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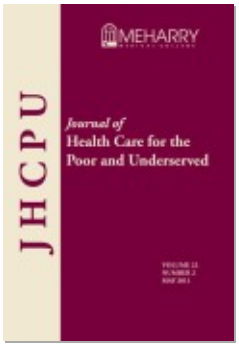

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Abstract: The impact of social and economic determinants of health status and the existence of racial and ethnic health care access disparities have been well-documented. This paper describes a model, the Health Care Access Barriers Model (HCAB), which provides a taxonomy and practical framework for the classification, analysis and reporting of those modifiable health care access barriers that are associated with health care disparities. The model describes three categories of modifiable health care access barriers: financial, structural, and cognitive. The three types of barriers are reciprocally reinforcing and affect health care access individually or in concert. These barriers are associated with screening, late presentation to care, and lack of treatment, which in turn result in poor health outcomes and health disparities. By targeting those barriers that are measurable and modifiable the model facilitates root-cause analysis and intervention design.

Key words: Health disparities, cultural competence, racial/ethnic disparities, health care access barriers, cause of disparities, access barriers model.

The impact of social and economic determinants of health status and the existence of racial and ethnic health care access disparities have been well-documented.[1,2,3] Increasingly, multifactorial models are being presented to explain the causes for such disparities.[4,5,6,7] Health care access barriers play an important role in understanding the causes of disparities.[8] This paper describes a model, the Health Care Access Barriers Model (HCAB), which provides a taxonomy and practical framework for the classification, analysis and reporting of those health care access barriers frequently faced by populations that exhibit adverse health disparities. The model is equally applicable across all racial and ethnic groups and specifically targets those access barriers which

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are modifiable in order to support the design of community-based interventions that may lead to reduced disparities.

The HCAB model has been used to design community-based health interventions to reduce the complications of diabetes mellitus in a high prevalence community and to improve cancer screening among Latinas.[9,10] In our community health work, we used the HCAB model to facilitate the realignment of prevention and health care services provided by a major academic medical center, NewYork-Presbyterian Hospital, to a large community of Latino immigrants in Washington Heights Inwood.[11] A community health needs assessment, linked with an analysis of financial, structural and cognitive barriers guided the development of Patient Centered Medical Homes, Information Technology communication strategies and cultural competence training of ambulatory care staff.

Health Care Access Models

While many health care access barriers have been described in the literature, they have generally not been incorporated into models that set access barriers as units of analysis; classify barriers; and provide frameworks that facilitate measurement, analysis, and reporting.[12,13,14,15] We have not identified models in the literature that specifically target modifiable health care access barriers. However, a few examples of analytic frameworks tie health care access barriers to adverse health outcomes and disparities. DeVoe et al. have presented a typology of barriers to health care access for low-income families that includes no health insurance coverage, no access to care, and inability to afford co-payments and other costs even if insured.[16]

Andersen's Behavioral Model of Health Services Use is a well-known and frequently applied model of access to care.[17,18] This model sets the individual as the unit of analysis and suggests that the individuals' use of health services is a function of their need and predisposition to use them.[19] Andersen's model serves as a framework for large scale studies and incorporates a comprehensive and wide array of determinants. Determinants include demographic factors (age and gender), social structure (education, occupation, ethnicity, and other factors measuring status in the community, as well as coping and the health of the physical environment), and health beliefs (attitudes, values, and knowledge that might influence perceptions of need and use of health services). The Model serves as a tool for the study of a broad set of determinants, both modifiable and not modifiable. A number of variations of the Andersen model have evolved over the years, but all subscribe to the same fundamental characteristics.[17] The Andersen model was built on the basis of quantitative national health surveys and offers a broad framework for the analysis of data from large datasets.[20]

The Health Care Access Barriers Model

The Health Care Access Barriers (HCAB) Model facilitates the design of community health interventions by targeting measurable and modifiable determinants of health status. This is different from the Andersen Model, which provides a broad framework of modifiable and non-modifiable determinants and is ideal for large scale studies of health

services utilization. The HCAB is not a comprehensive model that attempts to include all determinants; rather it targets modifiable health care access barriers in order to serve as a practical tool for root-cause analysis and community-based interventions.

The HCAB Model is summarized in Figure 1. The model provides a nomenclature and framework for identifying, categorizing, and targeting health care access barriers. It describes three categories of modifiable health care access barriers (financial, structural, and cognitive). We will demonstrate that these three types of health care access barriers are associated with decreased screening, late presentation to care, and lack of treatment, which in turn result in poor health outcomes and health disparities. By targeting those barriers that are measurable and modifiable, the model facilitates root-cause analysis and intervention design.

