

Population Science Is Science Only If You Know the Population

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Abstract—*Background.* Cancer control efforts have had limited effect in reducing the inequities for minorities and the medically underserved. One factor is the lack of theory-based conceptualization of the terms used to define *race*, *ethnicity*, and *culture*. *Method.* Guidelines are provided to develop more accurate use of the terms *race*, *ethnicity*, and *culture* to determine standards of comparability across studies of cancer incidence, survival, and quality of life in diverse populations rather than stereotypes. *Results and Conclusions.* Our ability to use theoretically based criteria to differentiate groups of people could increase our ability to more effectively eliminate these disparities. *J Cancer Educ.* 2006; 21(Suppl.):S22-S31.

The dramatic change in demographics that has occurred in the United States over the last 40 years is reflected in California's 2000 demographics, which has a population of over 33.8 million residents and no ethnic majority. The population is comprised of 46.7% Non-Hispanic Whites, 32.4% Hispanics, 12.3% Asian Americans, 7.4% African Americans, and 1% Native Americans, and nearly 5% of the population in California is identified as "two or more races."¹ The significance of the prediction that the changing ethnic composition of the entire United States will resemble that of California by 2050 is that these demographic changes affect health outcomes in profound ways.²⁻⁵ Although cancer control efforts have been brought to bear on these inequities in health outcomes, the impact is severely limited by the lack of theorization regarding the conceptualization and application of the terms used to differentiate the population groups—namely, *race*, *ethnicity*, and *culture*.^{6,7} The lack of precision in operationalizing these concepts would be unacceptable with any other variable used in scientific inquiry to explain how and why these groups of people are differentially affected, yet we persist in using these terms as though they are objectively meaningful.^{7,8}

Despite exhortations over the last 60 years by social and biologic scientists to clarify the use of the terms *race*, *culture*, and *ethnicity*, health researchers continue to use these terms reflexly as labels with little basis in science.^{7,9-12} The confounding and imprecision of these terms hinders our ability to identify measurable mechanisms that may better predict the outcomes of studies or accurately identify the groups to whom the findings are validly generalizable. Most often, the implicit assumption in using race as a population identifier is that these categories connote some homogeneous biologic or behavioral patterns (or both) that are predictive of the outcomes of interest in a putatively homogeneous population.¹³⁻¹⁵ The terms *race*, *culture*, and *ethnicity* represent very different but interrelated concepts. To eliminate the unequal incidence, prevalence, mortality, and suffering from cancer, a clearer, theory-based operationalization of these terms would increase our ability to more accurately identify what is unique about such groupings to identify the proximal mechanisms that create the disparities in health outcomes rather than stereotypes.

How then, do we use the structures and dynamic concepts of race, ethnicity, and culture to define populations in research and practice if we cannot use race as a segmenting instrument? In this article, I provide guidelines to develop more accurate use of the terms *race*, *culture*, and *ethnicity* to enable researchers to determine standards of comparability across studies of cancer incidence, survival, and quality of life in diverse populations rather than applying stereotypes. Our ability to use theoretically based criteria to differentiate groups of people could increase the likelihood that we would be able to differentiate groups of people on specific variables that are more mutable so that we could apply strategies more relevant to the populations of focus and more effectively

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modify or promote healthy behaviors and increase the likelihood of eliminating the cancer disparities.

DEFINITIONS

Accurate definitions are required to better operationalize the terms *population groups*, *culture*, and *ethnicity*. Culture is a way of life and has two functions: to assure the survival of its members and to provide meaning for one's life and proscriptions on how to appropriately react to life's experiences and interact within one's social network.^{13,16} As such, culture functions like a theory. The domains and variables of a theory are interrelated and fit together to form an integrated explanatory system as in the case of culture, the worldview for its members. The members of societies with designated roles, responsibilities, and relationships in complex cultural systems form a hierarchy of classes and social order with rules for interaction. Each of these roles is imbued with status and value. Not all members of the society have the same status or social value, but the relationship and mobility between the classes is prescribed by beliefs about the innate nature of the social order. Diversity within a cultural group is inherent in its structure. Hammond¹⁷ described culture as a nested group of 7 domains that emanate from the ecologic niche of the population group (Table 1). Thus, the basis of a culture is its ecologic niche, and each subsequent domain is formed and constrained by the prior domain. The beliefs, values, and life ways are developed by the population group to enable its members to exist and persist with meaning (spiritual and practical) and social order within a particular environment.^{18,19}

Culture refers to the essential organic, dynamic, and responsive strategies used by all human groups to adapt to a changing environment; otherwise, its members would become extinct. Thus, time, place, and circumstance are fundamental to assessing the construct of culture for a group of people and the effect of culture on its members as well as the effect of its members on the social and psychological nature of their ever changing culture. A static, monolithic, homogeneous, unidirectional operationalization of culture is inaccurate. Yet, this is the current practice in cancer control when culture is not measured as a continuous, contextual, and holistic concept. Table 2 indicates how culture might be operationalized and measured for a particular group. The 10 domains are familiar as routinely collected demographic information; however, the interrelated systemic nature of these variables within a social context is the missing strategy.

