



Published in final edited form as:

*J Aging Health*. 2014 October ; 26(7): 1100–1115. doi:10.1177/0898264314543472.

## Demographic Characteristics of U.S. Chinese Older Adults in the Greater Chicago Area: Assessing the Representativeness of the PINE Study

Melissa A. Simon, MD, MPH<sup>1</sup>, E-Shien Chang, MA<sup>2</sup>, Kumar Bharat Rajan, PhD<sup>2</sup>, Mary Jane Welch, DNP, APRN, BC<sup>2</sup>, XinQi Dong, MD, MPH<sup>2</sup>

<sup>1</sup>Northwestern University, Chicago, IL, USA

<sup>2</sup>Rush University, Chicago, IL, USA

### Abstract

**Objective:** We aimed to assess the representativeness of the demographic characteristics of the PINE study to the Chinese aging population in the Greater Chicago area.

**Method:** The PINE study is a population-based study of Chinese older adults aged 60 and over in the Greater Chicago area. In preparation of the PINE study, we conducted a random block census study in Chicago. Demographic characteristics of the PINE study were compared with the data drawn from U.S. Census 2010 and random block census study using chi-square tests.

**Results:** The PINE study is representative of the Chinese aging population in the Greater Chicago area. No significant difference was found in key attributes including age, sex, income, education, number of children, and country of origin.

**Discussion:** Our report is critical in understanding the vast socio-demographic diversity of U.S. Chinese older adults. Rigorous studies are needed to explore the heterogeneity among the diverse aging populations.

### Keywords

population-based study; aging; community-study

### Introduction

Population-based studies in aging sciences have made significant contributions in elucidating associations between risk factors and outcomes, further informing effective science-based prevention and intervention strategies (Bennett et al., 2005; Bienias, Beckett, Bennett, Wilson, & Evans, 2003; Cornoni-Huntley et al., 1993; Fried et al., 1993; Smith et al., 2009). The interpretation of population-based studies relies heavily on the

---

**Corresponding Author:** Melissa A. Simon, MD, MPH, Vice Chair of Clinical Research, Department of Obstetrics and Gynecology, Associate Professor, Departments of Obstetrics and Gynecology, Preventive Medicine and Medical Social Sciences, Feinberg School of Medicine, Northwestern University, 633 N. St Clair, Suite 1800, Chicago, IL 60611, USA., m-simon2@northwestern.edu.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

representativeness of the reference population, in which any bias may challenge the validity and generalizability of study outcome (Galea & Tracy, 2007; Szklo, 1998). In addition, nationally representative studies of older immigrant populations may not be necessarily representative of each racial/ethnic and nativity group (Crimmins, Hayward, & Seeman, 2004). For minority populations, however, perhaps one of the most critical research gaps lie in the lack of reliable community-level data to report basic health status of older adults, which may in turn lead to barriers in identification of needs for health care (Dong, Wong, & Simon, 2014).

U.S. Chinese population is among the fastest growing racial/ethnic minority groups in the country (Shinagawa, 2008). Accounted for 24.1% of the total Asian population, Chinese community has experienced a rapid growth of 37.9% in the past decade. Similar growth trend is reflected in the segment of older adults. From 2000 to 2010, Chinese aging population aged 65 and over has experienced a growth rate almost 4 times higher than the general U.S. aging population (U.S. Census Bureau, 2011). Currently, Chinese older adults aged 60 and over account for 14% of the total Chinese population in the United States. Whereas Chinese community is represented throughout the country, Chicago has one of the largest congregations of Chinese Americans (Simon et al., 2008). Yet, detail health and aging information of the Chinese older adults remain limited at the community, state, and federal level.

With the aim to fill the knowledge gap, the PINE study was carried out in the Greater Chicago area with the goal to provide community-level data of Chinese older adults. The PINE study is a community-engaged, population-based study of U.S. Chinese older adults aged 60 and over. To maximize participation and ensure study relevance to the well-being of the Chinese community, the PINE study implemented extensive culturally and linguistically appropriate community recruitment strategies. To our knowledge, the PINE study is the largest cohort of U.S. Chinese older adults assembled in the field of aging research with the focus on psychological and social well-being.

However, the level of the representativeness of the PINE study with respect to its studied population remains to be established. A representative sample should be an unbiased indication of what the population is like, and assessing representativeness can only be accomplished in the context of the question the data are supposed to address. Representativeness of the PINE study cohort is of critical importance to gauge generalizability of the findings that will emerge from the cohort. Generalizability, or external validity, occurs when unbiased inferences regarding a target population can be inferred from associations observed among participants in a specific study (Last, Spasoff, Harris, & Thuriaux, 2001; Lohr, 1999). The larger population to which we wished to generalize were Chinese older adults over the age of 60 years and older in the Greater Chicago area. A common technique is to compare characteristics of study participants with population benchmarks, in which the U.S. Census data are commonly used as the standard.

