The Causes of Vulnerability: Disentangling the Effects of Race, Socioeconomic Status and Insurance Coverage on Health

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Abstract

The policy debate as to how to improve health disparities in the US has focused on health insurance as one potential remedy. To understand the potential impact of providing insurance on health disparities, it is important to disentangle the effects of uninsurance from plausible confounding factors. Two important confounders of insurance status are race/ ethnicity and socioeconomic status. Each of these factors identifies groups of individuals who are vulnerable to poor health because they face barriers to receiving necessary health care. Since socioeconomic status and race/ ethnicity are associated both with uninsurance and with health, to what extent is the association of uninsurance and health due to these factors? To what extent does uninsurance mediate the impact of race/ ethnicity and socioeconomic status on health? The goal of this review is to assist researchers and policy-makers in understanding the potential influences of insurance, race/ ethnicity and socioeconomic status on access to health care and health outcomes.

Introduction

Policy debates regarding health disparities in the US have focused largely on health insurance as one potential remedy. Numerous studies have documented that the uninsured have poorer access to care, and greater morbidity and mortality. However, in establishing a causal link between uninsurance and health, it is important to eliminate plausible confounding factors. Two important confounders of insurance status are race/ ethnicity and socioeconomic status. Each of these factors identifies groups of individuals who are vulnerable to poor health because they face barriers to receiving necessary health care; but they also face other circumstances that compromise health status. Since socioeconomic status and race/ ethnicity are associated both with uninsurance and with health, to what extent is the association of insurance and health due to this confounding? Does uninsurance mediate the impact of race/ ethnicity and socioeconomic status on health or are there other factors involved in the association?

Disparities in mortality by race/ ethnicity and socioeconomic status in the United States (US) have increased during a time when overall mortality rates have declined.[1] Over this period, the number of uninsured in the US has grown. In 1999, approximately 44 million people – nearly one fifth of the non-elderly population – lacked health insurance.[2] There are significant disparities in insurance status by race/ ethnicity: African-Americans and Latinos are much more likely to be uninsured than whites. The Medical Expenditure Panel Survey (MEPS) finds that 19% of African-Americans and 34% of Latinos are uninsured, compared with 12% of whites.[2] Ethnic differences in health insurance coverage result, in part, from differences in the provision of employer-sponsored insurance coverage. Public insurance programs (e.g., Medicaid) only partially compensate for these disparities in employer-sponsored coverage.[3, 4] Uninsurance is also correlated with socioeconomic status. Almost two-thirds of people without

health insurance live in poor families. Similarly, 40% of adults without a high school diploma are uninsured, compared with 10% of adults with at least a college degree.[3]

This literature review was conducted to consider the relative contributions of insurance, race/ ethnicity and socioeconomic status on a variety of health outcomes. The relative contributions of each of these factors may provide insight into the potential benefits as well as limitations of policy interventions, like expanded health insurance coverage, on access to health care and health status.

New Contribution

This review of prior studies highlights what is known about the independent effects of health insurance, race/ ethnicity, and socioeconomic status on access to health care and health outcomes. The review also outlines the limitations of prior research, including the heavy reliance on observational studies, and the primary focus on health care utilization rather than health status as an outcome measure.

Methods

This literature review was undertaken to identify peer-reviewed articles that examine the inter-relationships between health insurance coverage, race/ ethnicity, socioeconomic status, health care utilization, and health for adults. This review excludes pediatric and perinatal studies. A MEDLINE search of the English language literature was undertaken to identify articles, published between 1985 – June 2001, that examine the independent relationship among at least two of these factors. We excluded studies with less than 250 participants, and those from a single institution (because the findings may be less generalizable), unless broader studies of a

particular outcome were limited. This review is organized by outcome (e.g., use of preventive care). In each section, the data regarding the independent effects of race/ ethnicity, socioeconomic status and insurance status are presented. Because ethnicity represents a complex concept, we note studies that have tried to measure the attributes of ethnicity more specifically. When available, we present information about ethnic sub-groups (e.g., Latinos of Puerto Rican descent versus Mexican descent), acculturation, language and communication, social integration and health beliefs and behaviors. We also present the separate effect of specific socioeconomic factors (i.e., education, income, employment) when available. Finally, to help tease apart the effects of insurance coverage from confounding factors, we briefly present data on the relationships between race/ ethnicity and socioeconomic status and health from countries with universal health coverage.

As will be seen below, most of this research has examined the utilization of health care. A smaller number of studies have examined health status as the outcome measure. It is also important to note that the vast majority of the relevant literature is cross-sectional and observational. The majority of these studies rely on multivariable models to estimate the independent effects of insurance, race/ ethnicity and socioeconomic status. One of the advantages of multivariable models is the capacity to simultaneously control for the influence of many factors. Although cross-sectional studies are limited in the interpretation of causality, well-designed cross sectional studies can yield robust findings, particularly when several studies suggest a consistent association.[5] While cross-sectional studies may not be able to identify the exact magnitude of the effect of a particular factor, a similar range of effect size and significance can serve as a guide of the true effect.

Access to Care

Measures of access to health care contribute to our understanding of the relationship between insurance, race/ ethnicity, disadvantage and health because access to care is a possible mediator of these relationships. Studies of access to care, however, are limited in their interpretation since health care can be unnecessary as well as necessary, and because health is determined by more than health care.

