

Disability Studies Quarterly  
Winter 2003, Volume 23, No. 1  
pages 75-95 <[www.cds.hawaii.edu/dsq](http://www.cds.hawaii.edu/dsq)>  
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Environmental Barriers and the Use of  
Health Care Facilities by Adults  
with Physical Disabilities

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Keywords: environmental barriers, health care facilities, public health

Introductory Note

The paper that follows this brief introduction was originally submitted for a class in Research Design at UCLA. This course was part of program of study in public health supported by a post-doctoral fellowship from the Agency for Health Research Quality (AHRQ) while I was on a sabbatical leave in 2000-2001. The explicit goal of my participation in this program was to discover some area of the conceptual framework of public health in which teaching and research about different models of disability could be conducted.

In taking the classes, I not only discovered an intense resistance to the investigation of disability, but also a strong hostility to the inclusion of this topic in the field of public health. The reason for the conflict between traditional training in public health and the issue of disability would require an explanation too lengthy to be included in this introduction.

The assignment for an early class was to write a research design. Another purpose of this paper was to form part of the foundation for an environmental component of a research paradigm that might complement or supplement clinical models for the investigation of health-related issues. The example of health-care utilization was chosen as a topic that might be of particular interest to health professionals. The paper I submitted was based on the common-sense observation that the presence of environmental barriers may pose a deterrent to medical treatment for disabled people. As a result, areas with such barriers had lower levels of utilization than in comparable areas with fewer barriers. In any event, the paper apparently was given a failing grade. I did not receive any credit for the course.

My concern is neither with the grade that I received nor with the fact that UCLA eventually invoked an obscure stipulation to prevent me from receiving a degree after the completion of my two-year course of study. I am disappointed that my efforts were rebuffed and that any institute would engage in this type of dishonorable conduct.

What is most disturbing about these events, however, is the

failure or refusal of education programs in public health to address the importance of research on the environmental component of disability within the confines of their discipline. This posture could impede the necessary progress of comprehensive research that is vital to the study of disability in the future.

During the last quarter of the twentieth century, an innovative perspective began to challenge the dominant paradigm that had shaped the study of physical disability for many years. Prompted by several factors including parallel developments in the civil rights and women's movements, the increased acceptance of social science research in health services, and the growing prominence of disabled scholars in many academic disciplines, the concept of disability gradually shifted from a trait that revolved exclusively about organic impairments to a phenomenon determined at least in part by surrounding social and cultural factors. This trend promoted a mounting recognition that the enabling or disabling features of the environment need to be included in any analysis of factors influencing the use of health care facilities by disabled people.

#### Background

These developments were reinforced and extended by other events. In 1973, Congress finally enacted a version of the Rehabilitation Act containing the first major ban on discrimination against disabled citizens in Section 504, which was copied almost directly from the Civil Rights Act of 1964.<sup>1</sup>

The failure of several presidential administrations to issue regulations to implement Section 504 inspired disabled people to engage in a series of sit-ins and protests<sup>2-3</sup> which provided the foundations for a continuing disability rights movement.<sup>4</sup> Henceforth, many of these citizens would not accept a restricted role as the passive recipients of medical or rehabilitation services; instead, proclaiming the slogan "nothing about us without us,"<sup>5</sup> some disabled individuals began to ask both social and biomedical scientists to explore the environmental dimension of disability.

#### Definitions

In addition, many researchers seemed increasingly receptive to a possible change in the conceptualization of disability. Traditionally, disability had been defined as "a form of inability or limitation in performing roles or tasks expected of an individual within a social environment."<sup>6</sup> Within this formulation, there seemed to be three distinct definitions that permitted observers to focus on (a) medically diagnosed impairments or "inability"; (b) vocational performance; or (c) social discrimination, respectively.<sup>7-9</sup> Any interviews conducted in the proposed research, therefore, will include questions that operationalized each of these definitions - i.e., work disability, or limitations "in the amount or kind of work that you can perform"; functional disability, or an inability to engage in a "major life activity"; and socio-political disability, or the social discrimination elicited by the stigmatizing perception of visible or labeled physical

differences; and the interrelationships of these concepts will be examined.

Although there are no existing data that would permit personal impairments and environmental barriers or facilitators to be neatly severed, a preliminary finding that the increased prevalence of environmental barriers is related to a decreasing use of health care facilities - as an example - could be regarded as an important step toward the conceptual clarification of this relationship.

