Anna H. Wu · Daniel O. Stram *Editors*

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Preface

There are profound differences between countries, ethnic groups, and races in risks of virtually all common cancers; variations in cancer rates by population may reflect the influence of genetic, environmental, or behavioral risk factors and such variations have long motivated speculation about the causes of cancer. Our knowledge about whether the causes of the observed differences in cancer risk are modifiable is greatly enhanced by consideration of migration studies. When rates of a particular disease change rapidly among migrants, then this is supporting evidence that risk of that disease may be at least partly environmentally or behaviorally driven, rather than solely due to differences in the genetic background and therefore not amenable to intervention. This is especially true when risks in migrants approach those seen in the host country.

The most rapidly developing countries in the world today are in Asia, and Asians constitute the fastest growing immigrant populations in the USA. Asian Americans represent a heterogeneous population that includes Asian Indians, Chinese, Filipino, Japanese, Kampuchean (Cambodian), Korean, Vietnamese, and other Southeast Asians. Cancer is the leading cause of death for Asian American men and women. Studies of cancer in Asian Americans can reveal important clues to disease etiology since increases or decreases in cancer rates in Asian Americans can help to identify environmental and lifestyle causes of cancer. This book describes the current state of knowledge about the epidemiology of cancer risks in Asian Americans with specific references to changes in behavior and exposures due to the process of acculturation in the USA. The usual approaches to analytic investigation of epidemiology of complex diseases in US populations, i.e., case–control and cohort studies, have only sometimes or recently included Asian Americans to any large degree. Part of the rationale for this book is to be as thorough as possible in bringing to light what has been learned from these traditional approaches despite the often lack of data on Asian Americans. In addition, an overall theme of the book is the judicious use of ecologic comparisons as a source of information about the Asian American cancer experience, the risk factors underlying that experience, and the relevancy of the Asian American cancer experience to the rest of the Americas and the world, particularly as a source of information about the effects of continued globalization and acculturation on cancer risks.

The first section includes four chapters. Chapter "Resources and Methods for Studying Cancer among Asian Americans" summarizes the resources in the US and established study methods to conduct such studies in Asian Americans. Chapters "Cancer Incidence and Mortality Patterns among Chinese Americans" and "Cancer Incidence and Mortality among Filipinos in the United States and the Philippines: Patterns and Trends" provide a review of the specific cancer patterns in the two largest Asian American groups in the USA. Chapter "Cancer Screening among Asian Americans" examines the utilization of cancer screening tests among selected Asian American ethnic groups and describes the research on factors that are associated with screening. The second section includes eight chapters. Upon migration to the USA, there are increases in the incidence of cancers that are typically associated with westernization and decreases in the incidence of cancers that are linked to an infectious origin and other lifestyle factors that are prevalent in Asia. Chapters "Lung Cancer Among Asian Americans," "Colorectal Cancer among Asian Americans," "Prostate Cancer Among Asian Americans," "Breast Cancer among Asian Americans," and "Endometrial Cancer among Asian Americans" cover the cancer sites (lung, colorectum, prostate, breast, and endometrium) that are traditionally associated with Western lifestyles. Reasons that are favored to explain the increases in these cancers in Asian Americans are explored, including increased prevalence of the higher risk profiles in Asian Americans, timing of exposure to particular risk factors, and the magnitude of risk associations in Asian Americans. Chapters "Liver Cancer Among Asian Americans," "Gastric Cancer Among Asian Americans," and "Cervical Cancer Among Asian Americans" cover cancer sites that are historically very common in Asia; while the incidence rates of these cancers decline in Asian Americans, their rates remain relatively high. In these chapters, reasons that may explain the decline in the incidence of these cancers upon migration are discussed, paying attention to the prevalence of changing risk factors, the importance of timing of exposures, and other cofactors important in the etiology of these cancers. Whenever possible, genetic determinants and gene–environment relationships associated with specific cancers were included in the discussion. As will be evident, most of the information on Asian Americans is based largely on studies conducted in Japanese Americans. While Chinese and Filipino Americans were included in some analytic epidemiologic studies, few studies focused on their risk factors specifically. Even less has been done in the other Asian American groups. As the population of the other Asian ethnicities increases in the USA, there is a need to include other Asian ethnic groups in etiologic studies despite the challenges of small sample sizes, language, and other barriers.

In summary, this book aims to provide important and up-to-date information on cancer trends and risk factor patterns among the large and growing Asian American population in the USA. The chapters place an emphasis on the most common cancers diagnosed in Asian Americans, examining risk factor patterns, but also pointing to the gaps in knowledge as we often had to rely on results from studies conducted in Asia.

