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Asthma management: an ecosocial framework for disparity research

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Abstract

Background: Asthma management disparities (AMD) between African and White Americans are significant and alarming. Various determinants have been suggested by research frameworks that affect the unfair distribution of resources for asthma management to groups who are more or less advantaged socially. Ecosocial models organize determinants into individual/family, healthcare, community, and sociocultural levels. Multilevel interventions can affect AMD through simultaneous actions on different levels and pathways between determinants.

Objective: Provide a comprehensive summary of the known determinants of AMD.

Method: Peer reviewed research frameworks of AMD from 1998-2009 were retrieved from PubMed/ Web of Science databases using ("Socioeconomic Factors"[Mesh] OR ("Healthcare Disparities"[Mesh] OR "Health Status Disparities"[Mesh])) AND "Asthma"[Mesh] AND "African Americans"[Mesh] OR "Ethnic Groups"[Mesh]). Abstracts assessed for a focus on AMD, and determinants. Articles were analyzed for ecosocial levels and determinants.

Results: 13 research frameworks described 34 determinants. Compared to other levels, Individual/family levels had the most emphasis, and frameworks using healthcare and community levels were the most narrow in focus. Stress, poverty, violence/crime, quality of care, healthcare access, and indoor air quality were well described determinants.

Conclusions: Multilevel investigations should include those well described determinants of AMD and increase knowledge of pathway interactions between healthcare and community levels.

Keywords

African Americans; Asthma – Treatment; Discrimination in medical care; Determinant; Eco-social model; Health status disparities; Marginality; Social

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Key words: Asthma, health status disparities, African Americans, eco-social model, determinant.

INTRODUCTION

The disparities which exist in asthma management are a significant, persistent, and growing problem that have devastating social and economic impacts (Ginde, Espinola, & Camargo, 2008; Gupta, Carrión-Carire, & Weiss, 2006; Sullivan, 2005; Wertz et al., 2010). These disparities are conceptualized as the differences attributable to determinants within an ecosocial model that is comprised of individual, healthcare, community, and sociopolitical contexts, or *levels* (N. Krieger, 2011). Determinants are conceptualized as those aspects of life and the environment that affect the distribution of resources for asthma management within a population. For example, medication beliefs are a determinant at the individual level relating to asthma management or mismanagement (Horne, 2006; Wade et al., 1997; Wells et al., 2008), whereas the sociopolitical determinant of segregation can affect the distribution of health resources within a community for asthma management (Landrine & Corral, 2009; Marmot & Wilkinson, 1999).

Focusing on a singular determinant provides an incomplete understanding of how to reduce asthma management disparities (hereinafter referred to as AMD) (Lynam, 2005), and researchers now call for multilevel approaches that consider: (1) the multiplicity of pathways that exist for interaction between determinants, and (2) the simultaneous effects of eco-social levels on disparities (N. Krieger, 2008; R. J. Wright & Subramanian, 2007). For example, while some studies show that African Americans are *less* likely than White Americans to manage their asthma through the use of inhaled corticosteroids (Crocker et al., 2009), other studies find that African Americans may be *more* likely to be prescribed inhaled corticosteroids (Stewart et al., 2010). A multilevel approach might explain this contradiction by examining how self-management skills may interact with provider-patient communication, and how a community environment of violence and crime may discourage a caregiver from refilling a prescription. Ignoring the multilevel approach might limit the effect of an intervention; in this case to an over-reliance on interventions to increase provider-patient communication in place of encouraging providers and others to limit neighborhood violence. What has been missing for practitioners and researchers who are interested in reducing AMD through complex multilevel approaches is a road map of the determinants known to influence AMD.

The purpose of this article is to provide a comprehensive and practical summary of the known determinants of AMD from existing peer-reviewed research frameworks. Rather than critiquing the evidence for such determinants, this article will evaluate these frameworks on their exploration of: 1) the simultaneous effects of multiple ecosocial levels on AMD, and 2) the potential pathways of interaction between determinants. The first part of this article defines AMD and describes an eco-social model for understanding AMD. The second part of this article reviews and evaluates existing frameworks of AMD determinants.

