



## The shape of things to come? Obesity prevalence among foreign-born vs. US-born Mexican youth in California

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### ABSTRACT

Obesity among the Mexican-origin adult population in the US has been associated with longer stays in the US and with being US- vs. Mexican-born, two proxies for acculturation. This pattern is less clear for Mexican-origin children and young adults: recent evidence suggests that it may be reversed, with foreign-born Mexican youth in the US at higher risk of obesity than their US-born Mexican–American counterparts. The objective of this study is to evaluate the hypothesis that the immigrant advantage in obesity prevalence for Mexican-origin populations in the US does not hold for children and young adults. We use data from the Los Angeles Family and Neighborhood Survey ( $N = 1143$ ) and the California Health Interview Survey ( $N = 25,487$ ) for respondents ages 4–24 to calculate the odds of overweight/obesity by ethnicity and nativity. We find support for the hypothesis that overweight/obesity prevalence is not significantly lower for first-generation compared to second- and third-generation Mexican-origin youth. Significantly higher obesity prevalence among the first generation was observed for young adult males (ages 18–24) and adolescent females (ages 12–17). The previously-observed protective effect against obesity risk among recent adult immigrants does not hold for Mexican-origin youth.

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### Introduction

Hispanic youth in the US are a large and rapidly-growing group: the 5–17 year-old Hispanic population will increase from 11 million in 2006 to 28 million in 2050, at which point there will be more Hispanic than non-Hispanic white school children in the US (Fry & Gonzales, 2008). This group is growing in other ways as well: Overweight and obesity among Hispanic children and adolescents have increased substantially in the past 20 years, particularly for Mexican-origin adolescents (Flegal, Ogden, & Carroll, 2004). The National Health and Nutrition Examination Survey (1999–2002) recorded an overweight prevalence of 40% for Mexican-origin children ages 6–18 (vs. 28% for non-Hispanic whites), and an obesity prevalence of 22% (vs. 14% for non-Hispanic whites) (Hedley et al., 2004). A pattern of higher obesity prevalence for Hispanic children relative to non-Hispanic white children emerges as early as preschool (Anderson & Whitaker, 2009).

High obesity prevalence in the young Hispanic population raises concerns about social disparities in current and future chronic disease burden. Hispanic-origin school children have already been shown to have higher prevalence of high blood pressure, hyperlipidemia, and diabetes compared to non-Hispanic whites (Trevino et al., 1999; Winkleby, Robinson, Sundquist, & Kraemer, 1999), all of which are associated with overweight in children. Dietary and physical activity patterns established during adolescence often persist into adulthood, making obesity difficult to reverse. Therefore, the weight status of the young Hispanic population may point to the shape of things to come.

Understanding the mechanisms that produce race–ethnic disparities in obesity prevalence is important for designing effective obesity prevention and treatment programs. In addition to comparisons across race–ethnic groups, analyses of within-ethnicity differences have been a particular focus of studies of Hispanic adult obesity. Generally, adult obesity prevalence has been shown to be higher for US-born (second- and higher-generation) Hispanic adults compared to the foreign-born (first-generation) (Akresh, 2008; Bates, Acevedo-Garcia, Alegria, & Krieger, 2008). Within the first generation, a longer stay in the US has also been associated with higher risk of obesity and obesity-related health

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behaviors (Barcenas et al., 2007; Kaplan, Huguet, Newsom, & McFarland, 2004; Oza-Frank & Cunningham, 2010). Much less attention has been paid to describing and understanding these within-ethnic group differences in younger Hispanics, particularly foreign-born children. This evidence gap is unfortunate for at least two reasons. First, as stated above, this large and growing population in the US is at particularly high risk of obesity. Second, the mechanisms that pattern obesity risk by length of stay in the US or nativity may differ for Hispanic youth compared to adults. In this study we address this gap by describing patterns of overweight/obesity risk in the Mexican-origin population, the largest Hispanic subgroup in the US, in four recent samples of children and young adults in California. We motivate the study with a review of prior evidence linking length of stay in the US and generational status to obesity risk for Mexican-origin youth in the US, and a discussion of factors that may contribute to a different relationship between nativity and obesity risk in these younger cohorts compared to older adults.

## Background

One of the first studies of nativity patterns of obesity for Hispanic youth in the US found higher obesity risk for 2nd (children of immigrants) and 3rd (children of natives) generation relative to 1st generation adolescents, confirming the immigrant advantage already observed in the adult population (Popkin & Udry, 1998). Subsequent studies have identified higher obesity risk specifically among the 2nd generation children or adolescents relative to 3rd (Baker, Balistreri, & Van Hook, 2009; Balistreri & Van Hook, 2009; Hernández-Valero et al., 2011; Hernandez-Valero et al., 2007; Liu, Chu, Frongillo, & Probst, 2012). Two studies based on the 2003 National Survey of Children's Health suggest that obesity prevalence may be similar or even higher among the 1st and 2nd generation compared to 3rd generation Hispanic youth (Singh, Kogan, & Yu, 2009; Taverno, Rollins, & Francis, 2010). Prior evidence is therefore not consistent about whether the immigrant advantage in obesity observed among Hispanic adults holds for Hispanic youth, particularly for the first generation. In addition, there is scant evidence for recent cohorts; with one exception (Hernández-Valero et al., 2011), data in these studies were collected prior to 2007.