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Resources and Methods for Studying Cancer Among Asian Americans

Ann S. Hamilton, Anna H. Wu, and Daniel O. Stram

Abstract Asian Americans are a diverse group and have a long history of migration to the United States (USA). Large differences in cancer rates between countries of origin and the USA, as well as diversity in lifestyle and environmental exposures, provide an opportunity to identify and study risk factors for specific cancers that can provide insights into cancer etiology and methods of prevention. The migration experience has created a type of natural experiment in which populations with a common genetic background have been exposed to different risk factors in a new environment and provides the opportunity to determine if risk factor changes can be linked to changes in their cancer rates. Multiple data sources are available to study cancer in Asian Americans, including US Census data to provide denominators for rates, cancer registries to assess cancer incidence, as well as observational studies in which personal risk factor information is obtained. Study designs which have been used include the ecologic, cross-sectional, case series, case-control, and cohort studies. Limitations and caveats in using these resources and study designs are described.

Keywords Asian Americans • Cancer • Risk factors • Cancer registry • Study designs • Migration

Introduction

Asian Americans are extraordinarily diverse with respect to country of origin, time since immigration, socioeconomic status, languages and dialects spoken, religion, diet, and other characteristics, many of which may affect health. There has been a long history of migration from Asia to the United States (USA) in substantial numbers and from countries with differing cancer incidence rates, both higher and lower than found in the USA. If cancer rates differ between Asians in their country of origin, migrants, and their counterparts born in the USA, these differences provide important clues to determine environmental and lifestyle risk factors for cancer,

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since these comparison groups generally have a similar genetic background. On the other hand, if cancer rates do not differ between migrants and nonmigrants, this may be due to similar environmental factors in both locations or alternatively due to host/genetic factors.

Asian Americans are defined by the US Census Bureau as individuals with origins in "any of the original people of the Far East, Southeast Asia, or the Indian Subcontinent." Modern Asian immigration to the USA began in the 1880s, when first Chinese and later Japanese, Filipino, and Korean workers were recruited to work on plantations and farms in Hawaii and California (See Chaps. 2 and 3 for details on migration history of Chinese and Filipinos). Various Exclusion Acts limited other forms of immigration by Asians until 1965, when discrimination based on country of origin was prohibited. Asian immigration to the USA has increased steadily since then.

Here, we describe the composition and numbers of Asian Americans in the USA today, sources of data used to assess cancer rates among the various Asian subgroups both in the USA and in their countries of origin, and discuss methodological issues, study designs, and potential biases that should be assessed when studying the role of migration on changing cancer risk factors.

Asian-American Population Characteristics (2000–2010)

Coding for specific Asian ethnic groups was added to the US Census over time beginning in 1870 for Chinese which included all east Asians, 1890 for Japanese; 1920 for Hindu (South Asia Indian), Korean, and Filipino; and 1980 for Vietnamese and Pacific Islander groups. In the past three censuses (1990, 2000, 2010), the racial categories were the same except that the option for listing multiple races was not provided until 2000. In 2010, the US Census obtained a person's race according to the form shown in Fig. 1 [1]. In addition to the specific Asian groups listed as check boxes in the questionnaire (Asian Indian, Chinese, Filipino, Japanese, Korean, and Vietnamese), there was a box for "Other Asian" allowing the person to write in other groups. From this text field, additional Asian groups were identified, including Bangladeshi, Bhutanese, Kampuchean (Cambodian), Hmong, Indonesian, Iwo Jima, Laotian, Malaysian, Mongolian, Nepalese, Okinawan, Pakistani, Singaporean, Sri Lankan, Thai, and other Asian, not specified. In 2010, over 17 million people listed at least one Asian race, and of them, 15.3% or 2.6 million listed more than one race [1]. The total Asian population, including those listing more than one race, comprised 5.6% of the US population. The US population grew by 9.7% between 2000 and 2010; however, the Asian population grew faster during this decade than any other racial group, rising by 43% for those who reported an Asian race alone and by 46% when including those reporting an Asian race in combination with another race.

Among the detailed Asian ethnic subgroups in 2010, the Chinese population was the largest (Table 1); Filipinos were the next most prevalent, followed by Asian Indians, Vietnamese, Koreans, and Japanese. The Asian ethnic subgroups with the

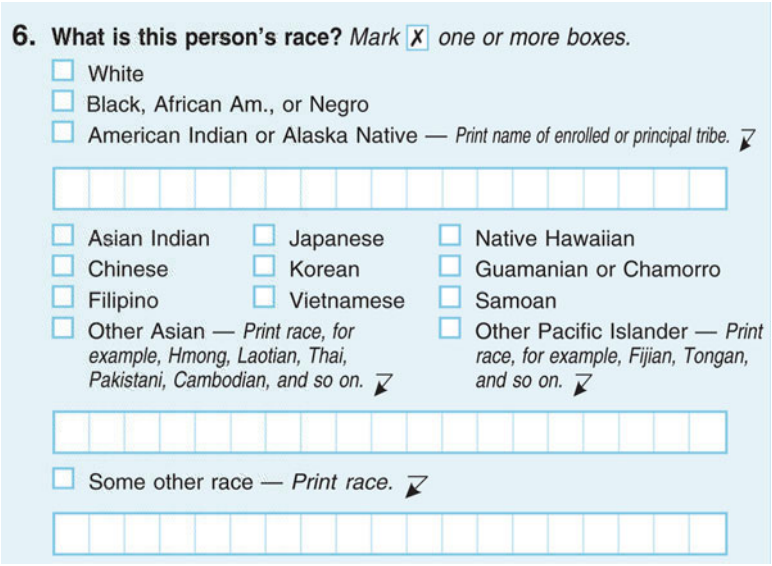

Fig. 1 Reproduction of the question on race from the 2010 Census [1]

