavities/Tooth Decay	27	10

Other responses regarding what diseases a child might be at risk for if they did not get enough calcium included: bone disease (n=20), brittle bones (n=16), arthritis (n=12), colds (n=10), drowsiness/loss of energy (n=9), decreased growth (n=9), poor concentration (n=7), bone cancer (n=5), loss of strength/weakness (n=5), bad teeth (n=4), anemia (n=3), poor general health (n=3), bone loss (n=2), scoliosis (n=2), weight loss (n=2), brittle teeth (n=2), diabetes (n=2), bowed legs (n=2), eye diseases (n=2), cancer (n=2), bone malformation (n=2), underdevelopment (n=2), short stature (n=2), poor posture (n=1), damaged muscles (n=1), rashes (n=1), blood disease (n=1), body will not function (n=1), thyroid disorder (n=1), sore gums (n=1), problems in the brain (n=1), skin problems (n=1), early aging (n=1), headaches (n=1), stomach problems (n=1), poor eyesight (n=1), pain in the bones (n=1), poor nails and feet (n=1), eating disorders (n=1), loss of balance (n=1), muscular pain (n=1), poor growth (n=1), rickets (n=1), high cholesterol (n=1), weak immune system (n=1), allergies (n=1), bad bone marrow (n=1), malnutrition (n=1), hair loss (n=1), teeth do not grow in (n=1), and bone deficiency (n=1). One client could not name any health conditions and one client refused to answer.

### ***Assessment of Health Belief Model Variables***

Variables from the Health Belief Model that may ultimately affect the consumption of calcium-rich foods by children were examined in caregivers.

These included caregiver:

- Perceived susceptibility of their children to a disease that may be prevented by adequate calcium intake
- Perceived severity of the symptoms of these diseases
- Perceived benefits of adequate calcium intake during childhood
- Perceived barriers to adequate calcium intake in their children
- Self-efficacy to ensure that their children get adequate calcium in their diet.

### **Perceived Susceptibility to Inadequate Calcium Intake by Children**

Out of the sample of 275 caregivers, 218 (79%) said they believed the children they cared for consumed enough calcium daily; while, 44 (16%) did not believe the children they care for consumed enough; 3 (5%) indicated they “did not know.”

Ironically, despite caregiver perceptions that their children were not susceptible to inadequate calcium intake, responses to questions designed to determine the knowledge they would need to possess to make this determination suggested

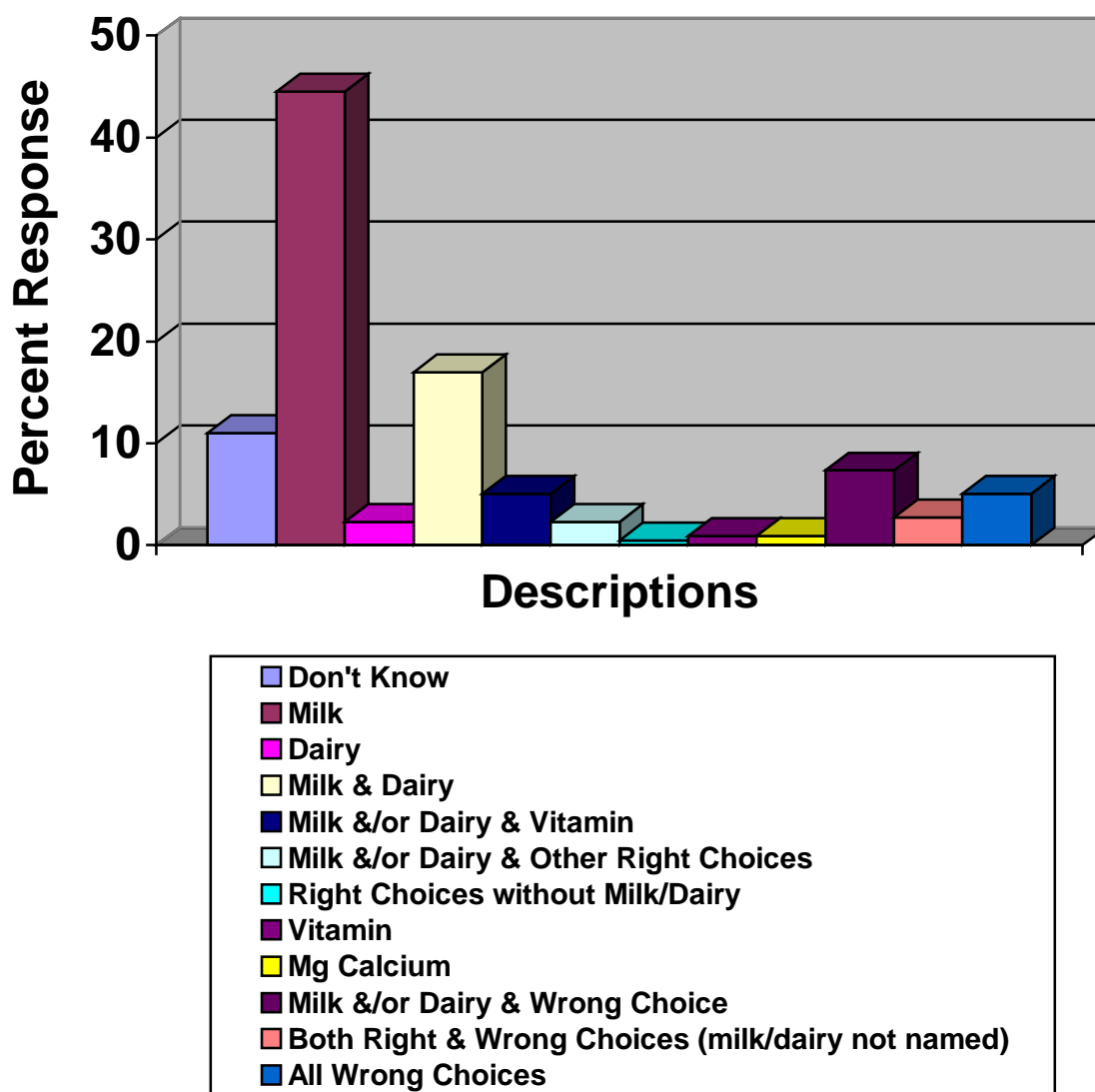
their perceptions were invalid. For example, most of these caregivers did not know their children's daily requirement of calcium. Furthermore, the mean response for those who believed they did know was far less than the actual requirement. Only one caregiver that claimed they did know their children's requirement gave the correct amount.

<b>Table 4.4: Knowledge of Their Children's Daily Requirement for Calcium in Caregivers That Did Not Perceive That Their Child was Susceptible to Inadequate Calcium Intake</b>					
	<b>Frequency</b>	<b>%</b>	<b>Mean <math>\pm</math> SD (mg)</b>	<b>Minimum (mg)</b>	<b>Maximum (mg)</b>
<b>Caregivers of Children Aged One to Three (n=103, 47%)</b>					
Did Not Know Requirement	83	81			
Claimed to Know Requirement	20	19	144 $\pm$ 299	2	1000
<b>Caregivers of Children Aged Four to Eight (n=122, 56%)</b>					
Did Not Know Requirement	102	84			
Claimed to Know Requirement	20	16	159 $\pm$ 318	2	1000
<b>Caregivers of Children Aged Nine to Eighteen (n=97, 44%)</b>					
Did Not Know Requirement	81	84			
Claimed to Know Requirement	16	16	202 $\pm$ 345	2	1000

There was no correlation between those who felt that the children they cared for consumed enough calcium daily and how confident they were in their ability to find out how much calcium was in a food  $r(275) = 0.03$ ,  $p = 0.61$ .

These clients were also asked to describe what constituted “enough” calcium for their youngest child each day. The client could describe what enough calcium was for their child in any way they preferred, e.g., by naming foods their child had to eat and in what amounts, or by naming how many milligrams of calcium they needed, etc. Below is a graph depicting how caregivers who thought their children got enough calcium described what “enough” calcium was (Figure 4.1).

**Figure 4.1: How Caregivers Described Their Determination of “Enough” Calcium for Their Children**



The responses above were further queried to assess “amounts” of each response named by those caregivers who believed their youngest child/children got “enough” calcium; 26 (12%) could not respond in a manner that could be further assessed. Of those who could give measurable amounts (n=192), only



51 (26%) responded with answers that met the child's My Pyramid guidelines for calcium intake. Most caregivers (n=98; 51%) described an amount that was below the My Pyramid guidelines, while 43 (22%) described an amount that exceeded the guidelines.

### **Perceived Severity of Inadequate Calcium Among Children**

The extent to which caregivers were worried that their children were not getting enough calcium was measured with a five point Likert scale. Responses were found to be normally distributed. On a scale from one to five, with one being not worried at all and five being very worried, the average response was  $2.6 \pm 1.3$  (n=275). Similarly, the degree to which caregivers believed not getting enough calcium was harmful to their children, with one being not harmful and five being so harmful that their child might die, revealed a mean response of  $2.7 \pm 0.9$  (n=272). In response to the second question, two clients responded they didn't know and one client refused to answer.

### **Perceived Benefits of Adequate Calcium Intake Among Children**

Laundromat clients were asked to tell the researcher how they thought getting enough calcium helped their child. Twenty-two (8%) participants reported having no knowledge of calcium's importance for their children. Below is a table of the most popular responses given by more than 10% of the remaining 253 (92%) participants (Table 4.5).

<b>Table 4.5: Caregiver Perceived Benefits of Their Children's Adequate Calcium Intakes</b>		
<b>Response</b>	<b>Frequency</b>	<b>%</b>
Strengthens Bones	207	75
Strengthens Teeth	89	32
Promotes Growth	34	12

Other caregiver responses of how getting enough calcium helped their child included: promotes health (n=18), helps concentration (n=9), improves vision (n=8), strengthens the body (n=8), increases energy (n=5), helps their brain (n=4), improves the skin (n=4), helps children learn (n=2), good for the bones (n=2), helps bone formation (n=2), improves the immune system (n=2), makes your hair healthy (n=2), strengthens muscles (n=1), increases iron absorption (n=1), aids in brain development (n=1), increases brain activity (n=1), prevents osteoporosis (n=1), insulates the body (n=1), prevents diseases (n=1), keeps you regular (n=1), improves digestion (n=1), helps the nervous system (n=1), helps to maintain a health weight (n=1), helps keep children alert (n=1), prevents autism (n=1), prevents colds (n=1), prevents allergies (n=1), and whitens teeth (n=1). No disease prevention relationships were mentioned by more than 10% of the study population.

## **Barriers to Adequate Calcium Consumption Among Children**

Overall, survey participants perceived few barriers to their children's adequate calcium consumption; however, further inquiries suggested otherwise. Barriers investigated included caregivers' perceptions of any troubles they encountered in ensuring that their children received enough calcium daily, if they knew how to determine how much calcium was in a food, and their, and their children's avoidance of dairy products.

Most (n=233, 85%) study participants denied having any problems making sure their children received enough calcium, few (n=33, 12%) thought otherwise. Study participants who stated they had problems ensuring adequate calcium intake were asked to describe the problems they had experienced. Twenty-two (67%) participants said the children they cared for were picky eaters. Other problems included incomplete control over the child's diet (n=5), a preference for "junk foods" (n=3), limited knowledge of calcium-rich foods (n=2), inadequate time to plan nutritious meals (n=1), poor quality of foods available (n=1), inadequate knowledge regarding children's calcium requirements (n=1), and inability of children to eat dairy products (n=1). Seven clients stated they had problems ensuring that their child got enough calcium, but were unable to verbalize their problems.

While only two people independently identified not knowing how much calcium was in foods as a barrier, when asked, 122 caregivers (44%) said they did not know how to determine how much calcium foods contained. When the 153 (56%) caregivers who stated that they did know how to determine how much calcium foods contained were asked to describe how they did so, most (n= 101, 66%) described an unacceptable method, e.g. “look by the calories on the food label,” and 16 (10%) individuals could not express the method they used. Only 36 (24%) of the caregivers who had claimed to know how to determine how much calcium was in a food described an acceptable method for doing so.

Only 30 (11%) of the study participants stated that they avoided dairy foods. Lactose intolerance was the most common reason for avoiding dairy foods (n= 12). Other reasons caregivers avoided dairy foods included: dislike of the taste of dairy (n=4), upset stomach (n=3), gas (n=3), made them “feel sick” (n=3), promoted acne (n=1), existing heart condition (n=1), and diarrhea (n=1). Three clients did not detail their reasons for avoiding dairy foods. Foods avoided by the caregivers included milk (n=16), all dairy foods (n =6), ice cream (5), yogurt (n=4), cheese (n=4), and only whole milk (n=1).

Similarly, 32 participants claimed that the children they cared for avoided dairy foods. Dislike of the taste of dairy foods was the most common reason named (n=15). Other reasons included: lactose intolerance (n=7), upset stomach (n=6),

gas (n=2), diarrhea (n=2), and asthma (n=2). Foods avoided by the child included milk (n=29), cheese (n=15), yogurt (n=6), and ice cream (n=1).

Avoidance of dairy foods, both by caregivers and children, were correlated with race. A positive correlation between being African-American and avoiding dairy foods was found among the children  $r(275) = 0.12, p < 0.05$ , while the caregiver data similarly approached significance  $r(275) = 0.10, p = .09$ , with African-Americans once again associated with greater avoidance of dairy foods than Hispanics. Overall, avoidance of dairy foods by caregivers was positively correlated with child avoidance of dairy foods  $r(275) = 0.13, p < 0.05$ .

