



Consistency of Minority and Socioeconomic Status as Predictors of Health

Ari K. Mwachofi, University of Oklahoma, Health Sciences Center

Robert W. Broyles, University of Oklahoma, Health Sciences Center

Abstract

This paper examines the relative consistency of economic and racial status as predictors of the individual's physical and emotional health. The focus of the study is the covariates of (1) limited activity resulting from poor physical and (2) limited activity resulting from poor emotional health. Using data from the 2003 Behavioral Risk Factor Surveillance System survey, the study was developed in two phases. In the first, logistic regression analysis was used to examine two binary variables that identified respondents who reported at least one day of limited activity that resulted from poor physical and then poor emotional or mental health. Limited to those who reported at least one day of limited activity, the second stage of the study examined variability in the number of days of limited activity that resulted from 1) poor physical health and; 2) poor mental or emotional health. After controlling for chronic conditions, risk factors, access to care and the demographic attributes of the individual, the results indicate that the economically disadvantaged consistently reported poor health while wealthier members of the study group reported good health. The coefficients derived for membership in minority groups, defined as African Americans, Native Americans and Latinos, were inconsistent and, in general, insignificant ($P < .05$).

Key Words: socioeconomic status, racial status, health status

Introduction

That members of minority groups experience a poorer health status than their white counterparts is well established (Institute of Medicine, 2002; American Cancer Society, 2000; Mensah et al., 2005; Holmes, Arispe & Mory, 2005; Polednak, 2004; Silventoinen et al., 2005). In addition, previous research also indicates that, relative to other members of society, minority groups ex-

perience a diminished access to care, (Kaiser Commission, 2000; Hahn, 1995; Lillie-Blanton, 1995) receive less health education (Association of American Medical Colleges, 2002) and consume fewer units of physician, preventative and hospital services (Hahn, 1995; Anderson & May, 1995; Broyles, Narine & Brandt, 2000). Of particular importance to the policy analyst are results that suggest little, if any abatement in the racial or ethnic disparities in the disability experienced by the elderly during the past 20 years (Schoeni et al., 2005). Although the weight of evidence indicates the persistence of disability disparities, results reported by Portenoy et al., (2004) and by Strine et al., (2005) indicate that African Americans and Hispanics experience pain related disability for shorter durations but with more intensity than their white counterparts.

It is possible to argue that income exerts a direct influence on health status and an indirect effect that is attributable to the relation between an individual's socioeconomic status and their environment. Income is frequently used as a surrogate or proxy for the socioeconomic status of the individual (Wilkinson, 1989; 1992; 1997; Kawachi et al., 1994; Lynch, Smith & Kaplan, 2000;). The weight of the evidence is consistent with the proposition that, as income increases, access to health resources grows and the health status of the individual improves (Rodgers, 1979; Raphael, 2001). A logical corollary to these findings suggests that the presence and extent of poor health is greater among poor members of society than their wealthier counterparts. An unresolved issue involves the causal relation between poverty and poor health. It is, of course, possible to argue that poor health impedes the individual from performing normal economic roles, resulting in a relatively low earned income. Conversely, poverty and related poor nutrition, substandard housing and exposure to hazardous environmental conditions may result in greater health needs and increased poor health.

The development and implementation of policies designed to reduce or redress inequities in the distribution of health require an understanding of instrumental factors that influence the health status of the individual. Further, the development of effective policies must focus on the nexus of factors that contribute to health disparities. Currently, our understanding of disparities in health is incomplete and, as a consequence, extant policies or practices may require revision.

The purpose of this paper is to examine the relative consistency and importance of socio-economic status and membership in one of several minority groups as predictors of health status. The analysis also focuses on the affects of chronic illness, life style risks, demographic attributes and access to health care on limited activity that results from a poor physical and mental

health status reported by the individual. The paper concludes with an assessment of policy options that might reduce or redress disparities in health.

