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Differences in cholesterol management among states in relation to health insurance and race/ethnicity across the United States

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BACKGROUND: Across the United States, hyperlipidemia remains inadequately controlled and may vary across states according to differences in health insurance coverage and/or race/ethnicity.

OBJECTIVE: To examine relationships between states' health insurance and race/ethnicity characteristics with measures of hyperlipidemia management across the 50 U.S. states and the District of Columbia.

METHODS: Cross-validated, multiple linear regression modeling was used to analyze associations between states' health insurance patterns or proportions of racial minorities (from the 2010 U.S. Census data) and states' aggregate frequency of checking cholesterol within the previous 5 years or prescriptions written for lipid-lowering medications (from national survey and population-adjusted retail prescription data, respectively), with adjustments for age, sex, body mass index, race/ethnicity, and poverty.

RESULTS: In states with proportionately more uninsured, cholesterol levels are checked less often, but in states with proportionately more private, Medicare, or Medicaid coverage, providers are not necessarily more likely to check cholesterol or to write more prescriptions. In states with proportionately more African-Americans and/or Hispanics, cholesterol is more likely to be checked, but in states with more African-Americans, more prescriptions were written, whereas in states with more Hispanics, fewer statin prescriptions were written.

CONCLUSION: Variations across states in insurance and racial/ethnicity mix are associated with variations in hyperlipidemia management; less-insured states may be less effective whereas states with more private, Medicare, or Medicaid coverage may not be more effective. In states with proportionately more African-Americans vs. Hispanics, lipid medications may be prescribed differently. Our findings warrant further investigations.

Despite extensive knowledge of the role of hyperlipidemia in atherosclerosis, national consensus recommendations to guide clinical decision-making, and the availability of powerful lipid-lowering medications, substantial improvements can still be made in optimally treating hyperlipidemia in the general population.[1,2] Numerous population-based surveys have demonstrated that large numbers of hyperlipidemic individuals are still not being adequately controlled to treatment targets[1–5] and therefore remain at increased risk of atherosclerotic complications. More effective use of lipid lowering medications will likely produce substantial societal and economic benefits.[6]

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Across the United States, health care services are largely implemented under the jurisdiction of individual state governments, and as a result, the manner of implementation, effectiveness of insurance coverage, and as a consequence, the degree of health prevention enjoyed by patients may be highly variable across different states.[7–14] Aggregate data from a nationwide survey of cholesterol medication prescriptions for each of the 50 U.S. states and the District of Columbia were recently gathered for a nationally disseminated but state-specific online medical education newsletter focusing on the management of lipid disorders.[15] These data are now being used here to explore potential relationships between indicators of states' delivery of hyperlipidemia care and states' patterns of insurance coverage, taking into account the variations among states' demographic characteristics. The principal aims were to try to identify any such relationships that may inform potential health care system factors to optimize hyperlipidemia management and to explore whether the different racial/ethnicity mixtures across states might also be independently related to their delivery of hyperlipidemia care.

Methods

A cross-sectional, secondary data analysis was conducted with the use of population-based, statewide data obtained from publicly available survey sources that involved all 50 U.S. states and the District of Columbia. Analogous data from U.S. territories were not included because not all key variables were equally available for all territories. The study protocol was reviewed and exempted from informed consent requirements by the Institutional Review Board of Charles R. Drew University of Medicine and Science. All analyses were performed between August 2011 and August 2012.

The 2010 U.S. Census was the source of the following data: (1) The proportion of each state's population that had no health insurance coverage, that was covered by any source of private insurance, by Medicare, or Medicaid[16]; (2) Each state's total population and racial/ethnicity distribution categorized as the proportion self-reporting as white, African-American, Hispanic or Latino, and all other race groups combined (because of the relatively smaller numbers in each of these other race groups)[17]; (3) Each state's age and sex distributions, the former categorized as the proportion of the state's population age 18–44, age 45–64, and age ≥65 years, and the latter characterized as the proportion of females[18]; and (4) Each state's proportion of individuals falling below the 200% Federal Poverty Level (FPL) threshold (by 2010 reference income levels).[19] In addition, the 2009 Behavioral Risk Factor Surveillance System (BRFSS) from the Centers for Disease Control and Prevention was the source of the following data: (5) Each state's distribution of body mass index (BMI), categorized as the proportion of the population who were lean (<24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (≥30.0 kg/m^2)[20]; and (6) Each state's adequacy of cholesterol screening, as indicated by the 2009 BRFSS survey of the percentage of individuals who reported having their cholesterol levels checked within the previous 5 years[21] (ie, the minimum frequency currently recommended by the screening guidelines of the Third Adult Treatment Panel of the National Cholesterol Education Program).[22]

Data for each state's prescribing patterns of all major classes of lipid lowering medications during a period of 12 months ending in March 2010 were collected by the IMS Institute for Healthcare Informatics in collaboration with the Physician Educational and Training Division of the American Medical Association for a continuing medical education project to highlight the management of hyperlipidemias and the use of lipid-lowering medications, both nationally and specifically for each state to which the program was distributed.[15] National retail prescription data were sourced from the IMS Xponent (IMS Health, Danbury, CT) family of products, based on actual prescription activity within the U.S. retail, mail service, long-term care, specialty retail, and Puerto Rico markets.[23] Based on complex algorithms and patented methodologies, Xponent projects prescriptions generated across all prescription channels and payment types (cash, Medicaid, third-party) for more than 800,000 individual prescribers every month. IMS collects more than 75% of the retail prescription data for new and refilled prescriptions every day of the month. These source data were composed of fully adjudicated medical and pharmaceutical claims for more than 60 million unique anonymous patients from more than 90 health plans across the United States.

Four dependent variables were examined in the principal analysis: (1) Adequacy of cholesterol screening, as reflected by the percentage of each state's population who reported having had their cholesterol levels checked within the past 5 years; the population-adjusted rates of prescriptions written over the 12-month period for: (2) all lipid lowering medications; (3) all HMG-CoA reductase inhibitors (statins); and (4) all non-statin lipid medications (ie, all other major classes pooled). Nonstatin classes included fibrate agents (clofibrate, gemfibrozil, and all formulations of fenofibrate and fenofibric acid available on the U.S. market), prescription niacin preparations (both immediate- and extended-release formulations), ezetimibe, bile acid sequestrants (including colestipol, cholestyramine, and colesevelam), prescription formulations of omega-3 fatty acid esters, and combination agents that include at least one lipid-lowering component (ie, ezetimibe/simvastatin, extended-release niacin/lovastatin and extended-release niacin/simvastatin, amlodipine/atorvastatin, and pravastatin/acetylsalicylic acid, but not including sitagliptin/simvastatin as these data were collected before this agent was approved for the U.S. market).

Although nonstatin prescriptions were written substantially less often than statins, it was decided *a priori* that if one or more independent variables predicted all nonstatin prescriptions, a subanalysis would be conducted on each