Over a number of years, the lead author and colleagues have developed a health care access barriers model that is rooted in the social and cultural barriers that limit doctor-patient interactions.[21,22] Multiple health care access barriers facing Hispanics were noted through interviews and focus group studies supported by the Robert Wood Johnson Foundation in 2001.[23] These access barriers have been classified and sorted into categories.[24] In addition, a review of the literature yielded three intermediary variables that link these access barriers with poor health outcomes.[25] Here we articulate a model oriented specifically to health care access barriers that proposes mechanistic links between three categories of access barriers and subsequent health disparities.

The fundamental characteristics of the HCAB model are classification of health care access barriers; identification of barriers that are measurable, modifiable, and identified using the best available evidence; and recognition of intermediary factors that link barriers with health outcomes.

The HCAB model sets health care access barriers as the units of analysis and provides an approach that focuses on the causal pathways between the access barriers and the adverse health outcomes. This differentiates HCAB model from the Andersen model, which sets the individual as the unit of analysis.[18] We propose a taxonomy that describes three categories of health care access barriers: *Financial*—cost of care and health insurance status barriers; *Structural*—including institutional and organizational barriers; *Cognitive*—knowledge and communication barriers. The previously cited DeVoe model addresses financial and structural barriers, but it does not explore cognitive barriers, which have also been shown to limit access.[16,26,27,28] These three categories of barriers are reciprocally reinforcing and affect health care access individually and in concert. For example, cognitive barriers may aggravate or compound financial and structural barriers. Similarly, financial barriers may lead to structural or cognitive barriers.

The HCAB model also defines three intermediary variables (prevention, timely care, treatment) that can serve as intermediary measures reflecting the impact of access barriers.

Financial, Structural, and Cognitive Health Care Access Barriers

Financial barriers to health care access arise in vulnerable populations when patients are uninsured or underinsured.[24] Research has demonstrated that the impact of being uninsured and underinsured disproportionately affects Latinos and African Americans

