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A Trajectory Model for Understanding and Assessing Health Disparities in Immigrant/Refugee Communities

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Abstract While numerous factors contributing to racial/ethnic health disparities have been identified, the clustering and interaction of these factors as a syndemic or trajectory has not been well-studied (Starfield in Soc Sci Med 64:1355–1362, 2007; Singer in Soc Sci Med 39(7):931–948, 1994). More importantly, for immigrant/refugee populations, the interaction of contributing factors is not documented adequately enough to provide a solid framework for planning, implementation and evaluation of interventions aimed at reducing disparities. In this paper, the authors draw from the literatures on health disparities and immigrant/refugee health, as well as direct program and research experience, to propose an approach for assessment of the diachronic interaction of ecological factors (a trajectory, or "diachronic ecology") contributing to health disparities among immigrant/refugee populations. It is our hope that this approach will contribute to the important effort to collect data supporting the development of interventions and policies that effectively address the dynamic processes through which health disparities are created, maintained, and changed.

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Introduction

While numerous factors contributing to racial/ethnic health disparities have been identified in research and in the literature, the clustering and interaction of these factors as a *syndemic* or *trajectory* has not been well-studied [1, 2]. More importantly, for immigrant/refugee populations, the interaction of contributing factors is not documented adequately enough to provide a solid framework to guide the planning, implementation and evaluation of interventions aimed at reducing disparities. This article seeks to provide a framework and direction for research documenting the interaction of these factors. To do so, we first synthesize the relevant literature in order to outline key factors that in themselves contribute to health disparities among immigrant and refugee populations. Building upon these factors, we then propose a theoretical framework and an approach for assessment of what we call the diachronic interaction of ecological factors (a trajectory, or "diachronic ecology") contributing to these health disparities. Finally, we discuss some of the methodological challenges inherent in the proposed approach, and outline key points with respect to the investment necessary to carry it through. It is our hope that the approach presented here will contribute to the important effort to collect data that becomes a basis for developing interventions and policies that effectively address the dynamic processes through which health disparities are created, maintained, and changed. Moreover, though the focus here is on immigrant/refugee populations, the

proposed approach may be useful for understanding health disparities in any racial/ethnic minority population.

Racial/Ethnic Disparities in Health: Overall Issue

The reduction or elimination of racial/ethnic health disparities presents a key and continuing public health challenge, as encoded in the second major goal of *Healthy People 2010* [3]. This challenge will remain at the forefront, because in the years ahead, the population of the US will continue to grow increasingly diverse. According to the US Census Bureau (http://www.census.gov/population/www/pop-profile/profiledynamic.html accessed July 2008), the two fastest growing population groups are Asian and Hispanic, with the Asian population growing 20 percent between 2000 and 2005, and the Hispanic population growing 21 percent during the same period. Most important with respect to this application, of the 100 million Americans added to the population since 1967, *53 percent are recent immigrants or their descendants (J. Passel, Pew Hispanic Center, quoted in* [4]. Thus not only will the population of the US be increasingly diverse, but the diversity will be substantially composed of recent immigrants and new generations within their families. The interaction between immigration and health disparities is complex; nevertheless, it is clear that progress in this area is an important component of the overall effort to eliminate racial/ethnic health disparities. Yet the unprecedented population growth in the last three decades for the US immigrant population, from 9.6 million in 1970–32.5 million in 2002, has not been accompanied by increased monitoring of immigrant health [5].

The issue of racial/ethnic health disparities was foregrounded as a major policy issue[1] beginning with the DHHS Secretary's Task Force Report in 1995 ([6], called the "Heckler Report" after then DHHS Secretary Margaret Heckler), and continuing through several recent reports documenting disparities in health care, including those from the Institute of Medicine [7]; the Kaiser Family Foundation (e.g., [8, 9]—the latter on disparities in cardiac care); the Commonwealth Fund [10]; and recent National Healthcare Disparities Reports [11, 12], among others. Disparities in health status between racial/ethnic minority and majority populations have been documented over a wide range of health conditions (with variations depending upon the population and health condition). These disparities are also considered to be differences in health status that, as stated by Whitehead (1992, quoted in [13], "are not only unnecessary and avoidable but, in addition, are considered unfair and unjust."

Immigrant and Refugee Health and Health Disparities

The scope of health disparities referred to above includes significant disparities pertaining to immigrant/refugee populations. Such disparities are complex: health status varies by national/ethnic group, and some immigrant groups have better health status than the general population or native-borns when they first arrive [5, 14, 15]; National Academy of Sciences Commission on Behavioral and Social Sciences and Education 1999; [16, 17]; and others), though this changes over time.