Conceptual Framework

This study is guided by essentially two conceptual frames of reference. The first, the social model of disability, posits that poor health status, disability and periods of limited activity are a result of physical, organizational and attitudinal barriers (Finkelstein, 1996). Rather than characteristics of the individual, the social model views disability as a product of external barriers such as the educational environment, information and communication systems, transport, housing and the working environment.

The study also relies on the capabilities model which posits that an impaired health status, disability or limited activity is a deprivation of a capability or a functioning. Specifically, the model argues that capabilities are practical opportunities that are available to an individual and functioning is the state of being that the individual considers valuable. Mitra (2006) demonstrates that an individual who is deprived of capabilities has a potential disability while a person who is deprived of a functioning has an actual disability. The model further argues that a deprivation of a capability or a functioning results from an interaction among the individual's personal characteristics, the economic basket of goods or services available to the individual and the social, economic, political and cultural environment (Mitra, 2006).

As indicated by Burchardt (2004), the social and capability models are complementary. Figure 1 shows that this paper relies on elements of both models to examine correlates of limited activity. Specifically, the approach presupposes that access to health resources, personal characteristics, environmental factors, illness, injury and health risks contribute to either an absolute or relative disadvantage. An absolute disadvantage may be temporary or permanent and impairs the individual from performing normal social, economic or mental functions that are of value. A relative disadvantage also may be permanent or temporary and impairs the ability of the individual to perform functions or roles less well than their comparable counterparts.

Figure 1 also suggests that a disadvantage may result in an impairment which is defined as a physiologic, mental or anatomical loss. An impairment may lead to an actual disability or limited activity. Health resources include factors such as nutrition, housing and access to health care. Personal characteristics are represented by demographic attributes, to include educational attainment, age, gender and membership in a minority group. Finally, the figure posits that a disadvantage and related limited activity is related to environmental factors such as the location of the individual's residence. The

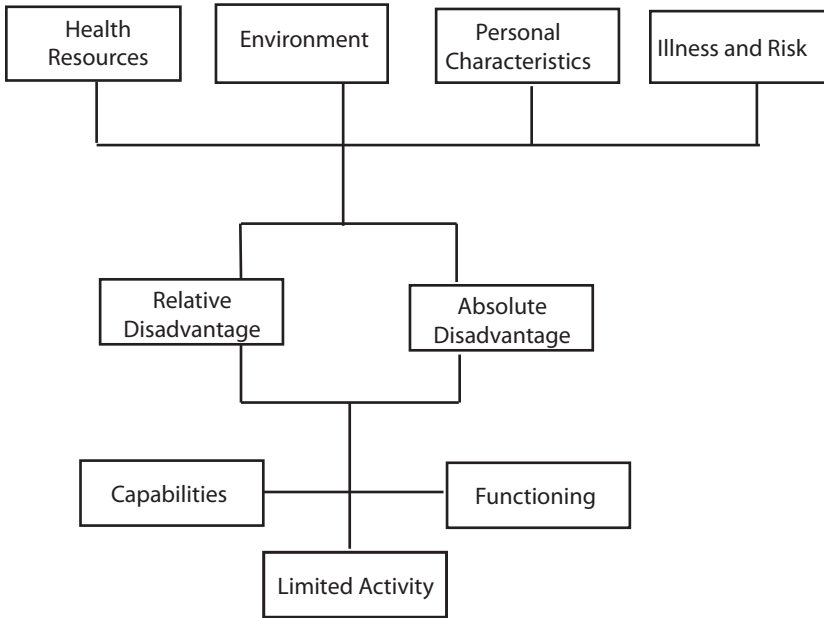
Figure 1 – Study Model

figure also suggests that a relative or absolute disadvantage may restrict the individual's capabilities or functionings, an outcome that results in poor health, actual disability, or limited activity.