TABLE 1. Nested Components of Culture

- Environment
- Economy
- Technology
- Religion/worldview
- Language
- Social structure/society
- Beliefs and values

TABLE 2. Composite Measure of Culture—Worldview

1. Parental heritage
2. Ethnic group(s) with which one identifies
 - Generation
 - Degree of desired integration into mainstream society
 - Language proficiencies
 - Beliefs and practices
 - Degree of personal identification and public identity
 - Number of identity groups and degree of overlap
3. Diet
4. Physical activity
5. Interethnic social interaction choices
 - By circumstances or choice
 - Geographic residence
 - Regional
 - Community(ies) within region
6. Family structure/support system
 - Composition
 - Age
7. Socioeconomic status
 - Income—No. of families in household
 - Wealth
 - Education
 - % money sent to home country or support of other households
8. Generation in United States and/or reason for immigration
 - Push/Pull
9. Religion/spirituality
 - Beliefs and practices
 - Internal/external locus of control
10. Alternative health practices
 - Healers
 - Parallel or complementary use

Ethnicity is one's sense of self as a member of a self-identified group within a power structure of a multicultural society.^{13,17} In any society, ethnic groups are usually configured in a hierarchal structure based on differential distribution of power and resources in relation to the social structure. Application of this definition leads to a more complex assessment of the environmental and societal forces that shape the availability, accessibility, acceptability, and affordability of resources for a group of people. Lewis and colleagues²⁰ showed that promotion of better nutrition and physical activity to reduce diabetes, cardiovascular disease, and cancer among African Americans in South Los Angeles would be more effective if major effort was also made to create safe areas for exercise and provide easily accessible and affordable fruits and vegetables.

Race, as noted in Office of Management and Budget (OMB) Directive 15, is a powerful social/political force in US society that is manifested through racism or the color-coded hierarchy of social status and value.¹³ Racism privileges the group in power at the expense of those discriminated against. The effect of racism on health care has been documented in numerous studies in which differential health outcomes directly result from differential medical treatment.^{3,21-23} This racialized or differential care, which

is primarily provided based on one's skin color, negatively affects the quality of health care provided in spite of objective clinical indicators.^{24,25} Distressingly, this effect on medical judgment and practice is usually based in beliefs, assumptions, stereotypes, attitudes, values, and biases about "differences" that are unconscious and thus very difficult to recognize and acknowledge.^{13,26-29} Clinicians who provide health care and the institutions that structure their practice are part of the larger US culture where these biases, ideas, and values are inherent. Efforts to address population differences must also include and challenge the wider societal forces that maintain the practice of differential care.^{13,17}

CLINES

Populations that have evolved to exist in particular geographic niches are biologically referred to as *clines*. When the gradual variation in a characteristic of a species can be correlated with a gradual geographic variation, the variation of the character is called a *cline*. For example, clines occur because of altitude or latitude gradients.⁷ Thus, the "White" group needs to be disaggregated as are all the other OMB categories if we are to truly understand the impact of culture

and clines on cancer. *Cline* is the more scientifically accurate term for human populations with particular adaptive characteristics including genetic polymorphic expressions and cultural differences expressed in behavioral patterns, not *race*, which is an unscientific term.

Expressions of various genetic polymorphisms occur in identifiable patterns between human population groups, but these do not occur along race lines. Instead, the differences are expressed within population groups or clines that are identified by ecosystems and gene-flow patterns of migration through evolution in particular ecologic climates.^{19,22,30} Unlike other species, however, humans use culture to adapt more efficiently to environmental variations for survival rather than waiting for genetic mutation and adaptation.

Figure 1 illustrates how within-group variation is expressed geographically in a genetically similar group. The top 5 sites of cancer vary considerably among Chinese in China, Hong Kong/Singapore, and the United States³¹ Environmental and lifestyle practices appear to have a strong effect.