Common health issues for immigrant/refugees from a number of countries include: obesity/diabetes, mental health (including depression), tuberculosis, nutritional deficiencies, intestinal parasites, chronic hepatitis B infection, and lack of immunization as major health problems in many groups (e.g., [18–20], though there is variation in other health and psychosocial issues, as well as cultural beliefs, among these groups [18]. Comparisons of health-related data across types of immigrants (by immigration category) also point to within-group variation. Based on data from the New Immigrant Pilot Survey (NIS-P):

- The health of immigrants in the two largest visa categories (employment and spouse of US citizen) is typically better than the typical native-born American at time of arrival.
- In other visa categories, however, the situation changes—immigrants who came as spouses of permanent resident aliens reported much poorer health than those who married US citizens. And about one-third of refugees and asylees report that they are in fair or poor health [21, 22].

These differences between groups of immigrants/refugees are supported by the largest and longest studies of children of immigrants, the Children of Immigrants Longitudinal Study [23–25].

In what has been viewed as a "health paradox," immigrant and refugee populations that arrive in the US with better health status than the average native-born lose this health status advantage after a number of years. For example, while most Mexican immigrants living in the US come to the country healthier than the average American, this changes—about 7 percent of immigrants living in the US for 10 years or less have fair or poor health, after 15 years this rises to 15 percent [26]. There are many possible reasons—one may be self-selection for healthiness among those who emigrate (explaining better health status

[1] Though the current emphasis on racial/ethnic health disparities was foreshadowed much earlier in separate efforts by W. E. B. DuBois and Booker T. Washington to address African-American health issues (DuBois 1906/2003; Quinn and Thomas 1996; Thomas et al. 2006).

at time of immigration), combined with a trajectory in the United States that entails certain difficulties and barriers to health. At the same time, many immigrant and refugee groups come to the US after fleeing or otherwise leaving traumatic and severe crises, presenting another set of barriers to health. *Understanding such trajectories is a foundation for effectively addressing health problems and disparities that result.*

Why Health Disparities?

Since the Heckler Report, there has been a wide range of efforts to understand and address racial/ethnic health disparities. A substantial body of literature (e.g., [7–10, 27–36] and others) has identified numerous factors that contribute to these disparities, including: Health care bias; racism and discrimination; lower SES as a common factor among racial/ethnic minorities; lack of insurance; differences in knowledge; patterns of mistrust and alienation; cultural differences; language barriers; lack of culturally competent care; exposure to environmental risk; poor neighborhood conditions, including deteriorated housing, pollution, crime/violence; lack of community resources; and inadequate minority health systems, planning and data. Both the US Office of Minority Health (OMH) and the National Center on Minority Health and Health Disparities (NCHD) have recently developed frameworks for understanding and addressing health disparities, with a goal of fostering a systematic approach to achieving progress.

Factors Contributing to Health Disparities Among Immigrant and Refugee Popoulations

For immigrant and refugee populations, a number of the factors cited above as contributing to health disparities in general are particularly salient, depending upon the population as noted. Key overarching issues include the following:

Poverty and lack of resources: Approximately 21 percent of children in immigrant families live in poverty, compared to 14 percent in native-born families [37]. Data from the National Survey of American Families [38] shows that hardship is greater for children of immigrants than for children of US natives in three areas: food, housing and health care. The level of hardship for these children varies by state and parallels the degree to which state policies offer public benefits to non-citizens. Some research even reports that immigrants are often staying away from public programs and assistance even when they are eligible, out of concern about the effects participation will have on their legal status or potential legal status [39]. Finally, the national survey also found that children of immigrants are more than four times as likely as children of natives to live in crowded housing [38]. In addition, populations that have experienced disproportionate poverty may be less accustomed to some of the lifestyle patterns that have become commonplace among wealthier and mainstream population segments. With this in mind it is again not surprising that African-Americans and Hispanics are the population groups least likely to exercise even 20 min a day, three times per week (Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System 2005). *Exercise* as a discrete and popular activity, not just as part of life, is a relatively recent and largely middle or upper class phenomenon that accompanied the rise in living standards in the US over the past century, and the increasing separation of work from physical activity in a post-industrial, technological society.[2]

While racial/ethnic minority populations include members across socioeconomic categories, it is fair to say that these populations are over-represented in lower socioeconomic groups, which means that the consequences of low SES fall harder on minority populations. Low SES (see, for example, [30]) is widely associated with health risks and problems, such as nutrition, smoking, injuries, environmental pollution, unemployment, low income, family dysfunction, psychosocial stress, presence of community violence, limited recreational space, and the like. Socioeconomic factors do not refer just to income: Housing segregation by race/ethnicity (regardless of income) is associated with a range of health risks [33, 36]. Neighborhood characteristics (e.g., crime, lack of recreation space) intertwined with socioeconomic status also have an impact on such health conditions as obesity, violence and substance use [31, 32, 34].