Of particular importance to this study is the role of socio-economic status and membership in a minority group as covariates of poor health or limited activity. In this context, it is posited that being a member of a minority group in the US has a limiting effect on one's capability set which can lead to a potential disability or poor health. Minorities in the US have a higher probability of experiencing capabilities deprivations as evidenced by their higher unemployment rates, lower access to quality health care, higher incidence, morbidity and mortality rates, and poorer health status than their White counterparts. As depicted in Figure 1, an individual who is impaired may experience poor health or an actual disability if environmental factors interact with the impairment to restrict the individual's functionings resulting in an inability to do things he/she considers to be of value or achieve a state of being that he/she values. On the other hand, those who occupy a low SES reside in poor areas and are less able to acquire health resources than their wealthier counterparts

and therefore more likely to experience poor health or actual disabilities.

In this framework, this study's question is whether the membership in a minority group is a stronger or more consistent predictor of poor physical or mental health than SES. It is important to note that the SES of individuals may influence their place of residence and the environment to which they are exposed. Accordingly, SES can be regarded as a surrogate for environmental factors or access to health resources which interact with the individual characteristics and influence the likelihood or extent of poor health or limited activity. Conversely, SES is an individual characteristic that influences the individual's capabilities and functionings.

Methods

The analysis is based on the responses of 260,062 individuals to the Behavioral Risk Factor Surveillance System, BRFSS, which was administered in 2003. The BRFSS is a cross-sectional random telephone survey of non-institutionalized adults aged 18 years or older. The survey monitors health behavior, key indicators of health and the socio-economic attributes of respondents.

The means, standard deviations and definitions of the dependent variables and covariates examined in this study are summarized in Table 1. As indicated in the table, the focus of the analysis is, in part, on two binary variables. The first, PHYSICAL, identifies individuals who reported at least one day of limited activity during the previous month that resulted from poor physical health. The second binary variable, MENTAL, identifies respondents who reported at least one day of limited activity due to poor mental health. Limited to those who experienced at least one day of limited activity, the study examines as dependent variables the logarithm of the number of days of limited activity reported by the individual which were attributed to 1) poor physical health or 2) poor mental health.

The purpose of the analysis is to estimate the parameters of the general linear model represented by

$$HS_j = f(M_j, RE_j, IR_j, R_j, D_j)$$

where the subscript j identifies the individual as the unit of analysis. The vector identified as HS represents the set of variables that measure the presence and extent of limited activity.

Regarding the covariates examined in the study, the notation M corresponds to a set of binary variables that identify membership in a minority group. As indicated in Table 1, the variables BLACK and INDIAN represent African and Native Americans respectively. Similarly, the binary variable

Table 1: Variable Definitions and Summary Statistics

Variable	Mean	Std.Dev.
Dependent Variables		
Limited activity - poor physical health	0.368	0.482
Limited activity - poor mental health	0.341	0.474
Limited activity - poor physical health - past month	2.033	1.150
Limited activity - poor mental health - past month	2.123	1.081
Racial Status		
African American	0.089	0.284
American Indian	0.020	0.141
Latino(a)	0.075	0.263
Health Resources And Environment		
Annual Income is \$50,000 or more	0.363	0.481
Annual Income is \$20,000 or less	0.211	0.408
Employed	0.900	0.300
Cost of Care Access	0.122	0.327
Illness And Health Risks		
Diabetes	0.082	0.275
Arthritis	0.318	0.466
Asthma	0.121	0.326
Assistive Devices	0.074	0.261
Hypertension	0.290	0.454
High Cholesterol	0.350	0.477
Smoking	0.443	0.497
Binge Drinking	0.133	0.340
Trying to Lose weight	0.414	0.492
Exercise	0.785	0.411
Personal Characteristics		
Male	0.394	0.489
Age	49.049	17.452
Married	0.575	0.494

LATINO identifies respondents of Hispanic origins. It is expected that members of each minority group will experience greater disability than their white counterparts.