Various combinations of definitions and operational measures have been used in previous studies. In the major available study of disability and the use of health care for secondary conditions, for example, statistics were calculated on the basis of functional limitations in everyday life, restrictions on major life activities, and a list of diagnostic categories frequently associated with impairments.<sup>10</sup> This is one of few assessments that focused on the "working-age" population of persons with disabilities between 21 and 65 years old.<sup>11</sup>

Increasingly, however, researchers have begun to center attention on the exogenous or environmental variables that can contribute to any of the outcomes implied by the three major definitions of disability including debilitating functional limitations, extraordinarily high rates of joblessness, and discrimination elicited by stigmatized bodily differences.<sup>1-14</sup> As a result, a growing number of scholars eventually began to accept a perspective that regards disability as a product of interactions between individuals and the environment; hence, disability can be readily interpreted as the effect of a disabling environment as well as organic impairments.<sup>15-16</sup>

Another event that has undoubtedly contributed to increased demands for a measurement of disability encompassing an environmental component as well as physiological assessments was the World Health Organization (WHO) project to create an International Classification of Impairments, Disabilities, and Handicaps (ICIDH).<sup>17</sup> Although this plan originally reserved the category of "Handicap" for disadvantages that "reflect interaction with and adaptation to the individual's surroundings" and subsequent deliberations focused on the concepts of "environment" and "participation," the second or beta version of the International Classification of Functioning and Disability released by WHO<sup>18</sup> seemed to subvert the environmental concepts which had supposedly been accepted previously.<sup>19-20</sup>

As a result, some disabled professionals have begun to seek other formulations including the environmental dimension as one element of a general assessment of disability that might be incorporated in a wide range of studies. Several disabled scholars have drawn from their experience with the ICIDH plan to start to develop a framework for environmental measures of disability. One proposal, for example, has moved beyond a simple unidirectional chart to an interactive model (see Figure 1) of impairments, disabilities, and environmental obstacles.<sup>21</sup>

A report issued by the Institute of Medicine also emphasized environmental characteristics as prominent features of a model for Rehabilitation Science and Engineering.<sup>22</sup> Thus, it appears likely that environmental categories will eventually become a necessary element of an adequate measure of physical disability.

## Assessment of Relevant Evidence

In addition to the conceptual developments that have underscored the growing significance of environmental factors as part of the measurement of disability, many scholars began to realize the potential value of this independent variable for research on many issues. The collection of data on such - exogenous barriers and facilitators - has unfortunately been prevented by the prior failure to operationalized the environmental dimension of the definition of disability in sample surveys such as the Health Interview Surveys (HIS) conducted by the National Center for Health Statistics or the Survey of Income and Program Participation (SIPP) of the U.S. Bureau of the Census. But the extent to which environmental characteristics shape the everyday lives of disabled people may be readily inferred from the recognition that no individual can seek available resources for any purpose unless such a person possesses the means of reaching the desired location, or simply "getting from here to there."

Since the environmental component of disability has not been embraced thus far by established fields of study having an interest in disability such as medicine, rehabilitation, public health, or related professions, this topic also has not yet been fully indexed in standard or computerized bibliographies and databases. In fact, the principles of etiology, or causation, that mold the medical model for research as well as treatment regarding health conditions tend to center on diagnostic classifications that may or may not reflect either functional capacities or vulnerability to environmental obstacles.

In addition to scattered research in diverse disciplines ranging from architecture and ergonomics to medical sociology and policy analysis, the only field that has embraced the environmental perspective is the embryonic area of disability studies which - despite an active membership in the Society for Disability Studies - has not yet begun to supply a commercial foundation for the compilation and dissemination of a serialized data base. As a result, the information needed to support this new environmental initiative must be gleaned from a comprehensive understanding of multidisciplinary analyses in disability studies.

Testimonial evidence indicates, however, that many disabled people do not even have accommodations in their own homes which would permit them to leave their dwellings or "back bedrooms," where they are frequently concealed from public view. Others cannot leave the confines of a restricted area because of inaccessible steps, walkways, and intersections; or the lack of verbal or visual information about environments that lie beyond the realm of daily routines. And, even if they could navigate distant streets or sidewalks, an extraordinary proportion of disabled residents do not have access to public or private transportation via motor vehicles, which customarily are not designed by manufacturers to permit access by disabled drivers or passengers.