The overall aim of this report is thus to evaluate the representativeness of the PINE study by systematically comparing key attributes of study participants with a random block census study of the Chinese community in Chicago, which was conducted in preparation

of the population-based study. In addition, we aimed to evaluate the representativeness of participants enrolled into the PINE study using demographic data from the U.S. 2010 decennial census.

## Method

### Population Settings

**The PINE study.**—The Population Study of Chinese Elderly in Chicago (PINE) is a population-based study of community-dwelling Chinese older adults aged 60 and over in Chicago (age ranges from 60 to 105 years). Briefly, the PINE study aims to collect community-level data of Chinese older adults by examining a wide array of health and aging issues in the Chinese aging population. Participants were invited to the study through extensive community-based recruitment strategies toward achieving cohort participation.

To prepare for a population-based study aimed to assess health and well-being of the Chinese aging population, we implemented the community-based participatory research (CBPR) approach to collaborate with the Chinese community in Greater Chicago area. CBPR has been proven as an effective approach in increasing public health research relevancy (Horowitz, Robinson, & Seifer, 2009; Leung, Yen, & Minkler, 2004; N. B. Wallerstein, 2006). The formation and conduct of the community-academic partnership allows us to develop appropriate research methodology in accordance with Chinese cultural context, in which the Community Advisory Board (CAB) played a pivotal role in providing useful perspectives and strategies for aging research conduct and partnership sustainability (Dong, Chang, Wong, & Simon, 2011a; Dong, Chang, Wong, & Simon, 2011b; Dong, Li, Chen, Chang, & Simon, 2013).

With respect to data collection, trained bilingual research assistants gathered health data through face-to-face interviews in the homes of older adults. Participants were surveyed in their preferred language and dialects including Mandarin, Cantonese, Toishanese, Teochew dialect, or English. The majority of respondents were interviewed in Chinese, including Cantonese, Toishanese, Mandarin, Teochew dialects. The study had less than 1% of the respondents who were interviewed in English. A total of 3,159 older adults were enrolled from 2011 to 2013, with a response rate of 91.9%.

**U.S. Census dataset.**—U.S. Census data are derived from the Census 2010 estimates, the most recent national census of the United States. Conducted every 10 years, the U.S. Census provides an accurate count of individuals and comprehensive demographic information. Data on race have been collected since the first U.S. decennial census in 1790, but no distinction was made for people of Asian descent until 1860 when Chinese, the first Asian response category, was added to the question on race in California (Hoeffel, Rastogi, Kim, & Shahid, 2012). At present, the Asian population includes people who indicated their race as “Asian,” or reported entries as “Asian Indian,” “Chinese,” “Filipino,” “Korean,” “Japanese,” and “Vietnamese,” or provided other detailed Asian responses. Currently, information on age and sex was the only available demographic attributes of Chinese older adults at the community, city, state, and federal level released from U.S. Census 2010 dataset.

**The random block census study.**—In preparation of a population-based study of U.S. Chinese older adults, the research team first conducted a random block census study of the Chinese community in Chicago. The goal of this project was twofold. First, it aimed to examine the demographic characteristics of the Chinese aging population in Chicago. The Chinatown community in the near south side of Chicago was chosen as the main site, owing to the fact that this community is a geographically defined area where the largest congregations of Chinese persons aged 60 and over were located. Second, this study aimed to find ways to ensure community engagement and sustainability of community support for the conduct of a population study.

Based on the U.S. Census data, the highest concentrations of Chinese older adults were represented in three major census tracts in the Chinatown community in Chicago (Tract 3401, 3402, 3403), with more than 40% of one or more Chinese persons aged 60 and over per household. Street blocks from these three census tracts were randomly selected to serve as the basis for the household counts. After formally introducing the census study to the community through press releases, public announcements, and advertisements, we conducted door-to-door contacts of all households on selected street block to ascertain whether there was a Chinese older adult aged 60 and over in the household. Upon initial contact, a trained interviewer first determined whether the resident was eligible to the study. If so, the interviewer then consented older adults to the study and gathered demographic information with respect to age, sex, education, income levels, marital status, number of children, and country of origin. The detailed operational procedure is described in Figure 1.

In aggregate, the research team approached 509 units on 13 selected street blocks in the three tracts (Figure 2). The census study wished to enroll Chinese older adults aged 60 and over. After initial screenings and repeated contact attempts, a total of 213 older adults in 170 units were eligible to the census study. We achieved a total unit response rate of 91.8% and a participant response rate of 93.5%. The study is approved by the Institutional Review Boards of Rush University Medical Center.