Study Citation	Sample	Outcomes	Main Findings
Physician utilization disparities between the uninsured and the insured [6]	1989 National Health Interview Study (n=102,055) Cross-sectional study.	• Any health care within a 1 year period.	After adjustment for a variety of factors, the uninsured were significantly less likely than the insured to receive any health care (odds ratio {OR} 0.51). African-Americans, Latinos and Asian-Americans were also significantly less likely to receive any health care (OR -.7 – 0.9). Individuals with a higher level of education and income were more likely to receive health care. This study suggests that the effects of insurance, race/ ethnicity and socioeconomic status may be independent.
Health insurance and access to care for symptomatic conditions[7]	National Access to Care Survey. Participants with one of 15 serious conditions (n=574). Cross-sectional study.	• Receive needed care.	The uninsured were significantly less likely to receive needed care (OR 0.28). There were no differences by race/ ethnicity or socioeconomic status.
Unmet health needs of uninsured adults in the US[8]	Random household telephone survey of adults sampled from the Behavioral Risk Factor Surveillance System. Cross-sectional study.	• Could not see a MD when needed to secondary to cost. • Did not receive recommended preventive care.	After adjustment for race and socioeconomic status, among individuals who were uninsured for more than 1 year, 27% could not see a physician when needed, compared with 22% of those uninsured for less than 1 year and 8% of the insured. The independent effects of race and socioeconomic status are not presented.
Insurance status and	National Health	• Mean number of	Demographic information, including income, education,

access to health services among poor persons[9]	Interview Surveys, 1983, 1984, 1986. Participants below 150% of the poverty level. Cross-sectional study.	annual ambulatory visits.	health status and race were combined into an aggregate measure of "vulnerability". Found that individuals with Medicaid had more visits than either those who were covered with private insurance or who were uninsured, probably related to unmeasured severity of illness differences between these groups.
Does medical insurance contribute to socioeconomic differentials in health?[10]	1995 Survey of Aging, Status & Sense of Control (nationally representative, English-speaking). Follow-up in 1998. (N = 1,355). Longitudinal analysis using time 1 predictors (1995) and time 2 outcomes (1998).	• No. of physician visits. • No. of medications. • Trouble paying bills.	Individuals with Medicaid had more physician visits than the uninsured, again possible related to unmeasured severity of illness differences between these groups.
Measuring under-use of necessary care among elderly Medicare beneficiaries using inpatient and outpatient claims[11]	Randomly selected Medicare beneficiaries (n = 345,253)	• Receiving necessary care as defined by an expert panel.	All had Medicare. For 16 of 40 indicators, Medicare enrollees received necessary care less than 67% of the time. African-Americans received less necessary care than whites for 16 of 40 outcomes (and more than whites for 2 indicators). Residents of poverty areas received less necessary care than residents of higher income areas for 17 indicators (and more for 1 indicator). Suggests that racial and socioeconomic disparities persist among those with Medicare coverage.

In summary, there are several nationally representative, cross-sectional studies that demonstrate disparities in access to care between the uninsured and the insured, independent of race and socioeconomic status. The independent effects of race and socioeconomic status are not as consistently associated with measures of access to care. There is only one study that attempts

to look at the effect of insurance in ethnic or socioeconomic subgroups,[9] but this study is one of the few that does not demonstrate any overall difference in access between the uninsured and the privately insured.

Quality of Care

Quality of care measures identify what happens to patients once they have entered the health care system. These measures attempt to identify care that is necessary or important, and therefore goes beyond a simple measure of access to care. Despite the development of sophisticated systems to measure quality of care, better quality of care may not translate directly into improvements in health.

Study Citation	Sample	Outcomes	Main Findings
Quality of ambulatory care[12]	5,986 adults & children with one of 17 chronic illnesses. RAND health insurance experiment. Randomized controlled clinical trial.	• Explicit quality of care -process -outcome	In aggregate across all conditions, the poor were less likely to receive "appropriate" care than the non-poor in both the free care and the cost sharing plans although the magnitude of difference in the cost-sharing plan was greater than the free care plans.
Socioeconomic status and risk for substandard medical care[13]	30,195 patients sampled from 51 hospitals in NY state. Cross-sectional study.	• "Substandard" care (adverse events related to negligence).	Uninsured were at greater risk of substandard care due to negligence (odds ratio 2.4). There were no differences by race or income.
Health care for black and poor hospitalized Medicare	Nationally representative sample of Medicare beneficiaries hospitalized with one	• Process of care. • Instability at discharge.	All had Medicare. When stratified by type of hospital (e.g., urban teaching hospital), patients who are African-American or poor receive worse process of care and have greater instability at discharge than patients who

patients[14]	of four common medical conditions (n = 9,932). Cross-sectional study.		are white or non-poor. Suggests that there are differences in quality by race/ ethnicity and income for Medicare beneficiaries by hospital type.

The Rand Health Insurance Experiment is the only randomized trial that examines the effect of health insurance. It provides the strongest evidence that there are differences in the quality of care for the poor independent of insurance status (i.e., even with health coverage the poor are less likely to receive "appropriate" care), and that insurance may have a differential effect for different socioeconomic groups.