Asthma management is defined as the individual and collective activities used to achieve or maintain asthma control (e.g., being symptom free) and avoid future risks of exacerbation [Figure 1.] (Reddel et al., 2009). The measurement of these disparities lies not just in accounting for the unequal burden of disease as an outcome, but also in the unequal distribution of activities and resources (human and non-human) needed to manage asthma (Braveman, 2006). The determinants that affect the distribution of these resources are best understood within an eco-social model of four nested eco-social levels: individual/family, healthcare, community, and sociocultural levels.

An ecosocial approach conceptualizes the micro- to macro-level effects of determinants on health [Figure 1.] (N. Krieger, 2001b; N. Krieger, 2005; Marmot & Wilkinson, 1999; USDHHS, 2002). The individual/family-level includes determinants that pertain to individual and group characteristics such as beliefs, behaviors, and family coping. The healthcare-level includes determinants that affect the delivery of a continuum of preventative, diagnostic, and therapeutic services provided in traditional healthcare settings (Smedley, Stith, & Nelson, 2003). These elements relate to processes, access, quality of care, and the delivery systems that influence the distribution of these determinants.

Figure 1. An Ecosocial Model of Asthma Management Disparities
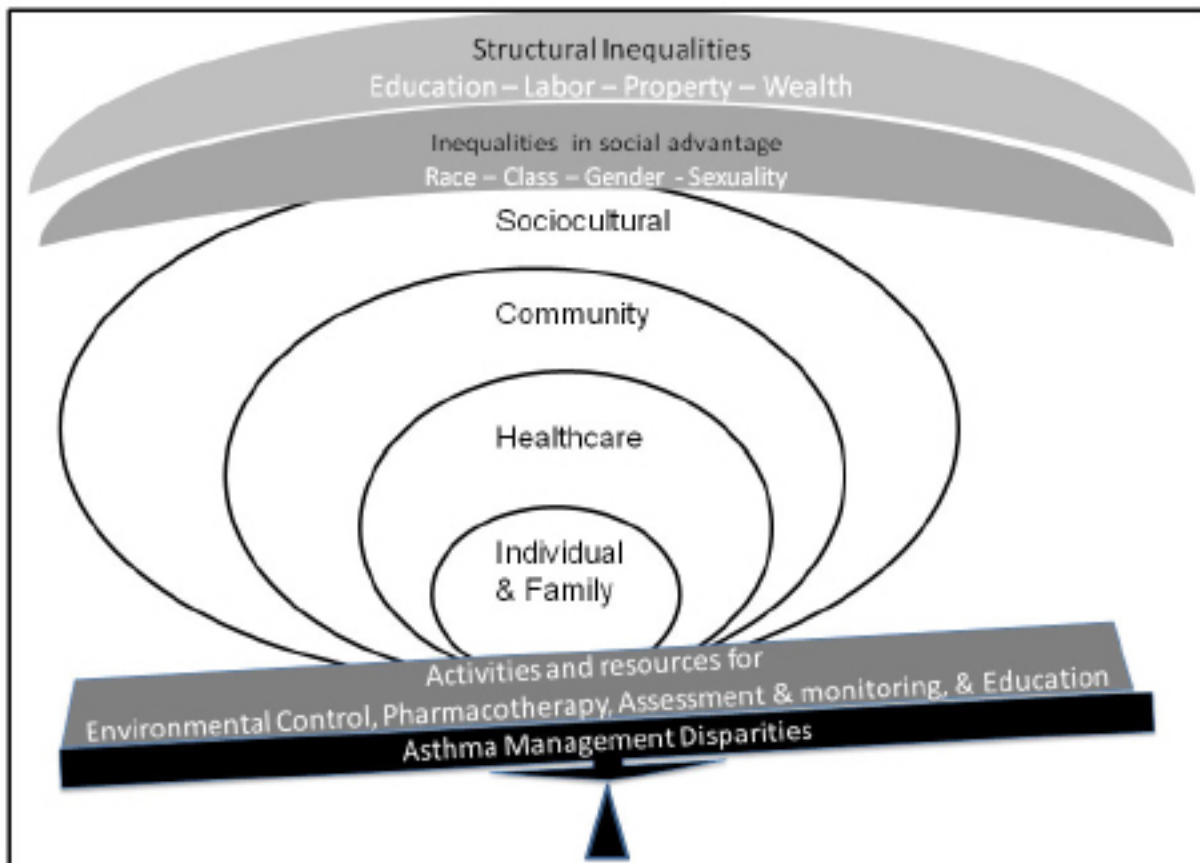
The community-level includes the determinants focused on the social and the built environment. The sociocultural-level includes determinants within the larger environments of culture (norms, beliefs, and values), political systems, and policy-driven environmental exposures.