The vector RE represents a set of variables that measure an individual's access to health resources and environmental factors that might influence the socio-economic status of the individual. In this study, SES is measured by the individual's income and serves as a surrogate for the individual's ability to acquire health resources. In addition SES represents a gross proxy for environmental factors that may influence days of limited activity. Specifically, SES represents a surrogate for variation in the amenities available to the individual and characteristics associated with the location of the respondent's residence. As indicated in Table 1, a value of one was assigned to the binary variable RICH if the respondent reported an annual income of \$50,000 or more. Conversely, a value of one was assigned to the binary variable POOR if the respondent reported an annual income of \$20,000 or less. In addition to income, the study also adopts the binary variable EMPLOYED as an indicator of socio-economic status. This variable separates respondents who were employed from their counterparts who were unemployed. Finally, the binary variable COST-BAR is used as a measure of access to care and identifies individuals who were prevented from seeking service by the high cost of care. In this study, it is expected that coefficients derived for RICH and EMPLOYED will support the proposition that those of high SES are less likely to report poor health or limited activity than members of the reference category. In addition, it is expected that the coefficients will support the expectation that those occupying a low SES are more likely to report poor health or at least one day of limited activity.

The vector IR represents a set of binary variables that measure the presence of chronic conditions and behavioral risks. Specifically the binary variables identify respondents who are diabetic, arthritic, asthmatic and dependent on assistive devices such as a cane, wheel chair or special bed. The binary variables HYPERTENSION and CHOLESTEROL identify respondents who were hypertensive or reported high cholesterol while SMOKE and BINGE identify individuals who use tobacco products and engaged in binge drinking on at least one occasion during the past 30 days. In this study, binge drinking was defined as consuming 5 or more drinks on an occasion. The study also explores the association of vigorous exercise and the need to diet on the individual's health status.

Finally, the vector D corresponds to a set of binary variables that measure personal characteristics of the individual. Included in the set of covariates are the gender, age and marital status of the respondent.

Logistic regression analysis was used to examine the binary dependent variables defined by PHYSICAL and MENTAL. Limited to those who experienced at least one day of disability during the past month, regression analysis was used to examine the variation in the number of days of limited activity resulting from poor physical and/or mental health. To accommodate the distributional assumptions of Ordinary Least Squares (OLS) regression analysis, the logarithm of days of limited activity was used in each of these analyses.

Results

Listed in Tables 2 and 3 are the results obtained by the logistic regression analysis of the binary variables that focus on respondents who reported at least one day of limited activity resulting from poor physical health and poor mental health. As indicated, the analysis of limited activity due to poor physical health and poor mental health resulted in the correct classification of 69.2 and 69.5 of the cases, respectively.

The results depicting the association of membership in a minority group are mixed and, in general, inconsistent with expectations. Specifically, African Americans were among the least likely to report limited activity due to poor physical and mental health. The results also suggest that respondents of Hispanic origins were relatively unlikely to report a day of limited activity resulting from poor mental health.

The results depicting the association of SES with health status are, in part, consistent with expectations. As indicated in Tables 2 and 3, wealthier members of society were less likely to report a day of limited activity due to poor physical health than their middle class counterparts. As expected, respondents occupying a low SES were more likely to report a day of disability due to poor physical health and poor mental health than their middle class counterparts. As a consequence, the results suggest the existence of a gradient in which the wealthy are more likely to experience a good health status than members of the middle class while the less wealthy were among the most likely to report a poor health status than their middle class counterparts.

Regarding the other indicators depicting the availability of health resources and environmental factors, the results suggest that, relative to their unemployed counterparts, employed respondents were less likely to report poor physical and poor mental health. The analysis also supports the expectation that financial impediments to health care also exert an adverse influence on health status. As indicated in Table 2, respondents who experienced a financial barrier to care were more likely to report at least one day of limited activity due to poor physical health. Results reported in Table 3 also support the expectation that financial barriers to care contribute to poor mental health.