At present, even estimates or approximations of the extent to which such obstacles form a permanent and insurmountable barrier to the activities of disabled citizens are not available due to the absence of prior attempts to collect data on these subjects. Confusion about this matter also is exacerbated by the

existence of 49 different definitions of disability in current Federal statutes.<sup>23</sup> Both the pressing need and the crucial nature of this information, therefore, seem to provide substantial support for the initiation of research that would begin to address this problem.

While any analysis of the degree to which environmental barriers or facilitators constrain the free movement of disabled citizens is almost precluded by the failure of earlier surveys to gather data about this topic, some initial assessments might be inferred from demographic information obtained through questions about individual traits that have previously been employed to delineate this segment of the population. According to the best available estimates, approximately 35-46 million Americans live with disabling conditions.<sup>24</sup>

In comparison with other stigmatized and disadvantaged groups, disabled people have the highest rates of unemployment, poverty, and welfare dependency in most societies. Early statistics - which have remained essentially unchanged - indicate that about three-fifths of disabled Americans live below the poverty line, and more than two-thirds are unemployed in almost all advanced industrialized nations including the United States.<sup>25</sup> The extent to which each of these problems are produced or exacerbated by environment barriers is, of course, presently unknown. But there appear to be ample grounds to surmise that joblessness, poverty, and welfare might be related to problems such as a lack of transportation or alternative means of moving from a disabled person's domicile to other sites in the community.

Yet the determination of Congressional representatives and government policy makers to curb discrimination and to grant disabled persons equal rights eventually culminated in the passage of the Americans with Disabilities Act (ADA) in 1990. This law extends the promises of Section 504, designed for programs receiving "substantial Federal financial assistance," to almost all areas of community life including public accommodations which are covered by Title III of the ADA. While an early survey revealed that nearly ninety per cent of institutions affected by anti-discrimination provisions of the Rehabilitation Act still were not in compliance with the statute long after the regulations had been promulgated,<sup>26</sup> there have been few subsequent studies of implementation or compliance with the ADA.

Evidence about the observance of ADA requirements for the removal of environmental barriers in most localities, however, can be secured from various sources. In some localities, for example, information about these accommodations - including both the removal of physical and attitudinal obstacles and the introduction of facilitators that promote the activities of disabled citizens - might be discovered in the files of municipal engineers or in the administrative orders of city officials. In nearly every community, however, pertinent objective facts can be obtained through the completion of checklists by trained ADA surveyors as well as local persons with disabilities.

While the prior lack of available data concerning implementation or compliance prevents the use of ADA mandates per se as independent variables in the proposed research, these provisions of the law do provide a valuable standard for

determining the presence or absence of environmental barriers in selected neighborhoods or communities. In particular, the regulations issued by the U.S. Architectural and Transportation Barriers Compliance Board (ATBCB) will be adopted for assessing the relative number and severity of environmental barriers in these areas as the major independent variable in the proposed study.

Although there seems to be no consensus in the community of disability scholars about concepts used in previous research against which construct validity might be measured, the opportunity to compare the results of the proposed research with the official requirements of government policy could be interpreted as yielding an increase in the general validity of the study.

Information about exogenous obstacles such as steps or staircases for wheelchair users, incomplete verbal directions for people with vision impairments, and incomplete visual directions for persons with hearing impairments, will be computed to form an index of environmental barriers. Conversely, of course, data regarding exogenous variables that promote the activities of disabled adults such as accessible public transportation, the availability of readers for blind students and employees, CAP, or sign-language interpreters for deaf individuals will be compiled to form an index of environmental facilitators.

#### Review of Relevant Prior Research

The purpose of the proposed research is to examine the effect of environmental barriers or facilitators on the use of health care facilities by adults with physical disabilities. The pressing need for the study is demonstrated not only by the absence of any previous investigation of the correlation of these variables but also by the lack of prior examinations either of the environmental dimension of disability or of the use of health care facilities by disabled adults. As indicated by the report by Fougere<sup>21</sup> derived from his experience with debates about the ICIDH and the model developed for Rehabilitation Science and Engineering,<sup>22</sup> most research incorporating the environmental components of disability has not yet advanced beyond an initial model-building stage.