Two mechanisms have been proposed to explain nativity or generational differences in obesity risk in Hispanic populations. A large literature cites acculturation, the process by which immigrant groups adapt to a new destination, as a primary cause of obesogenic habits and behaviors (Abraido-Lanza, Chao, & Florez, 2005). Acculturation may increase the risk of obesity for Hispanics because it is associated both with stress (leading to maladaptive behaviors) and with the abandonment of healthier behaviors from the country or culture of origin in favor of less healthy behaviors in the US, such as fast food or soda consumption (Finch & Vega, 2003; Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005). Studies assessing the relationship between acculturation and obesity operationalize acculturation many ways, most commonly through measures of exposure to US culture as defined by nativity, parents' nativity, and time spent in the US. Other acculturation measures include language use and ability, and social interaction with ethnically and linguistically similar or dissimilar people. Most of the studies cited above that found higher risk of obesity among more acculturated children and adolescents employed measures of duration of time in the US as proxies for acculturation.

A second and less studied mechanism linking nativity of US immigrants to obesity risk is the interconnectedness of the food environment and migration dynamics in the sending country

(Buttenheim, Goldman, Pebley, Wong, & Chung, 2010; McLaren, 2007; Van Hook, Baker, Altman, & Frisco, 2012). This is particularly relevant in the case of obesity risk for Mexican-origin children in the US, given the large, circular migration flows between the two countries and the well-documented nutrition transition underway in Mexico (Popkin & Gordon-Larsen, 2004; del Rio-Navarro et al., 2004; Rivera et al., 2002; Rivera, Barquera, Gonzalez-Cossio, Olaiz, & Sepulveda, 2004). This transition is characterized by a shift from unprocessed and low energy density diets to highly processed, energy dense foods. The transition is due in part to new food marketing strategies and a simultaneous decrease in physical activity that has accompanied urbanization and economic development in Mexico (Franco-Marina, 2007; Popkin, 2001, 2006). Mexico's nutrition transition has been notably rapid: Mexico now has the second highest rates of adult obesity among OECD countries (after the US) (Sassi, 2010).

In prior decades, recent migrants from Mexico to the US may have enjoyed an obesity advantage because they were coming from a less obesogenic environment, and may also have been selected for better health. As Mexico's obesity rates approach those in the US, and as the propensity to migrate becomes less associated with lower obesity risk for both migrants (Rubalcava, Teruel, Thomas, & Goldman, 2008) and their family members remaining at home who may later migrate (Creighton, Goldman, Teruel, & Rubalcava, 2011), we would expect the immigrant advantage in obesity to be attenuated. This should be particularly true for youth, given that obesity rates have increased particularly rapidly for this age group in Mexico, and that health selection is likely to operate less strongly for migrant children. At the same time, two recent studies comparing overweight/obesity of Mexican-American children (both native and Mexican-born) in the US to children in Mexico find substantially higher prevalence in the Mexican-American populations, which argues against an "importation" of high obesity prevalence across the border (Hernández-Valero et al., 2011; Rosas et al., 2011).

## Research questions

Our primary goal in this study is to describe ethnicity–nativity differences in obesity risk in several recent cohorts of Mexican-origin youth in California. We seek to evaluate whether the immigrant advantage in obesity observed in the adult population also characterizes Mexican-origin children, adolescents and young adults. Due to the changing food environment in Mexico and changes in migration dynamics and selection, we hypothesize that exposure to the US is not a strong determinant of obesity risk for youth. We add to the literature on acculturation, migration, and obesity in Mexican-American youth by providing age–sex specific estimates of the odds of overweight/obesity in two large, recent datasets from California. Our inclusion of young adults ages 18–24 with the child and adolescent samples is also an important contribution. Many studies of adult obesity generally, and immigrant obesity specifically, restrict the sample to adults ages 25–64, thus excluding the young adult years. In addition, we argue that the 18–24 year old group still has much in common with children and adolescents in terms of family roles, food environment, and eating behaviors. Indeed, as of 2007–2009, 43% of both whites and Latinos in the US ages 20–24 resided with their parents (Qian, 2012). Our analysis is focused on California, where 37% of the US Mexican-origin population lives.

## Methods

### Data

The study exploits two data sets: the second wave of the Los Angeles Family and Neighborhood Survey (L.A.FANS-2) and the

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