Figure 2 highlights the danger in using OMB race classifications in aggregate to report population data. In aggregate, the Census 2000 reported poverty rate for Asian Americans (alone) was 13% compared to 12% for the United States

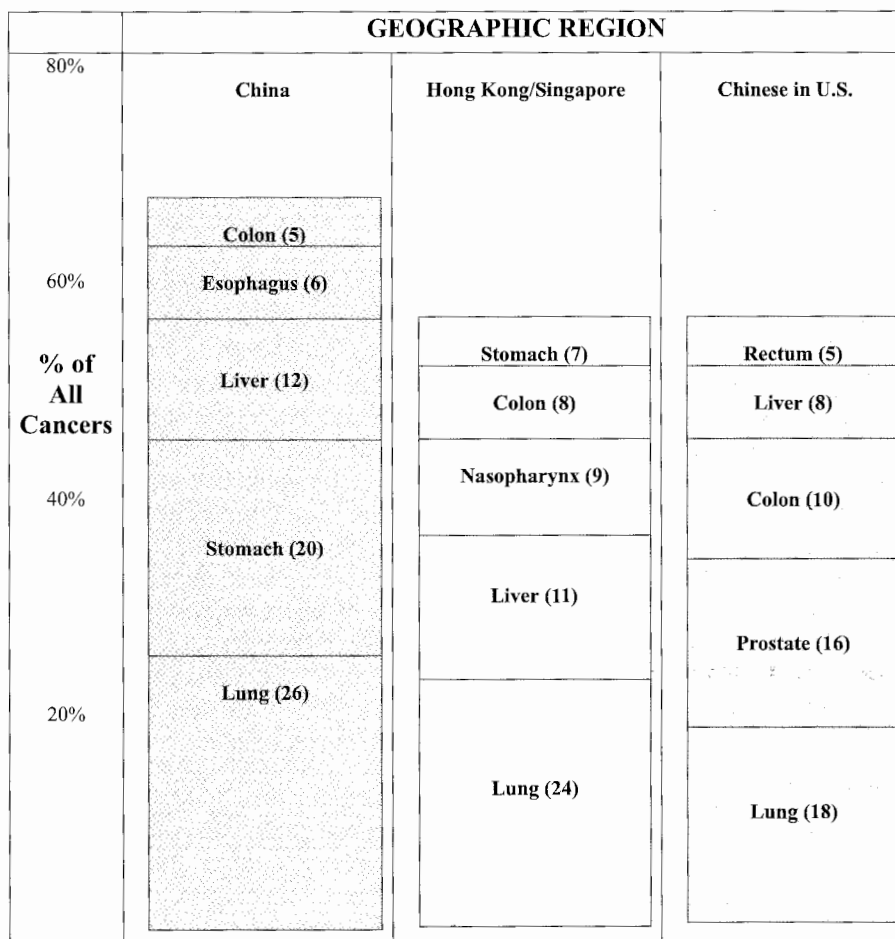


FIGURE 1. Five cancers contributing to overall cancer incidence burden in Chinese males by race/ethnicity and geography, 1988-1992. From Prehn A, Lin S, Clarke C, et al. Northern California Cancer Center, 1999.³¹

