

Different Views

Hypertension Prevalence and the Status of Awareness, Treatment, and Control in the Hispanic Health and Nutrition Examination Survey (HHANES), 1982–84

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Abstract: The prevalence rates of hypertension among adult (ages 18–74) Mexican Americans, Cuban Americans, and Puerto Ricans were estimated using data from the 1982–84 Hispanic Health and Nutrition Examination Survey (HHANES). Hypertension is defined as diastolic greater than or equal to 90 mm Hg, or systolic greater than or equal to 140 mm Hg, or currently taking antihypertensive medication. Among Mexican Americans in the Southwestern United States, 16.8 percent of the males and 14.1 percent of the females were found to be hypertensive. Among Cuban Americans in Dade County, Florida 22.8 percent of the males and 15.5 percent of the females were hypertensive. Among Puerto Ricans in the New

York City area 15.6 percent of the males and 11.5 percent of the females were hypertensive. The age-adjusted rates are significantly lower than comparable rates for Whites and Blacks as measured in the second National Health and Nutrition Examination Survey (NHANES II), 1976–80. Control of hypertension in the HHANES populations fall short of the 1990 Objectives for the Nation established by the US Public Health Service 60 percent (34 percent controlled Mexican American hypertensives, 27.8 percent controlled Cuban American hypertensives, and 29 percent controlled Puerto Rican hypertensives). (*Am J Public Health* 1990; 80:1431–1436.)

Introduction

Hypertension continues to be a leading contributor to morbidity and mortality in the United States.¹ While the number of studies on the extent and nature of hypertension in the US population has increased, our knowledge of how this condition affects Hispanics has lagged behind.² Hispanics are the second largest minority in the United States and constitute a rapidly growing population.³ An assessment of risk factors for hypertension has suggested that Hispanics may have high rates of the condition.² Surveys which have estimated the prevalence of hypertension among Hispanics have given inconclusive results.^{4–8}

The drive toward better blood pressure control has been heightened by the success measured in a decline in stroke and coronary artery disease mortality.¹ The US Public Health Service has set “1990 Objectives for the Nation” including nine dealing with hypertension control. The 1990 Objectives directed towards improving health status of hypertensives state that “. . . at least sixty percent of the estimated population having definite high blood pressure (160/95) or

higher should have attained successful long-term blood pressure control, i.e. a blood pressure at or below 140/90 for two or more years.”⁹ The extent to which Hispanics have met these goals is unknown.

This paper provides estimates of the prevalence of hypertension among three Hispanics subgroups based on the Hispanic Health and Nutrition Examination Survey (HHANES) conducted by the National Center for Health Statistics between 1982 and 1984. These estimates are compared to the published results for Whites and Blacks in the general population using the second National Health and Nutrition Examination Survey (NHANES II), 1976–80.¹⁰ The status of awareness, treatment, and control of hypertension among Hispanics has also been estimated using HHANES data.

Methods

Survey Design

The HHANES was conducted among three Hispanic subgroups in the United States from July 1982 through December 1984. The three target populations consisted of the civilian, noninstitutionalized population of Mexican origin or ancestry in selected parts of five southwestern states (California, Arizona, New Mexico, Colorado, Texas); of Cuban origin or ancestry in Dade County (Miami), Florida; and of Puerto Rican origin or ancestry in selected counties in New York, New Jersey, and Connecticut.

The survey design of HHANES was a stratified, multi-stage, probability sample of persons ages six months through 74 years. Selected households within the survey were visited by a bilingual interviewer who identified eligible Hispanic families. A pre-determined sampling pattern was followed to choose specified family members to participate in the survey. A family was considered eligible if the national origin or ancestry of at least one family member met the criteria (Mexican American in the southwest, Cuban American in

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Editor's Note: See also related Different View p 1437 and editorial p 1427.

Acronyms Used:

DBP: Diastolic blood pressure
SBP: Systolic blood pressure
HHANES: Hispanic Health and Nutrition Examination Survey
JNC 1984: Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure 1984
JNC 1988: Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure 1988
NHANES II: Second National Health and Nutrition Examination Survey

Dade County, and Puerto Rican in the New York City area); however, the selected sample persons themselves were not necessarily of the same origin. Analyses in this paper are based on data only for those sample persons of Mexican origin or ancestry in the southwest, of Cuban origin or ancestry in Miami, Florida, and of Puerto Rican origin or ancestry in the New York City area.