### **Self Efficacy to Do Tasks Related to the Consumption of Calcium Foods by Their Children**

Caregivers' self-efficacy to ensure adequate calcium consumption by their children was assessed in terms of their perceived abilities to: choose calcium-rich foods, use the nutrition facts label, obtain calcium-rich foods, e.g., afford or safely transport them, and get their children to eat them. An overall measure of their confidence in their ability to control their children's diets to ensure adequate calcium intake was also assessed. Caregivers were somewhat confident in their ability to choose calcium-rich foods, i.e., on a scale from one to five with one being not sure and five being completely sure, caregivers' mean response was  $3.1 \pm 1.1$  (n=273). They exhibited similar confidence levels for their ability to use

the nutrition facts label to choose calcium-rich foods, i.e., their mean response was  $3.1 \pm 1.3$ . Caregivers were even more confident that they could obtain calcium-rich foods and get their children to eat them, i.e., their mean responses were  $3.6 \pm 1.1$  ( $n = 272$ ) and  $3.6 \pm 1.1$  ( $n=275$ ), respectively. Caregivers were most confident that they could control their children's consumption of calcium-rich foods. On a scale from one to five with one being no control at all and five being complete control, their mean response was  $3.7 \pm 1.2$ .

### **Calcium-Rich Foods Consumed Among African-American and Hispanic Low-Income Children**

The most common calcium-rich food that caregivers stated their child consumed was milk ( $n=256$ ); with cheese ( $n=222$ ) and yogurt ( $n=152$ ) also named as popular calcium sources. Notably, far less than half of all caregivers named sources of calcium other than milk, cheese, and yogurt. Below is a table of the calcium-rich dairy foods that caregivers stated their children consumed regularly (Table 4.6).

<b>Table 4.6: Calcium-Rich Dairy Foods Caregivers Stated Their Children Consumed</b>		
<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Milk	256	93
Cheese	222	81
Yogurt	152	55
Cheese Pizza	113	41
Ice Cream	110	40
Macaroni and Cheese	110	40
Pudding	60	22

Only three non-dairy sources of calcium-rich foods were correctly identified by more than one third of the caregivers (Table 4.7).

<b>Table 4.7: Calcium-Rich Non-Dairy Foods Caregivers Stated Their Children Consumed</b>		
<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Calcium Fortified Cereal	110	40
Calcium Fortified Juice	102	37
Broccoli	94	34
Calcium Fortified Bread	90	33
Calcium Fortified Frozen Waffles	60	22
Collard Greens/Turnip Greens	55	20
Calcium Fortified Pancakes	51	19
Calcium Fortified Graham Crackers/Animal Crackers	43	16
Multivitamin that Contains Calcium	31	11
Canned Salmon with the Bones	28	10
Calcium Fortified Soy Milk	12	4
Calcium Fortified Cereal Bars	10	4
Calcium Fortified Canned or Instant Pasta	9	3
Calcium Fortified Instant Rice	4	2

Caregivers erroneously named a large number of foods that did not contain a significant amount of calcium (Table 4.8).



<b>Table 4.8: Foods Named by Caregivers that Were Not Calcium-Rich</b>		
<b>Response</b>	<b>Frequency</b>	<b>%</b>
Fruit	116	42
Low Calcium Vegetables	91	33
Cereal that is not Calcium-Fortified	66	24
Juice that is not Calcium Fortified	54	20
Bread that is not Calcium Fortified	39	14
Canned or Instant Pasta that is not Calcium Fortified	38	14
Eggs	31	11
Multivitamins that do not Contain a Significant Amount of Calcium	29	11
Instant Rice that is not Calcium Fortified	16	6
Frozen Waffles that are not Calcium Fortified	13	5
Chicken	11	4
Graham Crackers/Animal Crackers that are not Calcium Fortified	8	3
Butter	7	3
Fish	7	3
Cereal Bars that are not Calcium Fortified	6	2

## ***Summary***

The limited ability to report results regarding the original purposes of this project led to the revision of this thesis' aims. Data collected from all who had not observed the campaign materials was used to provide a baseline understanding of the target populations' characteristics that were pertinent to further campaign implementation. Results showed that study participants had previous limited exposure to calcium-related materials, with those who had participated in federal aid programs reporting having had more exposure than those who had not participated. Caregiver knowledge about calcium and its importance for children was lacking. The majority of the study population exhibited limited knowledge of: their children's calcium requirements; calcium sources, especially non-dairy sources; and, calcium-related health conditions other than those associated with bones or teeth.

Findings from variables drawn from the Health Belief Model suggested that caregivers did not perceive their children were susceptible to inadequate calcium intake, and they identified few barriers to ensuring the adequacy of their children's calcium intake. The self-efficacy of most, regarding tasks related to ensuring adequate calcium consumption among their children, e.g., ability to use the Nutrition Facts label to determine calcium content, was high. Notably, when caregivers were asked to describe how to determine calcium content from the Nutrition Facts, most were unable to do so or described an incorrect method. Caregivers had a high degree of confidence in their control over their children's

diet but had limited knowledge of what foods in their child's diet were high in calcium. Finally, caregivers perceived few benefits of adequate calcium consumption, but indicated they believed the consequences of inadequate calcium intake to be severe.

## CHAPTER 5: DISCUSSION

### ***Campaign Implementation and Associated Challenges***

#### **Laundromat Owner- based Obstacles to Campaign Effectiveness**

The recruitment of laundromat owners proved to be one of the greatest difficulties experienced throughout this project. In order for a laundromat to be a participating location, the campaign had to be described to the owner, and their consent had to be obtained. As noted in the methods, this proved to be difficult since many owners were not present in the laundromats at the time of recruitment. Employees stated that some owners only stopped into the laundromat at unscheduled times. Researchers dealt with these difficulties by describing the campaign to the employee in charge, i.e. the manager, and gave them the forms that needed to be signed by the owner. Although this method was successful in the recruitment of six of the ten laundromats, it hindered the recruitment of additional visited laundromats, since some employees forgot to tell the owners about the campaign or stated they had been afraid to do so. In contrast, all of the laundromats in which the owner was present at the initial recruitment visit, were included in the study.

Gaining approval to use laundromats as control sites in Jersey City was even more difficult than doing so in Newark. Researchers may have experienced greater difficulties in this city because they faced the previously discussed

barriers to recruitment, as well as the lack of a goodwill incentive as a motivator for participation.

With regards to the owners' or managers' role in campaign implementation, it had been hypothesized that being a caregiver of a child, having a nutrition-related health condition, knowing one's clientele, having a history of community involvement, and/or doing volunteer work would predict laundromat owners'/managers' campaign commitment level. However, correlation results suggested this was not the case. Other observed concerns may have precluded the ability of these factors from affecting the owners'/managers' dedication to the campaign. For example, throughout the course of this project researchers observed that most of the laundromat owners/managers were overworked and consumed by the responsibilities of running the laundromats. Lacking owner campaign commitment was likely one contributor to the ineffectiveness of the intervention.

### **Challenges that Impeded Laundromat Clients' Awareness of the Campaign**

Although the recruitment of laundromat clients significantly improved following the addition of child-focused incentives, it still proved to be challenging overall. The challenges experienced during the recruitment of laundromat clients may have been related to their ethnicity and income level. Research findings have suggested that recruitment of low-income,<sup>75, 76, 77</sup> and African-American<sup>77</sup> and

Hispanic<sup>75, 76</sup> participants has been particularly troublesome and fraught with obstacles. Obstacles mentioned in a study by Milburn et al. as having negatively affected the recruitment of minority populations have included low response rates, interviewer bias, and male respondents having been difficult to recruit. While most of the strategies mentioned in this article to minimize these difficulties, including: focusing on the benefits to the community; using community organizations to endorse and publicize the study; and use of same race, same sex interviewers when possible, were used in this thesis project, recruitment remained difficult. One strategy mentioned that could have been used in this research was the over sampling of subpopulations, especially male subjects, to increase the ability to generalize study results.<sup>77</sup> However, the higher percentage of female subjects was beneficial to this project since because women remain the primary people responsible for household chores, including laundry, and are also responsible for shopping for groceries and feeding their children.<sup>78</sup> Thus, it seems that laundromats, where more women than men could expect to be found, would have been effective locations for the delivery of the information provided in the intervention, i.e. knowledge of calcium-rich sources and ways to increase children's consumption of these foods. Further, hypothetically, the recruitment of more women than men would have been optimal for research associated with children's consumption of calcium-rich foods.

However, the negligible number of laundromat clients who observed the campaign materials, suggested that the passive display of these materials in

laundromats frequented by limited-resource African-American and Hispanic caregivers in urban, New Jersey communities, was not an effective means of providing nutrition education to the target population. This contrasts with the findings of focus groups conducted with the target audience prior to this research, in which focus groups participants identified laundromats, and other locations in which they were required to wait for extended periods, as good locations for campaign implementation. The disconnect between the findings of the focus groups and the results of this project demonstrate the difference between what people say they will do and what they actually do.

To address such potential discrepancies, focus group findings should be tested via small pilot studies. This work was a pilot study; however, it should have been done on an even smaller level, using fewer resources. A smaller pilot study should have been designed to identify key issues to campaign implementation throughout the course of the intervention, and adjustments to campaign strategies should have been made on an ongoing basis for the duration of the pilot, until the researchers were either satisfied with the campaign's progress, or they determined the venue's use was unrealistic. The ongoing examination of barriers to the intervention's effectiveness and means for potentially overcoming them should be conducted with laundromat owners and clients, as well as via direct observation.

## **Client Laundromat Routine-based Obstacles to Campaign**

### **Effectiveness**

Laundromat client survey responses were not consistent with researchers' observations. Study results had suggested that the clients interviewed patronized campaign laundromats frequently. Ninety-seven percent of those interviewed reported that they had been to the laundromat previously. These study participants indicated they visited the laundromat approximately 41 times a year, and spent an average of two hours during each visit. The large amount of time laundromat patrons spent in these locations would infer they had been exposed to the campaign materials displayed; however, apparently they did not notice them. Based on the researchers' observations, two client-based rationales for this phenomenon were hypothesized.

First, contrary to reports that patrons spent two hours per visit, observations made while conducting this research suggested otherwise. Most laundromat clients, many of whom had apparently walked to the laundromat from their homes, were observed placing their clothes into the washers or dryers and leaving. It may be that patrons chose to pass the idle time while their clothes were in the machines, at home. Regardless of where the time was spent, researchers noted that it was not in the laundromat.

Secondly, it was noted that children were often in accompaniment with the patrons of the laundromat. Laundromat clients who came to the laundromats



with their children spent most of their time looking after and caring for the children, rather than passing the time reading. This and the former scenario greatly decreased the opportunities for these individuals to view the displayed campaign materials.

Future nutrition education interventions that target caregivers should involve entertaining their children. This idea resulted from observations that: (1) many clients spent most of their idle time tending to their children; and, (2) it was noted that when child -focused incentives, such as the P-Saurus puppets and stress balls in the shape of cows, were added to the recruitment protocol the ability of caregivers to spend up to a half hour completing surveys with the researchers exponentially improved, as their children were occupied with the campaign-related toys. If caregivers were able to spend this amount of time focused on survey completion, hypothetically the same amount of time could be spent in direct, or indirect, education. However, it is unlikely that indirect means of providing campaign messages would be effective, since laundromat clients who did not bring their children to the laundromat, did not state they had noticed the campaign materials either. In summary, the most effective means for increasing campaign awareness might be to provide campaign-related incentives to children, and then review the campaign messages or brochures with the caregivers. In this way, caregivers may view campaign exposure as a welcomed relief to childcare and an opportunity for their children to be made satisfied. The latter hypothesis is based on the fact that when incentives were provided to

children during the interview process, caregivers actually approached the researchers and asked to participate in order to get their children puppets.

A study by Sosa examined barriers to the participation of Hispanic parents in their children's school activities, and successful methods for facilitating their involvement. Sosa discussed that schools, such as the Eugene Field Elementary School in Albuquerque, had been successful in increasing attendance at school functions by providing childcare.<sup>79</sup> If providing childcare increased the participation of parents in the school environment, it may have the same effect if used as an opportunity to give the parents "adult time" and allow them to focus in nutrition education interventions. However, providing childcare may not be an option for all interventions since it would: pose an additional degree of liability; increase intervention cost, i.e., it would require more staff; and further, parents may be worried to leave their child with a stranger. Providing a toy to keep the child busy may serve the same purposes, and it would be far less expensive. For example, the P-Saurus puppets provided in this project cost less than four dollars, it amused the children of the people interviewed, and it did not require additional staff, nor that parents leave their children in the care of others.

### **Campaign Material Design and Placement-based Obstacles to Campaign Effectiveness**

Laundromat clients may have seen that campaign materials were present; however, if this was the case it is clear they chose not to read them. Some

laundromat patrons were observed reading magazines and/or newspapers. In fact, some laundromat locations even provided magazines and newspapers for their customers' use. The bright logos and celebrity covers displayed on these publications as well as their popular contents, may have swayed customers toward choosing to read the magazines and newspapers over the displayed brochures.

If this is true, changing the appearance of "Calcium Select to Protect" campaign materials may help increase their effectiveness. To compete with other publications, such as magazines, the campaign materials' covers should more closely mimic the formatting of magazine covers, and/or perhaps feature celebrities revered by the target audiences.