### Demographic Variables

We collected demographic attributes including age (in years), sex, education (years of education completed), and annual personal income (US\$0-US\$4,999; US\$5,000-US\$9,999; US\$10,000-US\$14,999 per year; US\$15,000-US\$19,999; and more than US\$20,000 per year). We also gathered additional information regarding marital status (married, widowed, divorced, separated) and number of children. Immigration data relating to participants' country of origin (Mainland China or others) were collected.

### Data Analysis

Descriptive analyses were used to describe the characteristics of the study participants. We used chi-square tests to evaluate the socio-demographic differences between the U.S. Census 2010 estimates, the PINE study, and the random block census study. Significant level and *p* values were computed. Data were processed by SAS version 9.2 software (SAS Institute, Inc., Cary, North Carolina).

## Results

### Comparison by Age and Sex Group

We first examined the percent distribution of age in the PINE study as compared with the U.S. Census 2010. In aggregate, the total population of Cook County equals 5.2 million, and the total population of Chicago is approximately 2.7 million. Total numbers of Chinese older adults in various regions, including Chinatown in Chicago, Chicago, and Cook County were extrapolated from Census 2010 estimates (Table 1). About half of the Chinese older adults aged 65 and older in the state of Illinois resided in the city of Chicago (49.0%). A total of 2,478 older adults aged 65 and over enrolled in the PINE study, which was approximately 52.7% of the total Chinese aging cohort in Chicago.

The samples in Chicago and Chinatown were composed of 48.2% to 51.7% of the youngest-old group aged 65 to 74, and 10.6% to 11.5% of the oldest-old group aged 85 and over. The percent distribution of age in the PINE study cohort exhibited proportions most similar to the Chinatown and Chicago level data, with approximately half of the cohort (50.4%) in the youngest-old group, and 11.1% was composed of the oldest-old cohort. There was no statistically significant difference in age groups between the PINE cohort and the Chinatown sample ( $p = .22$ ), as well as with the Chicago sample ( $p = .73$ ).

We further examined age group difference stratified by sex. For both older men and women cohorts, there existed significant difference between the PINE cohort and the state sample, as well as PINE and the national sample ( $p < .001$ ). For older men, however, no difference was found between the PINE cohort and the Chinatown sample ( $p = .81$ ), with the Chicago sample ( $p = .71$ ), and with the Cook Country sample ( $p = .08$ ). Similarly, for older women, no difference was observed between PINE cohort and the Chinatown sample ( $p = .06$ ), with the Chicago sample ( $p = .60$ ), and with the Cook Country sample ( $p = .12$ ).

### Comparison of the PINE Study and the Random Block Census Study

In addition, we examined the demographic characteristics of PINE study participants in comparison with the random block census study (Table 2). With respect to age, the PINE study had a younger cohort, with a mean of 72.8, and standard deviation ( $SD$ ) of 8.3, comparing to the mean age of 76.4 ( $SD \pm 8.8$ ) in the census cohort. Specifically, the oldest-old proportion (80 and over) accounted for 42.3% in the census sample, compared with 21.2% in the PINE cohort. The difference was statistically significant ( $p < .001$ ).

Due to the fact that detailed-level data of Chinese older adults regarding education, income, and other key characteristics were not available from the U.S Census 2010 at the time when this manuscript was prepared, we used the census sample as the reference group of the Chinese population in Chicago. With respect to other key demographic variables including sex, education, and income, no significant difference was found between the PINE cohort and the census study cohort. In total, 58.9% of the PINE cohort was female. The mean number of years of completed education was 8.7 years ( $SD \pm 5.1$ ). A total of 85.1% of the PINE cohort had an annual personal income lower than US\$10,000.

However, there existed significant difference in marital status between participants from two cohorts ( $p < .001$ ). The majority of the PINE cohort was married (71.3%), with 24.5% widowed, 2.4% divorced, and 1.8% separated. In comparison, the census cohort has smaller proportion of participants being married (60.5%) and a larger percentage of participants who were widowed (38.0%). No significant difference was reported regarding the number of children between two groups. The mean number of children was 2.9 in the PINE study ( $SD \pm 1.5$ ) and 3.0 in the census study ( $SD \pm 1.5$ ). With respect to immigration information, no statistical significant difference was observed regarding country of origin. Both groups were composed of more than 90% of older adults who migrated from Mainland China. In the PINE study cohort, 92.8% of the respondents originated from Mainland China, 3.3% from Hong Kong/Macau, 1.3% from Taiwan, 1.5% from Vietnam, and 1.2% from other countries including Southeast Asia. The mean years in the United States were 20.0 ( $SD = 13.2$ ) among study participants

## Discussion

The present study sought to examine the PINE cohort representativeness of the Chinese aging population in the Greater Chicago area. We compared key demographic characteristics of the PINE participants with the latest available data of U.S. Census estimates and a random street block census of the Chinese community in Chicago. Our analysis indicates that no statistically significant difference was found in key socio-demographic, socio-economic, and household characteristics, suggesting that the PINE study is representative of the Chinese older adults in the Greater Chicago area.