Another way to synthesize the impact of these broad social and economic factors in producing health disparities is to think of poverty and social marginalization as creating groups of people (defined by their socioeconomic status, race/ethnicity, etc.) with poor access to the inter-related systems of health, economic and social resources. This general access-poor relationship generates patterns of living that focus more on survival and achieving social goals (e.g., family needs, access to resources) within a very limited sphere, as opposed to maximizing health. This view is expressed in the literature on *vulnerable populations* [40–43], and, for example, the research of medical anthropologists such as Dressler and colleagues (see what

[2] Though exercise and health "fads" have existed for some time, and of course, it has always been a part of life for athletes. We are referring to the popularization of exercise as part of a modern lifestyle, where it has become a significant commercial enterprise and consumer choice (fitness centers, gyms, running paths, sports apparel, etc.).

is called the structural-constructivist model of health disparities in [44] and Merrill Singer [1]. This is also similar to the idea discussed herein of disparities as an indicator of different *health trajectories*.

Lack of insurance and economic support: Most immigrants are in working families; however, the nature of their jobs (low income, no health insurance) as well as restricted access to insurance for other reasons leads to a situation in which 42–51 percent of non-citizens lack health coverage, compared to 15 percent for native citizens [45]. According to the National Survey of American Families [38], 22 percent of immigrant children are also uninsured, more than twice the rate for US natives. Some states have signicficantly higher rates of uninsured. Lack of insurance correlates to reduced access to care, and consequently to poor health status.

Difficulties in accessing health care and treatment bias: Moreover, regardless of age, legal status or insurance coverage, immigrants receive about half the health care services provided to native-born Americans [46]. Financial, cultural and language differences all make it hard for immigrants to afford care, understand medical advice or embrace recommendations from American doctors and nurses. African Americans, Hispanics, and Asian Americans all report, in numbers higher than the overall populations, having a major problem getting specialty care [47]. Even when there is access to health care, a number of studies have documented differential treatment for racial/ethnic minorities in the health *care* system. A recent Institute of Medicine (IOM) report [7], for example, described such disparities, including a lack of culturally and linguistically competent care. The Kaiser Family Foundation has issued numerous briefings and reports addressing provider bias and differences in quality of care (e.g., [8, 9]—the latter on disparities in cardiac care), as has the Commonwealth Fund [10]. A recent study [48] showed that cultural competency training is still inadequate for medical students: Significant percent ages of resident physicians ($n = 2047$) felt they were not prepared to provide specific components of cross-cultural care, including: providing care to individuals with non-Western health beliefs (25%); care to new immigrants (25%); and care to individuals whose religious beliefs affect treatment (20%). In addition, 24% felt they did not have the skills to identify cultural customs impacting on medical care.

Differences in health knowledge and practice: Populations migrating to the US from all over the world may come with different understandings about health and health care. Such knowledge differences may be related to indigenous ethnomedical systems (see generally [49])—that is, those cultural systems of knowledge and practice that define (for the populations in the culture) the spectrum of illnesses and diseases, their causes, appropriate treatments, and appropriate treatment providers. Where these culturally specific definitions vary from the definitions that are more predominant in Western biomedical knowledge and practice, and where immigrant and refugee populations maintain strong adherence to these definitions, a significant gap in understanding and utilization of standard medical care may result (see, for example, [50] for the classic case of this kind of gap among Hmong refugees). Or, some immigrant populations may lack adequate information about preventive and treatment procedures. For example, a study of Mexican–American attitudes about screening and preventive medicine found a lack of knowledge about cancer, a tendency to avoid the disease, and fatalism with respect to the consequences [51]. Avoidance of discussion topics related to sex and HIV/AIDS is viewed as characteristic of some Asian and Pacific Islander populations ("What Are Asian and Pacific Islander HIV Prevention Needs," UCSF Center for AIDS Prevention Fact Sheet).

Migration and immigration experiences including acculturative stress: Three additional and related sets of factors must be considered as unique to immigrants/refugees [52]: home country trauma, migration trauma, and the impact of social, cultural, and economic change after arriving in the US Many immigrant groups—for example, Sudanese and Somalis today, Central Americans and Southeast Asians in previous years—are coming from home country situations in which there are brutal civil wars, genocide, and starvation. Moreover, the migration experience is itself dangerous and difficult for many, including persecution, pirate attacks, rape, robbery, years in refugee camps, family separation, and other experiences. Once they are in the US, immigrant and refugee families may experience social role changes, generational family disruption, economic hardship, language and other difficulties. There is a high likelihood that these factors have an impact on health (see [53–56], and others).

Related to this set of factors is the role-shifting that occurs within immigrant families. This has significant impacts on health and health care. Where mothers, or parents generally, are traditionally responsible for health care, it is often necessary for children to serve as interlocutors because they are more English-fluent and familiar with public transportation and logistics. The role-shifting may in turn strain family decisionmaking and lines of authority.

Mistrust and other attitudes: Mistrust of the health system (similar in some ways to that described for the African American community—see for example [28], as well as [35], may also exist in different forms among immigrant/refugee communities (e.g. Asner-Self and Marotta 2005). The authors, for example, have conducted program evaluation research related to migrant worker populations from Central America who come to the US

reluctant to trust government agencies and institutions (including public health clinics) due, among other things, to bad experiences during the years of civil conflict in Central America. If one adds to this a long history of dealing with health problems outside of the mainstream health care system, because of a lack of insurance or other resources to cover the cost, or simply because of exclusion, it is not surprising that, for example, African-American and Latino men are less likely than Caucasian men to see a doctor, even when they are in poor health [57].