Other campaigns have used celebrity-focused marketing to promote nutrition. One such intervention was the Milk Mustache campaign, i.e. "Got Milk", which utilized photos of celebrities with milk mustaches to promote the consumption of milk.<sup>54</sup> Another nutrition education campaign entitled "Salud!", which targeted Hispanic populations, encouraged increased fruit and vegetable intake via campaign messages delivered through a variety of media channels. All printed "Salud!" media, including: street billboards, bus signs, bus stop shelter displays, posters, and newspaper and magazine advertisements, featured Latino television celebrities from the popular show "Sabado Gigante". This campaign was highly

effective, as 77% of the study population surveyed, reported exposure to at least one “Salud!” item.<sup>80</sup>

Although target audience members stated that the campaign materials were eye catching during focus groups conducted during the development of “Calcium: Select to Protect” campaign materials, they had not been in competition with other publications in the focus group environment as they were in the laundromats. For example, campaign brochures were often displayed next to local magazines and newspapers; and, in one location the owner displayed the intervention poster on a bulletin board filled with classified ads, and posters from other community-related programs. The competing materials seemed to make the campaign materials blend in and appear less attractive to clients.

The only location in which the materials proved to be at all effective was on the wall next to the change machine. The two individuals who reported awareness of campaign exposure stated that they had seen the intervention poster in this location. Researchers observed that almost all laundromat clients used the change machine, and thus materials displayed next to or near theses machines, may be viewed more often.

## **Environmentally-based Obstacles to Campaign Effectiveness**

Difficulties in campaign implementation identified by the intervention site owners/managers, and also observed by the researchers, included the disappearance of brochures and brochure holders, as well as graffiti drawn on campaign posters. In response to the disappearance of brochures and brochure holders, researchers moved the display to an area that was more highly visible to laundromat employees, e.g. next to the cash register or next to folding tables that were utilized by employees, to decrease the likelihood of theft. Posters that had been marked with graffiti were replaced. These methods did not appear to be effective remedies to these difficulties, as the brochures and brochure holders continued to disappear, and poster graffiti persisted, throughout the course of the intervention.

Based on these findings a better course of action may have been to permanently mount brochure holders to walls or furniture in areas that were both highly visible to employees and clients. This may have decreased the likelihood of brochure and brochure holder theft. It would also have eliminated the need to move the holders during cleaning. This may be important, as it is possible that brochures and brochure holders disappeared because employees threw them out when they had to clean the surfaces on which they had been displayed. Poster graffiti may have been decreased if the posters were framed or laminated since the plastic/glass surfaces of frames or laminated materials are more difficult to deface than the campaign posters' paper surfaces.

### ***Participation in Federally Funded Programs and Exposure to Calcium-Related Materials***

The clients' low rate of participation in federally funded programs, such as the Food Stamp Program and the Special Supplemental Program for Women, Infants, and Children (WIC) was shocking, as most study participants cared for a child under the age of five. At the time when this thesis was written, almost half of all infants and one-quarter of all children aged one to four in the United States participated in WIC.<sup>81</sup> These rates were considerably higher than the WIC participation rates of the study population (20%). Food Stamp participation rates among the study participants were also low compared to the national average. In 2005, 41% of the working poor in New Jersey participated in the Food Stamp Program, whereas only 12% of the study population reported participation.<sup>82</sup> Since the campaign and corresponding study were performed in a lower income area in Newark, it is possible that those interviewed simply may not have wished to report their participation in these programs to the research staff.

The initial purpose of this research was to expose limited-resource African-American and Hispanic children's caregivers to calcium-related materials. Not only did surveyed caregivers report essentially no exposure to "Calcium: Select to Protect" materials, but only 29% of participants reported exposure to any calcium-related materials. The most common materials seen were identified to be educational brochures that were from either the doctor's office or WIC. A

significant correlation was found between receiving WIC and reporting exposure to calcium-related materials. No participants reported having seen calcium-related educational materials at the Food Stamp office.

Although research has indicated that WIC participation has not increased calcium consumption among children, in this population it had been successful in educating its participants on calcium's importance in their children's diets.<sup>81</sup> Since no Food Stamp Program participants indicated they had been exposed to calcium-related materials in the Food Stamp Office, perhaps this federally funded nutrition assistance program should do more to promote calcium. At the time of this thesis' writing, this campaign is, in fact, being implemented in Food Stamp Offices throughout New Jersey, with the goal of increasing exposure in this venue to the broad NJ Food Stamp Nutrition Education (FSNE) Program's target audience.

Ways being used to deliver "Calcium Select to Protect" campaign messages include: displaying educational posters and brochures at the Food Stamp offices, having caseworkers' distribute brochures or place them among program applicants' materials, and/or having trained caseworkers engage in brief discussions with their clients who care for children. These methods reflect a more active way of promoting the "Calcium Select to Protect" messages, and may be more effective than the passive display of materials that was done in Newark Laundromats.

## ***Lack of Caregiver Knowledge as an Obstacle to Adequate Calcium Intake Among Children***

### **Determination of Calcium-rich Food Sources**

The most practical means of ensuring the adequacy of children's calcium intakes might be to promote caregiver knowledge of calcium-rich food sources, and to increase their ability to determine how much calcium a food contains through the use of the Nutrition Facts label. This is the approach that has been used in the "Calcium: Select to Protect" materials and messages.

The findings from this research indicated a deficiency in caregiver knowledge of dietary sources of calcium. As indicated in the results, caregivers were only able to correctly name three calcium-rich foods; while half of the foods they named were not rich in calcium. The four most mentioned foods, constituting 61% of all incorrect answers given, are all distributed by New Jersey WIC. Since there was a significant relationship between being a WIC participant and knowledge of calcium's importance, it was hypothesized that WIC participants believed all foods distributed by WIC were calcium-rich. However, further analysis revealed that WIC participants actually named the four most common incorrect foods, i.e. fruit, low calcium vegetables, cereal not fortified with calcium, and juice not fortified with calcium, significantly less often than those who did not participate in



WIC. Therefore, WIC had also been successful in increasing participant knowledge of dietary calcium sources.

Those interviewed were most likely to name dairy sources as calcium-rich foods. Milk, cheese, and yogurt were the most commonly named. This was not surprising for at least two reasons. First, USDA's My Pyramid features the "Milk Group" and espouses its role in providing ample calcium. Although the USDA My Pyramid website briefly names non-dairy alternatives, its focus is clearly on dairy. Second, the primary goal of several national calcium-related campaigns such as the "Got Milk" Campaign, which is funded by the nation's Milk Processors Education Program and Dairy Management Incorporated; the "3-A-Day for Stronger Bones" campaign, which is funded by the American Dairy Association/National Dairy Council; and, the "Milk Matters" campaign, funded by the National Institute of Child Health and Human Development, was to promote dairy consumption.

Knowledge of a wide variety of dietary calcium sources may be the first step toward increasing calcium intakes among children. A survey of over 1,000 adolescents found that those who were knowledgeable about calcium sources consumed more calcium, compared with those who were not as knowledgeable.<sup>24</sup> With most minority children not meeting their recommended levels of dietary calcium, efforts to increase both their knowledge, as well as their caregiver's knowledge, of calcium sources is needed. Non-dairy sources of calcium, e.g.,

canned salmon with bones; broccoli; turnip greens; collard greens; calcium-fortified products, e.g. animal or graham crackers, bread, canned and packaged instant pasta, cereal and cereal bars, waffles, pancakes, juices, and, soy and rice milk; and, complete multivitamins, may help minority children reach their calcium requirements. Further, they may be particularly important in doing so for those children who avoid dairy products.<sup>47</sup>

For children who avoid dairy products to meet their calcium requirements, the ability to determine how much calcium is in a food by using the Nutrition Facts Label, and front panel nutrient claims, is just as important as knowledge of calcium-rich food sources. The 1990 Nutrition Labeling and Education Act (NLEA) mandated that by May 8, 1994 most processed foods display nutrition information using a new label format entitled the “Nutrition Facts” panel. The goal of this revised food label was to provide nutrition information in a consistent, readable, and understandable manner.<sup>83</sup> However, research has shown that a majority of consumers still misunderstand and underutilize the food label, specifically the Percent Daily Values.<sup>83, 84</sup> This is of importance, as the calcium content of foods is presented as Daily Values. The lack of understanding about how to use the food label was evident in the study described in this thesis. The majority of caregivers interviewed, either stated they did not know how to use the food label, or they described incorrect methods for doing so.

The “Calcium: Select to Protect” brochure simply and concisely described how to find out if a food was a good source of calcium using the following four steps:

1. “Turn to the Nutrition Facts Label.”
2. “Find the serving size.”
3. “Look for the word calcium and the number after it.”
4. “If the number is 10% or above, each serving will add to the daily calcium total and help you ‘Select to Protect.’”

To determine the calcium content per serving the steps listed were:

1. “Drop the %”, e.g. 10% = 10
2. Add a zero”, e.g. 10 = 100

If used, these simple steps would increase the ability of caregivers to ensure adequate calcium intakes among their children. The “Calcium Select to Protect” brochure was a valuable resource that could have been used to educate the target population on a wide variety of calcium-rich foods and how to use the Nutrition Facts label; unfortunately in this work it was not noticed, let alone used.

### **The Importance of Calcium for Children**

One of the primary goals of the “Calcium Select to Protect” campaign had been to educate caregivers about calcium’s relationship to their children’s health. The main conditions mentioned in the campaign materials were: lead poisoning, high blood pressure, and osteoporosis. None of the caregivers surveyed associated

adequate calcium consumption by their children with a reduced risk for lead poisoning or high blood pressure.

Although many clients indicated that calcium was important for healthy bones, most failed to mention any other negative health conditions that might be positively affected by adequate calcium intake. Further, although clients were aware of the importance of calcium for healthy bones, only 16% of caregivers named osteoporosis as a disease of which their children may suffer in the future if they did not consume enough calcium in childhood. A study by Dore' et al also noted a lack of knowledge about calcium's role in disease prevention among minority populations. Dore' examined possible barriers to calcium consumption among low-income African-American women in Louisiana. Consistent with the findings of this research, Dore' found that most participants were not aware of the relationship between chronic low calcium intakes and the prevention of diseases other than osteoporosis.<sup>50</sup>

Many caregivers named conditions that are not affected by calcium consumption, such as arthritis, drowsiness, diabetes, allergies, etc. Although the writer of this thesis was unable to identify any similar findings in the literature, the research team observed that it appeared that many of those interviewed simply named any health condition they thought of at the time of the interview.

A study done by Tussing and Chapman-Novakofski, was designed to determine if a theory-based osteoporosis prevention program would significantly impact women's calcium intakes. The researchers found that women's knowledge of the importance of calcium intake for disease prevention accounted for the majority of variance in their intent to consume more dairy and calcium-rich foods, take a calcium supplement, and promote calcium-rich foods to their families.<sup>85</sup> When this finding is coupled with the results of the study presented in this thesis which suggested a large knowledge gap in this area, one would conjecture that increased knowledge of calcium-disease relationships, among women, might result in increased calcium intakes by the children for whom they are responsible.

### ***Assessment of Health Belief Model Variables that May Affect the Adequacy of Children's Calcium Intake***

#### **Perceptions of Children's Susceptibility to Inadequate Dietary Calcium Intakes**

Most caregivers stated that they believed their children consumed enough calcium daily, i.e. they did not perceive that their children were susceptible to inadequate calcium intakes. However, previous research had found that low-income African-American and Hispanic children were, in fact, highly susceptible to inadequate calcium intakes.<sup>19, 55, 60</sup> Thus, it is likely that this study's target population's perceptions were invalid.

Caregivers may not have been able to correctly assess their children's susceptibility to inadequate calcium intakes because: (1) as indicated in the results, they were unable to accurately state their children's calcium requirements, and (2) as previously described in this discussion, they could not describe what foods their child would have to eat and in what amounts, in order to meet their needs. Zablah et al also noted a lack of perceived susceptibility to inadequate calcium intakes among African-American women. More importantly, women who did not perceive themselves to be susceptible had significantly lower mean calcium intakes, i.e.  $51 \pm 48$  mg/day, compared to those who did perceive themselves to be susceptible, i.e.  $386 \pm 60$  mg/day.<sup>49</sup> Since lack of perceived susceptibility among women was found to be a barrier to their consumption of calcium, it may also be a barrier to their children's adequate consumption of calcium.

Decreased caregiver perceived susceptibility of their children to inadequate calcium intakes may have prevented other Health Belief Model variables from affecting children's calcium consumption. Even though caregivers had difficulty naming which health conditions were related to inadequate calcium intakes, they had indicated they believed the consequences of children's inadequate calcium intakes were moderately severe. However, even though caregivers thought the consequences were severe, since they did not perceive their children were susceptible to inadequate calcium intakes, it is likely they did not believe the children were susceptible to these moderately severe consequences.

## **Perceptions Regarding Benefits Associated with Children's Adequate Calcium Intakes**

The Health Belief Model includes “perceived benefits” as a key component of the model. As discussed above when examining caregiver knowledge, most caregivers knew that adequate calcium intakes among children were beneficial to the strength of their bones, but they were unable to name many other benefits associated with adequate calcium intakes. Higher levels of perceived benefits predicted adequate calcium intake among women in a study conducted by Blalock. Blalock concluded that perceived benefits are variables that may be improved upon by educational interventions.<sup>86</sup> Thus, hypothetically, if the “Calcium: Select to Protect” campaign messages had been successfully disseminated, knowing the benefits of adequate calcium intakes among children may have increased caregiver’s insurance of increased calcium consumption by their children.