Percentage of Selected Asian Americans Living Below U.S. Federal Poverty Line

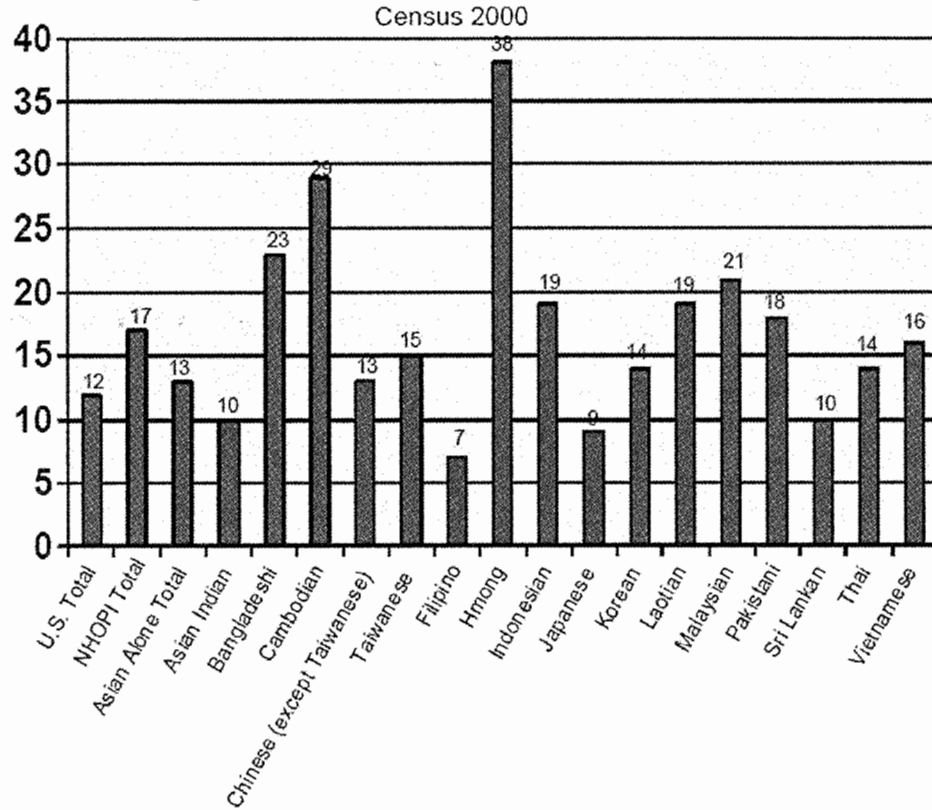


FIGURE 2. Disaggregated Asian American population by poverty status. Census 2000 data is based on the 1999 federal poverty level, which as \$8501 for an individual or \$17,029 for a family of four. NHOPI indicates Native Hawaiian and Other Pacific Islanders. From data in "We the People: Asians in the United States." Census 2000 Special Reports. December 2004. Available at: <<http://www.census.gov/prod/2004pubs/censr-17.pdf>>. Accessed June 16, 2006.

overall.³² When disaggregated, however, the picture is very different. Populations at higher risk for limited access to and utilization of available health services due to high poverty rates become visible such as the Vietnamese (16%), Indonesian and Laotian (19%), Malaysian (21%), Bangladeshi (23%), Cambodian (29%), and Hmong (38%).³²

Similarly, US male stomach cancer rates were 10.5/100,000 overall (1993-1997), but for Asian Americans males, the rate was nearly twice that at 20/100,000.³³ By looking at disaggregated stomach cancer incidence data, groups at highest risk (Korean, Japanese, and Vietnamese American) become visible, whereas these same groups are invisible when aggregated into the OMB Asian category. With more detailed information, including cancer data, on subpopulations, outreach efforts could be more strategically focused and tailored to those groups at highest risk by identifying and targeting education and screening efforts related to malleable risk factors that could reduce cancer health disparities.

The fact that culture is insufficiently conceptualized and measured is rarely recognized. If culture were correctly operationalized, its effect would likely be much more significant and importantly, identify how it differentially impacts cancer incidence, morbidity, survival, and mortality. There-

fore, to identify populations for study, correct use of the concepts of culture and ethnicity would enable us to determine who actually constitutes the population of study.

CANCER ETIOLOGY

Approximately 50% to 75% of all cancers deaths are attributable to the environment, including modifiable lifestyle choices.³⁴ Notably, two sets of studies that have been conducted on the same genetic population clearly indicate that genetics play a minor role in the incidence of cancer. First, migrant studies show that when populations migrate to another country, within one generation, the sites and incidence rates of cancer begin to mimic that of the host country and less like that of the home country.^{35,36} Studies of the same populations in different countries also show dramatic differences in the five most common cancer sites.³¹ As noted, Figure 1 shows the variations in the top five cancers in Chinese in China, Hong Kong/Singapore, and among Chinese in the United States. The genetic pool within each of the ethnic groups is ostensibly similar, but the cultural and environmental variations that occur due to national residence affects the incidence and types of cancers within as

few as 10 years and definitely after 1 generation.^{31,35-37} Thus, environmental exposures and lifestyle practices, such as diet and exercise patterns, have a significant effect on cancer incidence and type. Culture is the framework that prescribes the lifestyle of its members, and these practices vary considerably within and between cultural groups. Targeting these modifiable cultural characteristics will be more productive in reducing the avoidable burden of incidence and suffering from cancer.