Avoidable Hospitalizations

Avoidable hospitalizations for chronic medical conditions have been used as a readily measured "sentinel" indicator of inadequate access to primary care services.[15, 16] In 1990, 12% of all medical and surgical hospitalizations were found to be avoidable.[17]

Study Citation	Sample	Outcomes	Main Findings
Rates of avoidable hospitalization by insurance status in Massachusetts and Maryland[15]	Patients < 65 years old, hospitalized in these two states. Cross-sectional survey.	• Relative risk of admission for 12 types of avoidable hospitalizations.	The uninsured are more likely than both the privately insured and those with Medicaid to experience an avoidable hospitalization. These results may be explained by the hypothesis that the uninsured (and Medicaid enrollees) have less access to a usual source of care.
Preventable hospitalizations and access to care[16]	6674 English and Spanish speaking residents of 41 communities in California. Cross-sectional	• Cumulative hospitalization rates for five chronic conditions per 10,000 people.	Independent variables in the model represent the proportion of people in a geographic area with that characteristic (e.g., the % black), not individual characteristics. Controlled for self-rated access to care for a random sample of adults from that area. Suggests that people who reside in communities with greater

	study.		reported access to care have lower rates of avoidable hospitalization. Also suggests that communities with more uninsured, more African-Americans and more people with less than a high school education are more likely to be hospitalized for one of these chronic conditions.
Racial and ethnic differences in preventable hospitalizations across ten states.[18]	1996 discharge abstract data from ten states (representing 42% of US population). Cross-sectional study.	• Preventable hospitalization.	In 3/ 10 states uninsured Latinos had increased risk of avoidable hospitalization compared with uninsured whites, and in 2/10 states, Latinos had lower risk. In 9/ 10 states uninsured blacks had increased risk of avoidable hospitalization compared with uninsured whites. In 2/ 10 states privately insured Latinos had increased risk of avoidable hospitalization compared with privately insured whites, and in 1/10 states Latinos had lower risk. In all states privately insured blacks had an increased risk of avoidable hospitalization compared with privately insured whites. Ethnic differences in avoidable hospitalizations show similar patterns between insurance groups.
Potentially avoidable hospitalizations: inequalities in rates between US socioeconomic groups.[17]	1990 National Hospital Discharge Survey. Cross-sectional survey.	• Avoidable hospitalization (AH).	Age-adjusted AH greater for Medicaid recipients, followed by uninsured and then privately insured. Among those with private insurance, rates of AH greater for blacks than whites at all levels of community income. Rates of AH greater in lower income communities. Suggests that racial and income differences in AH are not explained by insurance. Authors state that the racial and socioeconomic differentials were not observed for persons over 65 years of age, perhaps related to Medicare coverage, but these data are not presented in the paper.

These studies suggest that both insurance status and race/ ethnicity may have an independent effect on rates of avoidable hospitalization.

Preventive Care/ Cancer Screening

Having a usual source of care is one of the strongest predictors of preventive care and cancer screening[19] Therefore, one could hypothesize that the use of preventive care would be dependent on access to care and health insurance status. While recommended preventive care and cancer screening are associated with long-term improvements in health on a population basis, they are not a measure of health status, but of health care utilization.

Study Citation	Sample	Outcomes	Main Findings
Reverse targeting of preventive care due to lack of health insurance.[20]	National Health Interview Survey, 1982. Women aged 45 – 64 (n = 10,653). Cross-sectional study.	• "Inadequate screening" (failure to receive four screening tests: annual blood pressure check, annual clinical breast exam, triennial PAP smear, biannual glaucoma screening).	Overall, 58% of these women were inadequately screened for these measures. Uninsured more likely to receive inadequate screening (relative risks for each measure of screening: 1.4 – 1.6) African-Americans more likely to receive screening for all screening tests except glaucoma screening. The poor were more likely to receive inadequate screening for these tests in aggregate.
Acculturation, access to care, and use of preventive services by Hispanics.[21]	Hispanic Health and Nutrition Examination Study, 1982 – 1984. Cross-sectional study.	• Utilization of a variety of preventive services for men and women in aggregate.	Examined aggregate measure of "access to care" including information about health insurance and having a regular source of care. Better "access to care" was associated with use of preventive tests. More acculturation associated with greater use of preventive tests. Greater education and income associated with greater use of preventive care. Effects were similar for sub-groups of Mexican-Americans, Cuban Americans and Puerto Ricans.
Breast and cervical cancer screening among multiethnic	1,420 women of four Latino subgroups	• Mammography, clinical breast exam and PAP smear	Insured more likely to receive cancer screening than the uninsured (odds ratios 1.6 – 2.1 for each test). More acculturated more likely to be screened than the less

women.[22]	and three black subgroups from NYC, 1992. Cross-sectional study.	according to NCI recommendations.	acculturated. No consistent association with socioeconomic status. Interesting cross-sectional study that specifically targeted certain ethnic sub-groups. Specifically measured negative cancer attitudes ("hopelessness") and beliefs that were associated with use of screening. Also examined interaction of beliefs with race/ ethnicity (found to be significant for several ethnic groups – effect not specified).
The association of race/ ethnicity, socioeconomic status and physician recommendation for mammography.[23]	Survey of 1,933 black and white women, > 52 years old, in 10 rural counties in North Carolina. Cross-sectional study.	• Physician recommendation for mammography within the past year.	Insured more likely than uninsured to have mammography recommended (odds ratio 1.6). No differences by race. Higher education and income more likely to have mammography recommended.
The effects of insurance coverage and ethnicity on mammography utilization in a postmenopausal population.[24]	San Diego Women's Health Initiative participants (n = 2,453). Cross-sectional study.	• Mammogram within past two years.	22% of this sample was Latina. All of these women were participants in a longitudinal cohort study, so may be atypical of the general population. Among those with a provider, uninsured less likely to receive a mammogram (odds ratio 0.4), but no difference by insurance for women without a regular provider. No significant differences by race or socioeconomic status. This study suggests the importance of having a usual source of care.
Black women receive less mammography even with similar use of primary care.[25]	Medicare data, 1990. Black and white women > 65 years old from 10 states. More than 3 million women. Cross-sectional study.	• Any mammogram.	All women had Medicare. Lower use of mammography for blacks compared with whites in all states. High income white women more likely to receive a mammogram (odds ratio 1.4). Socioeconomic trend not observed in black women. Deficits in mammography use persist after adjusting for the number of primary care visits. These findings suggest that neither insurance nor a primary care provider removed racial and