Patrick<sup>27</sup> also has formulated a general model of health promotion for people with disabilities that includes the social and physical environment, but there are hardly any empirical studies thus far that attempt to measure the effects of the environment configurations on the attitudes or behavior of disabled people. Research on the use of health care facilities of disabled adults has been only slightly more plentiful. An early study reported that a sizeable percentage of disabled persons experienced difficulty in securing health insurance and in locating knowledgeable physicians and personal assistants or attendants.<sup>10</sup>

Figure 1  
Environmental Barriers or Facilitators

Environmental	Abilities	Organic
Characteristics	or Disabilities	Systems Impairments

## Interaction

Adapted from P. Fougeyrollas, L. Noreau, H. Bergeron, R. Cloutier, S-A. Dion and G. St-Michel, "Social Consequences of Long Term Impairments and Disabilities: Conceptual Approach and Assessment of Handicap," *International Journal of Rehabilitation Research*, vol. 21 (1998), p. 130.

An investigation of barriers to health-promoting activities for disabled individuals, which claimed that only one survey item about impairment was directly related to the person's disability, also failed to include any direct questions about environmental barriers or facilitators.<sup>28</sup> Another analysis of potential support for health promotion by disabled people concentrated almost solely on personality correlates instead of environmental characteristics.<sup>29</sup> Additional research has demonstrated, however, that environmental obstacles often impede efforts by disabled people to obtain screening and preventive health services.<sup>30</sup>

Only one survey of environmental impediments to the care of disabled persons centered on the interiors of the examining rooms of 62 physicians in Harris County, Texas.<sup>31</sup> None of the existing studies of environmental influences on medical treatment for disabled adults has included any assessment of areas outside buildings or paths from nearby residences to the office suites of physicians.<sup>32</sup>

### Methods

The principal techniques for compiling and analyzing independent variables in the proposed research will entail the use of Geographical Information Systems (GIS). While the earlier use of aggregate data in health services research frequently was impeded by the difficulty that areal units reporting pertinent information were too large to permit meaningful analysis,<sup>33</sup> GIS now provides a means of reaggregating and manipulating massive amounts of geographic data to achieve significant research objectives. Other analyses have indicated that a combination of population data, health care data, and financial data in GIS could be valuable in local planning for health services.<sup>34</sup>

In this proposed study, the major task of fulfilling research purposes will entail the use of ArcView, ArcInfo, Map Info, and related software. The heterogeneous development and applications of GIS has hindered efforts to formulate a precise definition of the procedure, but three of the most crucial elements of GIS are spatial analysis, database management, and computer cartography.<sup>35</sup> GIS allows aggregate data to be displayed both numerically and spatially.

A possible by-product of the spatial representation of the proportion of domiciles occupied by disabled residents in different neighborhoods or cities, of course, could assist in resolving a persistent controversy about the "ghettoization" of disability.<sup>36-38</sup> Alternatively, as Dear and Wolch have noted,

Some status groups are noticeably uninvolved in struggles over territory. Their lack of defined - and hence defensible space for collective consumption mirrors their lack of

cohesion as a distinct group. . . . For the physically disabled, the social reproduction process is anchored in a pervasive, culturally-defined conception of acceptable bodily images. . . . In many ways, the continuing plight of the physically disabled provides an archetypal account of the problems facing any group wishing to break the mould of the socio-spatial reproduction process.<sup>39</sup>

Research about this topic, therefore, may not be able to unravel complex problems such as the distinction, if any, between organic impairments and the socio-political definition of disability; but it could assist in clarifying numerous issues about related problems including the political representation of non-territorial minorities.

A difficult dilemma in the proposed application of GIS, however, involves the selection of appropriate units of analysis. Since statistics based on earlier definitions of disability generally are not reported below the level of counties or states, some alternative method must be employed to examine relevant data from smaller geographic areas. The methodological problems of the design for the proposed research are, of course, further complicated by the absence in every jurisdiction in the U. S. of any known list of disabled people that might otherwise serve as a frame for drawing random samples.

#### Sampling Considerations

An initial important decision that had to be made concerning the selection of independent variables for the proposed research, therefore, depended in part upon a careful evaluation of the extent to which this study needed to be based on random sampling techniques. On the one hand, probability sampling would certainly provide a firmer empirical basis for the results of the study. Especially in the case of research that seeks to introduce or extend a new formulation of the major independent variable, such as an environmentally-based definition of disability, the incentive to gain increased prestige from the adoption of conventional approaches to sampling may be extraordinarily strong. On the other hand, there is no compelling theoretical or policy-related reason to attempt to extrapolate the findings of the proposed study to any local, state, national, or international population of disabled people.