However, what is missing from the current use of culture in cancer control is an accurate conceptualization and operationalization of the concept. Few health related “scales” of culture are used because the concept is so complex and dynamic. Instead, the OMB categories of race are erroneously used as a substitute for the concept of culture. Attempts to use particular beliefs as signal risk factors for a group of people are usually stereotypical and misused. Beliefs, such as fatalism, as characteristic of Hispanics and African Americans are used as explanatory rather than descriptive of a group of a particular socioeconomic or class stratum. Rendering these concepts as immutable cultural characteristics rather than adaptive coping strategies to untenable economic and political circumstances is unscientific and potentially does more harm than good in identifying actual adaptable areas for change.³⁸

ASSUMPTIONS ABOUT RACE, CULTURE, AND ETHNICITY

The first task is to evaluate the use of the OMB Directive 15 categories,¹³ which identify 5 race categories and one ethnicity (Table 3).³⁹ The document clearly states that no scientific or anthropological evidence exists for the construct of race, but these categories are, instead, powerful social/political constructs. Despite the abundant literature attesting to the lack of a scientific basis for race, these population designations continue to be reflexly used in cancer control research and medicine without appreciation of the emphasis on the social/political nature of the categories and acceptance of an implicit assumption that color groupings are accurate proxies for unmeasured cultural and biological factors.^{7,12,40} We must dispel and delete several basic assump-

tions about the use of the term *race* from research because of the implicit and erroneous message that the color of one’s skin is predictive of physiologic risk factors for cancer or, more insidiously, because skin color reflects inherent predispositions for particular risky behaviors without the addition of more sophisticated measures of cultural variations.^{6,7} Numerous studies and reports have been published to confirm that there is no justification for race categories as a biological characteristic and that there continues to be more similarity among racial groups on the genomic level than there are genetic differences within racial groups.^{7-14,40} The assumption that these categories of race are biologically delineated is scientifically ungrounded. More within group genetic variation exists than between groups. Humans are 99.99% genetically similar.⁴¹ No genetic variation exists to differentiate subspecies of *Homo Sapiens* by skin color or any other physical or genetic characteristic, thus rendering the race categories false.^{7,13} Notably for research, race/ethnicity categories are usually used as a categorical “yes/”no” variable. Although these categories are required for all federally funded studies, the political, socioeconomic requirements are not differentiated from the bases of these population groupings in relation to the scientific question. That is, the respondent is assumed to be either one of the noted mutually exclusive races or another. The context of racial/ethnic identity is only rarely measured, and when it is, this is often glossed as the equally problematic concept of “acculturation.” This dynamic, situational variant construct (acculturation) is also flawed as applied in health research.⁴²

Individuals who are more than one race are typically requested by researchers to choose one identity over the (or any) other, placed in one racial category by the research team without input from the participant, or placed in the “other” category for analyses. Even if an acculturation scale is used, an individual’s level of biculturalism or multiculturalism is rarely, if ever, noted. Rather, the measure of acculturation to the dominant culture (non-Hispanic White) is usually assessed by language and time in the United States. The unidimensional assumption is that the non-White individual becomes closer to the White culture and less of their own (or other’s) culture(s) over time in the United States without acknowledging the bicultural or multicultural, fluid, and situational nature of this concept.^{43,44}

The extreme heterogeneity within each of the OMB Directive 15’s³⁹ 6 racial/ethnic categories (Table 3) is also rarely noted in either sampling strategies or in reporting of findings. For example, over 2000 cultures and 6500 languages exist in the world, but we aggregate this enormous diversity into the 6 racial/ethnic categories for political purposes with stereotypical assumptions of homogeneity. Very broadly, the “Hispanic” category of ethnicity consists of over 34 countries, the “American Indian or Alaska Native” category encompasses over 800 tribal nations and groups, “Asians” are comprised of over 37 nationalities, “Native Hawaiian and Other Pacific Islander” are comprised of over 25 different groups, and “African American or Black,” as a category, covers more than 5 African American groups as well as

TABLE 3. Office of Management and Budget Directive 15 Categories for Race and Ethnicity*

Race	Ethnicity
American Indian or Alaskan Native	Hispanic or Latino
Black or African American	Non-Hispanic or Latino
Asian	
Native Hawaiian or Other Pacific Islander	
White	

*Source: Office of Management and Budget, *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity*, October 30, 1997.³⁹

those of African descent from the continents of Africa, South America and Central America, and the Caribbean. The "White" population is also aggregated as a monolithic, assumedly homogenous group. Included in this population, however, are Northern Europeans, Southern Europeans, Middle Easterners, and Western Asians. Significant differences also occur in these subgroups, resulting in the loss of ability to identify both potential benefits from cultural lifestyle practices (eg, tomato-based diets in Italy appear to provide a protective effect against prostate cancer) as well as risks (such as higher stomach cancer rates among Polish populations in the Warsaw area who eat larger amounts of high nitrate-content sausages).⁴⁵ Without knowledge about geographic differences, cultural practices, and potential genetic polymorphisms among particular population groups (or clines), such as BRCA1 and BRCA2 among Ashkenazi Jewish women,^{46,47} such risks are difficult, if not impossible, to detect.