## **Perceptions Regarding Barriers to Children's Adequate Calcium Intakes**

Most study participants perceived few barriers to their children’s adequate calcium consumption. Those caregivers who did perceive barriers indicated that their children’s “picky eating” habits were the greatest obstacles they faced. Carruth et al performed a study that examined “picky eating” among Caucasian

children and its relationship to dietary quality. “Picky eating” habits were found to negatively influence the diets of children, i.e. they consumed a lesser variety of foods and ate fewer foods daily. “Picky eaters” were found to consume less calcium, i.e.,  $763 \pm 343$  mg verses  $853 \pm 347$  mg than non-picky eaters.<sup>87</sup>

“Picky eaters” have been found to avoid foods for a variety of reason, including their: presentation, preparation, plate placement, or taste.<sup>87</sup> Since the most popular barrier faced by caregivers faced to ensuring adequate calcium intakes in their children was their picky eating, the latter rationale may be true with regards to dairy foods, in that the most common reason caregivers’ identified as to why children avoided dairy foods, was their dislike of their taste. This has also been reported in other studies, as an important barrier to calcium consumption among African-American and Hispanic populations.<sup>49, 50, 1</sup> For example, Dore’ et al. and Zablah, reported that African-American women who reported a dislike of the taste of dairy had a lower mean consumption of calcium compared to those who did not report to dislike the taste.<sup>49, 50</sup> All studies concluded that increased awareness of non-dairy souces of calcium is a key approach to decreasing this barrier.<sup>1, 49, 50</sup>

Another solution for overcoming the barrier to calcium intake from children being “picky eaters” may be found in Carruth’s work, which concluded that picky eating may be decreased by repeated exposures to the previously avoided foods.<sup>87</sup> Other ways to overcome the barrier of picky eating as it relates to calcium-



containing foods are mentioned in the “Calcium: Select to Protect” campaign materials, e.g. “sneaking” calcium into foods that are not rich in calcium, and providing children with a variety of calcium-rich foods.

Two barriers of which caregivers appeared to be unaware, yet that were evident in many of their responses to other study questions, were their limited knowledge of calcium-rich sources, and their inability to use the Nutrition Facts label to determine foods’ calcium contents. The inability to identify calcium-rich food sources has been shown to negatively affect calcium consumption,<sup>24</sup> and has been associated with decreased perceptions of susceptibility to health conditions that are associated with deficient calcium intakes.<sup>50</sup>

Another barrier faced by some caregivers and children was the avoidance of dairy foods. Lactose intolerance was the most common reason why caregivers avoided dairy products, however, it was mentioned by only 4% of the study population. This percentage was less than expected, since the prevalence of lactose intolerance among African-American and Hispanic adult populations has been reported to be as high as 75% and 53%, respectively.<sup>22</sup> It is possible that study participants did not want to tell the researcher that they were lactose intolerant since many campaign messages promoted calcium and the only calcium-containing foods they seemed to be certain of were dairy products. Another reason this percentage may be low is that they did not know they were lactose intolerant. The latter rationale is supported by the fact that some

caregivers named symptoms of lactose intolerance as the reason they avoided dairy, i.e. upset stomach, gas, made them “feel sick, and diarrhea.

Lactose intolerance has been found to be another important contributor to low calcium intakes among the target populations.<sup>22, 49, 50</sup> However, research has suggested that lactose intolerance may be mediated. Thus, several methods for doing so are presented in the “Calcium: Select to Protect” materials. Methods mentioned included consuming lactose-containing foods with a meal, consuming fermented dairy products, or using lactose-reduced food products.<sup>11, 22</sup>

Consumption of non-dairy sources of calcium is also mentioned as a way to overcome lactose intolerance as a barrier to calcium consumption. “Calcium: Select to Protect” messages were appropriately tailored to address this barrier, and may be a valuable resource to those who experience lactose intolerance if effectively disseminated.

Being of African-American race was found to be associated with an increased avoidance of dairy foods, as compared to being Hispanic. This correlation was significant among children  $r(275) = 0.12, p < 0.05$ , and caregiver data approached significance  $r(275) = 0.10, p = 0.09$ . This relationship may be related to the increased prevalence of lactose intolerance among African Americans as compared to Hispanics, or, it may be related to a greater prevalence of “picky eaters” in this population, or a lesser taste acceptance for calcium-rich foods.

In summary, when asked directly, study participants perceived few barriers to their children's adequate calcium consumption; however, responses to other queries found many, including picky eating among children, caregivers' decreased ability to identify calcium sources, avoidance of dairy foods, lactose intolerance, and the dislike of the taste of dairy. A study by Blalock that examined factors associated with calcium intake patterns across time found that although higher levels of calcium-related knowledge and the perceived benefits of calcium consumption were related to higher calcium intakes, addressing barriers to calcium consumption was identified as the most important factor in maintaining adequate calcium intakes overtime.<sup>86</sup> As discussed above, the "Calcium: Select to Protect" messages were tailored to address all of the barriers identified among the target audience in this study, however, in the absence of their effective dissemination, these messages were not well positioned to decrease barriers to children's calcium consumption and subsequently, increase children's calcium consumption.

### **Self-Efficacy to Do Tasks Related to the Consumption of Calcium Foods by their Children**

Caregivers' self-efficacy to do tasks related to their children's consumption of calcium-rich foods was high. These tasks included their perceived abilities to: choose calcium-rich foods; use the Nutrition Facts label; obtain calcium-rich foods, e.g. afford or safely transport them; get their children to eat the calcium-rich foods; and control their children's diets. However, responses to other survey

questions suggested their perceptions were incorrect. For example, caregivers reported high self-efficacy levels regarding both their abilities to choose calcium-rich foods, as well as their abilities to correctly use the Nutrition Facts label. However, most caregivers were only able to correctly identify a maximum of three sources of calcium-rich foods, and most were unable to correctly describe how to use the Nutrition Facts label to determine the calcium content of foods. Researchers' observations suggested that self efficacy levels may have been reported to be high, because caregivers did not want to express any difficulties getting their children to consume healthful food or having control over their diet. The survey participants may have perceived that their responses to these questions, which had been designed to assess their self-efficacy, were a reflection of their parenting abilities, and they did not want report lower competence for a variety of reasons.

Legitimately high levels of self-efficacy in feeding children calcium-rich foods is likely important. Studies have shown that increased self-efficacy for eating a calcium-rich diet significantly increased calcium intakes among individuals.<sup>85, 87, 88</sup> Based on these findings, it would not be unreasonable to presume that increased self-efficacy among caregivers would increase calcium consumption among children. Despite the fact that caregivers in this study suggested their self-efficacy levels were high, they were not. Thus, methods of legitimately increasing self-efficacy levels among these target populations are still needed; and, might result in increased calcium consumption among children.

## ***Summary***

This chapter provided a discussion of the main findings of this research. Since the intervention had been ineffective, these findings can act as a baseline for understanding factors among the target populations that influence their children's calcium intake, and used to inform future interventions. The data collected suggested that: caregivers lacked knowledge on how to identify calcium sources; they did not seem to understand that they were lacking in knowledge and the associated skills; and, as such, they incorrectly perceived that their children were not susceptible to inadequate calcium intakes. Other factors identified that may negatively affect calcium consumption among African-American and Hispanic children included caregivers' lack of perceived benefits of adequate calcium consumption among children; and, the barriers described above, that would appear to have decreased their children's calcium consumption.

## CHAPTER 6: CONCLUSION

Again, the original purpose of this research was to assess the impact of the dissemination of “Calcium: Select to Protect” campaign messages and materials in urban New Jersey laundromats. It failed. Thus, the main focus of this work shifted, and the data collected for this thesis was instead used to provide pertinent insights regarding factors that may influence the ability of limited-resource African-American and Hispanic caregivers to ensure adequate calcium intakes among their children. This chapter will: speculate methods for improving this type of intervention in the future, and discuss the limitations of the campaign implemented in this work that might have contributed to its failure. It will follow by providing the aforementioned insights about factors that may affect caregivers’ success in providing recommended levels of calcium to their children. Recommendations for future research will be discussed.

### ***Maximizing the Use of Laundromats as Locations for Providing Nutrition Education***

Clearly, the passive display of nutrition education materials in urban New Jersey laundromats was ineffective. However, this venue may still be a good location for providing nutrition education about calcium and calcium-rich foods to low-income African-American and Hispanic caregivers. This research confirmed previous findings that laundromats are highly frequented by the target

populations; and, for at least a portion of these target populations, laundromats were places in which they spent an ample amount of time. Findings that clients were mostly female further supported the use of laundromats as potentially viable venues in which to deliver nutrition education to children's caregivers. Campaign messages were most likely to be made actionable when directed toward females, since women are most often responsible for both buying groceries and feeding their children.

## ***Suggestions for Future Nutrition Education Campaign***

### ***Implementation***

Despite their promise for being viable locations in which to execute nutrition education campaigns, there were clearly several limitations associated with campaign implementation in low-income, urban laundromats. Potentially, solutions for overcoming these limitations could be developed. For example, the fact that laundromat owners were often not present in their businesses made it difficult to obtain their consent to use their businesses as campaign intervention locations. Further, the owners' absence from sites limited adherence to the campaign's original plans since they, who had supported the campaign's institution, were not available to oversee its implementation.

Future intervention plans for working in these venues should include a considerable amount of lead-time for location recruitment. Also, educators should work to form relationships with laundromat employees, with the intent of

encouraging them to both assist in obtaining the owners' consent for campaign implementation, and oversee the campaign's progress. Further, participation rates may be enhanced if researchers of a similar race or ethnicity approached owners and employees, as researchers of another race are often viewed with suspicion.

Limitations to the dissemination of the campaign messages that resulted from the theft of campaign brochures and their holders, and the defacement of posters with graffiti, might also be resolvable. Possible ways to alleviate these problems may be to mount brochure holders in areas that are visible to both the laundromat clients and the employees; and, to frame posters before they are hung in order to make them more difficult to ruin.

With regards to the lack of client awareness of the campaign messages and materials, in situations where the materials were both present and not defaced, researchers' observed that most clients either left the laundromat while their clothes were being washed and/or dried; or, clients were preoccupied with their children. Researcher observations, that were made during data collection visits, revealed potential methods for increasing the campaign's effectiveness. These included hypotheses that:

- child-focused incentives, i.e., puppets like those used when surveys were being performed, may entertain children and increase the degree to which caregivers focus on and receive intervention messages;



- campaign brochures, that were clearly in competition with colorful popular magazines, could be altered to resemble the publications with which they must compete, i.e. changing the cover to resemble magazine covers, incorporating culturally-appropriate celebrity photographs, and using bright colors, to better attract clients' attentions; and,
- since materials displayed in more highly frequented areas of the laundromat, i.e. the change machine, were the only ones that had been noticed, these and other locations most clients must momentarily be present near, should be sought out and used as display locations.

### ***Suggestions for Future Nutrition Education Campaign Research***

#### ***Endeavors***

Unexpected problems associated with conducting the research described in this thesis could be improved upon in future work. The low participation of laundromat clients that were accompanied by their children could potentially be overcome by providing child-focused incentives to the children of participating caregivers. In addition to entertaining children to increase caregivers' attention paid to the campaign, these incentives could be utilized in future research, as it was in this investigation, as an effective means of enhancing caregiver survey completion.

Another limitation that was identified while conducting this research was related to the inability of some laundromat client survey questions to exhibit reliability in

terms of obtaining the information they were designed to assess. For example, one question was designed to evaluate the prevalence of lactose intolerance among caregivers and their children. The low number of participants that indicated that they or their children suffered from lactose intolerance challenged the reliability of this question because responses differed greatly from previous studies that reported high levels of lactose intolerance among these populations. It is possible that this question was unable to accurately measure lactose intolerance prevalence because study participants did not want to tell the researcher that they suffered from the condition since many campaign messages promoted calcium and the consumption of dairy. Another reason for the ineffectiveness of this question may have been that they did not know they were lactose intolerant. One means of dealing with questions' reliability assessment would be to pilot the questions, and use triangulation and to evaluate the consistency of responses when different means were used to assess the same variables. Also, the reliability of this particular question may have been improved if the researchers had stated that lactose intolerance was common, before asking the question, and/or by explaining the symptoms of lactose intolerance when the question was asked.

Similarly, the limited number of laundromat clients that reported participating in federally funded nutrition programs, such as the Food Stamp Program and WIC, drew into question the validity of client responses. Participation rates for these programs were expected to be high, since the study population was recruited

from a low-income area and most cared for a child under the age of five. Clients may have hesitated to admit participating in such programs because their participation indicated that their household income level was low. The measurement of participation rates may have been improved upon if this question had been asked in a more private location, since those surveyed would not have been concerned about others hearing their responses. In addition, survey confidentiality could be reaffirmed when more sensitive questions are asked.

Finally, the questions used to assess the self-efficacy of caregivers to do tasks related to ensuring adequate calcium consumption among their children were found to need revision. Most caregivers reported a high level of self-efficacy in regards to these tasks, but their responses to additional questions suggested otherwise. Two potential rationales for this phenomenon were conjectured. First, those surveyed may have perceived that if they stated they were not confident in their abilities to do these tasks it reflected poorly on both their competency as caregivers, and their parental skills. The ability of such questions to examine the self-efficacy of caregivers may be improved in future nutrition education research if these questions are reworded to limit the perception that answers may imply poor parental skills and competency. Again, reassurance of survey confidentiality may also enhance response accuracy. Secondly, it appeared that many caregivers thought they were doing exactly what they should be doing to ensure adequate calcium intake among their children. To predict the

extent of this problem, an additional matching sub-sample could be recruited, given the knowledge necessary to knowing the proper practices associated with adequate calcium intake for children, then afterward, sensitively queried about their self-efficacy.

The conclusions drawn thus far have dealt with the study as it was originally designed to assess implementation of nutrition education campaigns in laundromats. Remaining conclusions presented will address the target audiences' responses to survey questions, which hitherto can be perceived to be "baseline" information of pertinent findings in relation to increasing the target audiences' caregivers' ability to ensure adequate calcium intake among their children.