			socioeconomic differentials in mammography use.
Mammography screening among California Medicare beneficiaries, 1993 – 1994.[26]	Women > 65 in California using Medicare claims (n = 837,413). Cross-sectional study.	• Mammogram within 2 year period.	All had Medicare. Dually eligible (Medicaid and Medicare) had lower rates of mammography than those with Medicare alone (odds ratio 0.6). African-Americans less likely to receive mammography than whites (OR 0.6). Residence in a community with a lower level of education also less likely to receive a mammogram (OR 0.8). Among the dually eligible, differences for African-Americans, and community education level were no longer significant, suggesting that some of the race effect is related to socioeconomic status.
Preventive services among Medicare beneficiaries with supplemental coverage versus HMO enrollees, Medicaid recipients, and elders with no additional coverage[27]	1996 Medical Expenditure Panel Survey – sub-sample of 2,251 persons age 65 and older with Medicare. Cross-sectional study.	Variety of preventive services (blood pressure check, flu shots, cholesterol screening, Pap smears, mammograms, breast exam and prostate screening).	Those with Medicare alone less likely to receive preventive care than those with some type of supplemental coverage (e.g., odds ratio for blood pressure screening 0.7). While all of these elders were insured by Medicare (and Medicare covers Pap smears, mammography and flu shots), Medicare coverage alone was still associated with disparities in use of preventive care. Racial and socioeconomic status disparities are also apparent. Insurance and education findings similar for all outcomes. Racial disparities apparent only for blood pressure exams and flu shots.

These studies demonstrate a fairly consistent association between insurance and the use of preventive care. In contrast to the other measures of utilization discussed thus far, a fairly consistent relationship is also seen for race/ ethnicity and socioeconomic status, perhaps related to differences in patient-doctor communication and beliefs about the importance of prevention. These studies suggest that insurance may necessary for an individual to receive preventive care, but may not be sufficient.

Mortality

Population-Based

There is substantial disparity in life expectancy between blacks and whites in the US; approximately 6 years.[28] The reasons for this disparity are not well understood, but go beyond differences in the prevalence of disease.[29] Several studies have looked at the effect of insurance, race/ ethnicity and socioeconomic status on population-based mortality:

Study Citation	Sample	Outcomes	Main Findings
Health insurance and mortality[30]	National Health and Nutrition Examination Survey (n = 4,694). Adults followed prospectively from early 1970's – 1987.	• Mortality.	Uninsured have a higher risk of death than the insured (hazard ratio 1.3). Similar differences for African-Americans compared to whites. No differences by socioeconomic status. Examined interactions between insurance and other covariates – none significant. Although data not presented, authors state that effect of insurance is observed in all ethnic and socioeconomic sub-groups examined.
Mortality in the uninsured compared with that in persons with public and private health insurance[31]	Adults from the Current Population Survey (n = 147,779). Cross-sectional study.	• Mortality.	Uninsured had higher risk of mortality compared to the privately insured for all race-sex strata except African-American women (relative risks 1.2 – 1.5). Similar findings when those with Medicaid or Medicare were compared to the privately insured. Suggests that insurance may not mediate all of the ethnic differences in mortality.
Effects of race and income on mortality and use of services among Medicare beneficiaries.[32]	1993 Medicare data linked to census data. Cross-sectional survey.	• Mortality.	All with Medicare. African-American men and women both had higher mortality than whites (odds ratios 1.2). Income explained little of the racial differences in mortality (OR 1.2 with and without adjustment for income).

These studies suggest a relationship between both insurance status and race/ ethnicity, and mortality. Comparisons by race/ ethnicity, however, are limited to comparisons between

African-Americans and whites. Only one study examines the effect of insurance in ethnic and socioeconomic strata,[30] and suggests that the effect of insurance may be similar for all sub-groups.

Hospital Mortality

While hospital mortality is an important outcome, it has more limitations of interpretation compared with population-based mortality. For example, hospitals may have different "thresholds" for admission and discharge. Deaths that occur soon after discharge may not be adequately measured. The administrative data that have typically been used to examine this outcome may not contain adequate detail about important clinical factors, like preferences for resuscitation.