Perceived discrimination: Although discrimination is a complex issue with respect to immigrant/refugee communities, the negative association between perceived discrimination and health has been demonstrated across numerous studies [58], where perceived discrimination is typically measured by respondent characterizations and frequency of various experiences and events (e.g., verbal abuse, denigration, exclusion, etc.). With respect to immigrants/refugees, the negative effects of discrimination are intermingled with political and economic contributing factors, and may be counterbalanced by strength of ethnic identity [59].

Lack of community efficacy: One additional factor that has emerged as important at least in the CDC-funded Latino immigrant community intervention called SAFER Latinos (www.saferlatinos.org, with two of the authors as Principal and Co-Investigator) is the lack of community efficacy as a factor contributing to reduced access to services and to the continuation of substandard housing as well as other community conditions affecting health. Due to language barriers, unfamiliarity with supportive resources, fear and mistrust, many immigrant community members are reluctant to take action or make complaints regarding such conditions, and may feel they cannot do anything to change the community. This kind of connection between efficacy and health is supported by other research as well [60, 61].

Lack of data and systems to address health needs of immigrant and refugee populations: Finally, there are also issues related to the lack of systems set up to address racial/ethnic minority health disparities in general, and even more so for immigrant/refugee populations. Before such disparities can be addressed, *they have to be identified.* That is, data need to be collected and maintained on health status and disparities among racial-ethnic minority populations [62, 63]. Currently, this is often not the case. Many populations are lumped together under general designations like "Asian" or "Hispanic (ethnicity)" which obscure significant differences—Peoples from Vietnam and India are both, for example, included in the "Asian". And when disparities are identified, the information should be available to agencies/organizations that are tasked with addressing them.

Resilience and minority health status: While the factors outlined above contribute to health disparities for immigrant/refugee populations, there are also studies that suggest a self-protective mechanism with respect to some health issues that may result from minority status. Thus, even while perceived prejudice may be detrimental to well-being, this effect may be counterbalanced by protective processes [64–66]: protective effects such as increased group identification and collective well-being may co-exist with the negative effects (e.g. decreased self-esteem) in a "dual-process" model. Or, self-protective group identification may lead to a higher sense of global self-esteem. This may also be the case relative to the protective effects of ethnic or cultural identification [59, 67].

The Trajectory Approach

Clearly, numerous factors contributing to racial/ethnic health disparities in general—and specifically for immigrant/refugee populations—have been identified. However, these contributing factors likely do not operate as distinct factors, but in a co-occurring and interactive fashion,[3] such that a *pathway* or *trajectory* with respect to the health of a population is created. Thus socioeconomic status, often linked to historical racism and a legacy of exclusion, shapes a "way of life" with respect to health that may include not only real limitations on access to and quality of care, and higher exposure to community and environmental health risk, but behavior patterns and community norms that follow from expectations of high risk and limited care options, and a particular "relationship" to the health care system. For immigrant and refugee populations, such trajectories are also shaped by cultural patterns related to health, the immigration experience itself and the dislocations and traumas that may be associated with it, as well as socioeconomic status: 43 percent of immigrant children live in low-income families, compared with 23 percent of US-born children [46].

What these historical circumstances produce is a *trajectory of health* for particular populations, which includes their vulnerability and exposure to disease, and the systems of knowledge, attitude and practice related to health that developed in response to their vulnerability and historical experience within a larger society—or, one could say, a larger environment. This combination of *vulnerability*, *circumstance* and *response* forms the larger set of forces that, together, create the differences in health status referred to as health disparities.

We believe that it is important to gain a better understanding of the shaping and evolution of such trajectories

[3] As a *syndemic.* See, for example, [1].