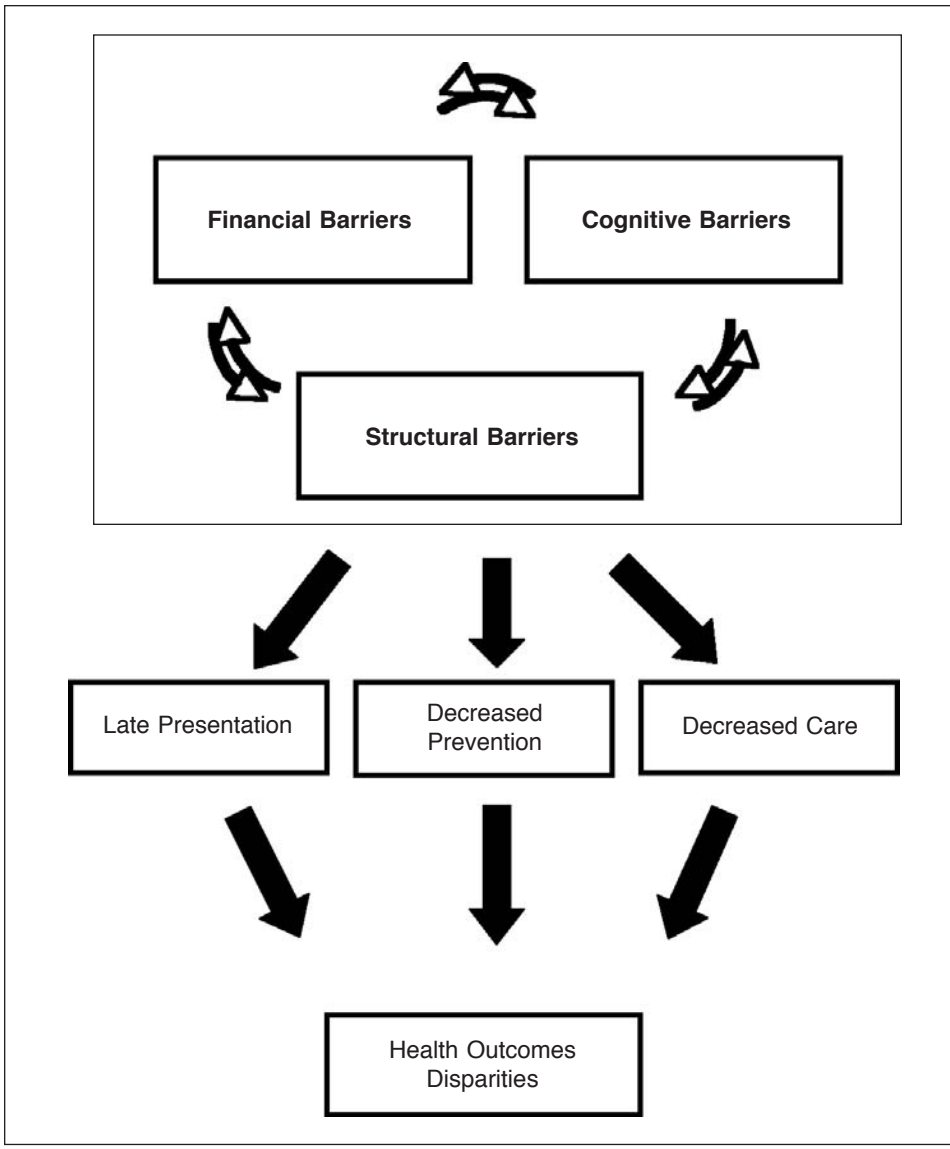

Figure 1. The health care access barriers (HCAB) model.

by limiting access to doctors when ill, going without a prescription for needed medications, or foregoing recommended tests or treatments.[29] The uninsured population includes many undocumented immigrants who are least likely to receive coverage from federal and state health reform efforts. According to a 2002 study conducted by the Commonwealth Fund, 34.1% of Hispanics and 21.6% of African Americans under age 65 in the United States are uninsured, compared with 12.5% for Whites.[30]

Individuals who are insured or who pay for their care by other means may nevertheless be subject to other access barriers that are not as tangible as insurance status.

Structural barriers are defined by the health care system's availability. Such barriers may be found within or outside of health care facilities. These barriers act independently or concurrently with financial barriers already facing those without insurance. Structural barriers may occur externally to the processes of care, as when people seek access to health care services. These barriers, as defined by recent studies, include but are not limited to availability and proximity of facilities, transportation, child care, and structural characteristics of care.[31,32,33] Structural barriers are often experienced within the health care facility. Barriers such as excessive waiting times may affect care-seekers who are have low incomes and live in neighborhoods of social and economic distress.[14] Financial and structural barriers may be further compounded by cognitive access barriers that may, alone or in combination, adversely affect disease prevention and health care.

Box 1 provides examples of financial, structural and cognitive barriers. Cognitive barriers are rooted in the patient's beliefs and knowledge of disease, prevention, and treatment, as well as in the communication that occurs in the patient-provider encounter.[21,26–28,34,35] A patient's lack of awareness of accessible health services may also compound health barriers. Limited health literacy, as well as linguistic and cultural barriers, may further prevent the patient from understanding and acquiring the necessary knowledge to carry out therapeutic directions.[36]

Evidence-based Identification of Barriers that are Measurable and Modifiable

The HCAB model focuses on those health care access barriers that are associated with adverse health care circumstances leading to health disparities. Many examples of such discrete barriers can be found in the literature.[12,13] These barriers must be measurable in order to facilitate quantitative analysis and evaluation. Furthermore, the model's barriers must be amenable to intervention, improvement, or correction: action can be taken to eliminate, ameliorate, or prevent the barrier. For example, lack of health insurance has been linked to health disparities and is readily measurable.[29] Similarly, the structural barriers and the cognitive barriers listed in Box 1 are all measurable and modifiable.

Unlike HCAB, several of the components of the Andersen model, including demographic factors and social structure, have a low degree of mutability.[19] The HCAB model targets health care access barriers that are modifiable and can be the subject of public health and clinical interventions.

Recognition of Intermediary Factors that Link Barriers with Health Outcomes

All three categories of health care barriers are associated with a number of intermediary factors that are known to result in poor health outcomes and disparities.[16,35,37–39] Decreased use of preventive measures, delayed presentation and recognition of disease, and lack of treatment or insufficient treatment are all associated with poor health outcomes.[16,35,37–39] For example, in patients with low health literacy, there is a demonstrated association with less use of preventive health services.[40] Box 2 lists examples of associations between the three types of health care access barriers and the three intermediary

Box 1.