Study Citation	Sample	Outcomes	Main Findings
Comparison of uninsured and privately insured hospital patients[33]	National sample of hospital discharges, 1987 (n = 592,598). Cross-sectional study.	• Risk adjusted, in-hospital mortality.	In 13 of 16 age-sex-race specific cohorts the uninsured had a 44% - 124% higher risk of death than the privately insured. The effect of uninsurance on hospital mortality was similar for blacks and whites. The effect of socioeconomic status was not examined.
Racial differences in mortality among men hospitalized in the Veteran's Affairs health care system[34]	Men admitted to VA hospitals with one of six common medical conditions (n = 36,000). Cross-sectional study.	• 30-day mortality.	All Veterans. Demonstrates lower risk-adjusted mortality for blacks in VA system. Adjusts for individual as well as hospital characteristics. Study limited by lack of detailed clinical data for risk adjustment. VA system offers a broader range of services to eligible beneficiaries than traditional health insurance plans.
Acutely injured patients with trauma in Massachusetts.[35]	All adults emergently hospitalized with acute trauma in 1990 (n=15,008). Cross-sectional	• In-hospital mortality. • Care in an ICU. • Physical therapy.	Uninsured experience higher in-hospital mortality than the privately insured (odds ration 2.2). Uninsured also received less trauma related care than the privately insured. No differences in mortality or process of care between those with Medicaid and the privately insured.

	study.		

Similar to population-based mortality, these results suggest that insurance status and race/ ethnicity both have an independent influence on hospital mortality. The caveats noted above, however, make it more difficult to interpret the true meaning of these findings in contrast to population-based mortality.

Outcomes for Specific Conditions

Studies that examine specific clinical conditions examine either process of care or health status (or both). Studies are summarized for a variety of common conditions where there is some indication that better process of care is associated with better health outcomes. Since health outcomes (e.g., mortality) may have a longer time frame for occurrence, it is often more feasible for studies to examine differences in process of care than differences in clinical outcomes. Measures of process of care that have a demonstrated association with health outcomes provide substance to cross-sectional studies that only examine process of care as a dependent variable.

<u>Cancer</u>

Ethnic disparities in cancer treatment appear to be decreasing over time. There are several cross-sectional studies examining cancer treatments, but many of these studies have methodological limitations because of limited data about treatment beyond the initial hospitalization. Since mortality is a well-established outcome for individuals with cancer this is an important condition for examining the effect of insurance, race/ ethnicity and socioeconomic

status on health. Since stage at diagnosis is strongly associated with mortality for most of the cancers examined in these studies this is an important intermediate indicator of health.

Study Citation	Sample	Outcomes	Main Findings
Breast			
Racial differences in survival from breast cancer[36]	1,130 women age 20 – 79 years, from three metropolitan areas, with a primary breast cancer.	• Mortality related to breast cancer and overall mortality.	Black: White hazard ratio for death 2.2 (adjusted for age and city). After adjusting for differences in stage at time of presentation HR 1.6. After also adjusting for insurance status and socioeconomic status this number was still 1.6.
Influence of socioeconomic and cultural factors on racial differences in late stage presentation of breast cancer.[37]	540 women with breast cancer in North Carolina. Cross-sectional study.	• Breast cancer stage at diagnosis (late vs. early stage).	Uninsured more likely to be diagnosed with late stage disease than the insured (odds ratio 2.5). Black: white differences in late stage diagnosis diminish after adjusting for insurance, income, education and other sociodemographic characteristics, and disappear after adjusting for cultural beliefs about cancer. Examples of the beliefs measured in this study include that: a devil can cause you to get cancer, that women who have surgery are no longer attractive to men, and that chiropractic care is an effective treatment for cancer. Suggests that insurance and race may influence behavior through different mechanisms.
Effects of health insurance and race on breast cancer treatments and outcomes[38]	Incident cases of breast cancer in Florida in 1994 (n=11,113) using state tumor registry data	• Mortality. • Use of breast conserving surgery. • Use of radiation therapy.	Higher mortality of uninsured and Medicaid explained by later stage of diagnosis. Racial disparities in mortality were not explained by stage of diagnosis, treatments used, or payer. Again suggests that something beyond insurance/ financial barriers is mediating the black: white difference.
Colon			
Effects of health insurance and race on colorectal cancer treatments and outcomes[38]	Incident cases of colorectal cancer in Florida in 1994 (n = 9,551)	• Treatment for colon cancer (e.g., definitive surgery). • Mortality.	No differences for the uninsured compared to the insured for definitive surgery, local stage, radiation therapy, or chemotherapy. But, uninsured had higher risk of death compared to the insured (odds ratio 1.4). Higher risk of death for African-Americans and less educated.

			Differences in mortality by race and education were not explained by differences in stage at diagnosis or type of treatments (as can be assessed in administrative data). Again suggests that other beliefs and behaviors may affect health differences by race/ ethnicity and education.
Lung			
Racial differences in the treatment of early stage lung cancer[39]	Patients with stage I or II lung cancer. SEER-Medicare linked database, 1985 – 1993 (n = 10,984)	• Rates of surgical therapy. • Mortality.	All with Medicare. Black-white relative risk of resection 0.8. No black-white differences in survival after accounting for the use of surgical resection. Overall, whites had significantly better survival than blacks.

These studies suggest a fairly consistent relationship between insurance status and cancer outcomes independent of race/ ethnicity and socioeconomic status. This body of literature may suggest that the effect of insurance is mediated through differences in the use of cancer screening, and therefore stage at diagnosis. In addition, there may also be an independent relationship between race/ ethnicity and these outcomes, possible related to differences in beliefs about cancer.

Cardiovascular Disease

In the area of cardiovascular disease, several studies have gone beyond simple categorization of race/ ethnicity and socioeconomic status to understand what potentially mediates ethnic differences in the use of cardiac procedures.