This study enhances our current understanding of the baseline socio-demographic information pertaining to the U.S. Chinese older adults. Despite that U.S. Census dataset provides the most accurate count of individuals and comprehensive demographic information at the national level, data on the distinction of race and ethnicity were often lumped together (Hoeffel et al., 2012). Overall demographic studies often aggregate Asian immigrants from 26 counties into the broadly defined Asian American population, with limited understanding in the intricate cultural and linguistic diversity between each ethnic group. A growing body of research had called for timely and accurate community-level data to fill this critical void (Kim et al., 2010; Mui & Shibusawa, 2008).

In addition, existing studies that sampled U.S. Chinese population tended to collect a small cohort of older Chinese Americans (Dong et al., 2014). To our knowledge, the PINE study is one of the few to extensively examine demographic characteristics of Chinese older adults based on community-level datasets. In a study of Asian American older adults in New York City, a total of 105 Chinese older adults aged 65 and over enrolled in the study. Their average age was 75.1 years, 56% female, and 93% had some levels of high school education (Mui et al., 2008). However, this study enrolled a smaller cohort of Chinese older adults and was intended to assist the immediate and long-range planning of services to Asian Americans, and the general understanding of Asian Americans in different communities in the United States. There existed limited epidemiological population-based investigations that specifically focused on aging issues among Chinese American older adults (Dong, 2012).



When examining the representativeness of the PINE study cohort to the referent population of Chinese older adults in the Greater Chicago area, we found that the main attributes important for aging research outcome, including age and sex, were comparable with the composition of Chinatown, Chicago, and Cook County based on the U.S. Census datasets. With respect to other variables of interest that were not available from Census 2010, including education, income, marital status, number of children, and country of origin, we found no significant difference between the PINE study and the census study with the exception of marital status. As compared with the census study, the PINE study has enrolled a larger proportion of older adults who were married and a smaller proportion of widowed participants. In addition, the census study also enrolled an older cohort in comparison with the PINE study. This may be partially explained by the random selection process in which one of the major senior apartments in the area was chosen. Therefore, the census cohort tended to be older. Nonetheless, our findings suggest that the PINE study cohort is representative of Chinese older adults in Chicago with respect to key demographic attributes.

In addition, the high response rate of the census study in preparation of the population-based study can perhaps be attributable to the unique community-engaged, action-orientated partnership that guided the overall design and implementation of study operations (Simon et al., 2008). Effective community-based program design often involves both top-down and bottom-up approaches (N. Wallerstein, 1993; N. B. Wallerstein & Duran, 2006). The top-down approach incorporates scientific experts in population-based program design, whereas the bottom-up grass roots approach involves mobilizing the Chinese community to address their public health concern on health and aging. With the goal to channel both approaches between academia and community, the PINE study research team established a CAB of over 20 community-based social services agencies and organizations (Dong et al., 2011a, 2011b). Board members from diverse backgrounds and expertise worked extensively with the research team to review study design, outreach, and implementation in the field.

At the same time, bi-directional educational initiatives and collaborations also allowed community leaders and stakeholders to become more knowledgeable of the conduct and advances of up-to-date aging science research (Dong et al., 2010). This sense of community co-ownership, or community “buy-in,” further enhanced local community participation, which was key in increasing response rate in population studies. We further postulate that the incorporation of a CBPR study design, and the utilization of community centers and social services agencies as recruitment sites, may have led to the high response rate and satisfying representativeness to the referent population (Simon, Chang, & Dong, 2010). This novel research module may have the potential to call for a paradigm shift in designing and implementing population-based aging research pertaining to the racially/ethnically diverse populations.

Several limitations of our study warrant further exploration. First, despite that the PINE study is representative of the Chinese aging population in the Greater Chicago area, there exists vast socio-demographic differences between Chinese communities in the United States. Therefore, the findings of the PINE study should not be generalized to other Chinese populations in the United States or overseas Chinese populations. National representative studies of U.S. Chinese aging populations are needed to comprehensively examine their

health and well-being. Second, the PINE study sample, overall Chicago Chinese population based on U.S. 2010 Census data, and the sample from the random block Census study may likely differ on unobserved characteristics that are correlated with aging and health, although the sample-population concordance on key demographic characteristics (age, sex, income, education, number of children, and country of origin) suggests this may likely be minimal. There is possibility that participants in the U.S. Census study also participated in the PINE study, or the random block census study. Third, there is also a pressing need to recruit more Chinese older adults into existing longitudinal studies. Last, we do not have information on the characteristic of the non-participants, which may help us further understand the possible impact of selection bias on study results. Nevertheless, as we witness a more diverse aging population in the future, our findings are critical in understanding the vast socio-demographic, cultural, and linguistic diversity of U.S. Chinese older adults.