Disparities in asthma exacerbations, emergency room visits, and hospitalizations are related to the unfair or unequal exposure to disadvantaged groups of an array of determinants affecting asthma management activities (Braveman, 2006). This inequality reflects the structural inequalities in society (Graham, 2004; Williams, Sternthal, & Wright, 2009). Structural inequalities are the political, social, economic, and cultural characteristics of a society that produce inequalities in social advantage [Figure 1.]. Inequalities in social advantage can occur across divisions such as race or class (Brunner & Marmot, 1999; Graham, 2004). A person or a group's social advantage will influence their exposure to social-determinants and also to the determinants for AMD (Landrine & Corral, 2009; Williams & Mohammed, 2009).

An operational definition for AMD could be found by examining the disparities of asthma management *activities* [Figure 1.]: (1) environmental control (of triggers and allergens); (2) the appropriate use of pharmacotherapy (the appropriate use of reliever and controller medications; (3) assessment and monitoring (during planned provider visits); and 4) education (of individuals, families, and communities) (NAEPP, 2007a). Control of symptoms is easier to measure, and thus acute exacerbations, emergency room visits, and hospitalizations become a proxy operational measure for disparities in asthma management (Reddel, et al., 2009).

METHOD

A literature search was designed by the author to gather existing frameworks for addressing AMD in African Americans. The search was conducted on both Web of Science (Science Citation Index Expanded, Social Sciences Citation Index, & Arts & Humanities Citation Index) and Pubmed databases for articles published between October 1998 and October 2009. The search used the following terms: "Socioeconomic Factors"[Mesh] OR ("Healthcare Disparities"[Mesh] OR "Health Status Disparities"[Mesh])) AND "Asthma"[Mesh] AND "African Americans"[Mesh] OR "Ethnic Groups"[Mesh]). Abstracts from articles, textbook chapters, and national reports were reviewed by hand. National reports included the National Asthma Education and Prevention Program (NAEPP) 2007 guidelines (NAEPP, 2007b) (p. 366-372) and abstracts from expert meetings held in 2005, 2006, and 2008 (Alexander, 2007; J. Krieger, 2008; Malveaux, 2009; Payne-Sturges et al., 2006). If these abstracts discussed determinants or models of asthma disparities between African Americans and White Americans, they were reviewed in full by this author. *Inclusion criteria:* Papers were included in this study if they: (1) were peer reviewed; (2) specifically discussed the activities of asthma management; and (3) developed models or lists of determinants of AMD using multiple ecosocial levels. *Exclusion criteria:* Papers were excluded for studies that either: (1) exclusively examined disparities in the prevalence of asthma; (2) used non peer-reviewed evidence; or (3) focused on a single eco-social level.

ANALYSIS

Frameworks were analyzed for determinants related to asthma management activities (environmental control, pharmacotherapy, assessment and monitoring, and education). Determinants were organized into four categories of eco-social level [Figure 1.]. Determinants that shared similar characteristics and eco-social level were combined into the one category of determinant. For example, symptom recognition, self-management skills, and understanding medications were combined into self-management skills. If two or more documents were the work of the same author (either as primary or otherwise), the determinants were combined within a single framework column.

In order to compare frameworks and compare the frequency of determinant by ecosocial level, a table was designed using a column for each framework, and listing determinants in each row [Table 1.]. The number of determinants used per framework was listed below the columns. If the framework depicted a model for interactions, this was also noted below the framework, and the model was used to identify and allocate the author's list of determinants into the appropriate eco-social levels. The number of frameworks using a determinant was included at the end of each row.

The table was analyzed vertically to assess for the simultaneous effects of eco-social levels within each framework. The table arranges frameworks from those that used the least number of determinants on the left, to those that used the most on the right. The table was analyzed horizontally for the potential pathways of interaction between determinants. In each eco-social level, determinants were arranged in order from those most frequently used by the frameworks at the bottom, to those least frequently used at the top.