Table 2 Logistic Analysis of Limited Activity Due to Poor Physical Health

Variable	Poor Physical health (69.2% correct prediction)			
	Coefficient	Wald Statistic	95.0% C.I. for EXP(B)	
Racial Status				
Black	-.235 ^a	54.148	.743	.842
Indian	.026	.262	.928	1.136
Latin	.006	.024	.928	1.091
SES				
Rich	-.114 ^a	39.028	.861	.925
Poor	.221 ^a	100.971	1.195	1.302
Employed	-.767 ^a	848.961	.441	.489
Chronic				
Diabetes	.434 ^a	276.501	1.467	1.625
Arthritis	.602 ^a	1303.109	1.768	1.887
Asthma	.478 ^a	445.748	1.543	1.686
Devices	1.197 ^a	1509.348	3.116	3.516
Risk Factors				
Hypertension	.194 ^a	120.002	1.173	1.257
Cholesterol	.180 ^a	117.864	1.159	1.236
Smoke	.015	.784	.982	1.050
Binge	-.060 ^a	7.257	.901	.984
Lose-Weight	.058 ^a	13.253	1.027	1.094
Exercise	-.407 ^a	448.422	.641	.691
Access				
Cost-Bar	.559 ^a	533.277	1.668	1.834
Demographic				
Male	-.223 ^a	187.318	.775	.826
Age	-.011 ^a	312.731	.988	.990
Married	.028	2.799	.995	1.064

^a $p \leq .01$; ^b $p \leq .05$

Table 3 Logistic Regression Analysis of Limited Activity Due to Poor Mental Health

Poor Mental Health (69.5% correct prediction)			95.0% C.I. for EXP(B)	
Variable	Coefficient	Wald Statistic	Lower	Upper
Race				
Black	-.222 ^a	49.247	.753	.852
Indian				
Latin	-.096 ^b	5.216	.837	.986
SES				
Rich	.009	.221	.973	1.046
Poor	.129 ^a	32.787	1.088	1.188
Employed	-.678 ^a	716.177	.483	.533
Chronic				
Diabetes	.068 ^a	6.372	1.015	1.129
Arthritis	.286 ^a	269.497	1.286	1.377
Asthma	.256 ^a	128.420	1.235	1.350
Devices	.432 ^a	222.718	1.455	1.630
Risk Factors				
Hypertension	.064 ^a	12.135	1.028	1.105
Cholesterol	.255 ^a	226.488	1.248	1.334
Smoke	.152 ^a	81.125	1.127	1.204
Binge	.195 ^a	79.088	1.165	1.269
Lose-Weight	.153 ^a	89.904	1.129	1.203
Exercise	-.099 ^a	24.807	.872	.942
Access				
Cost-Bar	.688 ^a	844.648	1.899	2.083
Demographic				
Male	-.542 ^a	1066.584	.563	.601
Age	-.032 ^a	2439.967	.967	.970
Married	-.206 ^a	145.970	.787	.841

With the exception of alcohol consumption, the findings that relate the set of chronic conditions and risk factors to health status are uniform and consistent with expectations. As expected, respondents who reported a chronic condition such as diabetes, arthritis, asthma, a dependence on assistive devices or the presence of risk factors represented by hypertension, high cholesterol and tobacco use were among the least likely to experience a good or excellent health status. The findings also indicate that respondents who were diabetic, arthritic, asthmatic, dependent on assistive devices, hypertensive, reported high cholesterol and used tobacco were relatively likely to experience at least one day of poor physical or poor mental health. The findings also support the expectation that respondents who engage in vigorous physical activity and were dieting are more likely to report a good health status and less likely to report at least one day of limited activity than members of their respective control groups.

The regression analysis results from the sub-sample of individuals who reported at least one day of limited activity are presented in Table 4. As indicated, the coefficients of multiple determination derived in the analysis were .14 and .34, for days of limited activity due to poor mental health and due to poor physical health, respectively.

