Person, Place, and Prevention in Primary Care: A Multilevel Analysis of Variation in Preventive Service Delivery
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Research Objective
The Uncertainty Hypothesis has been used to explain racial/ethnic disparities in health care quality. This research employs a multilevel analysis to test the influence of individual and community characteristics on the delivery of preventive services in primary care.

Hypothesis 1: An index of preventive services which are recommended by clinical practice guidelines will show little variation in delivery.
Hypothesis 2: Any individual level variation in service delivery will be explained by nonwhite race/ethnicity.
Hypothesis 3: Any community level variation in service delivery will be explained by health system capacity.

Study Design
A multilevel observational design with time-order effects, employing a two-part random intercepts regression model of any appropriate care, and the amount of appropriate care, if any was reported.

Five services comprise an index of appropriate preventive service delivery:
1. Substance use
2. Anxiety/depression interventions for
3. Behavioral health problems (among those who previously met alcohol/drug or anxiety/depression criteria).
4. Smoking (among those previously smoked daily or <pack/week)
5. Obesity (among those previously had a BMI≥30)

Explanatory domains include demographics, health care utilization, and health care factor status. At the community level, domains include health system capacity, socioeconomic status, and insurance environment.

Population Studied
Individual level data obtained from Healthcare for Communities, 2000-2001, which is a national survey based in 60 communities across the US (response rate 69.5%). Respondents had been previously interviewed in 1997-1998 (response rate 64%). Analysis is conducted with a subset of respondents (n=1,446) who visited general medical providers in the past year. Community-level data comes from the Area Resource File, Census, and Community Tracking Study Physician Survey.

Results
Nationally, 51.37% (SE: 0.91) of respondents reported receiving none of the clinical preventive services in the index. Among those who reported any services, the proportion of appropriate care was 53.73% (SE: 0.7).

Results: Individual level regression of Any (logistic) and Amount (linear) of appropriate preventive service delivery

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Results: Geographic Variation in Preventive Service Delivery

The proportion of respondents reporting any services ranged across communities from 42.76%. Among those reporting any services, the amount of appropriate preventive services ranged from 28-64%. Despite this community-level variation, the proportion of the total residual variation that is due to differences between groups was small: approximately 2% for reporting any services and 1.4% for the amount of service reported.

Results: Multilevel regression of Any (logistic) and Amount (linear) of appropriate preventive service delivery

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Conclusions
Hypothesis 1: Not supported. Half of respondents reported receiving none of the preventive services for which they were eligible and only half of appropriate care was reported by those who received any. The services comprising the index have strong evidence for efficacy, yet their reported delivery is limited. This finding is consistent with McAlister et al. finding that approximately half of appropriate preventive care is delivered. Services with limited observability, poor or absent reimbursement, or that involve assessing and promoting changes in health habits may be especially at risk for poor performance.

Hypothesis 2: Not supported. At the individual level, having a chronic illness, smoking, being obese, and having a substance abuse or mental health problem all increased the likelihood of receiving any service but either reduced the likelihood or were not significant predictors of the amount of services received. Additionally, age younger than 70 positively predicted both reporting of any service as well as the amount of appropriate care received. Those of Hispanic ethnicity were twice as likely to report any service, but race/ethnicity did not influence amount.

Hypothesis 3: Limited support. A higher ratio of primary care physicians to specialists was associated with a greater proportion of appropriate care reported. This finding is consistent with Bäckström and Chandra's finding that a higher proportion of generalists was associated with a higher state level quality of care rank for an index of services delivered to Medicare beneficiaries. A larger amount of service delivery also was reported in communities with a higher proportion of whites. Communities with a higher proportion of blacks were found to have lower rates of preventive service in research by Bäckström and colleagues. However, the amount of variation attributable to the community level was small.

Implications for Policy, Delivery, or Practice
The provision of preventive services in this index was poor and individual risk factors were prominent predictors of services that should be universal. The amount of variation that could be explained by community characteristics was small, but a more prominent primary care workforce was associated with greater amounts of preventive service delivery. The association with racial composition highlights the equity issues in improving health care delivery for all.

References

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