Each research paper was re-read and examined for suggested pathways between listed determinants within Table 1. A second table was designed to map these pathways by listing all the determinants described on each axis and using a mark within the grid to identify a pathway between two different determinants [Table 2.]. A count was made of the pathways per determinant, the pathways within each ecosocial level, and the pathways between ecosocial levels.

RESULTS

The search yielded 219 abstracts, and book chapters which were then reviewed. Thirteen articles (Bryant-Stephens, 2009; Canino, McQuaid, & Rand, 2009; Clark, Mitchell, & Rand, 2009; Federico & Liu, 2003; Gold & Wright, 2005; Gupta, Springston, & Weiss, 2009; Mitchell & Murdock, 2005; R. Morello-Frosch, Pastor, Porras, & Sadd, 2002; Payne-Sturges, et al., 2006; Shanawani, 2006; Strunk, Ford, & Taggart, 2002; Williams, et al., 2009; R. J. Wright & Subramanian, 2007) and one book chapter (Burkart, 2005) and two national guideline documents were included (J. Krieger, 2008; NAEPP, 2007b). After sorting the frameworks for similar authors, thirteen frameworks were described in Table 1. The frameworks were listed across the top of the table and the determinants were listed according by eco-social level on the left hand colum.

Table 1. Frameworks for Asthma Management Disparities

Level	Eco-Social System Determinants	Shanawani (2006)	Krieger (2008)	Clark (2009)	Mitchell (2005)	Burkhart (2005)	NAEPP (2007)	Federico (2003)	Gupta (2009)	Morello-Frosch (2002, 2006)	Strunk (2002)	Canino (2009)	Bryant-Stevens	Wright/Gold/Williams (2006)	Total
Socio-cultural Level	Employment										X			X	2
	Segregation									X			X	X	3
	Discrimination				X						X	X		X	4
	Density of polluting facilities	X				X			X	X				X	5
	Socioeconomic status	X				X	X			X	X			X	6
	Race	X			X	X	X			X	X			X	7
	Poverty				X		X			X	X	X	X	X	7
Community Level	Social isolation												X	X	2
	Community stress									X		X		X	3
	Social capital			X				X					X	X	4
	Crowding				T			X		X			X	X	5
	Neighborhood disadvantage			X	X							X	X	X	5
	Outdoor air pollution	X	X	X		X			X	X				X	7
	Inadequate housing		X					X	X	X		X	X	X	7
	Violence/crime				X			X	X	X	X	X	X	X	8

Framework Lead Author (Year)

Ecol-social Level / Socio-cultural Level / Community Level

Level	Eco-Social System Determinants	Shanawani (2006)	Krieger (2008)	Clark (2009)	Mitchell (2005)	Burkhart (2005)	NAEPP (2007)	Federico (2003)	Gupta (2009)	Morello-Frosch (2002, 2006)	Strunk (2002)	Canino (2009)	Bryant-Stevens	Wright/Gold/Williams (2006,)	Total
Eco-social Level	Health financing		X				X			X				X	4
Healthcare Level	Provider bias	X					X		X				X	X	5
	Cultural competence		X				X		X		X	X			5
	Provider to patient communication		X						X			X	X	X	5
	Process of care barriers	X	X							X		X	X	X	6
	Healthcare access		X	X	X	X			X	X	X	X	X	X	10
	Quality of care		X	X	X	X	X	X	X		X	X	X	X	11
Individual/family Level	Obesity										X			X	2
	Social Support								X	X			X		3
	Illness/respiratory infections							X	X					X	3
	Genetic polymorphisms						X		X		X				3
	Self-management skills			X	X			X			X			X	5
	Caregiver/individual depression					X			X	X	X	X			5
	Adherence	X					X	X				X	X		5
	Family dysfunction/adverse events						X	X	X			X	X	X	6
	Health literacy	X				X	X	X				X	X	X	7
	Beliefs/culture	X		X		X	X	X			X	X	X	X	9
	Stress			X	X	X		X	X	X	X	X	X	X	10
	Indoor air quality (tobacco, irritant, allergens)	X	X	X			X	X	X	X	X	X	X	X	11
	Model described/depicted?			Yes	Yes			Yes		Yes		Yes		Yes	
	Total	9	9	9	10	11	12	12	16	17	17	19	20	30	

Simultaneous effects of multiple eco-social levels

Researchers described a total of thirty-four determinants, ranging from nine to thirty determinants per author (Table 1.). Three research teams described the lowest number of determinants (n=9) (Clark, et al., 2009; J. Krieger, 2008; Shanawani, 2006); One team described the highest number of determinants (n=30) of AMD (Gold & Wright, 2005; Williams, et al., 2009; R. J. Wright & Subramanian, 2007).