Recommendations for Cancer Control Research

The standard against which behavior is judged is built on a monocultural belief structure, ie, that of the Euro-American cultural system in power. The refrain often heard from researchers is that we have to "untangle" race from socioeconomic factors that affect access to and use of health services. This is neither possible nor accurate when analyzing outcomes for different cultural groups because it is the interaction of these 2 constructs within a racialized society that is the focus.⁴⁸ Culture is erroneously blamed for poorer health outcomes without acknowledging the social-political and historical constraints that shape the reality of particular subgroups. To more effectively frame research and programmatic questions among various groups, we need to apply better ways of defining these populations and integrate measures that indicate how the social and political ecologic realities affect their ability to lead healthy lives.⁴⁹⁻⁵¹ When investigating differential influences of particular variables such as education, income, or health outcomes (see Table 2, Section 7: "Socioeconomic Status"), statistically controlling for these variables obfuscates our ability to ascertain these differences. Specifically testing for the interaction effect will help us see the differential effect exerted by these variables on diverse population groups.

Application of theoretically grounded definitions of race, culture, and ethnicity requires that we first look to the adaptive strategies of every cultural group within their ecologic circumstances to assess health risks. This paradigmatic change would stop the practice of working from a reflexive, deficit hypothesis when addressing groups that bear an unequal burden of cancer. Researchers would be able to integrate the adaptive function of culture and identify protective practices and community assets as well as vulnerabilities in diverse ethnic groups.⁵²

To test the effect of a population's culture requires that we understand the meaning of *culture*, and we know who ascribes to the worldview of that cultural group and to what

degree the members ascribe to the beliefs and practices. This approach requires integration of theories of culture from anthropology and sociology and testing of these concepts and constructs of theory in basic cross-cultural research on social and behavioral science theories, concepts, constructs, and measures.^{17,38,53} The cross-cultural validity of most social and behavioral theories used in health behavior research and their constituent concepts has yet to be tested in diverse cultural groups. Models such as the Health Belief Model and the concept of self-efficacy are constructs based on the concept of individuality and self efficacy.⁵⁴ Both concepts are conceived of quite differently in sociocentric cultures, which have concepts of ego that are quite variant with Western European concepts of dignity and autonomy.^{7,55,56} Thus, the cross-cultural primacy of these concepts, which are fundamental to many behavioral theories, may not be cross-culturally valid.⁵⁷

A fundamental premise of culture theory is diversity. Thus the assumption of equivalence across cultures is presumptuous. How have we ignored the social reality in science? Lack of demonstrated semantic/operational, structural, and metric equivalence of health-related constructs across cultures constitutes major barriers to the comparability of findings in current studies.^{7,58} Even when concepts do exist in diverse cultures, such as social support, the actual constellation of variables used to measure the concept and their individual salience and relationships may not be the same across cultures. Thus, the conceptual equivalence of concepts should be questioned and evaluated.³⁸ For example, the concept of family is often operationalized as a nuclear structure in a household. Yet, *family* is defined quite differently in other cultures, which include extended relatives and/or fictive kin as core family members or multiple families living in one household. These individuals may not be identified in our surveys and clinical practice unless these variations are recognized. Concepts such as wealth and income are often used synonymously. Studies have demonstrated, however, that these concepts are operationalized differently in diverse cultures such as the African American community in which wealth has been demonstrated to equal income, whereas in non-Hispanic White respondents, wealth represents income and assets.⁵⁹ Concepts of "quality of life" as measured with the SF-36 (36-Item Short Form Health Survey Medical Outcomes Trust, Health Assessment Lab, and QualityMetric Inc., SF-36.org, Lincoln, RI), have also been shown to be culturally variant.⁶⁰⁻⁶³ Concepts such as social class as an indicator of status within societal hierarchy is implicitly agreed as nonexistent in this country in contrast to the explicit aspects of class as noted in studies in Great Britain.⁶⁴ In a similar way, concepts that exert powerful influence on behavior in other cultures, such as the Asian concept of "face," hold little sway in Euro-American culture.⁴⁴

The metric equivalence of the variables within the theories and conceptual model health behavior also needs to be demonstrated.⁶⁵ The sobering fact is that the validity of all these aspects of our scientific tool kit has yet to be demon-

strated among diverse populations. Unlike mental health, medical health researchers have yet to question cross-cultural equivalence in a focused, systematic manner.^{38,66} For example, the call for evidence-based research by the US Department of Health and Human Services Substance Abuse and Mental Health Services Administration HIV/Substance Abuse Targeted Capacity Project^{7,67} is currently limited by using only the OMB 15 categories as the criteria for diverse samples. The evidence produced by the studies may well be misleading if the categories listed in Table 2 are not included nor used in an interactive, systemic manner.