### ***Factors Associated with Decreased Calcium Consumption Among Children***

The most pertinent conclusions gleaned from this research were the identification of factors that may negatively affect the ability of caregivers to ensure their children's adequate calcium consumption. In summary, these included:

- inadequate caregiver knowledge about the health conditions associated with inadequate calcium intakes and calcium food sources;
- caregivers' inability to use the Nutrition Facts label to determine foods' calcium content;

- erroneous caregiver perceptions that their children were susceptible to inadequate calcium intakes, despite their beliefs that the consequences of inadequate calcium intakes were severe;
- caregivers' inability to recognize the many benefits associated with adequate calcium intakes among children; and,
- barriers associated with children's adequate calcium consumption including picky eating among children, caregivers' decreased ability to identify calcium sources, the avoidance of dairy foods, lactose intolerance, and the dislike of dairy products' taste.

The last barrier listed above requires the greatest attention. Efforts to increase caregiver knowledge of a wide variety of calcium sources, e.g. non-dairy calcium-rich foods, foods fortified with calcium, and calcium supplements, are needed.

A review of the findings summarized above suggest that the "Calcium: Select to Protect" materials were appropriately tailored to address the factors most commonly associated with inadequate calcium consumption among African-American and Hispanic children. If effectively disseminated, these messages are well positioned to potentially to assist in improving children's calcium consumption.

## ***Additional Implications for Future Interventions and Their Assessment***

The findings of this research have several implications for future investigations. Several of these implications stemmed from suggestions made for improving this type of intervention in the future. First, the decision to execute this campaign in laundromats was based on previous target audience focus group findings that suggested laundromats would be good campaign implementation locations; and, that the campaign materials had been adequately designed to draw the attention of the caregivers. The failure of this campaign's implementation made it clear that research that relies on the findings from focus groups should be preceded by very small scale pilot studies to test the accuracy of the focus group suggestions without the burdens associated with a large investment of time and resources. This approach would also allow researchers to alter their campaign implementation approach, as needed; and, would likely increase campaign effectiveness.

Since avoidance of dairy products was found to be significantly higher among African-American children than among Hispanic children, further research is needed to determine why dairy avoidance was greater among this population so it can be addressed in future calcium-related campaigns. As discussed above, the dislike of the taste of dairy products may be one reason for the avoidance of dairy foods by African-American children, and if true, this is of particular importance since caregivers are less familiar with non-dairy sources of calcium.

Strong efforts are therefore needed to increase their knowledge other calcium-rich sources. One way of effectively doing so might be to alter the My Pyramid “Milk Group,” and to perhaps even go so far as to rename it, e.g., the “Calcium-Rich Food Group.”

## ***Summary***

In summary, despite the findings presented in this work, laundromats remain viable venues for providing nutrition education to limited-resource African-American and Hispanic caregivers. Campaigns implemented in this venue should feature child-focused incentives, and should consider using more active educational approaches as much as possible. Materials used to disseminate campaign messages should resemble the popular magazines they compete with by featuring bright colors and celebrity photographs.

Regarding those findings that pertained to the caregivers’ assessed, the Health Belief Model appeared to hold up. For, as it would predict, caregivers’ low perceptions of their children’s susceptibility to inadequate calcium intakes; their insufficient understanding of the benefits of adequate calcium intake during childhood; their indication that they experienced multiple barriers to their children’s adequate calcium consumption; and, caregivers’ low self efficacy regarding their ability to perform the tasks necessary to ensuring their children’s adequate calcium consumption, as perceived by the researchers, negatively

influenced the caregivers' behaviors that were associated with children's adequate calcium consumption. .

Additional work is needed to improve calcium intakes among low-income African-American and Hispanic children who live in urban environments; and, research is needed to determine the effectiveness of such interventions.



## Appendix 1: Pre-Survey for Owners

### Demographic Questions:

1. Gender: ☐ Male ☐ Female
2. How do you identify yourself? (Check all that apply.)
 

☐ American Indian   ☐ Asian/Pacific Islander   ☐ Black (non-Hispanic)  
☐ Hispanic   ☐ White (non-Hispanic)   ☐ Other
3. Do you have any children or grandchildren?  
☐ Yes ☐ No
4. Have you been told you have any health condition or disease that is related to what you eat?  
☐ Yes ☐ No
5. How health conscious do you consider yourself to be?  
☐ Not conscious at all  
☐ Somewhat conscious  
☐ Very conscious  
☐ Don't know  
☐ Refuse to answer
6. Have you ever done any volunteer work?  
☐ Yes ☐ No

If yes, please describe:

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7. Has your business acted as a sponsor for anything within the community?

☐ Yes

☐ No

8. Do you recognize and talk with your clients?

☐ Yes

☐ No

If yes, how often

\_\_\_ Never

\_\_\_ Not often

\_\_\_ Sometimes

\_\_\_ Often

\_\_\_ Very often

\_\_\_ Don't know

\_\_\_ Refuse to answer

9. What is the ethnic background of the clients who come to your laundromat?

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10. What is your role in this business (check all that apply):

☐ Owner

☐ Manager

☐ Other

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11. If you are the owner, how many laundromats do you own? \_\_\_\_\_

12. How many people are on your payroll?

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**Awareness Stage:**

13. Please name some foods that are high in calcium.

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14. Do you believe that most children get enough calcium each day?

☐ Yes

☐ No

15. Please list some health conditions children may be at risk for if they do not get enough calcium.

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**Adoption Stage:**

16. Do you believe that putting our brochures and posters out for your clients to read will make them want to give their child more calcium?

\_\_\_ Completely disagree

\_\_\_ Somewhat disagree

\_\_\_ Not sure

\_\_\_ Somewhat agree

\_\_\_ Completely agree

\_\_\_ Don't know

\_\_\_ Refuse to answer

17. How easy do you feel it will be to keep these brochures and posters on display?

- ☐ Very hard
- ☐ Hard
- ☐ Not sure
- ☐ Easy
- ☐ Very easy
- ☐ Don't know
- ☐ Refuse to answer

## Appendix 2: Post-Survey For Owners

### **Implementation Stage:**

1. Did your clients take the brochures?  
☐ Yes ☐ No ☐ Don't know

2. Did you or your staff see people looking at the posters?  
☐ Yes ☐ No ☐ Don't know

3. How easy was it to keep the calcium materials on display?  
\_\_\_ Very hard  
\_\_\_ Hard  
\_\_\_ Not sure  
\_\_\_ Easy  
\_\_\_ Very Easy  
\_\_\_ Don't know  
\_\_\_ Refuse to answer

4. Please describe any difficulties you had:

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5. Please describe any changes that were made in how or where the posters and brochures were displayed or given out:

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**Institutionalization Stage:**

6. Will you leave the posters up?  
☐ Yes ☐ No
7. Will you continue to display the brochures?  
☐ Yes ☐ No
8. Would you recommend working with us to other businesses?  
☐ Yes ☐ No

Why or why not?

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## Appendix 3: Memorandum of Understanding

### “Calcium: Select to Protect” Social Marketing Campaign

Studies have shown that African-American and Hispanic children do not get enough calcium. This problem prompted Rutgers to develop brochures and posters targeted to African-American and Hispanic caregivers. They are printed in English and in Spanish.

The “Calcium: Select to Protect” brochures and posters were made to teach caregivers of children these calcium facts:

- Why a child needs it
- How much a child needs every day
- Foods that have a lot of it
- How to find out how much is in a food
- How to deal with problems that may keep a child from getting enough of it

A study is being done by Rutgers to find out if laundromats are a good place to reach people who would be helped by reading these brochures and posters. If you agree to take part in this study you will be asked to:

- Hang **at least** one “Calcium: Select to Protect” poster at all times. It must be hung in an area that clients can see.
- Put out **at least** 20 brochures at all times. They should be in an area that clients can see and get to.
- Authorize your business as a site for researchers to come in and do in-person interviews with your clients.

The study will take at least 6 months after which a researcher will meet with you to determine if the study will continue. A researcher will visit the laundromat every 2 weeks for the first 2 months to check if you need more brochures and posters and to work with you to solve any difficulties. If the laundromat runs out of supplies before this time, someone should call a researcher **within 24 hours** so that more can be given.

Site: \_\_\_\_\_

Phone #1: \_\_\_\_\_ Phone #2: \_\_\_\_\_

Address: \_\_\_\_\_

Contact: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Today's Date: \_\_\_\_\_

## Appendix 4: Owner Consent Form

Rutgers is doing a program to increase the calcium intake of your clients and their children. If you are reviewing this consent form:

- The program has been discussed with you.
- You have signed a memorandum of understanding that states you are willing to:
  - Hang **at least** one “Calcium: Select to Protect” poster at all times. It must be hung in an area that clients can see.
  - Put out **at least** 20 brochures at all times. They should be in an area that clients can see and get to.
- Are willing to authorize your business as a site for researchers to come and do in-person interviews with your clients.

This consent form seeks your approval to participate in a 2 part survey. If you agree to take part in this survey you will be asked about:

- You and your business,
- Your awareness of calcium and health, and
- Your participation and experiences with the program.

The first part of the survey will be done before the program starts and the second part will be done after the program ends. Each part of the survey will take about 10 to 15 minutes. Your answers will be kept private. No one will see your answers except the people who are part of this project. There is no risk to you because you answer the survey questions. **You can stop at any time.**

If you have any questions about this survey you may contact any of these people:

Dr. Debrah Palmer Keenan  
(732) 932-9853

Audrey Adler  
(732) 932-0532

Alison Bigwood  
(732) 932-3779

Diana Cangemi  
(732) 932-3779

Located at:  
Rutgers University  
Dept. of Nutritional Sciences  
Davison Hall, 26 Nichol Ave  
New Brunswick, NJ 08901-2882

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Initial here



If you have any questions about your rights as a research subject, you may contact:

The Office of Research and Sponsored Programs  
Rutgers University  
ASB 43, 3 Rutgers Plaza  
New Brunswick, NJ 08901  
(732) 932-0150 ext. 2104  
Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu)

I agree to participate in the study outlined above:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

*This informed consent form was approved by the Rutgers Institutional Review Board for the Protection of Human Subjects on 4/20/06; approval of this form expires on 5/20/06.*

## Appendix 5: Laundromat Owner Research Protocol

### Background

Studies have shown that many children have an inadequate intake of calcium. Deficiencies among low-income African-American and Hispanic children are particularly troublesome. Inadequate intakes of calcium may lead to an increased risk of disease, including health conditions that present themselves in adult years such as high blood pressure and osteoporosis, and health conditions that are more prevalent in childhood, such as lead poisoning.

Lactose intolerance and low dairy consumption in culturally specific diets are barriers that African-American and Hispanic populations encounter when trying to obtain the recommended amounts of calcium. The “Calcium: Select to Protect” social marketing campaign created brochures and posters designed to teach African-American and Hispanic caregivers of children important facts about calcium. This information includes how much calcium children of various ages need; which foods are rich in calcium; how to read a food package label to determine how much calcium is in it; how to increase the amount of calcium in their child’s diet; and, alternative means of increasing calcium intake if their children have problems with dairy foods.

Laundromats have been chosen as locations to display and disseminate “Calcium: Select to Protect” materials. In previous studies, the target population indicated that they are required to wait for extended periods and often use

reading material available to pass the time. It is anticipated that laundromat clients would read literature on health topics, if it were available, while waiting in these establishments.

### Objectives

The objectives of this study are to determine if: (1) the “Calcium: Select to Protect” brochures and posters are effective at increasing the knowledge and awareness of the importance of adequate calcium intake among caregivers of children in limited-resource African-American and Hispanic urban populations, and (2) laundromats are useful venues in which to reach and educate this population.

### Subject Population

The “Calcium: Select to Protect” material will be displayed and distributed in Newark, a city with a high prevalence of African-American and Hispanic families in the community. The target population for this protocol is laundromat owners in this city. Up to fifty laundromat owners in Newark will be contacted; it is anticipated that this research will be implemented with a minimum of five owners in each city.

### Methodology

Laundromat owners will be informed of the details of study implementation and what they would be expected to do as a participant. The owners will be asked to:

(1) hang at least one “Calcium: Select to Protect” poster in an area within their laundromat(s) which will be easily visible by their clientele; (2) display at least twenty “Calcium: Select to Protect” brochures in an area that is easily accessible to clients; and (3) allow researchers to conduct in-person interviews with their clients at the start and completion of the study.

All owners agreeing to participate will be required to sign the Authorization from Non-Rutgers Research Sites form. The owners will also be required to sign a Memorandum of Understanding. Each owner will be asked to complete a survey after the study is explained but before the material is put on display. Written consent forms will be signed by each participant. The owner will be asked questions concerning: demographic information; calcium-related knowledge and beliefs; and, the anticipated difficulty in participating in the study. At the end of the study the owner will be asked to complete an additional survey. In this survey the owner will be asked questions concerning: the ease of participation; any difficulties experienced; any changes made in the display and distribution of the materials; and his/her intent to continue the protocol after the study ends.

During the study period, researchers will monitor and record the quantity of the “Calcium: Select to Protect” materials on display, and replenish them if needed.

#### Provisions for Protection of Private, Identifiable Information

No information is being collected during the study that could be harmful to the individual if revealed. Survey subjects will not be identified in any recorded data; all survey responses will be summarized for statistical purposes. All survey records for this study will be maintained in a locked file cabinet to maintain the confidentiality of subject lists and individual subject responses.

## Appendix 6: Authorization from Non-Rutgers Sites Form

I will allow Rutgers researchers to recruit and survey adults at my site to find out about them, what they eat and other dietary concerns. I know that you will recruit my clientele who meet the study guidelines to complete your survey.