EXAMPLES OF STRUCTURAL, FINANCIAL, AND COGNITIVE BARRIERS TO HEALTH CARE ACCESS

Examples of Structural Barriers

Availability: Medical Home	Waiting time
Transportation to health care facility	Multiple locations for tests and specialists
Telephone access to providers	Continuity of care
Lack of child care resources	Multi-step care processes
Street safety	Operating hours of health care facility

Examples of Financial Barriers

No health insurance
Underinsured

Examples of Cognitive Barriers

Knowledge Barriers	Communication Barriers
Awareness of prevention facts	Availability: interpreter services
Awareness of health resources	Language concordance of signage
Health literacy	Availability: cross-cultural communication skills
Understanding of diagnosis	Availability: translated materials
Understanding of treatment	Racial/ethnic concordance of provider

Sources, as listed in the Notes at the end of this paper: 19, 21, 28, 29, 35, 37, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48.

factors. These three intermediary factors represent pathways that facilitate root-cause analyses of episodes of health disparities and may aid in the design of local interventions targeting disparities reduction.

Application of Health Care Access Barriers Model

The proposed HCAB model provides a nomenclature and taxonomy that facilitates the discussion of health care access barriers. By defining categories and sub-categories of health care access barriers, we establish a reference point and terminology for future discussions. The taxonomy serves as a reminder of less evident barriers that might otherwise be overlooked. For example, if one is focused on financial barriers, reference to the HCAB framework would lead to simultaneous considerations of the structural and cognitive barriers.

The model is pragmatic, as it directs us to seek out those discrete and specific barriers that are both measurable and modifiable. Barriers that are not measurable or modifiable should be noted and considered; however, for such barriers there is no point in pursuing an analytic process that is directed toward solutions.

Box 2.

EXAMPLES OF ASSOCIATED HEALTH OUTCOMES

Financial, Structural and Cognitive Barriers	• Decreased Prevention • Late Presentation • Decreased Care
• Financial: No Insurance	↓ Screening test ↓ Child immunization Delayed HIV care Delayed diagnosis (breast, melanoma, colon, cervical cancer) Delayed MI presentation ↓ Care (prenatal, child, adolescent) ↓ Diabetes care
• Structural: Continuity of care	↓ Breast cancer screening ↓ Immunization Delayed recognition of psychosocial diagnosis
• Structural: Use of low performance hospital	Delayed percutaneous and thrombolytic cardiac care
• Structural: No medical home	↓ Preventive care reminders
• Structural: Excessive waiting times	↓ Pediatric care
• Cognitive: ↓ Breast Cancer diagnostic and treatment knowledge	Delayed breast cancer presentation
• Cognitive: ↓ Literacy skill	↓ Cancer screening
• Cognitive: ↓ Health literacy	↓ Breast and cervical cancer screening ↓ Flu vaccination
• Cognitive: ↓ Interpreter Services	↓ Colon cancer screening
• ↓ Language Concordance	↑ Asthma & ER use
• ↓ Doctor-Patient Communication	↓ HTN Care

Sources, as listed in the Notes at the end of this paper: 14, 29, 30, 31, 32, 33, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65.

The HCAB model provides a systematic approach for conducting the root-cause analyses of demonstrated disparities. By systematically identifying the presence of financial, structural and systemic, or cognitive barriers we can set up hypotheses that can be tested. For example, an administrator may wonder what may be causing a dis-

parity noted in an oncology clinic. The administrator noted that 25% of all patients found to have solitary lung nodules in routine screening chest x-ray (CXR) did not go on to have definitive diagnosis and treatment. A systematic approach to this question would spell out the various health care barriers that may have intervened between the CXR finding and definitive treatment at the oncology center. The administrator might use the HCAB model to evaluate the barriers faced by the adherent group and the non-adherent group so as to find the source of the problem.

Box 3 suggests the lines of inquiry that the administrator might pursue in this case. With a thorough comparison of the barriers faced by the adherent group and the non-adherent group the administrator would be well equipped to target the relevant problem areas.

The HCAB model also facilitates the design of interventions addressing racial and ethnic disparities by identifying those barriers that could arise for the target population. These barriers should be addressed by specific components of the intervention.

To illustrate how the HCAB model could bring about the development of interventions, the following case scenario is provided. When establishing a community-based intervention targeting type 2 diabetes mellitus, the planners would be aided by systematically addressing the three barrier categories that face the population in question.

Box 3.