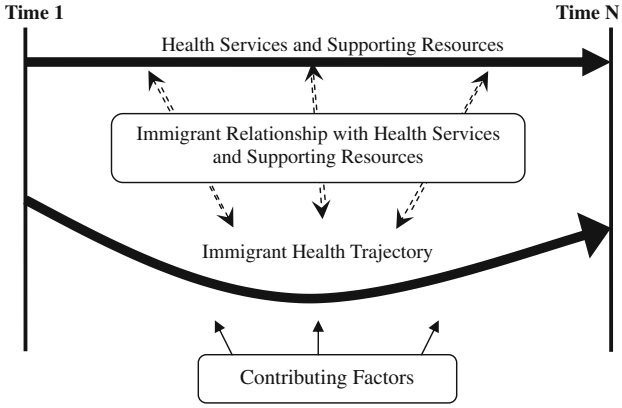

Fig. 1 Concept of immigrant/refugee health trajectory

and their impact on health disparities. This knowledge will serve the field and those populations experiencing disparities in developing better interventions, grounded in the dynamics underlying the relationships between peoples and the health system. Not only does this follow an ecological, determinants-of-health approach, but it mirrors the domain-based organization of *Healthy People 2010* [3], with one difference—the idea of a trajectory means that we understand these factors or determinants to operate together as a dynamic system over time [2], shaping an *ongoing relationship between a population and the health-related system*. The term "health-related system," in this approach, refers to the combination of health services *per se* together with the economic, community, social and cultural supports necessary for their effective delivery. Figure 1 is a representation of an immigrant/refugee health trajectory, moving from relatively good health status at entry to decreasing (and then slightly increasing) status over time as a function of marginalization from health and supporting resources, driven by multiple contributing factors.

A Model for Assessing Health Disparity Trajectories in Immigrant/Refugee Communities

The following discussion regarding a preliminary model of health trajectory determinants is intended as a potential guide for research efforts investigating factors that, together, contribute to health disparities in particular immigrant/refugee (or other) minority communities. Specific scales or measures are not included in the discussion because these may vary by population, and in some cases will need development. In order to assess a health trajectory for a specific (immigrant/refugee) population, longitudinal, multi-method data is necessary to track the co-occurrence of contributing ecological factors and health status over time. The following domains represent a preliminary categorization of data to be collected, derived from the general literature on disparities, as well as that specific to immigrants and refugees:

Factor Domain One—Migration Experience: Includes the home country situation at time of emigration (crises, civil war, famine, disasters, etc.), the migration experience, including difficult or lengthy migration periods (e.g., exposure to violence, robbery, rape; extended exposure to severe conditions; extended time in refugee camps before migration).

Factor Domain Two—Social Adjustment: Length of time in US, acculturation, home country social status and gender relationships, stressors created by the acculturation/adjustment process itself, regardless of migration experience. These may include: changes in social status, challenges to traditional gender roles and parental authority, change in SES (from home country), change in available social supports, and inter-generational conflict.

Factor Domain Three—SES: Economic, employment, and housing status to include economic supports for health care, such as insurance, employment with benefits, types and availability of employment, etc. (And change over time in any of these factors).

Factor Domain Four—Social Supports: Degree of cultural identity, extended family, neighborhood, cultural, employment and other important social network systems, and the degree to which any of these networks facilitate access to health care (social capital).

Factor Domain Five—Neighborhood Characteristics: Other community and neighborhood supports or barriers for health, including community organizations, social networks, recreation sites, parks, sources of healthy food (restaurants, grocery stores), etc. Presence/absence of environmental risks such as water/sanitation problems, sources of pollution, crime and violence. The level of community efficacy fits in this category.

Factor Domain Six—Health Status: Health status (self-report), focusing on a general measure of health status (such measures could focus on health issue "clusters" that current research suggests are impacted by migration and transition—for example, CVD/diabetes/obesity, and mental health).

Factor Domain Seven—Health Knowledge and Practices: Knowledge, attitudes and practices with respect to health, disease, and health care treatments and utilization, including knowledge connected to indigenous ethnomedical systems and approaches to treatment and care, etc. This category should include any differences between home country health care practices and current/US practices.

Factor Domain Eight—Access to Care: Actual and perceived physical availability of and access to health care services, location of services. Actual and perceived availability of culturally competent care at service delivery settings—including language interpretation services, health

care practices that recognize client cultural patterns, health care staff who are diverse, etc.

Factor Domain Nine—Perceived Discrimination: This is often measured as perceived level of discrimination and racism in daily experience, frequency of these experiences or events, as well as perceived acceptance, integration and involvement in various community settings (e.g., neighborhood, school, work, health care, etc.).

These domains set out the scope of data to be collected that represent dimensions of the health-related *trajectory* for each population studied. The trajectory incorporates a migration process beginning with a home-country situation and health-related patterns, then impacted by the nature of the emigration/immigration experience itself, then impacted by an often complex and extended adjustment to life in the United States [52, 68]. The trajectory, and the data collected to represent it, thus includes factors reported at the individual level (including individual characteristics and practices as well as social/community/cultural factors reported from the individual from the individual perspective), and environmental/ecological factors, some reported at the individual level, some which may need to be drawn from observational data in the community. In order to reduce complexity, health status questions may need to be limited to a general self-report health status measure as well as specific questions about health status primarily surrounding "health issue clusters" that are often problematic for immigrant populations: for example, cardiovascular disease/diabetes/obesity and mental health—the latter including specific symptoms of depression, stress, PTSD, and intimate partner violence. Some questions on tuberculosis and Hepatitis are also warranted.

Following the trajectory model, the factors listed above may, over time, increase or decrease the "distance" between a population trajectory and the mainstream health-related system—which can be understood as *marginalization*—as well as factors that may operate within a context of marginality yet serve as protective (e.g., social cohesion). Thus marginalization in itself may include positive and negative aspects. We can therefore hypothesize that an increase in *negative marginality,* represented by the presence or degree of negative factors in the above domains, will be associated with a decrease in health status in general and with respect to the two specific health issue clusters measured.