Some observers might even consider the adverse impact of environmental barriers on the struggle of disabled people for desired resources to be *prima facie* evidence extending beyond the need for statements of formal hypotheses or conclusions. The conscious decision to eschew the advantages of a methodology founded on probability sampling and to rely instead on techniques that use aggregate data and non-random selection procedures, despite potential attacks on its credibility, seemed both appropriate and justifiable. In fact, the primary purpose of the proposed research is to discover intriguing patterns in the data and to generate formal hypotheses for subsequent investigation. This orientation also might reduce the costs of the proposed study. Thus, a multi-staged non-probability sampling design seemed to be best suited to the objectives of this study.

Because the plan to utilize aggregate data in Geographical Information Systems precluded the choice of individuals as units

of analysis, an early step in the process of this investigation also seemed to revolve about the relative advantages or disadvantages of adopting smaller or larger geographical areas as a basis for further analysis. The major options appear to be municipalities, census tracts, or some other recombination of city block statistics as well as rural townships.

Census tracts were originally devised to facilitate the study of urban neighborhoods, which were conceptualized in the early twentieth century as relatively circumscribed geographic areas with a population between 3,000 and 6,000 residents.<sup>40</sup> Another recent analysis of the advantages of GIS for health care planning recommended a concentration on neighborhoods containing a population between 10,000 and 25,000 people which may encompass the catchment areas of many local physicians.<sup>41</sup>

Geographical Information Systems have been utilized in prior research on geographic access to general practitioners.<sup>42</sup> Some recent trends indicate, however, that patients may go beyond the offices of the nearest physicians or hospitals to seek medical treatment. Moreover, the distances that patients are willing to travel for medical attention seem to depend on perceptions of their own health conditions and the types of treatment available.<sup>43</sup>

One investigation of computer maps and aggregate numerical data from census tracts in Riverside, California, found that, while several measures of intellectual impairment, behavioral retardation, socioeconomic status, and ethnic characteristics are highly interrelated, the distribution of physically disabled residents in the community was not closely associated with any of these variables.<sup>44</sup> Clearly, additional research is needed to disentangle demographic and other variables to assess such concentrations in different geographic areas.

By contrast, since communities comprise the smallest jurisdictions that adopt public policy regarding environmental obstacles or facilitators, the appraisal of variations in programs and practices for barrier removal at this level could contribute to an improved understanding of the impact of political decisions upon the activities of disabled residents. But the goal of examining aggregate data from different government jurisdictions to assess the effects of public policy may also be achieved through the use of smaller units such as block statistics or census tracts. As a result, the proposed research will utilize a multi-staged stratified non-probability sample of blocks or census tracts to fulfill its principal objectives.

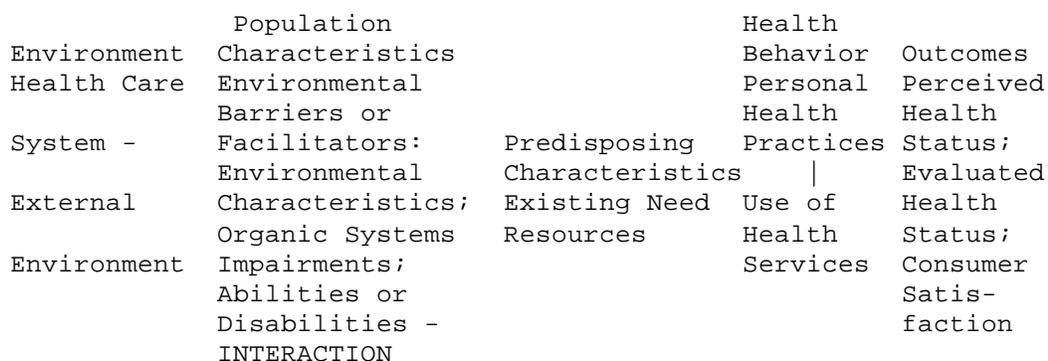
#### Analytic Strategies and Data Collection

Since much of the design of the proposed research is contingent of the availability of appropriate data concerning the dependent variable, a brief assessment of critical issues that need to be clarified and explained in this study also must be granted prominent attention. As Figure 2 illustrates, the principal model for assessing environmental barriers or facilitators related to disability<sup>21</sup> can be appropriately fit into the dominant model concerning the use of health care.<sup>45</sup>

As an initial step in the analysis of this subject, census tracts containing both the offices of general practitioners and a relatively large residential area will be compiled. A list of

such office addresses in various cities is readily available, although GIS software may be required to reconcile discrepancies between the boundaries of census tracts, postal codes, electoral precincts,<sup>46</sup> and other areal units. By ensuring that all numerical measures are obtained from the smallest available sources of data such as census tracts or reaggregated city block statistics, this process permits a detailed investigation of correlations between demographic attributes such as socioeconomic status, race or ethnicity, and information about the prevalence of disability, environmental barriers, and the use of health care facilities derived from other sources.