## Conclusion

In summary, the PINE study is representative of the U.S. Chinese older adults in the Greater Chicago area. The study investigation is expected to provide the basis for generating empirical knowledge for understanding the health and aging issues of U.S. Chinese older adults. Its novel community-academic partnership collaboration in engaging community participation that further enhances representativeness of the study sample may contribute to a new generation of population-based study design.

## Acknowledgments

We are grateful to the Community Advisory Board members for their continued effort in this project. Particular thanks are extended to Bernie Wong, Vivian Xu, Yicklun Mo with Chinese American Service League (CASL), Dr. David Lee with Illinois College of Optometry, David Wu with Pui Tak Center, Dr. Hong Liu with Midwest Asian Health Association, Dr. Margaret Dolan with John H. Stroger Jr. Hospital, Mary Jane Welch with Rush University Medical Center, Florence Lei with CASL Pine Tree Council, Julia Wong with CASL Senior Housing, Dr. Jing Zhang with Asian Human Services, Marta Pereya with Coalition of Limited English Speaking Elderly, and Mona El-Shamaa with Asian Health Coalition.

## Funding

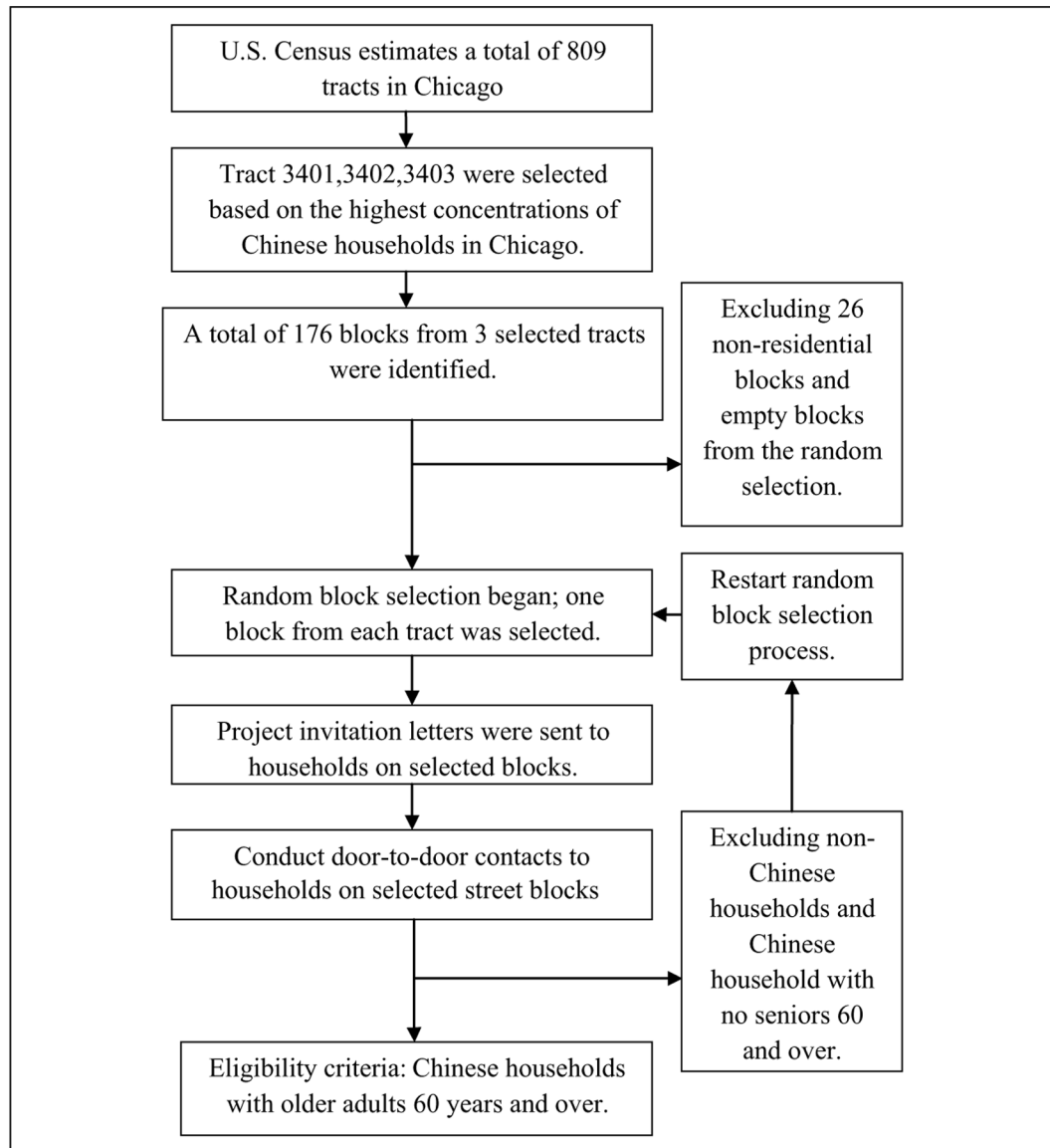
The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Dr. Dong and Dr. Simon were supported by National Institute on Aging grants (R01 AG042318, R01 MD006173, R01 CA163830, R34MH100443, R34MH100393, P20CA165588, R24MD001650 & RC4AG039085), Paul B. Beeson Award in Aging, The Starr Foundation, American Federation for Aging Research, John A. Hartford Foundation and The Atlantic Philanthropies.