Analytical Challenges

Collecting and analyzing data following the domains identified in this paper, however, presents significant challenges. These include the following:

Measurement issues: As noted earlier, many of the domains proposed do not have standardized measures. New measures will need to be created and the psychometric properties of the measures established. Moreover, in many cases existing measures will also need to be tested in specific immigrant/refugee populations. Moreover, measures of acculturation need to reflect rapidly-changing technologies, including Internet and mobile phone technologies that significantly impact the nature of social interaction, information and cultural exposure, particularly for younger age brackets.

Multi-level model issues: The model presented is inherently a multi-level model; thus analysis must also be multi-level so that cross-level factors, environmental factors impacting individual behavior, and perceptions of these ecological factors, can be assessed. The ability to do so is a function of the availability and quality of the ecological measures, across levels.

Issues related to longitudinal data collection: As discussed, the theoretical model of a dynamic system implies longitudinal data analysis and the identification and recruitment of a cohort to be followed over time. In immigrant/refugee populations, this is likely to be challenging, especially with population groups that are highly transient and perhaps apprehensive about cooperating in such research. Nevertheless, it has been done before [23]. The data collected will have to include both retrospective (prior to coming to the US) and longitudinal data in order to describe trajectories and test the theoretical models.

Data analysis: Because the model encompasses a large number of data items, and because of likely attrition in longitudinal studies, large sample sizes and high participation rates will be necessary. The approach described includes time-varying covariates so it must be modeled appropriately; it also implies the use of growth modeling techniques to identify health trajectories.

The Imperative

Because the complex of factors creating health disparities among immigrant/refugee populations differs in significant ways from the general population, such data are ultimately necessary in order to plan, implement and evaluate appropriate health promotion and intervention programs. The trajectory approach described herein offers one model for organizing the meaningful collection of such data. However, in order for the trajectory approach to achieve its aims, research and instrument development are necessary in order to fill in the methodological gaps noted above. The model described in this article has been presented with the express goal that such work should begin as soon as

possible as a foundation for data collection. The necessary work will entail, at a minimum, the following:

- Recruitment and involvement of a broad range of immigrant/refugee organizations and CBOs in a participatory research process to address the approach described herein. This may even include collaborative work with organizations in the countries of origin for these populations.
- Foundational work to develop/adapt instruments, scales and protocols for the domains outlined above, encompassing both quantitative and qualitative methods.
- A sufficient investment in research funding for longitudinal studies, with the understanding that addressing the methodological issues and collaborative partnership development takes time.

As value added, despite the unique characteristics of immigrant/refugee populations, we also believe that the trajectory approach and methodologies that result from it will be highly useful with respect to other racial/ethnic minority populations as well, for whom health access and health status is also the product of a dynamic interaction over time with health systems and their supporting resources.