I am responsible for this site and have read a copy of the study protocol.

I know that if I have any questions about this work I can contact any of these people:

Dr. Debrah Palmer Keenan  
(732) 932-9853

Audrey Adler  
(732) 932-0532

Alison Bigwood  
(732) 932-3779

Diana Cangemi  
(732) 932-3779

Located at:  
Rutgers University  
Dept. of Nutritional Sciences  
Davison Hall, 26 Nichol Ave  
New Brunswick, NJ 08901-2882

If any problems arise, I may also contact:

The Office of Research and Sponsored Programs  
Rutgers University  
ASB 43, 3 Rutgers Plaza  
New Brunswick, NJ 08901  
(732) 932-0150 ext. 2104  
Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu)

Site Name and Location:

Printed Name and Title:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix 6: Translated Authorization from Non-Rutgers Site Form

### Autorización de localidades fuera de Rutgers

Yo permito a los investigadores de Rutgers que alisten y registren a los adultos en esta localidad para averiguar sobre ellos, lo que comen y otros asuntos dietéticos. Yo sé que ud. alistaré a mis clientes que califican con los requisitos del estudio para poder completar la encuesta.

Yo soy responsable de esta localidad y he leído la copia del protocolo del estudio.

Yo sé que si tengo alguna pregunta sobre este estudio puedo ponerme en contacto con cualquiera de estas personas:

Dr. Debrah Palmer Keenan  
(732) 932-9853

Audrey Adler  
(732) 932-0532

Alison Bigwood  
(732) 932-3779

Diana Cangemi  
(732) 932-3779

Localizado en:  
Rutgers University  
Dept. of Nutritional Sciences  
Davison Hall, 26 Nichol Avenue  
New Brunswick, NJ 08901-2882

Si llega a surgir cualquier problema, también puede llamar:

The Office of Research and Sponsored Programs  
Rutgers University  
ASB 43, 3 Rutgers Plaza  
New Brunswick, NJ 08901  
(732) 932-0150 ext. 2104  
Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu)

Nombre y dirección de la localidad:

Su Nombre y Puesto:

Su Firma \_\_\_\_\_

Fecha:\_\_\_\_\_

## Appendix 7: Calcium Survey for Laundromat Clients

1. Is this your first time visiting this laundromat?

☐ Yes

☐ No

If "No": How often do you come to this laundromat? \_\_\_\_\_

2. Please think about how much time you spend here including the time spent waiting for your clothes to wash, folding your clothes, and extra time you may spend talking with friends etc. On average, what is the amount of time you spend here each time you come? \_\_\_\_\_

3. Have you seen any billboards, brochures, posters or have you been given anything from your doctor that talks about calcium?

☐ Yes

☐ No

☐ Don't know

If "Yes": Please describe the material.

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If "Yes": Where and when did you see this material?

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4. Do you take care of a child or children regularly?

☐ Yes

☐ No\*

**\*If “No”, thank him/her for their time and terminate the survey**

5. Ages of the children you are responsible for: \_\_\_\_\_

6. How do you think getting enough calcium helps your child?

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7. How worried are you that one or more of your children are not getting enough calcium?

\_\_\_ Not worried at all

\_\_\_ Slightly worried

\_\_\_ Worried sometimes  
and not others

\_\_\_ Worried

\_\_\_ Very worried

\_\_\_ Don't know

\_\_\_ Refused to answer

8. Do you think not getting enough calcium is harmful?

- |   |  |
|---|--|
| <input type="checkbox"/> Not harmful  | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> Slightly harmful                                     | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> So harmful that you<br>need a doctor's care          |  |
| <input type="checkbox"/> So harmful that you<br>need to go to the<br>hospital |  |
| <input type="checkbox"/> So harmful that you<br>might die                     |  |

9. Do you believe that your child gets enough calcium each day?

- ☐ Yes ☐ No ☐ Don't know

10. Please describe what you think is enough calcium for a child each day?

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How many of your children do you think do not get enough calcium each day?

☐ Don't know

11. How many milligrams of calcium do you think a child between the ages 1 to 3 need each day? \_\_\_\_\_

12. How many milligrams of calcium do you think a child between the ages 4-8 need each day? \_\_\_\_\_

13. How many milligrams of calcium do you think a child between the ages 9-18 need each day? \_\_\_\_\_

14. What health conditions may your child be at risk for if they do not get enough calcium?

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15. Do you have any trouble making sure your child gets enough calcium?

☐ Yes

☐ No

☐ Don't know

If "Yes": Please describe what problems

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16. Do you know how to find out how much calcium is in a food?

☐ Yes

☐ No

If "Yes": Please describe how you do this.

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17. Do you avoid food from the milk group?

☐ Yes

☐ No

**If "Yes", go to question 18, If "No", go to question 19.**

18. What foods do you avoid from the milk group and why?

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19. Do any of your children avoid foods from the milk group?

☐ Yes      ☐ No

**If “Yes”, go to question 20 and 21. If “No”, go to question 22**

20. How many of your children avoid foods from the milk group? \_\_\_\_

21. What foods does your child/ do your children avoid from the milk group and why?

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**For the next 5 questions I will ask you about choosing calcium-rich foods for your child/children. For each question you can choose from 4-5 answers.**

22. How sure are you that you are able to choose calcium-rich foods?

Would you say that you are:

\_\_\_\_ Not sure

\_\_\_\_ A little sure

\_\_\_\_ Somewhat sure

\_\_\_\_ Very sure

\_\_\_\_ Completely sure

\_\_\_\_ Don't know

\_\_\_\_ Refused to answer

23. How sure are you that you are able to use the food label to choose calcium-rich foods? Would you say that you are:
- |  |  |
|--|--|
| <input type="checkbox"/> Not sure        | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> A little sure   | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> Somewhat sure   |  |
| <input type="checkbox"/> Very sure       |  |
| <input type="checkbox"/> Completely sure |  |
24. How sure are you that you are able to obtain calcium-rich foods? Would you say that you are:
- |  |  |
|--|--|
| <input type="checkbox"/> Not sure        | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> A little sure   | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> Somewhat sure   |  |
| <input type="checkbox"/> Very sure       |  |
| <input type="checkbox"/> Completely sure |  |
25. How sure are you that you are able to get your child to eat calcium-rich foods? Would you say that you are:
- |  |  |
|--|--|
| <input type="checkbox"/> Not sure        | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> A little sure   | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> Somewhat sure   |  |
| <input type="checkbox"/> Very sure       |  |
| <input type="checkbox"/> Completely sure |  |
26. How much control do you think you have over whether your child consumes calcium-rich foods? Would you say that you have:
- |                                      |  |
|--------------------------------------|--|
| <input type="checkbox"/> None at all | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> A little    | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> Some        |  |
| <input type="checkbox"/> A lot       |  |
| <input type="checkbox"/> Complete    |  |

**Demographic Questions:**

27. Age: \_\_\_\_\_
28. Gender: ☐ Male ☐ Female
29. How do you identify yourself? Check all that apply
- ☐ American Indian ☐ Asian/Pacific Islander ☐ Black (non-Hispanic)
- ☐ Hispanic ☐ White (non-Hispanic) ☐ Other
30. Are you on WIC?
- ☐ Yes ☐ No

31. Do you receive food stamps?

☐ Yes

☐ No\*

If "Yes", how much a month \_\_\_\_\_

For how many people \_\_\_\_\_

If "No" ask:

Are you interested in finding out about getting food stamps?  
I/We have a flyer that will help you figure out if you can get them?

☐ Took flyer

☐ Did not take flyer

32. Where do you shop for most of your food? Please give the name of store and its location:

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**For open-ended questionnaires skip questions 33 and 34 and ask questions 35 and 36.**

**For closed-ended questionnaires continue with questions 33 and 34. Skip questions 35 and 36.**

**For Closed-Ended Food Frequency Questionnaire Only:**

33. Please name all the calcium-rich foods that you can think of:

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34. These next questions are about the foods your child usually eats or drinks. Please tell me how often your child eats or drinks each food listed, for example, everyday, twice a week, or once a month. Include all the foods your child eats or drinks at home and away from home.

**Read each food listed on the “Calcium Questionnaire”. Record how often the child eats the food and also note kinds/brands for starred items.**

**After completing the “Calcium Questionnaire” thank the participant for his/her time and end the survey.**

**For Open-ended Food Frequency Questionnaire Only:**

35. Name all the calcium-rich foods that your child eats or drinks.  
For each food please tell me how often he or she eats the food  
for example everyday, twice a week or once a month. Include  
all the foods your child eats at home and away from home.

**Record answers on “Calcium Questionnaire”, do not read the  
foods listed.**

## Appendix 7: Translated Laundromat Client Survey

### ENCUESTA SOBRE EL CALCIO PARA CLIENTES LAVANDERÍA

1. ¿Es la primera vez que viene a lavandería?

☐ Sí

☐ No

Si contesta "No", ¿con qué frecuencia viene ud. a lavandería? \_\_\_\_\_

2. Por favor, piense acerca de cuanto tiempo pasa ud. aquí, incluyendo el tiempo que ud. espera para lavar la ropa, doblar la ropa, y el tiempo adicional que pasa halando con sus amigas/os, etc. Por lo general, ¿cuánto tiempo en total pasa ud. cada vez que viene aquí? \_\_\_\_\_

3. ¿Ha visto ud. carteles, folletos o afiches o ha recibido materiales sobre el calcio de su doctor?

☐ Sí

☐ No

Si contesta "Sí", por favor describa el material

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Si contesta "Sí", ¿dónde y cuándo vio este material?

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4. ¿Esta ud. encargada de cuidar a niños regularmente?

☐ Sí ☐ No\*

**\* Si contesta "No", agradézcale a la persona por su tiempo y termine la encuesta.**

5. Las edades de los niños que ud. cuida:

\_\_\_\_\_

6. ¿Como cree ud. que consumir suficiente calcio pueda ayudar a sus niños?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. ¿Cuán preocupada(o) está ud. de que sus niños no reciban suficiente calcio?

\_\_\_ No preocupada/o en  
absoluto

\_\_\_ No Sé  
\_\_\_ Rehusó a

\_\_\_ Preocupada/o  
levemente

contestar

\_\_\_ A veces preocupada/o  
\_\_\_ Preocupada/o  
\_\_\_ Muy Preocupada/o

8. ¿Cree ud. que no recibir suficiente calcio sea perjudicial?

- |  |                                   |
|--|-----------------------------------|
| <input type="checkbox"/> No es perjudicial                               | <input type="checkbox"/> No Sé    |
| <input type="checkbox"/> Levemente perjudicial                           | <input type="checkbox"/> Rehusó a |
| <input type="checkbox"/> Tan perjudicial que ud. necesita ir al doctor   | contestar                         |
| <input type="checkbox"/> Tan perjudicial que ud. necesita ir al hospital |                                   |
| <input type="checkbox"/> Tan perjudicial que pueda morir                 |                                   |

9. ¿Cree ud. que su niño recibe suficiente calcio diariamente?

- ☐ Sí ☐ No ☐ No Sé

10. ¿Cuánto calcio cree ud. que es suficiente para su niño diariamente?

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¿Cuántos de sus niños cree ud. que reciben suficiente calcio diariamente?

☐ No Sé

11. ¿Cuántos miligramos de calcio cree ud. que un niño de 1 a 3 años necesita por día? \_\_\_\_\_

12. ¿Cuántos miligramos de calcio cree ud. que un niño de 4 a 8 años necesita por día? \_\_\_\_\_

13. ¿Cuántos miligramos de calcio cree ud. que un niño de 9 a 18 años necesita por día? \_\_\_\_\_

14. ¿Qué condiciones de salud pueden correr el riesgo de contraer sus niños si no consumen suficiente calcio?

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15. ¿Tiene ud. dificultad en asegurarse de que sus niños reciban suficiente calcio?

☐ Sí

☐ No

☐ No Sé

Si contesta "Sí", por favor describa las dificultades

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16. ¿Sabe ud. como averiguar que cantidad de calcio contienen los alimentos?

☐ Sí

☐ No

Si contesta "Sí", por favor describa como lo hace ud.

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17. ¿Evita ud. consumir productos lácteos (a base de leche)?

☐ Sí ☐ No

**Si contesta “Sí”, continúe con la pregunta 18. Si contesta “No”, pase a la pregunta 19**

18. ¿Qué alimentos lácteos evita consumir y porqué?

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19. ¿Evitan sus niños consumir productos lácteos?

☐ Sí ☐ No

**Si contesta “Sí”, continúe con la pregunta 20 y 21. Si contesta “No”, pase a la pregunta 22**

20. ¿Cuántos de sus niños evitan consumir productos lácteos?

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21. ¿Qué alimentos productos lácteos evitan consumir sus niños y porqué?

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**Auto Eficacia:**

**Las próximas 5 preguntas serán sobre la selección de alimentos ricos en calcio para sus niños. Cada pregunta tiene de 4 a 5 respuestas para elegir.**

22. ¿Cuán segura(o) está ud. de su habilidad para seleccionar alimentos ricos en calcio?

<input type="checkbox"/> Insegura(o)	<input type="checkbox"/> No Sé
<input type="checkbox"/> Un poco segura(o)	<input type="checkbox"/> Rehusó a contestar
<input type="checkbox"/> Algo segura(o)	
<input type="checkbox"/> Muy segura(o)	
<input type="checkbox"/> Completamente segura(o)	

23. ¿Cuán segura(o) está ud. de poder interpretar/entender las etiquetas de los alimentos para seleccionar alimentos ricos en calcio?

