ACCESSIBILITY TO MEDICAL CARE AMONG URBAN AMERICAN INDIANS IN A LARGE METROPOLITAN AREA

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Abstract—Federal health and medical care programs recently mandated for American Indians living in cities are predicated upon information pertaining to their unmet health needs and assessments of their accessibility to medical care. Based upon a household survey conducted among a representative Indian population living in a large metropolitan area, an evaluation is made of the accessibility experience of this population as it pertains to primary medical care. Using measures of accessibility including travel time, appointment delay time, and waiting room time, the experiences of Indian residents of major residential sections of the area are illustrated. Comparative assessments are made on the basis of the individual convenience factors as well as on the basis of an aggregate index of accessibility that has been proposed for health planning and evaluation. Significant differences in accessibility to primary care between residents in certain residential areas are demonstrated and suggestions for revision of the accessibility standards are offered.

INTRODUCTION

Although reliable enumerations of American Indian populations are not available, it has been estimated that close to 50% of the approx. 1 million Native Americans now live in off-reservation settings, most of them in urban areas. This percentage may increase substantially in the next decade if out-migration from the reservations continues and thus the number of Indians living in urban enclaves and scattered throughout the cities increases. In comparison to Indians living on reservations, urban Indians have generally been neglected and few among them receive benefits from the Indian Health Service or other federal or state programs. The United States Congress belatedly recognized the serious unmet needs of the American Indian population generally, including urban Indians, and it passed the Indian Health Improvement Act (Public Law 94-437) in 1976. Title V of the Act refers specifically to development of programs making health services more accessible to urban Indians. Funding of these programs, however, is predicated upon the availability of information documenting the accessibility status and needs of the Indians living in urban areas. The purpose of this paper is to present an assessment of selected dimensions of medical care accessibility among the Indian population of a large metropolitan area.

MEDICAL CARE ACCESSIBILITY

Accessibility as it pertains to medical care has been and remains a difficult concept to define and to measure. A *Discursive Dictionary of Health Care* prepared for the United States Congressional Subcommittee on Health and the Environment acknowledges that access "has geographic, financial, social, ethnic, and psychic components and is thus very difficult to define and measure operationally" [3]. It has also been suggested that access has been more of a political than an operational idea [4]. Efforts continue, nevertheless, to clarify the concept and to measure it adequately [5].

Despite these basic problems of definition and measurement, the goals of most health and medical care delivery programs, including the Indian Health Improvement Act, routinely incorporate concern with increasing access to medical care for their target populations. Programs such as Medicaid and Medicare, directed at the poor and elderly, have certainly attacked and alleviated major problems related to the financial dimension of access to medical care for selected population groups. Other large segments of the population are also covered by third-party insurers, thus reducing financial barriers to care and increasing access.

There is an increasing realization on the part of health services researchers, planners, and government officials that with a reduction in the importance of the financial dimension of access there is a concomitant increase in the importance of the 'convenience factors' in the individual's decision to use or not use available medical care [6-9]. Principal among these factors are travel time, appointment delay time, and waiting room time. Indeed, these are the only access measures for which quantitative national standards have been established in accordance with the objectives and goals of the National Health Services Planning and Development Act of 1974 (Public Law 93-641). In the Federal Register of 20 January 1978, it was stipulated that, in other than exceptional situations, a source of primary care should be available within 30 min of travel time, appointment delay time should be no longer than seven days, and waiting room time (beyond the time of appointment) should be no longer than 30 min. These standards were empirically derived from average times obtained in a national survey on medical care utilization [10]. Setting aside for the moment questions of appropriateness and general applicability of these standards, for the first time access benchmarks were determined against which the current experience of a population might be measured
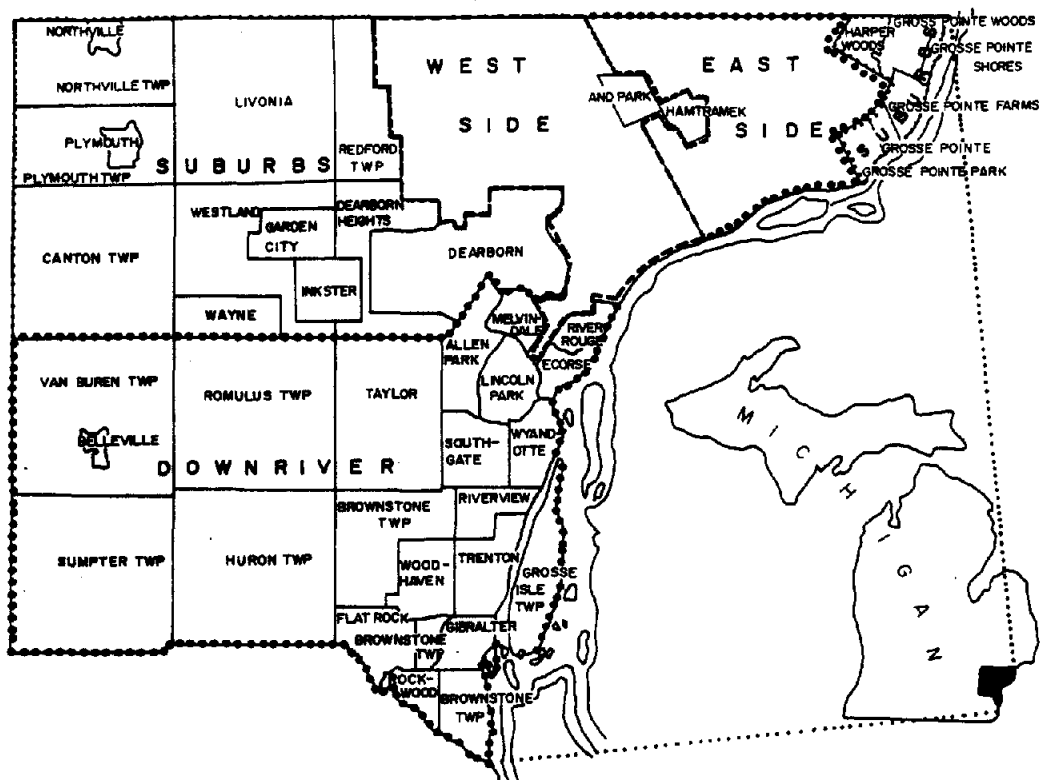
STUDY SUB-AREAS, WAYNE COUNTY