Study Citation	Sample	Outcomes	Main Findings
The association of payer with utilization of cardiac	Patients admitted to the hospital in 1985 with cardiovascular	• Use of cardiac procedures.	Uninsured received less angiography than the privately insured in every socioeconomic and race category. There were no differences between the uninsured and

procedures in Massachusetts[40]	disease. Cross-sectional study.		the privately insured for revascularization procedures for blacks, but there were differences for whites and in most income strata. Few differences in utilization between the uninsured and those with Medicaid in these strata. Suggests that insurance has an effect on utilization independent of race and socioeconomic status. Appropriateness of these differences not established.
Access to coronary artery bypass surgery by race/ ethnicity and gender among patients who are appropriate for surgery[41]	Medical record review at hospitals that perform angiography in NY. Tracked prospectively for 3 months to see if they underwent surgery in NY state (n = 4,905 of whom 1,261 were appropriate for surgery).	• Receipt of CABG surgery within the 3 month follow-up window.	Those covered by Medicaid or the uninsured less likely than the privately insured to undergo CABG surgery (odds ratio 0.6). African-Americans also less likely to receive CABG than whites (OR 0.6). Also examined use of CABG for patients where the surgery was judged to be a necessity (n = 651) with similar findings. Importantly these analyses adjusted for clinical factors like the presence of 3-vessel disease.
Racial and ethnic disparities in the use of cardiovascular procedures: associations with type of insurance[42]	Hospital discharge records from LA county of patients with possible coronary artery disease (n = 104,952). Cross-sectional study.	• Use of cardiovascular procedures (catheterization, CABG, PTCA).	Analyses stratified by payer. Ethnic differences in procedure use were observed for most insurance groups except private insurance. Suggests that private insurance may overcome ethnic differences, or, more likely, that blacks and Latinos with private insurance are more similar to whites in health beliefs and behaviors.
Racial differences in the use of revascularization procedures after coronary angiography[43]	National sample of Medicare enrollees who underwent cardiac catheterization in 1987 (n = 27,485). Cross-sectional	•Revascularization procedure (CABG or PTCA). • Use of thrombolysis. • Discharged on a ß-	All Medicare. Importantly overall rates of therapy were low (rates of use for whites: 17% for thrombolysis, 16% for beta-blockers, 45% for aspirin). African-Americans had less use of thrombolysis and revascularization but not of ß-blocker or aspirin usage.

	study.	blocker. • Discharged on aspirin.	
Racial differences in the use of invasive cardiovascular procedures in the Department of Veteran's Affairs Medical system[44]	Male Veterans with a primary diagnosis of cardiovascular disease, 1987 – 1991 (n= 400,000), Cross-sectional study.	• Cardiac catheterization. • Revascularization.	All Veterans. Black-white odds ratios for outcomes range from 0.5 - 0.7 depending on outcome. In an "equal access" system, significant ethnic disparities in procedure use similar to what has been observed in non-VA systems. In contrast to the next study, this study has no information about mortality differences.
Racial variation in cardiac procedure use and survival following acute myocardial infarction in the Department of Veterans Affairs[45]	Male Veterans discharged from a VA facility for an acute myocardial infarction (n = 33,641). Cross-sectional study.	• Survival at 1 year. • Catheterization within 90 days. • Revascularization within 90 days.	All Veterans. Found similar racial differences in procedure use but no significant differences in mortality.

These studies demonstrate a consistent relationship between health insurance and the use of cardiac procedures. Because several of these studies included stratified analyses, these studies also demonstrate more consistently than for other conditions that there is also an independent effect of race/ ethnicity on the use of cardiac procedures. The observation that the uninsured receive fewer cardiac procedures within different ethnic and socioeconomic groups provides reassurance that the effect of insurance status is independent of these other factors. These studies also demonstrate the important distinction between process and outcome: differences in procedure use by race/ ethnicity may not be associated with differences in mortality from cardiovascular disease.

Diabetes

Among diabetics less than 65 years old, 14% have no health insurance.[46] In a representative sample of US adults, black diabetics had a significantly higher risk of death, and shorter survival than white diabetics (this study did not examine health insurance status).[47] Also, glycemic control is worse for African-Americans and Mexican-Americans than for whites.[48] The prevalence and severity of diabetic retinopathy is greater in African-Americans and Mexican-Americans than whites, after adjusting for differences in the duration of diabetes, type of therapy and level of diabetes control.[49]

Study Citation	Sample	Outcomes	Main Findings
Eye care for elderly Americans with diabetes mellitus[50]	Medicare claims data. Beneficiaries with MD-diagnosed diabetes (n = 175,015). Cross-sectional study.	• Physician visit for any kind of eye care during a 2-year period.	All had Medicare. 33% of this sample did not receive an eye visit within a 2-year period. African-Americans less likely to receive an eye exam than whites (odds ratio 0.7). Community poverty level also inversely associated with eye care. Despite Medicare coverage, racial and socioeconomic disparities persisted. Importantly all of these beneficiaries were known to have diabetes by an MD.
Unmet health needs of uninsured adults in the United States[8]	Adults with diabetes who participated in the 1997 Behavioral Risk Factor Surveillance System. Cross-sectional study.	• Did not receive clinically indicated diabetes management (including measurement of glycosylated hemoglobin, foot examination by a health professional, dilated eye exam, cholesterol measurement,	After adjustment for race, education, income and employment, diabetics who are uninsured were more likely to not receive appropriate diabetes management. For example, for dilated eye exam, 44% of individuals uninsured for more than a year did not receive an eye exam within 2 years compared with 27% of insured adults. While race and socioeconomic status were adjusted for their level of association is not displayed.

		influenza vaccination and pneumococcal vaccination.	