Ecosocial levels had varying numbers of determinants. The individual/family-level contained the most determinants (n=12), the sociocultural-level and the community-level had equal amounts (n=8), and the healthcare-level had the least (n=7) determinants. Each level can be described by the determinants organized within it (Table 1.).

Determinants affecting AMD at the sociocultural-level are: (1) employment/unemployment; (2) segregation [a process of forces that differentially allot individuals into residential environments and economic opportunities on the basis of race (Kramer & Hogue, 2009)]; (3) discrimination [the process by which members of a socially defined group are treated differently (N. Krieger, 2001a)]; (4) differential density of polluting facilities (i.e., hazardous waste, freeways) in neighborhoods; (5) socioeconomic status and class (including resource-based measures such as wealth and education, and prestige-based measures such as rank or status); (6) race [a descriptive term for people sharing a certain biological characteristics and a culturally determined hierarchical human ranking style embodied in a western world view (Smedley, et al., 2003)]; (7) and poverty [impoverishment in multiple dimensions (N. Krieger, 2001a).

Determinants affecting AMD at the community-level are: (1) social isolation [including geographic isolation]; (2) community stress [evidenced by poverty, unemployment, depression, and violence (Burkart, 2005)]; (3) social capital [evidenced by social networks, social cohesion, and a community's ability to mobilize (Rachel Morello-Frosch & Lopez, 2006)]; (4) crowding (in housing and neighborhoods); (5) neighborhood disadvantage [including a number of community stressors, substandard housing, and crime (Rosalind J. Wright, 2006)]; (6) outdoor air pollution [in the form of ozone, diesel, particulate matter and nitrous oxides (J. Krieger, 2008; McConnell et al., 2002)]; (7) inadequate housing [dilapidated buildings with water damage, poor ventilation, and rodents (Bryant-Stephens, 2009)]; and (8) violence/crime [including exposure to violence, domestic violence, death of a peer, and hearing gunshots (Burkart, 2005)].

Determinants affecting AMD at the healthcare-level are: (1) healthcare financing (including the provision of resources, equipment, staffing, facilities, and reimbursement for self-management support/care coordination/home environmental controls like dust-mite impermeable bedding); (2) provider bias [a preference or an inclination, especially one that inhibits impartial judgment]; (3) cultural competence [professional attitudes, system understanding, and practice skills for cross-cultural situations]; (4) provider to patient communication; (5) process of care barriers [including wait times, insurance reimbursement, support staff, and coordination between primary and specialty care (J. Krieger, 2008)]; (5) healthcare access; and (6) quality of care [the degree to which health services for populations increase the likelihood of desired outcomes given the current state of knowledge (Strunk, et al., 2002)].

Determinants affecting AMD at the individual/community-level are: (1) obesity; (2) social support; (3) illness/respiratory infections; (4) genetic polymorphisms; (5) self-management skills [such as literacy, self-efficacy, education, symptom recognition, environmental modification, health seeking behavior, and medication use]; (6) caregiver/individual depression; (7) adherence [to preventative therapy]; (8) family dysfunction/adverse events [such as illness or economic hardships]; (9) health literacy [relating to illiteracy, education, and understanding health information]; (10) beliefs/culture [rituals and norms for interpreting causality, symptomatology, physiological responses, disease

history, and personal preferences and opinions(Gupta, Springston, et al., 2009)]; (11) stress; and (12) indoor air quality [including tobacco smoke exposure, allergens such as mold, cockroach, rodent and dust mite-endotoxin, and irritants such as nitrous oxides and particulate matter from wood stoves] (J. Krieger, 2008).