<input type="checkbox"/> Insegura(o)	<input type="checkbox"/> No Sé
<input type="checkbox"/> Un poco segura (o)	<input type="checkbox"/> Rehusó a contestar
<input type="checkbox"/> Algo segura(o)	
<input type="checkbox"/> Muy segura(o)	
<input type="checkbox"/> Completamente segura(o)	

24. ¿Cuán segura(o) está ud. de poder conseguir alimentos ricos en calcio?

<input type="checkbox"/> Insegura(o)	<input type="checkbox"/> No Sé
<input type="checkbox"/> Un poco segura(o)	<input type="checkbox"/> Rehusó a contestar
<input type="checkbox"/> Algo segura(o)	
<input type="checkbox"/> Muy segura(o)	
<input type="checkbox"/> Completamente segura(o)	



25. ¿Cuán segura está ud. de conseguir que sus niños consuman alimentos ricos en calcio?

\_\_\_ Insegura(o)

\_\_\_ No Sé

\_\_\_ Un poco segura (o)

\_\_\_ Rehusó a contestar

\_\_\_ Algo segura(o)

\_\_\_ Muy segura(o)

\_\_\_ Completamente

segura(o)

26. ¿Cuánto control cree ud. que tiene de sus niños sobre el consumo de alimentos ricos en calcio?
- |  |   |
|--|---|
| <input type="checkbox"/> Ninguno en absoluto | <input type="checkbox"/> No Sé              |
| <input type="checkbox"/> Un poco             | <input type="checkbox"/> Rehusó a contestar |
| <input type="checkbox"/> Algo                |   |
| <input type="checkbox"/> Mucho               |   |
| <input type="checkbox"/> Completo            |   |

**Preguntas Demográficas:**

27. Su edad: \_\_\_\_\_
28. Sexo: ☐ Masculino ☐ Femenino
29. ¿Cómo se identifica ud.? (Puede marcar más de una opción)
- |  |  |                                |
|--|--|--------------------------------|
| <input type="checkbox"/> Indio Americano<br>(No-hispano) | <input type="checkbox"/> Asiático-Islas del Pacífico | <input type="checkbox"/> Negro |
| <input type="checkbox"/> Hispano                         | <input type="checkbox"/> Blanco (no-Hispano)         | <input type="checkbox"/> Otros |
30. ¿Recibe ud. WIC?
- |                             |                             |
|-----------------------------|-----------------------------|
| <input type="checkbox"/> Sí | <input type="checkbox"/> No |
|-----------------------------|-----------------------------|

31. ¿Recibe ud. cupones de alimentos?

☐ Sí

☐ No

Si contesta "Sí", ¿cuánto recibe por mes?

\_\_\_\_\_

¿Para cuántas personas? \_\_\_\_\_

Si contesta "No," ¿está ud. interesada/o en recibir cupones de alimentos? Nosotros tenemos un folleto que les informará como obtener los cupones de alimentos.

☐ Tomó el folleto  
el folleto

☐ No tomó

32. ¿Dónde compra ud. la mayoría de sus alimentos? Por favor, díganos el nombre y la dirección de la tienda.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**For open-ended questionnaires skip questions 33 and 34 and ask questions 35 and 36.**

**For close-ended questionnaires continue with questions 33 and 34. Skip questions 35 and 36.**

**For Close-Ended Food Frequency Questionnaire Only:**

33. Por favor nombre todos los alimentos/comidas ricos en calcio que ud.conocé:

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34. Las próximas preguntas son sobre los alimentos que su niño/a consume normalmente. Por favor, dígame con que frecuencia su niño/a come o bebe cada alimento, mencion por ejemplo, todos los días, dos veces por semana, una vez por mes. Incluya todos los alimentos que su niño/a consume en casa y fuera de casa.

**Read each food listed on the “Calcium Questionnaire.” Record how often the child eats the food and also note kinds/brands for starred items.**

**After completing the “Calcium Questionnaire” thank the participant for his/her time and end the survey.**

**For Open-ended Food Frequency Questionnaire Only:**

35. Por favor, nombre todos los alimentos/comidas ricos en calcio que sus niños consume o beben. Para cada alimento dígame con que frecuencia su niño/a consume el alimento, por ejemplo, todos los días, dos veces por semana, una vez por mes. Incluya todos los alimentos que su niño/a consume en casa y fuera de casa.

**Record answers on “Calcium Questionnaire,” do not read the foods listed.**

36. Por favor nombre otros alimentos ricos en calcio que ud. piensa que su niño/a no consume.

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**Thank participant for his or her time and end the survey:**

**¡Eso es todo, muchas gracias por su participación en esta encuesta!**

## Appendix 8: Laundromat Client Food Frequency Questionnaire

### **Calcium Questionnaire:**

☐ Closed-ended

☐ Open-ended

<b>Foods</b>	<b>Kind/Brand Name (indicate for starred** items)</b>	<b># of times/day</b>	<b># of times/week</b>	<b># of times/month</b>	<b># of times/year</b>
Milk (any type)**					
Ice cream					
Yogurt (fresh or frozen)**					
Pudding (any type)					
Cheese (any type)**					
Macaroni and cheese					
Pizza with cheese					
Broccoli					
Graham or animal crackers that are calcium-fortified**					
Bread that is calcium-fortified**					

**Calcium Questionnaire:**☐ Closed-ended☐ Open-ended

<b>Foods</b>	<b>Kind/Brand Name (indicate for starred** items)</b>	<b># of times/day</b>	<b># of times/week</b>	<b># of times/month</b>	<b># of times/year</b>
Canned and instant pasta that is calcium-fortified**					
Cereal that is calcium fortified **					
Cereal bars that are calcium fortified**					
Waffles that are calcium fortified**					
Pancakes that are calcium fortified**					
Juice that is calcium fortified**					
Canned salmon with the bones in					
Soy or rice milk that is calcium fortified**					
Multivitamins with calcium**					
<b><u>Do not read if they identified themselves as Hispanic:</u></b> Collard or turnip greens					
<b><u>Do not read if they identified themselves as Black (non-Hispanic):</u></b> Instant rice that is calcium fortified**					



## Appendix 8: Translated Laundromat Client Food Frequency Questionnaire

### Calcium Questionnaire:

☐ Closed-ended

☐ Open-ended

Alimentos	Tipo/Nombre de la marca (indicate for starred** ítems)	# de veces por día	# de veces por semana	# de veces por mes	# de veces por año
Leche (cualquier tipo) **					
Helado o leche congelada					
Yogur (fresco o congelado)**					
Natillas y “puddings” (pudines) (cualquier tipo)					
Queso (cualquier tipo)**					
Macarrones con queso					
Pizza con queso					
Brócoli					
Galletas “Graham” y Galletas en forma de animales fortificadas con calcio **					
Pan fortificadas con calcio **					

**Calcium Questionnaire:**☐ Closed-ended☐ Open-ended

Alimentos	Tipo/Nombre de la marca (indicate for starred** ítems)	# de veces por día	# de veces por semana	# de veces por mes	# de veces por año
Pastas enlatadas a instantáneas fortificadas con calcio como***					
Cereal fortificado con calcio **					
Barras de Cereal fortificadas con calcio **					
Waffles fortificados con calcio **					
Panqueques fortificados con calcio **					
Jugos fortificados con calcio **					
Salmón enlatado con hueso					
Leche de soja o arroz fortificada con calcio **					
Multivitiminas con calcio**					
<b><u>Do not read if they identified themselves as Hispanic:</u></b> Collard or turnip greens					
<b><u>Do not read if they identified themselves as Black (non-Hispanic):</u></b> Arroz instantáneo fortificado con calcio**					

## Appendix 9: Consent Form for Clients

Rutgers is doing a survey to learn what you know about calcium and how much calcium you and your family eat. If you agree to take part in this study you will be asked questions about:

- the importance of calcium
- types of calcium-rich foods you and your child eat
- anything you feel may stop you from eating or providing foods high in calcium to your family.

The survey will take about 15-20 minutes. Your answers will be kept private. No one will see your answers except the people who are part of this project. There is no risk to you because you answer the survey questions. **You can stop at any time.**

If you have any questions about this survey you may contact any of these people:

Dr. Debrah Palmer Keenan  
(732) 932-9853

Audrey Adler  
(732) 932-0532

Alison Bigwood  
(732) 932-3779

Diana Cangemi  
(732) 932-3779

Located at:  
Rutgers University  
Dept. of Nutritional Sciences  
Davison Hall, 26 Nichol Ave  
New Brunswick, NJ 08901-2882

If you have any questions about your rights as a research subject, you may contact:

The Office of Research and Sponsored Programs  
Rutgers University  
ASB 43, 3 Rutgers Plaza  
New Brunswick, NJ 08901  
(732) 932-0150 ext. 2104  
Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu)

I agree to participate in the study outlined above:

Participants signature: \_\_\_\_\_ Date: \_\_\_\_\_

Researchers signature: \_\_\_\_\_ Date: \_\_\_\_\_

*This informed consent form was approved by the Rutgers Institutional Review Board for the Protection of Human Subjects on 4/20/06; approval of this form expires on 5/20/06*

## Appendix 9: Translated Laundromat Client Consent Form

### Autorización del Cliente

Rutgers está realizando una encuesta para averiguar lo que ud. sabe sobre el calcio y cuanto calcio ud. y su familia consumen. Si ud. está de acuerdo en participar en este estudio le preguntaremos sobre lo siguiente:

- la importancia del calcio
- tipos de alimentos ricos en calcio que ud. y sus niños consumen
- cualquier cosa que le impida consumir o proveer alimentos ricos en calcio a su familia

La encuesta tomará de 15 a 20 minutos. Sus respuestas son confidenciales. Nadie revisará sus respuestas con excepción de las personas de Rutgers involucradas con este estudio. Ud. no corre ningún riesgo al contestar esta encuesta. **Ud. puede parar en cualquier momento.**

Si tiene preguntas sobre esta encuesta, ud. puede ponerse en contacto con estas personas:

Dr. Debrah Palmer Keenan  
(732) 032-9853

Audrey Adler  
(732) 932-0532

Alison Bigwood  
(732) 932-3779

Diana Cangemi  
(732) 932-3779

Localizado en:  
Rutgers University  
Dept. Of Nutritional Sciences  
Davison Hall, 26 Nichol Avenue  
New Brunswick, NJ 08901-2882

Si ud. tiene alguna pregunta sobre sus derechos de sujeto de investigación, puede llamar a:

The Office of Research and Sponsored Programs  
Rutgers University  
ASB 43, 3 Rutgers Plaza  
New Brunswick, NJ 08901  
(732) 932-0150 ext. 2104  
Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu)

Yo estoy de acuerdo en participar en el estudio anteriormente citado:

Firma del participante \_\_\_\_\_

Fecha: \_\_\_\_\_

Firma del investigador/a \_\_\_\_\_

Fecha: \_\_\_\_\_

This informed consent form was approved by the Rutgers Institutional Review Board for the Protection of Human Subjects on (4/20/06) approval of this form expires on (4/20/07).

## Appendix 10: Laundromat Client Research Protocol

### Background

Studies have shown that many children have an inadequate intake of calcium. Deficiencies among low-income African-American and Hispanic children are particularly troublesome. Inadequate intakes of calcium may lead to an increased risk of disease, including health conditions that present themselves in adult years such as high blood pressure and osteoporosis, and health conditions that are more prevalent in childhood, such as lead poisoning.

Lactose intolerance and low dairy consumption in culturally specific diets are barriers that African-American and Hispanic populations encounter when trying to obtain the recommended amounts of calcium. The “Calcium: Select to Protect” social marketing campaign created brochures and posters designed to teach the caregivers of children of these ethnicities important facts about calcium. This information includes how much calcium children of various ages need; which foods are rich in calcium; how to read a food package label to determine how much calcium is in it; how to increase the amount of calcium in their child’s diet; and, alternative means of increasing calcium intake if their children have problems with dairy foods.

Laundromats have been chosen as locations to display and disseminate “Calcium: Select to Protect” materials. In previous studies, the target population indicated that they are required to wait for extended periods and often use

reading material available to pass the time. It is anticipated that laundromat clients would read literature on health topics, if it was available, while waiting in these establishments.

### Objectives

The objectives of this study are to determine if: (1) the “Calcium: Select to Protect” brochures and posters are effective at increasing the knowledge and awareness of the importance of adequate calcium intake among caregivers of children ages one to eight in limited-resource African-American and Hispanic urban populations, and (2) laundromats are useful venues in which to reach and educate this population.

### Subject Population

African-American and Hispanic laundromat clients who are caregivers of children will be surveyed in Newark and Jersey City. Up to 500 clients will be surveyed in each city.

### Methodology

Laundromat owners will be contacted and asked for permission to survey their clientele. Owners of laundromats who agree to participate will be required to sign the Authorization from Non-Rutgers Research Sites Form.

Laundromat clients at these sites will be asked to participate in an in-person interview conducted by one of the researchers. Written consent forms will be signed by each participant. During the interview participants will be asked for: demographic data; their beliefs about their children's calcium intake; their knowledge of the health conditions related to inadequate calcium intake; and, their children's current calcium intake through a food frequency questionnaire.

During the study period, "Calcium: Select to Protect" campaign materials will be displayed in the participating Newark laundromats. At least one campaign poster and at least twenty brochures will be displayed in each facility.

Jersey City will serve as the control city. Laundromat clients in this city will not be exposed to the "Calcium: Select to Protect" materials during the study period.

Upon completion of the study, researchers will return to the laundromats that were previously surveyed in all four cities. Laundromat clients will be asked to participate in an in-person interview using the same survey instrument that was used at the start of the study. Written consent will again be obtained from each participant.