References

1. Singer M. AIDS and the health crisis of the urban poor: the perspective of critical medical anthropology. Soc Sci Med. 1994;39(7):931–48.
2. Starfield B. Pathways of influence on equity in health. Soc Sci Med. 2007;64:1355–62.
3. US Department of Health and Human Services (DHHS). Healthy people 2010. Rockville Md: US DHHS; 2000.
4. El Nasser H. The USA's soaring population: 299,976,463 and counting… USA Today July 4; 2006.
5. Singh GK, Miller BA. Health, life expectancy, and mortality patterns among immigrant populations in the United States. Can J Public Health. 2004;95(3):I14–21.
6. US Department of Health and Human Services (DHHS). Report of the US department of health and human services secretary's task force on black and minority health, volume 1, executive summary. Washington, DC: US DHHS; 1995.
7. Smedley BD, Stith AY, Nelson AR, editors. Unequal treatment: confronting racial and ethnic disparities in health care. Washington, DC: National Academy Press, Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care; 2003.
8. Lillie–Blanton M, Lewis CB. Issue brief: policy challenges and opportunities in closing the racial/ethnic divide in health care. Menlo Park: The Henry J. Kaiser Family Foundation; 2005.
9. Lillie–Blanton M, Rushing EO, Ruiz R, Mayberry R, Boone L. Racial/ethnic differences in cardiac care: the weight of the evidence. Menlo Park: The Henry J. Kaiser Family Foundation; 2002.
10. SteelFisher GK. Issue brief—addressing unequal treatment: disparities in health care. New York: The Commonwealth Fund; 2004.
11. Agency for Healthcare Research, Quality. Third national healthcare disparities report. Rockville: AHRQ, DHHS; 2005.
12. Agency for Healthcare Research, Quality. Program brief: AHRQ activities to reduce racial and ethnic disparities in health care. Rockville: AHRQ, DHHS; 2007.
13. Braveman P. Health disparities and health equity: concepts and measurement. Annu Rev Public Health. 2006;27:167–94.
14. Hernandez DJ, Charney E, editors. From generation to generation: the health and well-being of children in immigrant families. Washington, DC: National Academy Press; 1998.
15. Landale NS, Oropesa RS, Gorman BK. Immigration and infant health: birth outcomes of immigrant and native-born women. In: Hernandez DJ, editor. Children of immigrants: health, adjustment and public assistance. Washington, DC: National Academy Press; 1999.
16. Guendelman S, Gould JB, Hudes M, Eskenazi B. Generational differences in perinatal health among the Mexican American population: findings from the NHANES 1982–1984. Amer J Pub H. 1990;80:61–5.
17. Guendelman S. Sociocultural factors in hispanic pregnancy outcomes. In: Morton CJ, Hirsch RG, editors. Developing public health social work programs to prevent low birthweight and infant mortality: high risk populations and outreach. Berkeley: University of California Press; 1998.
18. Ackerman LK. Health problems of refugees. J Am Board Fam Pract. 1997;10(5):337–48.
19. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995–2025: prevalence, numerical estimates, and projections. Diabetes Care. 1998;21:1414–31.
20. Mensah GA, Mokdad AH, Ford ES, Greenlund KJ, Croft JB. State of disparities in cardiovascular health in the United States. Circulation. 2005;111(10):1233–41.
21. Jasso G, Massey DS, Rosenzweig MR, Smith JP. Immigrant health: selectivity and acculturation. Paper prepared for the national academy of sciences conference on racial and ethnic disparities in health; no date.
22. Jasso G, Massey DS, Rosenzweig MR, Smith JP. The new immigrant pilot survey (NIS): overview and findings about U.S. Immigrants at Admission. Demography. 2000;37(1):127–38.
23. Portes A, Rumbaut RG. Immigrant America: a portrait. Berkeley: University of California Press; 2006.
24. Rumbaut RG, Portes A. Introduction—ethogenesis: coming of age in immigrant America. In: Rumbaut RG, Portes A, editors. Ethnicities: children of immigrants in America. Berkeley: University of California Press; 2001.
25. Rumbaut RG, Portes A, editors. Legacies: the story of the immigrant second generation. Berkeley: University of California Press; 2001.
26. Kaiser Family Foundation. Mexican immigrants' health status worsens after living in the U.S., Study Finds. Daily health policy report. San Francisco: Kaiser Family Foundation; 2005.
27. Anderson LM, Scrimshaw SC, Fullilove MT, Fielding JE, Normand J. Culturally competent healthcare systems: a systematic review. Amer J Prev Med. 2003;24(3S):68–79.
28. Corbie-Smith G. The continuing legacy of the tuskegee syphilis study: considerations for clinical investigation. Am J Med Sci. 1999;317(1):5–8.
29. Geiger HJ. Racial stereotyping and medicine: the need for cultural competence. CMAJ. 2001;164(12):16–9.
30. Kawachi I, Kennedy BP, Wilkinson RG. Society and population health reader, volume i: income inequality and health. New York: The New Press; 1999.
31. LaVeist TA, John MW. Health risk and the inequitable distribution of liquor stores in African-American neighborhoods. Soc Sci Med. 2000;51:613–7.