Fig. 1.

and changes monitored. This set of benchmarks is used in the present study to assess the accessibility experience of the American Indian population of Wayne County (Detroit), Michigan (Fig. 1).

SAMPLE POPULATION AND SURVEY

The data used in this study derive from a household survey conducted in 1980 among a representative sample of American Indians living in Wayne County, Michigan. This survey was conducted in conjunction with the Detroit American Indian Health Center and financial support was provided by a number of national, state, and local agencies*.

Based on a special census conducted earlier [11], a representative sample of Indian families was selected and 205 respondents interviewed. The number interviewed represented about 80% of those who were

*Agencies providing support include The Indian Health Service, The State Health Appropriations Committee, The Michigan Department of Public Health, the Michigan Office of Substance Abuse Services, The University of Michigan School of Public Health, The Detroit American Indian Health Center and The Saginaw Inter-Tribal Association.

†Detailed discussion of the methodology including sample design and data collection is available in *Health Care of Urban Indians in Michigan*. R. Bashshur and G. Shannon, Department of Medical Care Organization, University of Michigan, 1981.

selected in the sample†. The data were collected by a group of 21 Indian field workers who were recruited and trained in cooperation with the Detroit American Indian Health Center. Information was obtained from the mother/wife about the recent medical care experience of each member of the family as well as other socio-demographic, attitudinal, and locational characteristics of the respondent and family unit. Questions pertaining to the use of medical services focused on need for care, choice of provider, amount and type of care received, reason for visit, quality of care, satisfaction with care, and out-of-pocket cost.

The respondent was asked about her own health and the use of services as well as the health and use of service for each member of her immediate family. Pertinent to the current presentation were questions about physician use within the 6-month period preceding the survey. For each reported visit to a physician, the following information was recorded: reason for visit, appointment delay time, travel time, and office-waiting time beyond the designated time of appointment.

For the purposes of this study and to reflect the residential heterogeneity of the metropolitan area, respondents were grouped according to four recognized and identified major residential areas within the County. These were: (1) East Side and (2) West Side of the City of Detroit, (3) the Suburbs to the north, northeast, and northwest, and (4) the Downriver area (see Fig. 1).

Table 1. Average travel time, appointment delay time, and waiting room time
by area of residence

	West side	East side	Downriver	Suburbs
TR	21.9 min	23.8 min	16.2 min	12.8 min
	(SD = 17.5)	(SD = 16.3)	(SD = 10.6)	(SD = 8.3)
AP	4.3 days	3.7 days	4.3 days	5.8 days
	(SD = 7.2)	(SD = 6.8)	(SD = 7.2)	(SD = 8.8)
WR	41.4 min	38.1 min	49.5 min	43.2 min
	SD = 47.8)	(SD = 19.8)	(SD = 36.9)	(SD = 38.7)
	N = 94	N = 34	N = 103	N = 95

TR = Travel time of individual in minutes.
AP = Appointment delay time of individual in days.
WR = Waiting room time of individual in minutes.