#### Provisions for Protection of Private, Identifiable Information

No information is being collected during the study that could be harmful to the individual if revealed. Survey subjects will not be identified in any recorded data; all survey responses will be summarized for statistical purposes. All survey records for this study will be maintained in a locked file cabinet to maintain the confidentiality of subject lists and individual subject responses.



## Appendix 11: Script for Recruiting Laundromats

### **Script for Recruiting Laundromats in Newark**

Good morning/afternoon, may I please speak to an owner or manager?

My name is Alison Bigwood. I am a graduate student at Rutgers University and we are running a campaign to try to increase the calcium intake of children in the Newark area.

We have brochures and posters that explain the benefits of calcium for children. We are hoping to display these brochures and posters in your laundromat so that your clients can learn more about calcium.

I would like to tell you more about the program. Can I set up a date to meet with you and talk about the project in more detail?

### **Script for Recruiting Laundromats in Jersey City**

Good morning/afternoon, may I please speak to an owner or manager?

My name is Alison Bigwood. I am a graduate student at Rutgers University and we are trying to find out what people in the Jersey City area know about calcium and how much calcium children are getting. To do this we are hoping to ask your clients some questions.

I would like to tell you more about the project. Can I set up a date to meet with you and talk about this project in more detail?

## Appendix 12: Calcium Survey For Clients (Pilot)

1. Is this your first time visiting this laundromat?

☐ Yes ☐ No

If "No": How often do you come to this laundromat? \_\_\_\_\_

2. Please think about how much time you spend here including the time spent waiting for your clothes to wash, folding your clothes, and extra time you may spend talking with friends etc. On average, what is the total amount of time you spend here each time you come? \_\_\_\_\_

3. Have you seen any billboards, brochures, posters or have you been given anything from your doctor that talks about calcium?

☐ Yes ☐ No ☐ Don't know

If "Yes": Please describe the material.

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---

If "Yes": Where and when did you see this material?

---

---

---

---

4. Are you the primary caregiver of a child or children?

☐ Yes

☐ No\*

**\*If “No”, thank him/her for their time and terminate the survey**

5. Ages of the children you are responsible for: \_\_\_\_\_

**Perceived Benefits:**

6. How do you think getting enough calcium helps your child?

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---

---

**Perceived severity:**

7. On a scale of 1 to 10, with 1 being not worried at all and 10 being very worried, how worried are you that one or more of your children are not getting enough calcium? \_\_\_\_\_

8. Do you think not getting enough calcium is harmful?

☐ Yes

☐ No

☐ Don't know

**If No, skip to question 10**

9. On a scale of 1-10, with 1 being mildly harmful and 10 being very harmful, how harmful do you feel it is if your child does not get enough calcium? \_\_\_\_\_

**Perceived susceptibility:**

10. Do you believe that your child gets enough calcium each day?

☐ Yes

☐ No

☐ Don't know

11. Please describe what you think is enough calcium for a child each day?

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How many of your children do you think get enough calcium each day?

---

☐ Don't know

12. How many milligrams of calcium do you think a child between the ages 1 to 3 need each day? \_\_\_\_\_

13. How many milligrams of calcium do you think a child between the ages 4-8 need each day? \_\_\_\_\_

14. How many milligrams of calcium do you think a child between the ages 9-18 need each day? \_\_\_\_\_

15. What health conditions may your child be at risk for if they do not get enough calcium?

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**Perceived Barriers**

16. Do you have any trouble making sure your child gets enough calcium?

☐ Yes

☐ No

☐ Don't know

If "Yes": Please describe what problems

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17. Please name as many calcium-rich foods as you can think of:

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---

---

---

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18. Do you know how to find out how much calcium is in a food?

☐ Yes

☐ No

If "Yes": Please describe how you do this.

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---

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---

---

19. Do you avoid food from the milk group?

☐ Yes

☐ No

**If "Yes", go to question 20, If "No", go to question 21.**

20. What foods do you avoid from the milk group and why?

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21. Do any of your children avoid foods from the milk group?

☐ Yes

☐ No

**If "Yes", go to question 22 and 23. If "No", go to question 24**

22. How many of your children avoid foods from the milk group?

---

23. What foods does your child/ do your children avoid from the milk group and why?

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**Self Efficacy:**

**For the next 5 questions I will ask you about choosing calcium-rich foods for your child/children. For each question you can choose from 4-5 answers.**

24. How sure are you that you are able to choose calcium-rich foods?

Would you say that you are:

- |  |  |
|--|--|
| <input type="checkbox"/> Not sure        | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> A little sure   | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> Somewhat sure   |  |
| <input type="checkbox"/> Very sure       |  |
| <input type="checkbox"/> Completely sure |  |

25. How sure are you that you are able to use the food label to choose calcium-rich foods?

Would you say that you are:

- |  |  |
|--|--|
| <input type="checkbox"/> Not sure        | <input type="checkbox"/> Don't know        |
| <input type="checkbox"/> A little sure   | <input type="checkbox"/> Refused to answer |
| <input type="checkbox"/> Somewhat sure   |  |
| <input type="checkbox"/> Very sure       |  |
| <input type="checkbox"/> Completely sure |  |

26. How sure are you that you are able to obtain calcium-rich foods?

Would you say that you are:

☐ Not sure

☐ Don't know

☐ A little sure

☐ Refused to answer

☐ Somewhat sure

☐ Very sure

☐ Completely sure

27. How sure are you that you are able to get your child to eat calcium-rich foods?

Would you say that you are:

☐ Not sure

☐ Don't know

☐ A little sure

☐ Refused to answer

☐ Somewhat sure

☐ Very sure

☐ Completely sure

28. How much control do you think you have over whether your child consumes calcium-rich foods?

Would you say that you have:

☐ None at all

☐ Don't know

☐ A little

☐ Refused to answer

☐ Some

☐ A lot

☐ Complete



**Continue with the “Calcium Questionnaire” here**

**After the FFQ, ask:**

**Demographic Questions:**

29. Age: \_\_\_\_\_

30. Gender: ☐ Male ☐ Female

31. How do you identify yourself? Check all that apply

☐ American Indian ☐ Asian/Pacific Islander ☐ Black (non-Hispanic)

☐ Hispanic ☐ White (non-Hispanic) ☐ Other

32. Are you on WIC?

☐ Yes

☐ No

If "Yes", how much is your voucher good for each month?

\_\_\_\_\_

For how many people\_\_\_\_\_

33. Do you receive food stamps?

☐ Yes

☐ No

If "Yes", how much a month\_\_\_\_\_

For how many people\_\_\_\_\_

Thank you VERY much for participating in this survey!

### **African-American Calcium Questionnaire (Pilot)**

These next questions are about the foods your child usually eats or drinks. Please tell me how often your child eats or drinks each food, for example, everyday, twice a week, or once a month. Include all the foods your child eats or drinks at home and away from home.

<b>Calcium-Rich Foods</b>	<b>Kind</b>	<b># of times/day</b>	<b># of times/week</b>	<b># of times/month</b>	<b># of times/year</b>
Milk (any type)**					
Ice cream					
Yogurt (fresh or frozen)**					
Pudding (any type)**					
Cheese (any type)**					
Macaroni and cheese					
Pizza with cheese					
Broccoli					
Collard or turnip greens					

<b>Calcium-Rich Foods</b>	<b>Kind</b>	<b># of times/day</b>	<b># of times/week</b>	<b># of times/month</b>	<b># of times/year</b>
Graham cracker or animal crackers that are calcium-fortified					
Bread that is calcium-fortified					
Canned and instant pasta that is calcium-fortified**					
Cereal that is calcium fortified like Special K Plus and Total**					
Cereal bars that are calcium fortified**					
Waffles that are calcium fortified like Eggo Waffles					
Pancakes that are calcium fortified					
Juice that is calcium fortified**					
Canned salmon with the bones in					
Soy or rice milk that is calcium fortified					
Multivitamins with calcium**					

### **Hispanic Calcium Questionnaire (Pilot)**

These next questions are about the foods your child usually eats or drinks. Please tell me how often your child eats or drinks each food, for example, everyday, twice a week, or once a month. Include all the foods your child eats or drinks at home and away from home.

<b>Calcium-Rich Foods</b>	<b>Kind</b>	<b># of times/day</b>	<b># of times/week</b>	<b># of times/month</b>	<b># of times/year</b>
Milk (any type)**					
Ice cream					
Yogurt (fresh or frozen)**					
Pudding (any type)**					
Cheese (any type)**					
Macaroni and cheese					
Pizza with cheese					
Broccoli					
Graham crackers or animal crackers that are calcium-fortified					

<b>Calcium-Rich Foods</b>	<b>Kind</b>	<b># of times/day</b>	<b># of times/week</b>	<b># of times/month</b>	<b># of times/year</b>
Bread that is calcium-fortified					
Canned and instant pasta that is calcium-fortified**					
Cereal that is calcium fortified like Special K Plus and Total**					
Cereal bars that are calcium fortified**					
Waffles that are calcium fortified like Eggo Waffles					
Pancakes that are calcium fortified					
Instant rice that is calcium fortified					
Juice that is calcium fortified**					
Canned salmon with the bones in					
Soy or rice milk that is calcium fortified					
Multivitamins with calcium**					

## Appendix 13: Newark Food Stamp Flyer



**Every day people use foods stamps every day. Food stamps can help you eat in a more healthy way.**

### **What are food stamps?**

Food stamps help people buy food. If you are eligible, you will receive a plastic card, called an EBT card, which you can use like cash at a grocery store or supermarket to buy healthy foods.

### **How do I know if I can get food stamps?**

To find out if you can get food stamps:

- Call 1-800-687-9512 or
- Visit the local food stamp office located at:

Essex County Department of Citizen Services  
Division of Welfare  
18 Rector Street, 9<sup>th</sup> Floor  
Newark, NJ 07102  
973-733-3000

### **What will I need to tell them?**

- The ages and health of the people who live with you
- How much money everyone in your house makes each month
- How much money you have saved
- If you own any cars
- Any medical and child care costs you pay each month
- If you are a US citizen or have a green card

## Appendix 14: Jersey City Food Stamp Flyer



**Every day people use foods stamps every day. Food stamps can help you eat in a more healthy way.**

### **What are food stamps?**

Food stamps help people buy food. If you are eligible, you will receive a plastic card, called an EBT card, which you can use like cash at a grocery store or supermarket to buy healthy foods.

### **How do I know if I can get food stamps?**

To find out if you can get food stamps:

- Call 1-800-687-9512 or
- Visit the local food stamp office located at:

Hudson County Division of Social Services  
100 Newkirk Street  
Jersey City, NJ 07306  
201-420-3000

### **What will I need to tell them?**

- The ages and health of the people who live with you
- How much money everyone in your house makes each month
- How much money you have saved
- If you own any cars
- Any medical and child care costs you pay each month
- If you are a US citizen or have a green card



## Appendix 15: Translated Newark Food Stamp Flyer



### **La gente común usa los cupones de alimentos todos los días. Los cupones de alimentos pueden ayudarle a comer más saludablemente/sanamente**

#### **¿Qué son los cupones de alimentos?**

Los cupones ayudan a las personas a comprar alimentos. Si ud. califica, ud. recibirá una tarjeta plástica que se llama “EBT Card,” la cual ud. puede usar como dinero en bodegas o supermercados para comprar alimentos saludables.

#### **¿Cómo puedo averiguar si puedo obtener los cupones de alimento?**

Para averiguar si califico para recibir los cupones de alimentos:

- Llame 1-800-687-9512 o
- Visite la informática a [18.mynihelps.org](http://18.mynihelps.org) o
- Visite su oficina local de cupones de alimentos localizada en:  
Essex County Department of Citizen Services  
Division of Welfare  
18 Rector Street, 9<sup>th</sup> Floor  
Newark, NJ 07102  
973-733-3000

#### **¿Qué información necesitarán en la oficina?**

- Las edades y estado de salud de las personas que viven con ud.
- Los ingresos mensuales de cada persona en la casa.
- Cuánto dinero tienen uds. ahorrado.
- Son propietarios de automóviles.
- Los costos médicos y de cuidado de niños que uds. paga por mes.
- Si ud. cualquiera en su casa es un ciudadano de los Estados Unidos o si tiene la tarjeta verde, o es un inmigrante legal

## Appendix 16: Translated Jersey City Food Stamp Flyer



### **La gente común usa los cupones de alimentos todos los días. Los cupones de alimentos pueden ayudarle a comer más saludablemente/sanamente**

#### **¿Qué son los cupones de alimentos?**

Los cupones ayudan a las personas a comprar alimentos. Si ud. califica, ud. recibirá una tarjeta plástica que se llama “EBT Card,” la cual ud. puede usar como dinero en bodegas o supermercados para comprar alimentos saludables.

#### **¿Cómo puedo averiguar si puedo obtener los cupones de alimento?**

Para averiguar si califico para recibir los cupones de alimentos:

- Llame 1-800-687-9512 o
- Visite la informática a [18.mynjhelps.org](http://18.mynjhelps.org) o
- Visite su oficina local de cupones de alimentos localizada en:  
Hudson County Division of Social Services  
100 Newkirk Street  
Jersey City, NJ 07306  
201-420-3000

#### **¿Qué información necesitarán en la oficina?**

- Las edades y estado de salud de las personas que viven con ud.
- Los ingresos mensuales de cada persona en la casa.
- Cuánto dinero tienen uds. Ahorrado.
- Son propietarios de automóviles.
- Los costos médicos y de cuidado de niños que uds. paga por mes.
- Si ud. cualquiera en su casa es un ciudadano de los Estados Unidos o si tiene la tarjeta verde, o es un inmigrante legal.

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