32. Morland K, Wing S, Diez–Roux A, Poole C. Neighborhood characteristics associated with location of food stores and food service places. Am J Prev Med. 2002;22:23–9.
33. Richards CF, Lowe RA. Researching racial and ethnic disparities in health. Acad Emerg Med. 2003;10(11):1169–75.
34. Shihadeh ES, Flynn N. Segregation and crime: the effect of black isolation on the rates of black urban violence. Sociol Forces. 1996;74:1325–52.
35. Thomas SB, Quinn SC. The tuskegee syphilis study, 1932 to 1972: implications for HIV education and AIDS risk education programs in the black community. Amer J Pub H. 1991;81:1498–505.
36. Williams DR, Collins C. Racial residential segregation: a fundamental cause of racial disparities in health. Public Health Rep. 2001;116(5):404–16.
37. Greenberg M, Rahmanou H. Looking to the future: a commentary on children of immigrant families. Los Altos: David & Lucile Packard Foundation; 2004.
38. Capps R. Hardship among children of immigrants: findings from the national survey of American families. Number B-29 in a series of reports entitled new federalism: national survey of American families. Washington, DC: Urban Institute; 1999.
39. Hagan J, Rodríguez N, Capps R. Effects of the 1996 immigration and welfare reform acts on communities in Texas and Mexico. Houston: University of Houston center for immigration research, working paper WPS; 1999. p. 99–110.
40. Aday LA. At risk in America: the health and health care needs of vulnerable populations in the United States. San Francisco: Jossey–Bass; 1993.
41. Flaskerud JH, Betty JW. Conceptualizing vulnerable populations health-related research. Nurs Res. 1998;47(2):69–78.
42. Sebastian JG. Definitions and theory underlying vulnerability. In: Sebastian JG, Bushy A, editors. Special populations in the community: advances in reducing health disparities. Gaithersburg: Aspen Publications; 1999.
43. Sebastian JG. Vulnerability and vulnerable populations. In: Stanhope M, Lancaster J, editors. Community health nursing: promoting the health of individuals, aggregates and communities. 4th ed. St. Louis: Mosby; 1996.
44. Dressler WW, Oths KS, Gravlee CC. Race and ethnicity in public health research: models to explain health disparities. Annu Rev Anthropol. 2005;34:231–52.
45. Carasquillo O, Ferry DH, Edwards J, Glied S. Eligibility for government Insurance if immigrant provisions of welfare reform are repealed. Am J Pub Health. 2003;93(10):1680–2.
46. Mohanty SA, Woolhandler S, Himmelstein DU, Pati S, Carrasquillo O, Bor DH. Health care expenditures of immigrants in the United States: a nationally representative analysis. Amer J Pub H. 2005;95(8):1431–8.
47. Gornick ME. the association of race/socioeconomic status and use of medicare services; a little known failure in access to care. Ann NY Acad Sci. 1999;896:497–500.
48. Weissman JS, Betancourt J, Campbell EG, et al. Resident physician's preparedness to provide cross-cultural care. JAMA. 2005;294(9):1058–67.
49. Brown P, editor. Understanding and applying medical anthropology. Mountain View, Calif: Mayfield Publishing Company; 1998.
50. Fadiman A. The spirit catches you and you fall down: a hmong child, her American doctors, and the collision of two cultures. New York: Farrar, Straus and Giroux; 1997.
51. Puschel K, Thompson B, Coronado GD, Lopez L, Kimball AM. Factors related to cancer screening in hispanics: a comparison of the perceptions of hispanic community members, healthcare providers, and representatives of organizations that serve hispanics. Health Educ Behav. 2001;28:573–90.
52. Edberg M, Wong F, Park R, Corey K. Preliminary qualitative results from an ongoing study of HIV Risk in Three Southeast Asian Communities. In: Proceedings of the XIV international AIDS conference, Barcelona, Spain: World Health Organization, UNAIDS, Centers for Disease Control and other sponsors; July 2002.
53. Hsu E, Davies CA, Hansen DJ. Understanding mental health needs of Southeast Asian refugees: historical, cultural and contextual challenges. Clín Psychol Rev. 2004;24:193–213.
54. Min PG. Changes in Korean immigrants' gender role and social status, and their marital conflicts. Sociol Forum. 2001;16(2):301–20.
55. Schweitzer R, Melville F, Steel Z, Lacherez P. Trauma, post-migration living difficulties, and social support as predictors of psychological adjustment in resettled sudanese refugees. Aust N Z J Psychiatr. 2006;40(2):179–88.
56. Thomas TN. Acculturative stress in the adjustment of immigrant families. J Soc Distress Homeless. 1995;4(2):131–42.
57. Brown ER, Ojeda VD, Wyn R, Levan R. Racial and ethnic disparities in access to health insurance and health care. Los Angeles: UCLA Center for Health Policy Research and Henry J. Kaiser Family Foundation; 2000.
58. Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: findings from community studies. Am J Pub H. 2003;93(2):200–8.
59. Mossakowski KN. Coping with perceived discrimination: does ethnic identity protect mental health? J Health Soc Behav. 2003;44(3, Special Issue—Race, Ethnicity and Mental Health): 318–33.
60. Sampson RJ. The neighborhood context of well-being. Perspect Biol Med. 2003;46(3, Supplement):S53–64.
61. Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: a multilevel study of collective efficacy. Science. 1997;277(5328):918–24.
62. Agency for Healthcare Research and Quality. Addressing racial and ethnic barriers to effective health care: the need for better data. Washington, DC: AHRQ; 2002.
63. Minnesota Immigrant Health Task Force. Immigrant health: a call to action. Minneapolis: Minnesota State Department of Health; 2005.
64. Bramscombe NR, Schmitt MT, Harvey R. Perceiving pervasive discrimination among African-Americans: Implications for group identification and well-being. J Pers Soc Psychol. 1999;77:135–49.
65. Crocker J, Major B, Steele C, Gilbert D, Fiske S, editors. The handbook of social psychology, vol. 2. 4th ed. Boston: McGraw-Hill; 1998. p. 504–53.
66. Spencer-Rodgers J, Collins NL. Risk and resilience: dual effects of perceptions of group disadvantage among Latinos. J Exp Soc Psychol. 2006;42(6):729–37.
67. Clauss-Ehlers CS. Sociocultural factors, resilience, and coping: support for a culturally sensitive measure of resilience. J Appl Dev Psych. 2008;29(3):197–212.
68. Chng CL, Wong FY, Park RJ, Edberg M, Lai DS. A model for understanding sexual health among Asian American/Pacific Islander men who have sex with men (MSM) in the United States. AIDS Educ Prev. 2003;15(Supplement A):21–38.