Details of the HHANES sample design, selection process, operational plan, quality control procedures, and questionnaires have been previously documented.¹¹

Data Collection

The HHANES included both a household interview and a physical examination conducted in a specially designed mobile examination center. As part of the household interview, sample persons were asked if they had ever been told by a physician or other health professional that they had hypertension and if they were currently using medication for treating hypertension. Upon completion of the household interview, participants were scheduled for a physical examination that included blood pressure measurement, conducted in the mobile examination center.

Systolic (first phase) and diastolic (fifth phase) blood pressure were measured to the nearest even digit using a standard mercury sphygmomanometer. Two blood pressure measurements were taken on one occasion in the mobile examination center as part of a physician's examination. Both measurements were taken with the patient seated, five minutes into the examination and five minutes apart. The average of the two readings was used for the estimates presented here.

Definitions

For the purpose of the prevalence estimates presented in this paper, persons are considered hypertensive if they meet one of the following conditions set by the 1988 Report of the Joint National Commission on Detection, Evaluation, and Treatment of High Blood Pressure (JNC 1988): 1) a diastolic blood pressure of greater than or equal to 90 mm Hg; 2) a systolic blood pressure greater than or equal to 140 mm Hg; 3) reporting currently using anti-hypertensive medication (regardless of blood pressure measurements).¹ The 1990 Objectives use a second definition for hypertension setting the thresholds at diastolic greater than or equal to 95 mm Hg and systolic greater than or equal to 160 mm Hg. This second definition for hypertension (160/95) is used to assess the levels of awareness, treatment, and control of hypertension.

Prevalence estimates for the specific categories of adult blood pressure levels follow the JNC 1988 guidelines. These categories are listed and defined in the Appendix. Blood pressure levels are reported as a percent of the HHANES target population and as a percent of the hypertensives in those populations.

Hypertension prevalence estimates are available for Whites and Blacks in the general population based on the NHANES II (1976-80). These estimates have been previously published in a report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure, 1984 (JNC 1984).¹⁰ The JNC 1984 estimates for hypertension were based on the average of three pressures (taken with the examinee sitting, lying, and again sitting). A caveat for the comparisons is that the JNC 1984 estimates included a small number of Hispanics. However, the removal of Hispanics from the sample does not produce estimates that show statistically significant differences from the estimates published in JNC 1984 report.

The percent of hypertensives under control on medication is defined as: the number of hypertensives who report taking medication and whose blood pressure is less than the threshold of 140/90 mm Hg (numerator) divided by the total of the hypertensives (denominator). Control is reported as a proportion of both definitions of hypertension, using the 140/90 and 160/95 thresholds.

The higher threshold for hypertension determines the denominator for the status variables (awareness, treatment, control). A person is considered aware of their hypertension if they report having ever been told by a physician or other health professional that they have high blood pressure or hypertension. Those who report they are currently taking antihypertensive medication are considered treated.

Response Rates

Among those selected for HHANES and eligible (of Hispanic origin), ages 18 to 74 years, there were 5,130 Mexican Americans, 1,560 Cuban Americans, and 1,942 Puerto Ricans. Of the selected persons, the proportion of persons interviewed was 77.4 percent, 72.6 percent, and 77.9 percent for Mexican Americans, Cuban Americans, and Puerto Ricans, respectively. Two blood pressure measurements were obtained on 82.3 percent, 75 percent, and 77.7 percent of the interviewed persons in the Mexican American, Cuban American, and Puerto Rican samples, respectively. No significant differences were noted with regard to age, sex, and antihypertensive medication status between persons interviewed and persons with two blood pressure measurements in any of these subgroups.

Systematic Bias in BP Measurements

The tendency toward blood pressure readings ending in zero was identified as a problem in HHANES (diastolic 23.8 percent, systolic 27.6 percent). Further analysis of this systematic bias was made around the critical values used to define hypertension: 90 mm Hg diastolic and 140 mm Hg systolic. Diastolic 86 mm Hg and 88 mm Hg were read more often than either 90 mm Hg or 92 mm Hg. Systolic 140 was read more often than 138. Thus it appears that the examiners tended to read below the level defining hypertension on the diastolic reading and above the level defining systolic hypertension. Therefore, the previously noted systematic bias may be thought to have an equivocal effect on the point estimates presented here.