## References

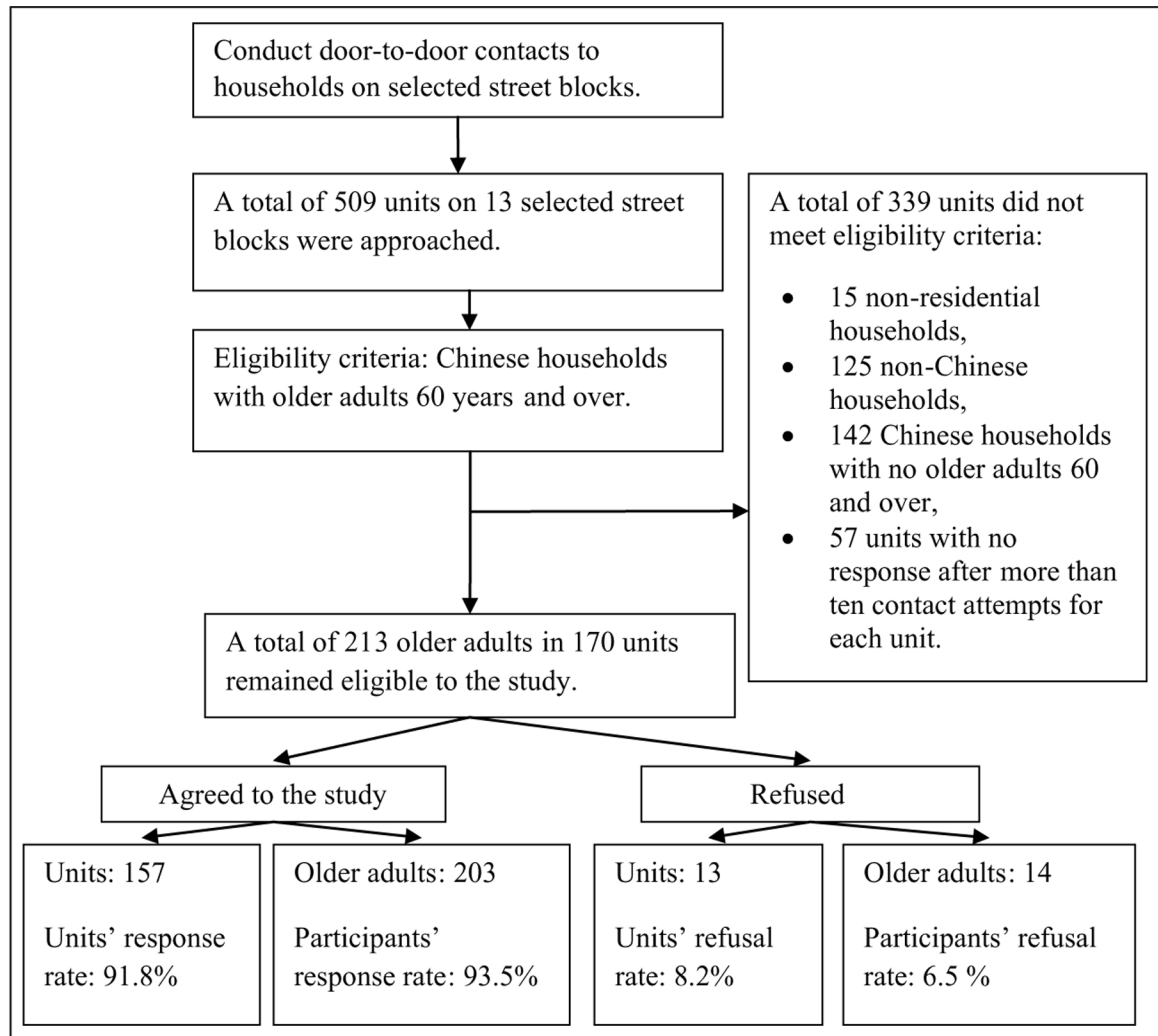
- Bennett DA, Schneider JA, Buchman AS, Mendes de Leon C, Bienias JL, & Wilson RS (2005). The Rush memory and aging project: Study design and baseline characteristics of the study cohort. *Neuroepidemiology*, 25, 163–175. [PubMed: 16103727]
- Bienias JL, Beckett LA, Bennett DA, Wilson RS, & Evans DA (2003). Design of the Chicago Health and Aging Project (CHAP). *Journal of Alzheimer's Disease*, 5, 349–355.
- Cornoni-Huntley J, Ostfeld AM, Taylor JO, Wallace RB, Blazer D, Berkman LF, ... Sherr PA (1993). Established populations for epidemiologic studies of the elderly: Study design and methodology. *European PubMed Central*, 5, 27–37.
- Crimmins EM, Hayward MD, & Seeman TE (2004). Race/ethnicity, socio-economic status, and health. In Anderson NB, Bulatao RA, & Cohen B (Eds.), *Critical perspectives on racial and ethnic differences in health in late life* (pp. 310–352). Washington, DC: National Academies Press.