ACCESSIBILITY BY INDIVIDUAL FACTOR

It was deemed useful for comparative purposes to first assess the experience of each residential group by each of the access factors being considered here, since the composition and characteristics of the Indian population differed among these areas. The average travel time, appointment delay time, and waiting room time for primary care for respondents and their families are presented in Table 1. This table provides the basis for comparing the medical care experience of the Indian population in each area.

We can see, for example, that, on the average, per-, sons residing in the Suburbs spend the least amount of time (13 min) in travelling to primary care and those on the East Side of Detroit spend the greatest amount of time (24 min). Among our sample population travelling for primary medical care, 88% of the reported visits were made by private automobile. Therefore, the observed differences in travel time are probably not due to differences in mode of travel. It may reflect, however, the increased 'friction of distance' encountered by residents of the central city as a result of greater urban density there. Travelling equal and even shorter distances can consume more time in the inner city as compared to the suburbs. This pattern has been observed in an earlier study in the Cleveland metropolitan area [12].

When appointment delay time is considered a different pattern emerges. Indians in the Suburbs wait, on the average, about 6 days for an appointment compared to 4 days for those in the central city. This observed difference may be due, in part, to a greater percentage of visits for non-acute and preventive medical services on the part of Suburban residents.

In terms of waiting room time, Indians on the East Side have the shortest average office waiting time, about 38 min. compared with the longest average office waiting time of almost 50 min for Indian residents of the Downriver area. Generally, residents of the central city have somewhat shorter waiting times, on the average, than residents of both the Suburbs and Downriver areas.

An indication of the relationship of the experience of Indians' access to medical care compared to the standards established by the National Planning Council is presented in Table 2. Generally, the Indian population of Wayne County, as represented by our sample families, surpass the national standards on travel time and appointment delay time. That is, on the average, when measured by travel time and appointment delay time, our respondents and members of their families are waiting shorter periods for appointments and travelling shorter periods for primary care than reflected in national averages and standards.

When measured by waiting room time, however, Indian families in each of our residential sub-areas were experiencing waits well beyond what is considered reasonable, i.e. more than 30 min. The longest waiting room times were reported by Indians living in the Downriver area, about 20 min, on the average, above the national standard. On the other hand, residents of the East Side were waiting on the average only about 8 min beyond the standard.

These findings are useful and may be used to highlight particular dimensions of access that should be addressed in formulating and implementing medical care delivery programs directed toward the urban Indian population living in metropolitan southeastern Michigan. It is difficult at this point, however, to determine whether Indians in one area have greater access to primary medical care, in terms of the convenience factors, than Indians of another area.

In the Suburbs, for example. the residents were spending the least amount of time in travel for primary medical care, but they were also waiting the longest average time for an appointment. Is primary care more acccessible for these people than for those on the East Side of Detroit who travel on the average more than 10 min longer but have to wait about 2 days less for an appointment? Difficulties in comparing the aggregate access experience are obvious. In an effort to permit this type of comparison an index was constructed using all three convenience factors simultaneously. Detailed narrative of the construction of this index is presented elsewhere [13] and is only briefly outlined as it is developed here.

THE AGGREGATE INDEX OF ACCESSIBILITY

Basically, the index is a standardized weighted average of the three measures of convenience in transformed form. First, the individual observations of each measure are subtracted from its respective quantitative norm—30 min for travel time, 7 days for

Table 2. Average deviated scores from national planning council standards for travel time, appointment delay time, and waiting room time by area of residence

	West Side	East Side	Downriver	Suburbs
TR'	−8.2 min	−6.2 min	−13.8 min	−16.8 min
	(SD = 17.5)	(SD = 16.3)	(SD = 10.6)	(SD = 8.3)
AP'	−2.5 days	−3.3 days	−2.6 days	−1.2 days
	(SD = 7.2)	(SD = 6.8)	(SD = 7.2)	(SD = 8.1)
WR'	11.4 min	8.1 min	19.5 min	13.2 min
	(SD = 47.8)	(SD = 19.8)	(SD = 36.9)	(SD = 38.7)

$$TR' = TR_i - 30; \quad AP' = AP_i - 7; \quad WR' = WR_i - 30;$$

and

$$\overline{TR'} = \frac{1}{N}\sum_i^N TR_i'; \quad \overline{AP'} = \frac{1}{N}\sum_i^N AP_i'; \quad \text{and} \quad \overline{WR'} = \frac{1}{N}\sum_i^N WR_i'.$$

appointment delay time, and 30 min for waiting room time (Table 2). Since the deviated scores are in their original units of measurement that are different and incommensurate for aggregation, they are further transformed by dividing them by their respective standard deviations to free them of their measurement units and to equalize their standard deviations. The latter is desirable in aggregating random variables into a single variable to remove the influence of variables with the larger variances. The results of this second transformation are presented in Table 3.