Table 1 Total 2010 US population by detailed Asian subgroup [1]

	Asian alone	Asian in combination
Chinese	3,535,382	474,732
Filipino	2,649,973	766,867
Asian Indian	2,918,807	264,256
Vietnamese	1,632,717	104,716
Korean	1,463,474	243,348
Japanese	841,824	462,462

highest proportion of people naming an Asian race in combination with another race were Japanese (35.4 %) and Filipinos (22.4 %). Among the 2.6 million Asian in combination with another race population, 1.6 million named the White race as a second racial group [1].

The increasing Asian-American population over the last decade is reflected in the timing of when foreign-born Asians have come to the USA. Over 30 % of foreign-born males and females have arrived in the USA between 2000 and 2009, and another 5–6 % have arrived since 2010. Over 56 % of the Asians in the USA were foreign born in 2010, including those who were Asian alone or in combination with another race, about 30 % of Asian Americans were in the 35–54 age group, with relatively low percentages in the over 65 age group.

In 2010, the highest proportion of the total Asian population (i.e., Asian alone + Asian in combination with another race) lived in the West (46.2 %), followed by the South (22.1 %), the Northwest (19.8 %), and the Midwest (11.9 %) which was very

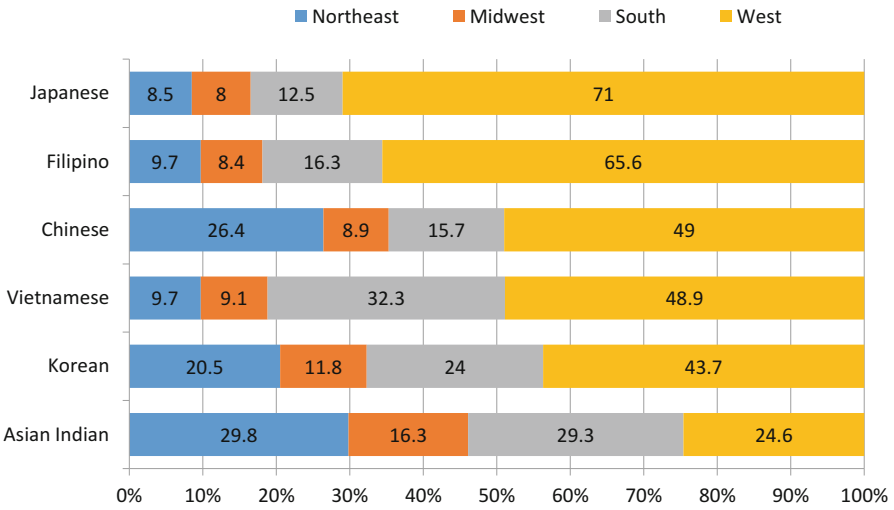

Fig. 2 Percent distribution of geographic location* of detailed Asian subgroups: 2010 US Census [1]. *The Northeast census region includes Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Midwest census region includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The South census region includes Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The West census region includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming

similar to the distribution in 2000. The states with the greatest numbers of Asians in 2010 were California (5.6 million), New York (1.6 million), Texas (1.1 million), New Jersey (0.8 million), Hawaii (0.8 million), Illinois (0.7 million), Washington (0.6 million), Florida (0.6 million), Virginia (0.5 million), and Pennsylvania (0.4 million) [1]. Although the top five cities with the greatest numbers of Asians included New York, NY; Los Angeles, CA; San Jose, CA; San Francisco, CA; and San Diego, CA, the areas experiencing the highest percentage growth in the number of Asians between 2000 and 2010 were located in the South and Midwest.

There were, however, substantial differences in the geographic distribution of the specific Asian ethnic subgroups in 2010. As shown in Fig. 2, 71.0 % of Japanese and 65.6 % of Filipinos lived in the West, followed by close to half of Chinese and Vietnamese, 43.7 % of Koreans, and about a quarter of Asian Indians. Close to a third of Vietnamese and Asian Indians lived in the South, the highest percentages of any of the Asian ethnic subgroups living in that region. Chinese and Asian Indians were the most likely of any of the groups to live in the Northeast (26.4 % and 29.8 %, respectively). Asian Indians, who were distributed the most evenly across the country, also had the highest percentage of any group living in the Midwest (16.3 %). California had the highest proportion of each of these subgroups living in any state, ranging from 43 % of the Filipinos to 19 % of the Asian Indians.