With the exception of African Americans, the coefficients derived for the individual's membership in a minority group were not significant at conventional levels ($P < .05$). However, the results indicated that, relative to their white counterparts, African Americans reported fewer days of limited activity due to poor physical and poor mental health.

On the other hand, the coefficients derived for SES are significant and consistent with expectations. In particular, the poor reported more days of limited activity than members of the middle class. Similar to the results reported in Tables 2 and 3, wealthy members of the study population and employed respondents reported fewer limited activity days than members of the middle class and the unemployed respectively. The regression analysis results also suggests that those who encountered a financial barrier to securing care reported more limited activity days due to poor or mental health than members of the reference category.

The regression analysis indicated that the number of days of limited activity is significantly greater among respondents who reported chronic conditions (diabetes, asthma, arthritis and a dependence on assistive devices) and health risks (hypertension, high cholesterol and tobacco use). On the other hand, those who engaged in vigorous exercise reported fewer days of limited activity than their sedentary counterparts while respondents who were losing weight reported fewer days of poor physical or mental health.

Table 4: Regression Analysis of Limited activity Days

Variable	Poor Mental Health Days		Poor Physical Days	
	Coefficient	t -statistic	Coefficient	t-statistic
Race				
Black	-.099 ^a	-2.863	-.092 ^a	-3.372
Indian	-.036	-.704	.075	1.906
Latin	.066	1.431	.036	1.002
SES				
Rich	-.104 ^a	-4.128	-.218 ^a	-12.156
Poor	.134 ^a	5.712	.141 ^a	7.919
Employed	-.386 ^a	-17.027	-.686 ^a	-38.941
Chronic				
Diabetes	.023	.808	.081 ^a	4.029
Arthritis	.085 ^a	4.076	.161 ^a	10.619
Asthma	.085 ^a	3.748	.099 ^a	5.735
Device	.016	.621	.396 ^a	21.228
Risk				
Hypertension	.066 ^a	3.087	.082 ^a	5.278
Cholesterol	.088 ^a	4.401	.051 ^a	3.467
Smoke	.197 ^a	9.793	.106 ^a	6.989
Binge	-.034	-1.268	-.102 ^a	-4.879
Lose-Weight	-.032	-1.684	-.041 ^a	-2.855
Exercise	-.275 ^a	-12.981	-.441 ^a	-27.884
Access				
Cost-Bar	.174 ^a	8.068	.129 ^a	7.390
Demographic				
Male	-.016	-.773	.077 ^a	5.241
Age	.001	.679	.010 ^a	17.481
Married	-.046 ^b	-2.311	.047 ^a	3.173
R- Square	.140		.338	
F -Value	94.046 ^a		495.089 ^a	

^a p≤.01; ^b p≤.05

Discussion

Prior to a discussion of the conclusions suggested by the analysis, several limitations of the study should be noted. First, the study is based on cross-sectional data and the experience of one year. As a consequence, causal interpretations are neither possible nor implied. In particular, available data prevented an assessment of the proposition that a low SES is a result of poor health or the possibility that poor health is a byproduct of low SES. Second, the analysis was based on responses of individuals to a survey instrument, implying that the validity and reliability of the data may be compromised by memory failures or misinterpretations of the questionnaire. Accordingly, the results reported here may represent an imperfect reflection of the relation between the set of covariates and the measures of health status.

Although limited by several qualifications, the analysis suggests several tentative conclusions and policy implications. First, risk factors and chronic conditions were consistently and significantly associated with a poor health status. These results suggest that the effective management of hypertension or high blood cholesterol and a decline in the use of tobacco can improve the probability of good health and reduce the number of days that the individual experience poor health. Similarly, the results also suggest a need to enhance the resources available to health promotion programs that promote vigorous physical exercise and weight loss. Accordingly, the analysis indicates a need to focus policy on prevention and to implement programs that encourage health promoting rather than health endangering activities.