- Dong X (2012). Cultural diversity and elder abuse: Implication for research, education, and policy. *Generations: Journal of the American Society on Aging*, 36, 40–42.
- Dong X, Chang E-S, Wong E, & Simon M (2011a). Sustaining community-university partnerships: Lessons learned from a participatory research project with elderly Chinese. *Gateways International Journal of Community Research and Engagement*, 4, 31–47.
- Dong X, Chang E-S, Wong E, & Simon M (2011b). Working with culture: Lessons learned from a community-engaged project in a Chinese aging population. *Aging Health*, 7, 529–537.
- Dong X, Chang E-S, Wong E, Wong B, Skarupski KA, & Simon MA (2010). Assessing the health needs of Chinese older adults: Findings from a community-based participatory research study in Chicago's Chinatown. *Journal of Aging Research*, 2010, Article 124246.
- Dong X, Li Y, Chen R, Chang E-S, & Simon M (2013). Evaluation of community health education workshops among Chinese older adults in Chicago: A community-based participatory research approach. *Journal of Education and Training Studies*, 1, 170–181.
- Dong X, Wong E, & Simon MA (2014). Study design and implementation of the PINE Study. *Journal of Aging and Health*, 26, 1085–1099. [PubMed: 24667107]
- Fried LP, Borhani NO, ENright P, Furberg CD, Gardin JM, Kronmal RA, ... Newman A et al. (1993). The cardiovascular health study: Design and rationale. *Annals of Epidemiology*, 1, 263–276.
- Galea S, & Tracy M (2007). Participation rates in epidemiologic studies. *Annals of Epidemiology*, 17, 643–653. [PubMed: 17553702]
- Hoeffel EM, Rastogi S, Kim MO, & Shahid H (2012). *The Asian population: 2010* Washington, DC: U.S. Census Bureau
- Horowitz CR, Robinson M, & Seifer S (2009). Community-based participatory research from the margin to the mainstream. *Circulation*, 119, 2633–2642. [PubMed: 19451365]
- Kim G, Chiriboga DA, Jang Y, Lee S, Huang C, & Parmelee PP (2010). Health status of older Asian Americans in California. *Journal of American Geriatrics Society*, 58, 2003–2008.
- Last JM, Spasoff RA, Harris SS, & Thuriaux MC (2001). *International epidemiological association (4th ed.) (A dictionary of epidemiology)* Oxford, UK: Oxford University Press.
- Leung MW, Yen IH, & Minkler M (2004). Community-based participatory research: A promising approach for increasing epidemiology's relevance in the 21st century. *International Journal of Epidemiology*, 33, 499–506. [PubMed: 15155709]
- Lohr SL (1999). *Sampling: Design and analysis* Pacific Grove, CA: Duxbury Press.
- Mui AC, & Shibusawa T (2008). *Asian American elders in the twenty-first century: Key indicators of well-being* New York, NY: Columbia University Press.
- Shinagawa L (2008). *A portrait of Chinese Americans* Asian American studies program College Park: University of Maryland.
- Simon MA, Chang E-S, & Dong X (2010). Partnership, reflection, and patient focus: Advancing cultural competency training. *Medical Education*, 44, 540–542. [PubMed: 20604849]
- Simon MA, Magee M, Shah A, Cheung W, Liu H, & Dong XQ (2008). Building a Chinese community health survey in Chicago: The value of involving the community to more accurately portray health. *International Journal of Health & Aging Management*, 2, 40–57.
- Smith S, Jaszczak A, Graber J, Lundeen K, Leitsch S, Wargo E, & O'Muircheartaigh C (2009). Instrument development, study design implementation and survey conduct for the national social life, health, and aging project. *Journals of Gerontology, Series B: Psychological Sciences & Social Sciences*, 64, i20–i29. [PubMed: 19357076]
- Szklo M (1998). Population-based cohort studies. *Epidemiologic Reviews*, 20, 81–90. [PubMed: 9762511]
- U.S. Census Bureau. (2011). *2010 census demographic profile* Washington, DC: Author.
- Wallerstein N (1993). Empowerment and health: The theory and practice of community change. *Community Development Journal*, 28, 218–227.
- Wallerstein NB (2006). Using community-based participatory research to address health disparities. *Health Promotion Practice*, 7, 312–323. [PubMed: 16760238]
- Wallerstein NB, & Duran B (2006). Using community-based participatory research to address health disparities. *Health Promotion Practice*, 7, 312–323. [PubMed: 16760238]



**Figure 1.**  
Random census block selection process.



**Figure 2.**  
Door-to-door contact flow chart.

**Table 1.** Comparison of Chinese Older Adults Aged 65 and Older by Age and Sex Group Between U.S. Census 2010 and the PINE Study.