Researchers did not necessarily include all four ecosocial levels in their frameworks. Six out of the thirteen research frameworks described determinants across all four levels. The healthcare-level was the only ecosocial level to be included in all thirteen frameworks. Four frameworks used one or fewer sociocultural level determinants (Clark, et al., 2009; Federico & Liu, 2003; Gupta, Springston, et al., 2009; J. Krieger, 2008), three utilized one or fewer community-level determinants (Burkart, 2005; NAEPP, 2007b; Shanawani, 2006), one framework used only one determinant from the healthcare-level (Federico & Liu, 2003) , and another framework used only one determinant from the individual/family-level (J. Krieger, 2008).

Six research teams described or depicted models of the interactions between determinants and levels. Canino, McQuaid, & Rand's (2009) "Framework for Asthma Disparities" model depicted the simultaneous effects of all four levels. Clark's (2009) "Circles of Influence for Disease Control" model, and Federico and Liu's (2003) "Pathway to Asthma Severity" model, described the simultaneous effects of the community-level, healthcare-level, and individual/family-level. Morello-Frosch, Pastor, Porras, and Sadd (2002) depicted the simultaneous effects between the sociopolitical-level, community-level, and individual/family-level in their "Political Economy of Environmental Inequality" model. Wright and Subramian's (2007) "Multilevel Framework" model, and Mitchell and Murdoch's (2005) "Context Health Development" model, depicted the simultaneous effects of the community-level and individual/family level.

Pathways of interaction between determinants

Of the thirteen frameworks examined, the ten most-frequently discussed determinants across all ecosocial levels were: (1) indoor air quality (n=11); (2) stress (n=10); (3) quality of care (n=11); (4) access to healthcare (n=10); (5) beliefs/culture (n=9); (6) violence/crime (n=8); and (7) race, poverty, outdoor air pollution, and health literacy (all at n=7) . The eight least-frequently discussed determinants were: (1) obesity (n=2); (2) social isolation (n=2); (3) employment (n=2); and (4) segregation, community stress, social support, illness/respiratory infections, and genetic polymorphisms (all at n=3). The ecosocial levels with the highest frequency of determinants were the individual/family-level and healthcare level (Table 1.).

Examination of the texts describing the frameworks revealed a complex map of proposed pathways between determinants [Table 2.]. One hundred and one two-way pathways of interaction between were mapped using the determinants suggested by the research frameworks. The two determinants with the greatest number of pathway interactions were poverty (n=13) and stress (n=11). For poverty the pathway interactions were: race, social status, segregation, community stress, outdoor air pollution, violence/crime, healthcare access, quality of care, social support, caregiver/individual depression, family dysfunction/adverse events, stress, and indoor air quality (Bryant-Stephens, 2009; Canino, et al., 2009; R. Morello-Frosch, et al., 2002; Strunk, et al., 2002; Williams, et al., 2009). For stress these pathway interactions were: employment, discrimination, poverty, neighborhood disadvantage, violence/crime, social support, illness/respiratory infections, self-management skills, caregiver/individual depression, adherence, and family dysfunction/adverse events (Bryant-Stephens, 2009; Burkart, 2005; Canino, et al., 2009; Federico & Liu, 2003; Gold & Wright, 2005; Strunk, et al., 2002; Williams, et al., 2009; R. J. Wright & Subramanian, 2007).

Table 2. Asthma Management Disparity Determinants: Interactive Pathways

Eco-Social Levels	Eco-social System Determinants	Interactive Pathways	Pathways of interaction within (X/X) or between (X/Y) Eco-social Levels
Socio-cultural (SC) Level	Employment		
	Segregation		Total SC/SC 5
	Discrimination		
	Density of polluting facilities		SC/C 14
	Socioeconomic status		SC/HC 6
	Race	x x	SC/IF 14
	Poverty	x x x	Total SC/Y 34

Eco-Social Levels	Eco-social System Determinants	Interactive Pathways	Pathways of interaction within (X/X) or between (X/Y) Eco-social Levels
Community Level	Social isolation	x	
	Community stress	x x x	
	Social capital	x x x	Total C/C — 6
	Crowding		
	Neighborhood disadvantage	x x x x	C/SC — 14
	Outdoor air pollution	x x x	C/HC — 2
	Inadequate housing	x x x	C/IF — 13
	Violence/crime	x x x x	Total C/Y — 29