Statistical Analysis

Sampling weights were used when calculating point estimates in order to account for individual selection probabilities and adjustments for non-response, non-coverage, and poststratification which resulted from the complex survey design used in HHANES. When the appropriate weights are used, the samples are representative of the Mexican origin population in the five southwestern states, the Cuban origin population in Dade County, Florida, and the Puerto Rican origin population in the New York City area.

The complex survey design used in the HHANES tended to increase the variance which would have been obtained through simple random sampling.¹² The complex survey design was accounted for by using an average design effect to adjust the variance calculated under the assumption of simple random sampling. As described by Kovar,¹³ the design effect is the ratio of the variance of a statistic from a complex sample to the variance of the same statistic from a simple random sample. The value of the design effect is an indicator of the impact of the complex sample design on the variance.

The average design effect for hypertension was 1.0 for all three Hispanic subgroups. The complex design, therefore, has little effect on the variances and one could consider assuming simple random sampling for these analyses. A t-test was used to compare point estimates. All data analyses were done using programs accessible through SAS.¹⁴

The direct method was used for age adjustment. The reference population was the civilian noninstitutionalized population of the United States at the midpoint of the NHANES II, March 1, 1978.

Results

Prevalence of hypertension from HHANES is presented by subgroup, sex, and age in Table 1. These estimates represent approximately 775,000 hypertensive Mexican Americans in the southwest, 56,400 hypertensive Cubans in Dade County, Florida, and 78,000 hypertensive Puerto Ricans in the New York City area at the 1983 population levels.

Expected age and sex differences in hypertension were observed for the three Hispanic subgroups. The prevalence of hypertension was higher in older age groups for each of the three Hispanic subgroups. The rates of hypertension were age-adjusted, using the US population in 1978 as a reference (the mid-point of NHANES II). Men had significantly higher age-adjusted prevalence estimates for hypertension compared to women in the Mexican American (95% CI = 0.2, 6.2) and Cuban American (95% CI = 1.4, 12) subgroups. Age-specific comparisons between sexes suggest the same conclusion.

Table 2 presents the distribution of blood pressure levels regardless of medication status, among men and women in the Hispanic subgroups. The results are similar for all three Hispanic subgroups. The great majority of individuals in the HHANES populations have blood pressure measurements in the normal range. Mild diastolic elevation (DBP 90-104) ranges from 2.7 percent to 11.1 percent in the HHANES populations. Isolated systolic hypertension (SBP \geq 160) was discovered in a very small portion of the population (less than 1.2 percent).

The distribution of blood pressure levels among hypertensives is presented in Table 3. By far the largest numbers of hypertensives are found in the mild hypertensive category (DBP 90-104), approximately 40 percent. Taken together, those with borderline isolated systolic hypertension (SBP 140-159) and isolated systolic hypertension levels (SBP \geq 160) made up over one-third of all the Hispanic hypertensives. Less than 20 percent of all hypertensives (140/90) were controlled by medication.

A number of statistically significant results were observed comparing hypertension rates from HHANES with Whites and Blacks in the general population as measured in NHANES II (1976-80). Hypertension is more prevalent among Whites or Blacks than it is among Mexican Americans, Cuban Americans, or Puerto Ricans (see Table 4). Individual comparisons using the age-adjusted estimates revealed that each of the three Hispanic subgroups had statistically significant lower levels of hypertension than did either Blacks or Whites. Comparisons of age-specific rates suggest the same conclusion.