The aggregate index of access based on the three convenience factors is derived from the following formula:

$$\text{Access} = \frac{W_1 \text{tr} + W_2 \text{ap} + W_3 \text{wr}}{W_1 + W_2 + W_3}.$$

Thus, the index of access is a weighted average of the three measures of travel time, appointment waiting time, and waiting room time in transformed form. Since the value of a weighted average is not affected by the absolute magnitudes of the weights, but rather by their proportionality, the equation may be reduced to:

$$\text{Access} = W_1 \text{tr} + W_2 \text{ap} + W_3 \text{wr},$$

provided the weights sum to unity [14].

In the original formulation of the index it was sug-

gested the weights should reflect the relative importance of each of the convenience factors derived from a survey of the general population. In so far as dissatisfaction with the various aspects of medical care may be related to non-utilization and reflects a community's concern, it was decided to use this as a measure of convenience factor evaluation [15].

Among our sample population, 11% were dissatisfied with travel time to the physician, 25% with appointment delay time, and 48% with waiting room time. Dividing each percentage by the sum of the three provided the following weights: $W_1 = 0.13$ (travel time); $W_2 = 0.30$ appointment delay time); and, $W_3 = 0.57$ (waiting room time). The order of importance among our sample was the same as that obtained in a national health survey [16]. Using these weights a mean index of access was computed for each of the residential areas (Table 4).

Using the aggregated and standardized index of accessibility it is now possible to compare the overall accessibility experience of Indians in each residential area of the County. When this aggregate index is used for comparison, it appears that the Indian families in the Suburbs, despite their long average wait for appointments, have the greatest 'overall' access to primary care and those on the East Side of Detroit the least. Using a t-test, we were able to reject the null hypothesis that there was no difference in accessibility

Table 3. Transformed average deviated scores by areas of residence

	West Side	East Side	Downriver	Suburbs
tr	−0.60	−0.38	−1.02	−2.06
	(SD = 1.0)	(SD = 1.0)	(SD = 1.0)	(SD = 1.0)
ap	−0.39	−0.53	−0.37	−0.15
	(SD = 1.0)	(SD = 1.0)	(SD = 1.0)	(SD = 1.0)
wr	0.19	0.44	0.55	0.34
	(SD = 1.0)	(SD = 1.0)	(SD = 1.0)	(SD = 1.0)

$$\text{tr}_i = \frac{TR_i'}{SD_{TR}}; \quad \text{ap}_i = \frac{AP_i'}{SD_{TR}}; \quad \text{and} \quad \text{wr}_i = \frac{WR_i'}{SD_{WR}}.$$

$$\overline{\text{tr}} = \frac{1}{N}\sum_i^N \text{tr}_i; \quad \overline{\text{ap}} = \frac{1}{N}\sum_i^N \text{ap}_i; \quad \text{and} \quad \overline{\text{wr}} = \frac{1}{N}\sum_i^N \text{wr}_i.$$

Table 4. Mean aggregate index of accessibility to primary medical care by area of residence

	West Side	East Side	Downriver	Suburbs
I_{mn}	-0.07	$+0.05$	-0.01	-0.17
	$(S^2 = 0.534)$	$(S^2 = 0.579)$	$(S^2 = 0.492)$	$(S^2 = 0.302)$

I_{mn} = mean aggregate index of accessibility.

to medical care between residents in the Suburbs and those on the East Side.

The accessibility experience of residents on the West Side of Detroit appears to approximate that of Downriver residents, both being more favorable than that for residents on the East Side when the aggregate indices are compared. There were no significant differences discovered, however, between the access experiences of residents of these areas when statistically compared.

SUMMARY AND DISCUSSION

An inquiry into the primary care accessibility experience of Indians living in a major metropolitan areas has been presented. Our focus has been on access as measured by a set of convenience factors including travel time, appointment delay time, and waiting room time. It is acknowledged that this is only one dimension of medical care accessibility, however, it is one of growing importance and the only dimension for which quantitative standards have been suggested. The factors comprising convenience provide important information for identifying deficiencies in current delivery systems or for assessing the use and non-use of available medical services by selected populations. And, they also may be used as benchmarks against which to measure effects of programs for medical care delivery improvements.

One major concern regarding the convenience standards should be raised. From our experience and that of others, there appears to be considerable variation from region to region in terms of convenience experience and expectations [17, 18]. We would suggest that a better approach would be the development of regional standards to be employed in the determination of the current experiences of the population and against which changes might be measured. Moreover, perhaps indices might be considered based on preference structures of the population regarding convenience as well as other factors. That is, the subjective interpretation of accessibility may, in the long run, provide more insight and understanding of the medical care utilization patterns. Until these developments, however, the use of an aggregate index as presented here represents an important step forward in our ability to measure and assess accessibility.

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