IDENTIFICATION GUIDE FOR HYPOTHETICAL ONCOLOGY SCENARIO

Financial Barriers—Health Insurance

What is insurance profile of a sample of patients who followed through with evaluation?
What is the insurance profile of patients who did not complete evaluation?
What are the insurance requirements of diagnostic center?

Structural Barriers

Working telephone?	Continuity of care?
Proximity to oncology center?	Pre-authorization requirements?
Transportation?	Signage?
	Interpreters-staff access?
	Working during hours of operation?

Cognitive Barriers

Knowledge
- Evidence of patient understanding per chart review
- Evidence of literacy per form completion

Communication
- Language concordance?
- Materials provided in patient's language?

In this case, working with a health plan that provides governmental health insurance access or with a local federally qualified health center might help address financial access barriers. Furthermore, given the presence of multiple structural barriers, the introduction of patient navigators or community health workers might help overcome structural barriers. Training the providers in skills-based cultural competence and health literacy strategies might help reduce some cognitive barriers.

In the second case, the HCAB model provides an analytic framework that facilitates research using factor analysis and regression analysis. The presence or absence of a particular barrier can serve as the basic units of analysis for both qualitative and quantitative methods. The three intermediary variables (prevention, timely care, treatment) can serve as outcome measures reflecting the impact of access barriers. In this way we may measure the impact of single barriers and multiple barriers. For example, we can design a study of the impact of health access barriers on prevention and care for a population of recent Mexican immigrants to a New York City neighborhood. A survey instrument can be constructed using a set of financial, structural, and cognitive barriers and the results can be entered as variables along with routine socio-demographic characteristics. Logistic regression analyses can help determine the impact of individual barriers and various permutations of different types of barriers on preventive care services, delay in initiation of care, and lack of necessary care.

The HCAB model may be tested by examining its usefulness in providing a nomenclature and framework for the classification, analysis, and reporting of modifiable health care access barriers. Early applications of the model by NewYork-Presbyterian Hospital in Northern Manhattan have demonstrated such usefulness and practicality.[11] The model may also be tested by studying the impact of access barriers on three intermediary measures (prevention, timely care, treatment) in interventions facilitated by HCAB.

Limitations

The HCAB model does not capture the overlap among multiple health care determinants of disparities. The barriers defined by HCAB may occur simultaneously as well as sequentially in real time. By postulating linear relationships in the HCAB model we risk losing sight of the overlap and simultaneity of the complex web of determinants. Furthermore, by concentrating the framework around access barriers to the exclusion of other social and cultural determinants, we may not have encompassed the entirety of causes of disparities. However, the identification of an evidence-based pathway between measurable and modifiable health care access barriers and health outcomes makes the HCAB model a useful and practical tool for analysis and intervention.

Conclusion

As health care and public health professionals we have a special opportunity and responsibility to target a particular determinant of disparities—health care access barriers. Recognition, measurement, analysis and reporting of these barriers are prerequisites to quality improvement and the design and evaluation of effective corrective interventions to existing processes of care.

Despite the fact that many types of health care access barriers have been widely cited as root causes of poor health outcomes, we have lacked an effective taxonomy and practical framework to help us measure, analyze and report modifiable barriers. We have articulated a methodology that denominates and classifies health care access barriers and provides a framework that allows us simultaneously to consider such disparate variables as health insurance, transportation, and knowledge of risk factors. By defining and targeting specific barriers that are measurable, modifiable, and supported by the evidence, we provide a formula that generates uniform standards and facilitates the design of interventions. The adoption of a common set of descriptive terms and uniform standards in the assessment of health care access barriers makes comparability among studies possible. The use of a framework that provides for standardization and comparability may also accelerate the pace of research in this area of critical need.

One can never capture a complex system with one model or taxonomy; much depends on the questions one wants to ask.[41] By capturing this slice of the complex multifactorial interactions leading to adverse health outcomes we can answer certain questions that may lead to practical and effective interventions.[41] The more we learn about the impact of these barriers, singly or combined, the more effective we will be in reducing health disparities.

Our review of the literature substantiates and early applications of the model suggest, that the Health Care Access Barriers Model provides a unique taxonomy and a practical and effective framework for the classification, analysis, and reporting of modifiable health care access barriers. The model's specific targeting of modifiable barriers facilitates the design of interventions that may lead to reduced disparities. This innovative categorization format and practical analytic framework supports interventions that can help reduce modifiable health care access barriers faced by the poor and underserved.

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