TABLE 1—Hypertension* Prevalence by Hispanic Subgroup, Sex and Age

Sex, Hispanic Origin, and Age (years)	Males			Females		
	Number of examined persons	Percent with hypertension	Standard error of the percent	Number of examined persons	Percent with hypertension	Standard error of the percent
<i>Mexican Americans</i>						
18-74	1553	16.8	1.2	1965	14.1	0.9
18-74 age adjusted		22.9	1.1		19.7	0.9
18-24	342	5.1	1.6	417	0.5	0.4
25-34	423	10.4	2	527	4.9	1.1
35-44	246	12.3	2.8	333	7.6	1.7
45-54	268	28.5	2.8	350	24.1	2.2
55-64	191	47.2	3.6	219	44.9	3.4
65-74	83	59.6	6.4	119	66.8	4.6
<i>Cuban Americans</i>						
18-74	398	22.8	1.2	498	15.5	0.9
18-74 age adjusted		20.5	2		13.8	1.5
18-24	55	1.1	0.9	54	0	0
25-34	62	5.5	2	73	1.1	0.8
35-44	52	13.7	3.3	94	5.2	1.5
45-54	114	37.5	2.4	116	15.2	1.8
55-64	74	41.4	3.1	97	35.6	2.6
65-74	41	46.3	4.2	64	49.8	3.3
<i>Puerto Ricans</i>						
18-74	495	15.6	1.1	835	11.5	0.7
18-74 age-adjusted		19.7	1.8		18	1.3
18-24	112	1.1	0.7	188	0.6	0.4
25-34	107	4.6	1.6	171	1.9	0.8
35-44	73	17.4	3.6	152	7.1	1.6
45-54	102	26.4	2.5	174	23.7	1.8
55-64	78	51.1	3.2	97	47	2.7
65-74	23	**	**	53	55.2	3.8

SOURCE: NCHS, HHANES, 1982-84

*Defined as the average of two blood pressure measurements \geq 140/90 mm Hg or currently taking antihypertensive medication.

**Sample size too small to produce reliable estimates.

TABLE 2—Distribution of Blood Pressure Level Regardless of Medication Status

Blood Pressure Level	Mexican American		Cuban American		Puerto Rican	
	Males n=1553 % SE	Females n=1965 % SE	Males n=398 % SE	Females n=498 % SE	Males n=495 % SE	Females n=835 % SE
Normal Blood Pressure*	72.7 ± 1.4	85 ± 0.9	67.8 ± 1.4	81.4 ± 1	78.7 ± 1.3	88.2 ± 0.8
High Normal Blood Pressure*	12.3 ± 1	4.9 ± 0.5	13 ± 1	6.6 ± 0.6	6.9 ± 0.7	3.7 ± 0.4
Mild High Blood Pressure	8.8 ± 0.9	4.1 ± 0.5	11.1 ± 0.9	4.8 ± 0.6	10.2 ± 0.9	2.7 ± 0.4
Moderate High Blood Pressure	1.0 ± 0.3	0.2 ± 0.1	1.7 ± 0.4	0.7 ± 0.2	0.3 ± 0.2	0.4 ± 0.1
Severe High Blood Pressure	0.2 ± 0.1	0.1 ± 0.1	0.7 ± 0.2	0 ± 0	0.1 ± 0.1	0 ± 0
Borderline Isolated Systolic Hypertension	4.7 ± 0.7	5 ± 0.5	4.3 ± 0.6	5.3 ± 0.6	2.8 ± 0.5	4.2 ± 0.5
Isolated Systolic Hypertension	0.4 ± 0.2	0.6 ± 0.2	1.2 ± 0.3	1.2 ± 0.3	0.9 ± 0.3	0.6 ± 0.3

*Includes those hypertensives who are controlling their blood pressures.
SOURCE: NCHS, HHANES, 1982-84

Results of comparisons of the distribution of blood pressure levels (regardless of medication status) indicate that Whites or Blacks in NHANES II generally had higher levels in each elevated blood pressure category when compared to Hispanics. Whites and Blacks (both sexes) were two or three times more likely to have mildly elevated diastolic blood pressure (DBP 90-104) than each of the Hispanic subgroups. Among White men and women, as found in the JNC 1984 report, 18.4 percent and 10.8 percent, respectively had mildly elevated diastolic blood pressure. Mildly elevated diastolic blood pressure has been found in 20.6 percent and 17.9 percent of Black men and women, respectively. Whites and Blacks were also more likely to have moderately (DBP 105-114) and severely elevated (DBP > = 115) blood pressures, compared to Hispanics.

The proportion of hypertensives (160/95) aware, treated, and controlled is presented by sex and Hispanic subgroup in Table 5. Awareness was high among women, over 95 percent in each of the three groups. Within each Hispanic subgroup, women hypertensives reported having been told about their hypertension more often than men. A substantial portion of Mexican American and Puerto Rican male hypertensives, i.e. 32.1 percent and 21.3 percent, respectively, are unaware of their condition.