Humans have 3 universal needs: safety and security, integrity and meaning in life, and a sense of belonging.^{65,68} How these needs are met, however, is culture specific. For example, in the traditional Vietnamese Buddhist culture, the body has 3 souls and 9 vital spirits. The primary soul maintains the life force, the secondary soul is the seat of intelligence, and the tertiary soul is the seat of the senses and bodily functions. The 9 vital spirits function to maintain balance and well being. Cultural practices are designed to address this concept of health through diet and lifestyle. Diseases occur when an imbalance occurs among these life forces and souls. Treatments are designed to reestablish balance. In the Eastern healing system, Western medicine is considered "hot," and traditional medicine is "cool." Depending on the nature of the illness, either Western medicine or the traditional Vietnamese healing paradigm may be more appropriate than the other to treat the etiology.¹⁷ Commonly, both may be used sequentially or in parallel for different aspects of the illness experience. Knowledge of the extent to which such beliefs may be held would be important clinically for treatment and adherence and in research as well, for example, to inform questionnaire designs for surveys on health care decision making pertaining to access and utilization.

Concepts about the relationship between balance of life forces and health exist in most cultures, and the integration of these concepts would add an important dimension to understanding health care decision making for many diverse populations. Thus, differences in utilization for health care concerns may be due to access factors, but cultural variations in identifying health "problems" and routes of resolution may also differ due to cultural interpretations of physiologic (or psychologic) symptoms. For example, culture-bound syndromes are symptoms that are clustered uniquely in different cultural groups. Causes and symptoms attributed to three Korean folk illnesses, *Hwaybang*, *Han*, and *Singgyong shaeyak* are very real, culturally discreet forms of emotional distress, but no equivalent exists in Western biomedicine or *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* codes.^{69,70} Does this mean these are only imaginary entities for the traditional Korean population and can therefore be ignored in the biomedical system of care without consequence? Or can we not measure them because the culturally framed *DSM-IV* diagnostic categories are too limited to include such clinically treatable conditions?

Table 2 lists 10 demographic domains of one's cultural group. Most of the categories are often measured, but the interpretation of these variables need to be made as a construct within the social context of the population of focus. Attention to the major differences within the group would enable sampling with sufficient numbers in each category to enable multivariate and hierarchical analyses of interventions both within as well as across group differences. The interaction of the contextual factors and specific cultural beliefs and practices must be understood within a systems theory framework to appreciate the interaction effect and understand how culture functions within specific population groups. The gradations of intensity with which membership is held and the circumstances in which it becomes salient also identify the boundaries of the population groups. Those at the boundaries have the greatest degree of openness or permeability to the diffusion of ideas and practices of other groups. Diffusion of ideas, practices, and technology occur bidirectionally between the group of focus and those with which it comes into closest contact within the larger, multicultural US society. Measurement of these gradations is important within group differences that can better inform cancer control strategies.

CONCLUSIONS

Explicit operationalization of each of the terms *culture*, *ethnicity*, and *racialized care* would increase the scientific validity of research and refine clinical practice. Department of Health and Human Services, the National Institutes of Health, and foundation funding needs to be allocated for researchers to develop, test, and improve such measures. Researchers must be held accountable to base their definitions within the social science literature. We also need to better define the parameters for rigorous multicultural research designs rather than designing studies in the traditional paradigm and merely adding a diverse population using standardized strategies and measures that have not been tested cross-culturally.⁷¹ Multicultural research designs require assessing the degree of reciprocal interactions between diverse cultural groups, ie, mainstream and ethnic minorities and the medically underserved, to gauge the level of multiculturalism among ethnic groups as opposed to merely addressing diversity of groups in proximity.⁷²

To conduct multicultural research in underrepresented populations, increased use of mixed-methods research and participatory action research techniques are required to strengthen the validity and relevance of the findings. Use of participatory action research would enhance identification of valid indicators to identify the correct groups constituting the population of focus and more rigorous framing of the factors to be studied. Mixed-methods strategies would increase the probability that more relevant questions would be asked, more valid data collected, and the findings would be more accurately interpreted. Partnerships with the communities