Second, the coefficients derived for variables depicting the racial or ethnic status of the individual were unstable across the four equations estimated. The results indicate that Native Americans were neither more nor less likely to report a poor health status and experienced neither more nor fewer days of disability than their white counterparts. Similarly, the coefficients derived for respondents of Hispanic origin were, on balance, insignificant and unstable. On the other hand, African Americans were among the least likely to report a poor health status due to poor physical or mental health. In addition, African Americans also appeared to experience fewer days of disability than their white counterparts. With the exception of African Americans, the study suggests that membership in a minority group is a poor predictor of limited activity due to poor health status.

Conclusion

Of the measures depicting the availability of health resources and environmental factors, the coefficients derived for the poor and employed members of the study group were consistent and significant in all equations estimated. These results are consistent with the proposition that employed

members of society consistently reported a good health status and that those earning a low income were among the most likely to experience poor health. Further, limited to those experiencing at least one day of poor health, respondents who occupied a low SES experienced longer durations of limited activity due to poor health than those earning an average annual income. The results indicate a clear gradient between the individual's health status and SES with richer members of society reporting better health and poorer members of society experiencing poorer health.

Hence, the results suggest that policy deliberations designed to achieve equity in health should perhaps focus more on the availability of health resources and environmental factors than membership in a minority group. The gradient describing the relation between SES and health status suggests that the poor should consume more health resources, to include medical care, than their wealthier counterparts. When viewed from the perspective of reducing inequities in the distribution of health, analysts might consider policies that lower the costs of housing, nutrition, clothing and utilities used by the poor or policy options that improve the environment of impoverished areas. The results of this study also indicate that respondents who encountered a financial barrier to care were consistently associated with limited activity due to a poor health status. These findings suggest that the goal of ensuring an equitable distribution of health also may require the adoption of policies that promote uniform insurance coverage or a differential pricing scheme that enables the poor to acquire health care at prices lower than those that are applied to the wealthy. Similarly, equity in health may require a redistribution of sources of care with incentives designed to motivate providers to practice in underserved or impoverished areas. These observations suggest that an equitable distribution of health may require an inequitable distribution of health care.

Further, it is possible to argue that the benefits of additional units of health care result in a declining increment to the health status of the individual. Accordingly, it is likely that the marginal benefit of an increase in the use of health care by the wealthy is relatively low and the additional benefit of increased use of service consumed by the poor is relatively great. It is possible that a redistribution of health care from the wealthy to the poor will produce a health benefit accruing to the impoverished that exceeds the harm imposed on wealthier members of society. Hence, a redistribution of health resources, to include medical care, may result in a net improvement in the health status and reduce or redress inequities in the distribution of health among members of society.