Figure 2  
An Addition to an Emerging Model of Health  
Care Utilization by Adults  
with Physical Disabilities



Adapted from Ronald M. Andersen, "Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?" *Journal of Health and Social Behavior* vol. 36 (March, 1995), pg. 8.

Since census tracts are the primary units of analysis for this study instead of individuals and since no attempt will be made to extrapolate the findings to individual traits, the procedure also avoids the dangers of the much-touted "ecological fallacy."<sup>47</sup> The design of the proposed research, therefore, seems especially compatible with the use of statistics such as regression analysis which is based on an effort to determine the contribution of separate independent variables such as the prevalence of environmental barriers, demographic characteristics, and other measures to the explanation of the variance in the dependent variable, or the use of health care facilities disabled adults. Another statistical approach is the analysis of variance which is founded on measures to determine whether variance within the independent and dependent variables is greater than or less than the variance between such variables could also be applied to this research.

The cooperation of physician having offices in the selected census tracts will also be requested in locating patients with mobility or sensory impairments, especially those living within the same tract. Everyone contacted during this research will, of course, also be assured of strict adherence to the principles of anonymity and confidentiality as well as respect for the decision

to participate or to withdraw from the study at any time. In order to secure a broad range of functional limitations, no attempt will be made to rate the degree or severity of the impairment as a threshold for inclusion or exclusion from the project. To reduce expenses, however, the boundaries of the selected tracts will be used to establish the geographic area within which most data will be collected about disabled patients, environmental barriers or facilitators, and the use of health care facilities unless this procedure fails to yield a sufficient number of disabled patients for meaningful analysis.

One possible exception to the usual ratios between patients and physicians may be indicted by the complaints of many disabled individuals that medical doctors often concentrate on the vain effort to "fix" or "cure" their primary disabilities to the neglect of secondary illnesses and conditions. "Some professionals who are heavily grounded in the traditional medical model, with its emphasis on 'curing' the patient, may find it frustrating to work with people they cannot 'fix'."<sup>48</sup> The primary focus of the proposed research will concentrate on efforts by disabled adults to seek medical treatment for so-called "secondary conditions," unrelated to the person's disability.

A Delphi survey of professionals involved in programs for disabled people found that "secondary conditions" are often identified as a more important problem than hospital readmissions or other concerns.<sup>49</sup> Preliminary contacts with local practitioners in the proposed study, however, may be accompanied by a request for an additional interview that would center on the physician's attitude toward the significance of disability and their perceptions of the performance of professional responsibilities for a disabled patient. Data obtained from these interviews could permit the examination of a sub-hypothesis that the physician's views about the treatment of disability might be related to the number of disabled patients in their practice.

The focus on "secondary conditions," however, may exclude many specialists as well as the disabled patients who visit them regularly regarding their primary disabilities. If it is necessary to obtain a larger number of disabled patients for the purposes of this study, patients with impairments who reside outside the census tract will be contacted for interviews. But the survey of environmental barriers and facilitators, which may be conducted simultaneously with the attempt to identify disabled people for interviews, will remain largely confined to the selected census tract. The measure of health care utilization will reflect a combined index from the records of physicians and the statements of disabled patients.

Since a significant interest in the proposed research also includes disabled people who do not utilize local health care facilities, the interviews of disabled patients reported by physicians in selected census tracts will be supplemented by similar questions to be posed to disabled residents identified by other means. In particular, the technique of "snow-ball sampling," in which each disabled respondent will be asked to furnish the names and addresses of other disabled people in the community, will be adopted for this purpose.

To curb excessive costs, this practice - along with separate requests for the names of disabled residents from knowledgeable local informants such as directors of independent living centers

(ILCs), heads of social service agencies, and leaders of advocacy groups - will continue through no more than two iterations. While the absence of a known list of disabled persons in relevant neighborhood or communities precludes the use of probability sampling methods, the disabled residents identified through such interviews can be expected to yield a substantial amount of valuable data.