Only one study[8] directly address the effect of lack of health insurance on the outcomes of diabetics, after adjustment for race and socioeconomic status. This large nationally representative study suggests that the uninsured diabetics consistently receive less indicated care. In one cross-sectional study of Medicare enrollees, African-Americans are less likely to receive eye care despite their health coverage.

HIV

A recent well-designed study of HIV care provides the most current information about HIV-related care and outcomes. Since there is strong evidence that the use of antiretroviral therapy improves survival for many persons with HIV, it would be expected that this measure of process of care would be associated with improvements in health status.

Study Citation	Sample	Outcomes	Main Findings
Variations in the care of HIV-infected adults in the US[51]	Multistage probability sample of 2,864 adults with AIDS over 18 years receiving medical care in the US (HCSUS sample)	• Service utilization (outpatient and inpatient). • Medication usage (antiretrovirals and prophylaxis for pneumocystis).	Uninsured more likely than insured to never receive anti-retroviral therapy (odds ratio 2.8). Interestingly similar findings were observed when those with Medicaid were compared to the privately insured (odds ratio 2.2). Blacks and Latinos received significantly less outpatient care than whites. Outpatient care did not vary by insurance or education.
Delayed medical care after diagnosis in a US national	HCSUS sample	• More than 3 months delay from diagnosis of HIV and	No differences in delay of diagnosis for uninsured compared with privately insured. Medicaid coverage at the time of diagnosis was protective against delayed

probability sample of persons infected with HIV[52]		first HIV-related health care.	medical compared to those with private insurance. Latino's more likely to experience delays in care compared with whites (odds ratio 2.0).
Access of vulnerable groups to antiretroviral therapy among persons in care for HIV disease in the US[53]	HCSUS sample	• Receipt of highly active anti retroviral therapy (HAART) within specified time period.	No differences by insurance status. African-Americans less likely than whites to receive HAART (odds ratio 0.3). Examines four multivariate models that sequentially address predisposing vulnerabilities, predisposing controls, need variables and enabling variables. Sequential models suggest that enabling variables may help to over some of the predisposing vulnerabilities. Models also examined clinical characteristics (e.g., CD4 count), social support, geographic region and specific barriers to care (e.g., waiting and travel times).

This study suggests the possibility of an association between insurance coverage and process of care, independent of race/ ethnicity and socioeconomic status. These studies also suggest an independent effect of race/ ethnicity on HIV-related care and outcomes.

Hypertension

Despite national improvements in blood pressure control, poorly controlled hypertension remains a major health problem among minority and disadvantaged populations.

Study Citation	Sample	Outcomes	Main Findings
How free care reduced hypertension in the health insurance experiment[54]	RAND Health Insurance Experiment. Randomized controlled trial	• Blood pressure (BP).	Free care group had lower BP than cost sharing group (2 mm Hg). Differences for insurance groups between blacks and whites not significant. Differences between plans more important for lower income groups than for higher income groups (4 mm Hg vs. 1 mm Hg). Suggests that cost sharing may be more important for lower income groups.
Predisposing factors	93 patients with	• Uncontrolled	Uninsured more likely than insured to have uncontrolled

for severe, uncontrolled hypertension in an inner city minority population.[55]	sever uncontrolled hypertension + 114 control patients with hypertension in NY. All black or Latino	hypertension.	hypertension (odds ratio 2.2). Not having a primary care physician associated with an increase risk of uncontrolled hypertension (OR 4.4). No differences by race or education level. Suggests that in a racially diverse, and disadvantaged population (69% had not finished high school) that insurance and having a primary care providers is associated with blood pressure control.

The Rand Health Insurance Experiment specifically examined the effect of health insurance on blood pressure control and demonstrates an independent effect. This study also demonstrates that the effect of insurance may differ between socioeconomic groups.

Renal Transplant

The vast majority of patients with end stage renal disease in the US are eligible for Medicare, so comparisons between the uninsured and the insured are not relevant. This group of studies is important for demonstrating that despite Medicare coverage there are persistent racial and socioeconomic disparities in care and outcomes. Many of these studies have focused on transplant because it is associated with improved mortality and better quality of life for patients with end stage renal disease when compared with dialysis.

Study Citation	Sample	Outcomes	Main Findings
Barriers to cadaveric renal transplantation among blacks, women and the poor.[56]	7,125 patients beginning chronic dialysis in three states.	• Completion of four steps required to undergo transplant: A. Suitable for transplant. B. Interested in transplant. C. Completing pre-	All with Medicare. African-Americans less likely than whites to complete each stage of this process. Similar findings for lower income individuals compared with higher income. Suggests that independent of insurance that there are ethnic and socioeconomic barriers to care at several steps.

		transplant work-up. D. Receiving a transplant.	
Racial disparities in access to renal transplant.[57]	Chart review of 1,518 patients from four states	• Referral to a transplant center. • Placement on a waiting list. • Transplant.	All had Medicare – approximately 50% had additional private insurance. Among patients found to be appropriate for transplant, blacks less likely than whites to be referred (90% vs. 98%), placed on a waiting list, or receive a transplant (17% vs. 52%).
The effect of patients' preferences on racial differences in access to renal transplantation[58]	Interviews and chart review of 1,392 patients with end stage renal disease within 10 months of starting dialysis	• Patients preferences for renal transplant. • Access to renal transplant.	All had Medicare – approximately 50% had additional private insurance. For the access to transplant outcome, black women had poorer access than white women (60% vs. 75%) and black men had poorer access than white men (61% vs. 78%). Demonstrates that preferences for renal transplant vary by race (blacks less likely to prefer transplant). In addition to typical covariates, models for access to transplant controlled for differences in preferences for care suggesting that preferences explain littlie of the variation in access to transplant.