Region	Sex	Age groups					$\chi^2$ tests		
		65–69 (%)	70–74 (%)	75–79 (%)	80–84 (%)	85+ (%)	$\chi^2$	df	p value
Cook County	Male ( <i>n</i> = 3,004)	916 (30.5)	776 (25.8)	609 (20.3)	428 (14.2)	275 (9.2)	8.2	4	.08
	Female ( <i>n</i> = 3,555)	1,005 (28.3)	868 (24.4)	725 (20.4)	546 (15.4)	411 (11.6)	7.4	4	.12
Chicago	Male ( <i>n</i> = 2,105)	586 (27.8)	559 (26.6)	445 (21.1)	329 (15.6)	186 (8.8)	2.1	4	.71
	Female ( <i>n</i> = 2,597)	682 (26.3)	604 (23.3)	567 (21.8)	434 (16.7)	310 (11.9)	2.8	4	.60
Chimatown	Male ( <i>n</i> = 1,069)	269 (25.2)	281 (26.3)	238 (22.3)	175 (16.4)	106 (9.9)	1.6	4	.81
	Female ( <i>n</i> = 1,390)	314 (22.6)	322 (23.2)	310 (22.3)	268 (19.3)	176 (12.7)	9.2	4	.06
PINE	Male ( <i>n</i> = 1,027)	278 (27.1)	254 (24.7)	226 (22.0)	174 (16.9)	95 (9.3)	Reference group		
	Female ( <i>n</i> = 1,451)	365 (25.2)	352 (24.3)	331 (22.8)	222 (15.3)	181 (12.5)			

Note. Bivariate analysis and *p* values were computed in comparison with the PINE study cohort.

**Table 2.**

Comparison of Key Demographic Attributes Between the PINE Study and the Random Block Census Study.

	PINE study ( <i>n</i> = 3,159)	Random block census study ( <i>n</i> = 203)	$\chi^2$	<i>df</i>	<i>p</i> value
Age groups, <i>n</i> (%)					
<i>M</i> ( <i>SD</i> )	72.8 (8.3)	76.4 (8.8)			
60–64	681 (21.6)	28 (13.8)			
65–69	643 (20.4)	29 (14.3)			
70–74	606 (19.2)	23 (11.3)			
75–79	557 (17.6)	36 (17.7)			
80–84	396 (12.5)	45 (22.2)			
85 and over	276 (8.7)	42 (20.1)	57.6	5	<.001
Sex, <i>n</i> (%)					
Male	1,297 (41.1)	73 (36.0)			
Female	1,862 (58.9)	130 (64.0)	1.9	1	.17
Education, years (%)					
<i>M</i> ( <i>SD</i> )	8.7 (5.1)	7.9 (4.8)			
0	195 (6.2)	19 (9.4)			
1–6	1,179 (37.6)	80 (39.4)			
7–12	1,103 (35.1)	76 (37.4)			
13–16	576 (18.3)	24 (11.8)			
17 and over	87 (2.8)	3 (1.5)	9.0	4	.06
Income, <i>n</i> (%)					
US\$0-US\$4,999	1,041 (33.3)	46 (26.0)			
US\$5,000-US\$9,999	1,617 (51.8)	95 (53.7)			
US\$10,000-US\$14,999	310 (9.9)	23 (13.0)			
US\$15,000-US\$19,999	68 (2.2)	3 (1.7)			
US\$20,000 and over	87 (2.8)	10 (5.7)	9.3	4	.055
Marital status, <i>n</i> (%)					
Married	2,237 (71.3)	121 (60.5)			
Separated	57 (1.8)	0 (0.0)			
Divorced	74 (2.4)	3 (1.5)			
Widowed	769 (24.5)	76 (38.0)	20.8	3	<.001
Number of children, <i>n</i> (%)					
<i>M</i> ( <i>SD</i> )	2.9 (1.5)	3.0 (1.5)			
0–1	469 (14.9)	27 (13.8)			
2 or more	2,682 (85.1)	169 (86.2)	0.2	1	.67
Country of origin, <i>n</i> (%)					
Mainland China	2,932 (92.8)	187 (92.1)			
Others	227 (7.2)	16 (7.9)	0.13	1	.72