Similarly, a larger number of Mexican American and Puerto Rican men were on no medication for their condition, compared to women in those subgroups. Cuban American hypertensive men were more likely to be on medication than hypertensive men in the other two Hispanic subgroups.

Control rates among hypertensives using the 1990 Objectives definition were generally low. With the hypertension threshold at 160/95 and control threshold at 140/90, the proportions of male hypertensives under control were 22.6

percent, 26.1 percent, and 11.9 percent for Mexican Americans, Cuban Americans, and Puerto Ricans, respectively (see Table 5). Higher rates of control were found among hypertensive women as compared to men, except in the Cuban subgroup where the level of control was similar for male and female hypertensives. No group attained the 1990 Objectives of 60 percent controlled.

Using a less stringent threshold for control (160/95), men still fall short of the objective of 60 percent control; 38.4 percent, 50.6 percent, and 19.7 percent of the hypertensive males (160/95) were controlled for Mexican Americans, Cuban Americans, and Puerto Ricans, respectively.

Discussion

The major finding of this study is that the HHANES populations had significantly lower proportions of hypertensives than did Whites or Blacks in NHANES II. This finding is supported by studies showing lower cardiovascular mortality rates among Mexican Americans and Puerto Ricans.^{4,15} However, cardiovascular diseases remain a leading cause of morbidity and mortality in these groups and the importance of hypertension should not be underestimated.¹⁶

Lower rates of hypertension are contrary to the expectations suggested by levels of risk factors for the condition among Hispanics. Considering the generally lower socioeconomic status of Hispanics,² the high prevalence of obesity,¹⁷ and the high prevalence of diabetes,¹⁸ we would anticipate hypertension rates to be higher than Whites. A study of risk factors for hypertension using HHANES data may shed light on this problem.

TABLE 4—Hypertension Prevalence Estimates NHANES II and HHANES (ages 18-74 years)

	Male		Females	
	%	SE	%	SE
<i>NHANES II*</i>				
White	32.6	1.4	25.3	0.9
Black	37.9	2.2	38.6	1.8
<i>HHANES**</i>				
Mexican American	22.9	1.1	19.7	0.9
Cuban American	20.5	2	13.8	1.5
Puerto Rican	19.7	1.8	18.0	1.3

SOURCE: NHANES II, 1976-80 (JNC 1984) NCHS, HHANES, 1982-84

*JNC 1984

**Age-adjusted to 1978 population

TABLE 3—Percent of Individual Blood Pressure Readings (systolic and diastolic) around Critical Values for Definition of Hypertension

Diastolic Blood Pressure	Percent	Systolic Blood Pressure	Percent
86	30.8	136	24.6
88	31.7	138	15.4
90	17.5	140	25.4
92	10.8	142	21.4
94	9.1	144	13.3

SOURCE: NCHS, HHANES 1982-84

TABLE 5—Hypertension* Awareness, Treatment, and Control** Status among Three Hispanics Subgroups

	Males		Female		Female/ male % difference	(95% CI)
	%	SE	%	SE		
<i>Mexican American</i>						
Awareness	67.9	5.0	95.0	1.8	27.1	(15.8, 38.4)
Treated	49.3	5.3	86.0	2.9	36.7	(23.9, 49.5)
Controlled	22.6	4.4	43.6	4.1	21.0	(8.3, 33.7)
<i>Cuban Americans</i>						
Awareness	87.2	2.6	95.1	1.6	7.9	(1.4, 14.4)
Treated	70.1	3.6	79.1	3.0	9.0	(-0.9, 18.9)
Controlled	26.1	3.5	29.5	3.3	3.4	(-6.8, 13.6)
<i>Puerto Ricans</i>						
Awareness	78.7	3.8	96.1	1.2	17.4	(9, 25.8)
Treated	41.0	4.6	85.5	2.2	44.5	(33.7, 55.3)
Controlled	11.9	3.0	41.6	3.1	29.7	(20.6, 38.8)

SOURCE: NCHS, HHANES, 1982-84

*Hypertension is defined as either $\geq 160/95$ or reported currently taking antihypertensive medication.