Gaining physical entrance to a medical office is a complex endeavor for a person with a mobility or sensory impairment that imposes heavy responsibilities not only on disabled patients who must reach the designated location but also on physicians who might be expected to provide valuable advice about issues such as accessibility and durable medical equipment.<sup>50</sup> In an effort to develop a comprehensive examination of the probable effects of environmental barriers and facilitators on the use of health care facilities by disabled adults, several techniques will be employed to provide a useful benchmark for future research on this topic.

For each disabled resident of the selected tract, a path will be created to map the shortest distance between the domicile of the disabled individual and the office of the nearest general practitioner. This path will be examined and traveled by the disabled resident and a researcher to determine the number of environmental barriers and facilitators encountered along the route. The results of both assessments will then be compared with the separate findings of independent ADA surveyors applying checklists based on ATBCB regulations. Each of these processes will increase the reliability of the data obtained in this investigation.

The differences between these measures also may provide an indication of the extent to which disabled residents become cognizant of these environmental characteristics or, conversely, of the extent to which they simply become part of "taken-for-granted" surroundings<sup>51</sup> that may be avoided and unchallenged in their own neighborhoods. More importantly, the total number of environmental barriers or facilitators from each of the paths in the census tract comprises an index that can be adopted as the principal independent variable in the proposed research.

These measures will be supplemented by surveys of local physicians and disabled patients and other disabled patients identified by "snowball sampling" or similar methods. A primary objective of the interviews will be to move beyond objective measure of accessibility and to explore perceptions of such issues. Conceivably, for example, the prevalence of environmental barriers that restrict access to health care facilities may have a less determinative effect on the utilization of health care than long-standing viewpoints about the extent of such barriers. If disabled people have a deep-seated perception that barriers restrict their access to these facilities, they may be less inclined to seek health care there, regardless of the objective situation.

These methods, of course, also provide an unusual opportunity to explore another measure of reliability as well as the relationship between perceptions and actual circumstances. Hence, while the inclusion of interviews in the research design may be an expensive and time-consuming process, the potential value of data that can be gathered through this method seems to

overshadow the costs.

#### Intervening Variables

While the dependent variable will of course consist of standard measures of the use of health care facilities that have been largely developed for other purposes, some of the expected associations between environmental barriers and the use of health care facilities also may be modified by several intervening variables that are worthy of careful consideration.

Both the size of the community and the size of the disabled population in the area under investigation, for example, would seem to represent logical criteria for stratification. Hence, a listing of urban, suburban, and rural communities that accurately reflects their respective portions of the general population will be adopted in each of four broad regions of the country - Northeast, Midwest, South, and West - for the selection of census tracts that contain medical offices as well as residential areas, which will become the ten principal research sites for the proposed investigation.<sup>52</sup>

In part, these regional influences - because local "reform" governments (characterized by administrative hierarchies based on civil service rather than patronage, nonpartisanship, and at-large representation) tend to predominate in the West and South instead of the Midwest and Northeast - also introduce a political dimension in this study. In addition, "form of local government" might be included as a separate intervening variable in the proposed research. Perhaps the most important intervening factor that may assist in examining the impact of public policy on environmental barriers or facilitators, however, can be gleaned from the findings of a previous study of state and local laws about disability -which disclosed that "Democratic strength in competitive states and a history of positive governance are the primary determinants of ... disability rights laws."<sup>53</sup>

In research within the discipline of political science, factors like party strength, political competitiveness, the relative abundance of community resources, and a record of progressive legislation are usually considered attributes of the political process that often are associated, especially at the local level, with the adoption of public policies as an "outcome" variable. There is no persuasive reason, however, to prevent these characteristics from being employed as intervening or independent variables in the analysis of topics such as government support for barrier removal programs. Since the provisions of the ADA ostensibly represent a uniform national policy on this subject, state and local statutes represent the only possible variations in official requirements concerning barrier removal.

The investigation of this intervening or independent variable, therefore, could yield valuable information about two important questions: (1) Does public policy, especially in local or state measures, have any effect on the implementation or enforcement of significant community activities such as barrier removal? (2) Can the enactment of local laws concerning disability be regarded as indicators for the amount of effort and resources devoted to the fulfillment of related policy objectives including barrier removal?