These studies suggest that race/ ethnicity and socioeconomic status may have an effect independent of health insurance on access to renal transplant.

What Can Be Learned from Abroad?

Socioeconomic disparities in health have been observed in many industrialized nations with well-established systems of universal health coverage, including the United Kingdom, Scandinavia, and Japan.[59-62] In fact, the establishment of the National Health Service in England was associated with widening of socioeconomic disparities in health, reflecting other societal inputs on health.[63] While national health care systems may narrow socioeconomic differentials in the use of health care, they have had far less effect in reducing differentials in

health.[10] The Whitehall studies demonstrate substantial socioeconomic disparities in health among a large cohort of British civil servants. Compared with top administrators, professionals had a relative risk (RR) of 10-year mortality of 1.6, clerical staff had a RR of 2.2 and unskilled laborers had a RR of 2.7.[64] All of these individuals were both employed and covered by health insurance. The prevalence of "medical" risk factors explained little of these differences, suggesting that perhaps there are other lifestyle and environmental factors that are associated with these socioeconomic disparities in mortality. The socioeconomic status-health gradient is shallower in countries, such as Scandinavia, in which there is not only universal health coverage, but also a wide range of social programs designed to reduce socioeconomic disparities across the society.[65] In countries such as England in which there is universal coverage but wide income disparity, the socioeconomic status-health gradient is similar to that in the US. This body of literature consistently suggests that the implementation of universal cover narrows disparities in utilization, but not disparities in health.

Unresolved Issues

Several additional pieces of information would help disentangle the relationship between insurance status, race/ ethnicity and socioeconomic status. First, we need a better understanding of the causes of ethnic and socioeconomic disparities in health. To what degree do financial barriers, differences in health beliefs and practices, low literacy and numeracy skills, provider bias and a history of discrimination, and environmental factors contribute to health? Studies need to move beyond documenting disparities, and try to decipher the factors that mediate disparities. Second, while many studies examining the effect of insurance status on health have adjusted for race/ ethnicity or socioeconomic status, many of these studies do not report the

actual coefficients for these factors. This information should be fairly accessible, and would further our understanding of the relative importance of each of these factors. Third, while many studies have demonstrated differences in access to care and health status between African-Americans and whites, there is less information about Latinos and Asian/ Pacific Islanders. Within broad ethnic categories (e.g., Asian), we need to better understand how specific populations (e.g., Chinese descent) fare. To better understand ethnic differences, we need to better understand the role of language and acculturation on health. Fourth, not all insurance is created equal. We need to know more about the attributes of health plans that are most important. For example, how do gatekeeper requirements affect different ethnic groups? Particularly in this era of managed care, stratified analyses are needed to examine how different ethnic and socioeconomic groups fare with similar types of insurance plans. It is possible that the effects of health insurance on ethnic and socioeconomic disparities in health could be more substantial than has been documented to date if better measures of health insurance coverage were available. Health insurance plans have traditionally only provided coverage for discrete services. Health plans could become more involved in outreach and health education, and perhaps take a more population-based view of health in communities where they have a sizable market share. If so, insurance coverage would likely be more strongly associated with improved health. Fifth, we need to understand how insurance interacts with race/ ethnicity and socioeconomic status. It is possible, for example, that an African-American who is uninsured has worse access to care than a European-American who is uninsured. The range of complexity of these unresolved issues is broad. While some could relatively easily be examined, others would require significant redefinition of the mission of health insurers that is unlikely to occur.

Summary

This body of literature suggests that insurance coverage, race/ ethnicity and socioeconomic status each independently influence the utilization of health care and health status. The relative importance of each of these factors varies by outcome measure. Measures of health care utilization and process of care are more strongly and consistently influenced by insurance status than are measures of health status. While health insurance may alleviate financial barriers to care and improve the choice of providers, it does not address other individual and societal determinants of poor health that are experienced by ethnic minorities and the disadvantaged. These broader determinants include: low literacy and numeracy skills that may interfere with the ability to understand instructions or participate in medical decisions, health beliefs, lifestyle practices, and environmental influences. This is confirmed by studies from nations with universal health coverage programs in place. Studies from abroad suggest that even with universal coverage, ethnic and socioeconomic disparities in health persist.

Although lack of health insurance is only one of several factors that contribute to socioeconomic and ethnic disparities in health, it is still an important component, and it may be more amenable to intervention than are some of the other determinants. Despite the substantial obstacles to providing universal coverage in the US, these obstacles may be less daunting than other types of broad societal interventions that could reduce ethnic and socioeconomic disparities in health. Health insurance may be a necessary first step towards improving health status in the US. Even though ethnic and socioeconomic disparities in health may persist after the broader implementation of health insurance, this is not a justification for not pursuing the goal of universal coverage in the United States. All other developed nations have some sort of universal health coverage for their residents.[66] However, we should not be content to focus only on

insurance as a remedy for social disparities in health. Solutions to ethnic and socioeconomic disparities will require more clarification, and perhaps require more fundamental solutions.

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