**Control is defined as a threshold of 140/90.

Previous surveys comparing blood pressure levels of Hispanics with Whites have given inconclusive results. The results of the San Antonio Heart Study, conducted between 1979-82, suggests that Mexican American males had a prevalence of hypertension approximately equal to Whites, and Mexican American females had lower rates than White females.⁴ In Orange County, California, Hispanics and non-Hispanics were found to have similar systolic and diastolic blood pressure.⁵ The California Hypertension Survey (1978) found that Hispanic men had slightly lower rates of hypertension than White men. Among women, the prevalence of hypertension was higher in Hispanic women than in White women in the younger age groups and somewhat lower in older age groups.⁶ The one study of blood pressure among Puerto Ricans was small in scale and nonrepresentative.⁷ No study of Cuban American blood pressure has previously been published. The conclusions of these earlier studies which differ from those presented here may be due to the larger and more representative sample selected in HHANES.

The limitations of these data include the facts that: 1) hypertensives controlling their blood pressure without medication are not included in the definition; 2) only the civilian, non-institutionalized population ages 18-74 are included; 3) the sampling universe defined in HHANES does not include all persons of Hispanic origin; and 4) measures were taken on only one occasion. The use of blood pressure measurements on one occasion limits both the definition of hypertension and the "1990's" definition of control. Clinical definitions require more than one elevated measurement and the "1990 Objectives" define long-term control as "at or below 140/90 for two or more years."

The comparison of the prevalence of hypertension among Whites, Blacks, and Hispanics presented here must address the possibility of temporal changes. The NHANES II and HHANES were conducted five years apart. The prevalence of hypertension in the general population has remained relatively stable over the past 20 years.¹⁹ The incidence of hypertension also seems to have been stable for this period as measured in the Framingham study population.²⁰ Comparisons between the temporally separated NHANES II and HHANES are useful if we reasonably assume the rates among Hispanics have also been stable.

No comparisons of Whites or Blacks with the three Hispanic subgroups were attempted for awareness, treatment, and control status. Direct comparison of HHANES

and NHANES II for the status of awareness, treatment, and control of hypertension is inappropriate because of well described secular trends. Over the past decade, awareness of hypertension has increased, more people have begun treatment, and control has improved.²¹⁻²³ These important changes were happening during the interval between NHANES II (1976-80) and HHANES (1982-84). To the extent that US Hispanics have participated in the transition, we would expect that awareness, treatment, and control of hypertension also would have improved since the time when NHANES II was conducted.

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APPENDIX

Diastolic Blood Pressure (DBP) (mm Hg)	Category*
<85	Normal Blood Pressure
85-89	High Normal Blood Pressure
90-104	Mild Hypertension
105-114	Moderate Hypertension
≥ 115	Severe Hypertension
Systolic Blood Pressure (SBP) (mm Hg) when DBP <90 mm Hg	Category*
<140	Normal Blood Pressure
140-159	Borderline Isolated Systolic Hypertension
≥ 160	Isolated Systolic Hypertension

*A classification of borderline isolated systolic hypertension (SBP 140 to 159 mm Hg) or isolated systolic hypertension (SBP ≥ 160 mm Hg) takes precedence over a classification of high normal blood pressure (DBP 85 to 89 mm Hg) when both occur in the same individual. A classification of high normal blood pressure (DBP 85 to 89 mm Hg) takes precedence over a classification of normal blood pressure (SBP <140 mm Hg) when both occur in the same individual.

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IOM Conference on Health Status Assessment: Call for Papers

The Institute of Medicine of the National Academy of Sciences has announced a call for papers for its September 1991 conference on Advances in Health Status Assessment. Building on the outcome of two previous conferences (1986 and 1988) this conference will concentrate on the use and usefulness of health status and health-related quality of life measures in clinical practice, especially ambulatory care, and in clinical research that will directly facilitate the application of these measures by practitioners. The following issues are of particular interest, although others will be considered, and empirical research papers are especially invited.

- The use of measures of health status and health-related quality of life as aids in screening, planning patient care, monitoring individual patient outcomes of care, or evaluating quality of care in ambulatory clinical settings;
- Improvements in the definition, reliability, validity, and other methodologic or statistical aspects of health status and outcome measures, as they related to clinical settings.

The deadline for submission of abstracts of at least 2500 words is February 15. Author notification will be on or about April 1, with first drafts due June 1 and final publishable versions due August 1. For further information, contact Kathleen N. Lohr, PhD, or Jo Harris-Wehling, MPA, IOM, NAS, 2101 Constitution Avenue, NW, Washington, DC 20418; (202) 334-2165.