## Hypotheses

The general outline and thrust of the overall research design, therefore, seems to be most compatible with the use of statistical techniques such as analysis of variance or regression analysis to assess the significance of correlations that may be detected in the data to be collected. Such measures must be interpreted cautiously, of course, because the data are not obtained from a probability sample and, of course, they cannot be assumed to reflect a normal distribution. Nonetheless, the proposed research can yield valuable data to stimulate further investigations of a topic that has seldom been examined previously.

The principal or major hypothesis of the proposed study can be stated as follows:

(A) The use of health care facilities by disabled adults in each of the selected localities will be inversely related to the prevalence of environmental barriers within medical offices, on the paths to such facilities, and throughout these communities and neighborhoods.

(B) Sub-hypotheses of the initial phase of the analysis revolving about definitions of disability similarly predict:

(1) The categorization of disability on the basis of visible or labeled bodily differences or the combination of both attributes which may elicit discriminatory reactions from others is apt to be more closely related through ecological and psychological influences to the index of environmental barriers as well as a failure to use health care facilities than the criteria founded on everyday functional limitations or restrictions on major life activities.

(2) Moreover, the examination of correlations between data that reflect each of the three definitions of disability could be expected to indicate that the classification based on visible or labeled differences might be more strongly associated with functional limitations and constraints on major life activities than functional limitations and constraints on major life activities and are correlated with each other.

(C) The use of GIS software permits a test of another sub-hypothesis:

(1) The spatial display of the residential locations of disabled people will reveal an increasing "ghettoization" or geographic concentration of this segment of the population.

(2) Furthermore, despite the reported evidence from census tracts in Riverside, California, the growing tendency of disabled residents to cluster in inner-city neighborhoods will be strongly related to data that reflect decreasing socio-economic status and increasing populations of African-American and Latino inhabitants.

(3) The size of the group of disabled patients served by local physicians will also be more closely related to the understanding of disability-related issues displayed by the doctors than to the number of disabled residents living in their catchment areas.

(4) The relative prevalence of environmental barriers - both within and outside medical offices - will also be more closely related to the use of health care facilities by disabled adults than other factors that might restrict conventional access to health care such as socio-economic status, employment,

insurance coverage, and similar traditional variables.

(5) The principal difference between the disabled patients of local physicians and their counterparts who do not seek health care can be explained by the influence of environmental barriers or facilitators upon these two groups of disabled people. And this influence may also be mitigated or intensified by additional factors such as prevailing favorable attitudes about experience with a disability, residence in cities with non-"reform" governmental institutions in the Northeast, a prevalent assumption that public policy can mold community.

Almost all of the major hypotheses in this research proposal could be substantially modified or reinforced by the intervening or independent effects of variables such as size of the city, region of the country, form of local government, or other conditions favorable to the enactment and implementation of local or state disability rights statutes.

#### Directions for Future Research

The testing of these hypotheses can be expected to yield interesting patterns that may provide significant directions for further research. In addition to the extent to which each of the separate independent variables may contribute to the explanation of the variance in the dependent variable concerning the use of health care facilities by disabled adults, the general findings of the proposed research could conceivably add to an understanding of the role of social interactions or social support in achieving or maintaining personal health.

Perhaps one of the most significant facts to emerge from a survey of a random sample of disabled Americans was the evidence from the first Harris poll in 1986 that they were much less likely than their nondisabled counterparts to engage in various forms of social participation such as neighborly visiting, shopping at supermarkets, attending concerts or movies, and meeting with community organizations.<sup>54</sup> These facts appear to take on added significance in view of the general and growing agreement that social activities comprise a crucial element of good health.

The environmental obstacles - and perceptions of such barriers - that disabled people have encountered in the use of health care facilities as well as other aspects of community life probably has had a dampening effect on the social and physical health of this segment of society. The proposed research, therefore, may constitute a crucial initial step in assessing the effects of social isolation and confinement on actual health of disabled people.

#### Policy Implications

Government officials are constantly asked to evaluate competing demands for limited public resources. As a result, for example, political decision-makers may want to discover the most effective means of providing needed health care for disabled citizens on the same basis as the nondisabled portion of the population; but they might also question whether such a goal can be achieved most effectively by emphasizing the removal of environmental barriers or by stressing increased subsidies for existing programs such as Medicaid or Medicare which are supported by the social welfare policies that established

Supplemental Security Income (SSI) and Social Security Disability Insurance (SSDI), respectively. Hence, data that might contribute to the resolution of this policy dilemma could have important implications for government budgets as well as civil rights.

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