References

- American Cancer Society (2000). *Cancer facts and figures for African Americans 2000-2001*. Atlanta, GA: American Cancer Society; 2000
- Anderson L. M., & May D. S. (1995). Has the use of cervical, breast, and colorectal cancer screening increased in the United States? *American Journal of Public Health* 85(6), 840-2
- Association of American Medical Colleges (2002) *Minority Graduates of U.S. Medical Schools: Trends, 1950-1998*. Washington DC
- Broyles, R., Narine, L. & Brandt, E. (2000) Equity concerns with the use of hospital services by the medically vulnerable. *Journal of Health Care for the Poor and Underserved* 11 (3), 343-360.
- Burchardt, T. (2004). Capabilities and disability: the capabilities framework and the social model of disability. *Disability & Society*. 19(7), 735 – 751
- Cohen, J. J. (2003) Disparities in Health Care: An Overview. *Acad. Emerg Med*. Vol. 10 (11), 1155-1160
- Elster, Arthur, et al. (2003) Racial and Ethnic Disparities in Health Care for Adolescents, a systematic review of the Literature. Reprinted *Arch Pediatr Adolesc Med* 157, 867-874
- Finkelstein, V. (1996) Modelling Disability- From a Workshop organized for the 'Breaking The Moulds' conference, Dunfermline, Scotland. 16-17 May 1996. Accessed 12/21/06 at <http://www.leeds.ac.uk/disabilitystudies/archiveuk/finkelstein/models/models.htm>
- Hahn, B. A. (1995) Children's health: Racial and ethnic differences in the use of prescription medications. *Pediatrics* 95(5), 727-732.
- Holmes, J. S., Arispe, I. E., & Moy, E. (2005) Heart disease and prevention: race and age differences in heart disease prevention, treatment, and mortality *Med Care*. 43(3 Suppl), I33-41.
- Institute of Medicine (2002) *Unequal Treatment confronting racial and ethnic disparities in healthcare*. Institute of Medicine Report. Washington D.C. National Academy Press
- Kaiser Commission on Medicaid and the Uninsured Report. (2000) *Health coverage and access to care among African Americans*
- Kawachi, I., Levine, S., Miller, M., Lasch, K., & Amicj, B. (1994) *Income Inequality and Life Expectancy – Theory, Research and Policy*. Society and Health Working Paper Series No. 94-2: 1994. Harvard School of Public Health
- Lillie-Blanton, M. D., Leigh, W. A. , & Alfaro-Correa, A. I. (1996) (editors). *Achieving equitable Access: Studies of Health Care Issues Affecting Hispanics and African Americans* Joint Center for Political and Economic Studies.
- Lynch, J. W., Smith, G. D., Kaplan G. A., & House, J. S.. (2000) Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions *British Medical Journal* 320,1200-1204

- Mensah, G. A., Mokdad, A. H., Ford, E. S., Greenlund, K. J., & Croft, J. B. (2005) State of disparities in cardiovascular health in the United States. Office of the Director, Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control Pub Med Circulation March 2005
- Mitra, S. (2006) The Capability Approach and Disability. *Journal of Disability Policy Studies*, 16(4), 236-247
- Polednak, A. P. (2004) Racial differences in mortality from obesity-related chronic diseases in US women diagnosed with breast cancer. *Ethn Dis.* 14(4), 463-8.
- Portenoy, U. C., Fuller I., & Haas, G. (2004) 'Population based survey of pain in the United States: differences among white, African American and Hispanic Subjects' *Journal of Pain* 5, 317 - 328
- Raphael, D. (2001) Inequality is Bad for Our Hearts: Why Low Income and Social Exclusion are Major Causes of Heart Disease in Canada. Toronto: North York Heart Health Network 2001. From www.yorku.ca/wellness/ Retrieved October 2002
- Rodgers, G. B. (1979) Income and inequality as determinants of mortality: an international cross-section analysis. *Population Studies* 33, 343-51
- Schoeni, R., L Martin, P. Andreski, V. & Freedman (2005) Persistent and growing socioeconomic disparities in disability among the elderly: 1982-2002 *American Journal of Public Health* 95(11), 2065-2070
- Silventoinen, K., Pankow, J., Jousilahti, P., Hu, G., & Tuomilehto, J. (2005) Educational inequalities in the metabolic syndrome and coronary heart disease among middle-aged men and women. *International Journal of Epidemiology* 34(2), 327-334
- Strine, T. W., Hootman, J. M., Chapman, D. P., Okoro, C. A. & Balluz, L. (2005) Health related quality of life, health behaviors, and disability among adults with pain related activity disability. *American Journal of Public Health* 95 (11,) 2042 -2048
- Wilkinson, R.G. (1997) Health inequalities: relative or absolute material standards? *British Medical Journal* 314, 591-5
- Wilkinson, R. G. (1989) Class mortality differentials, income distribution and trends in poverty 1921-1981. *Journal of Social Policy* 18 (3): 307-35.
- Wilkinson, R. G. (1992) National mortality rates: the impact of inequality? *American Journal of Public Health* 82: 1082-4

Ari K. Mwachofi, Assistant Professor, University of Oklahoma, Health Sciences Center

Robert W. Broyles, Professor, University of Oklahoma, Health Sciences Center