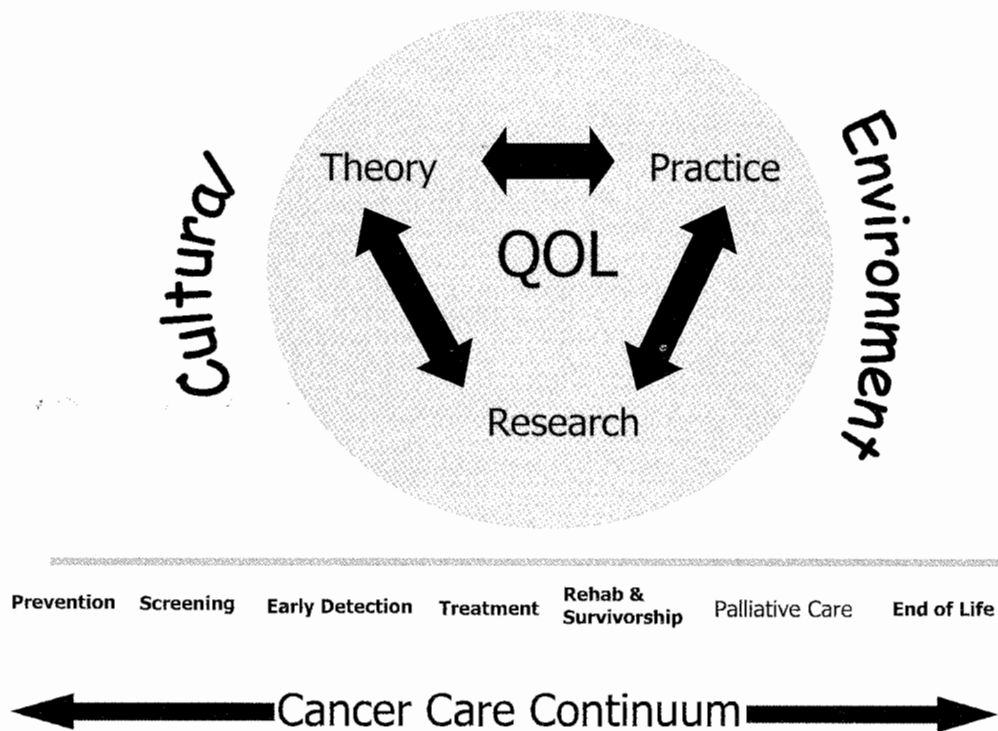


FIGURE 3. Cancer care continuum. QOL indicates quality of life.

of focus throughout the research process would also increase the likelihood that the interpretation of the data would also be more accurate and relevant.^{7,57}

Fundamental to the required transformation in cancer control research to reduce cancer disparities is a mind-set change that must occur in the professional world to one that views diverse cultural constructs with equal validity and utility as one's own. The function of the observed behaviors must be understood within its social, political, and historical context—both of the population of focus as well as of the scientific community. We need:

1. Better data on who and what constitutes self-identified groups (ethnic, cultural, and population groups);
2. Clearly conceptualized and operationalized measures of the effects of color-coding groups (racialization).
3. Identification and analysis of within group variation as well as between cultural/ethnic group differences and similarities. And ultimately,
4. More sophisticated, scientifically based ability to identify the pathways by which such differences impact cancer-related health practices.

Studying health behaviors among different groups requires an evaluative eye to determine which practices are adaptive, neutral, or maladaptive in the context of their lives.^{72,73} The group members themselves would then be able to determine which behaviors could and should be changed. As researchers and program planners, we would then be able to determine, in partnership with population group members, the best means to achieve the desired end. As Dr G. Friedell (oral communi-

cation, April 2000) often states, "If the problems are in the community, then the solutions are in the community."

Race, culture, and ethnicity have been used interchangeably to differentiate diverse populations and identify disparities, but we have reached the end of the road of the usefulness of the current application of these terms. To effectively address the disparities, we must improve the science of behavioral research in cancer control by understanding how culture contextually affects health behavior in diverse populations. The concepts of culture, race, and ethnicity individually impact cancer outcomes and are inextricably linked to the social and political context of our society. By using this complex relationship as the ecologic framework for cancer research and practice with at-risk populations, we could more effectively direct efforts along the entire cancer care continuum from prevention, early detection, treatment, rehabilitation, palliation, and end of life care (Figure 3) and eliminate unnecessary suffering and death in these communities, and improve their quality of life.

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