Eco-Social Levels	Eco-social System Determinants	Interactive Pathways	Pathways of interaction within (X/X) or between (X/Y) Eco-social Levels
Healthcare Level	Health financing		
	Provider bias	x	Total HC/HC 11
	Cultural competence	x	
	Provider to patient communication	x x	HC/SC 6
	Process of care barriers	x x x x x	HC/C 2
	Healthcare access	x x x x	HC/IF 12
	Quality of care	x x x x x	Total HC/Y 20

Eco-Social Levels	Eco-social System Determinants	Interactive Pathways	Pathways of interaction within (X/X) or between (X/Y) Eco-social Levels
Individual/family Level	Obesity	x x x x	
	Social Support	x x x x x	
	Illness/respiratory infections	x x	
	Genetic polymorphisms	x x	
	Self-management skills	x x x	
	Caregiver/individual depression	x x x x x	
	Adherence	x x x x x	
			Total IF/IF 18

Eco-social System	Interactive Pathways																														Pathways of interaction within (X/X) or between (X/Y) Eco-social Levels	
Cont. Individual/family Level																																
Family dysfunction/ adverse events	X			X					X												X				X							
Health literacy			X											X		X							X								IF/SC	14
Beliefs/ culture								X	X	X										X				X							IF/C	13
Stress	X	X		X		X		X	X								X	X	X	X	X		X		X						IF/HC	12
Indoor air quality (tobacco, irritant, allergens)				X		X	X			X		X		X							X	X									Total IF/Y	39
Pathways per determinant (both axes)	5	6	1	9	13	4	6	3	9	4	4	8	4	6	4	7	7	7	3	4	4	2	8	9	9	5	6	6	11	8	Path ways	101

The number of described pathway interactions varies between and within ecosocial levels. The greatest number of pathway interactions between levels (suggesting a greater knowledge of the simultaneous effects of these levels on AMD) were described between the sociocultural-level and community-level (n=14), and the sociocultural-level and individual/family-level (n=14) [Table 2.]. The least number of described pathway interactions between levels were described between the community-level and healthcare-level (n=2), and the sociocultural-level and healthcare-level (n=6). The greatest number of pathway interactions described within an ecosocial-level were in the individual/family-level (n=55). The least number of pathway interactions described within a level were within both the sociocultural-level (n=6) and the community-level (n=6).

DISCUSSION

This review is intended to be a comprehensive and practical summary of the known determinants of AMD for African Americans in existing peer-reviewed research frameworks that were published between 1998 and 2009. The description of these determinants within an ecosocial model provides opportunities for health promotion programming, and research for the elimination of AMD. The ecosocial model developed in this study provides a roadmap for identifying known simultaneous effects of determinants, and for appraising known pathways of interaction between determinants.

Compared to other levels, the least number of simultaneous effects were reported between the healthcare and community levels [Table 2.]. This may suggest that clinicians (who were the majority of the researchers developing the frameworks) have few ideas of how healthcare determinants work simultaneously with other ecosocial level determinants in relation to AMD. This is surprising given the extensive discussions on this topic for health disparities in general (Smedley, et al., 2003). A recent publication of the National Asthma Education and Prevention Program also addresses this issue in some detail, and was used as a framework in this analysis (J. Krieger, 2008).

The greatest numbers of pathways of interaction for determinants are within the individual/family level. The appraisal of pathways for individual/family-level determinants, and the application of educational interventions targeted at indoor air quality, stress, beliefs, adherence, and self-management skills, have been shown to be critically effective in improving individual asthma management; however, few educational interventions as yet have specifically focused on reducing differences in asthma management between African Americans and White Americans, and fewer than this number have used a matched comparison group made up of White Americans (Clark, et al., 2009; Coffman, Cabana, & Yelin, 2009).

Researchers considering multilevel interventions based on these determinants can use these results to refine knowledge on existing determinant effects, or explore less developed areas of knowledge such as for determinants in the sociocultural-level and community-level. These efforts should be cognizant that differences in scale (of prevalence, disadvantage, or impact) between determinants might make some areas of investigation more worthy than others, and that solutions addressing health policy should be broad in scope (Bell & Standish, 2005). For example, the scale and impact of indoor air quality for African Americans is high because of the large numbers living in inadequate housing, while the scale and impact of quality care may be less than expected. A three state survey that controlled for the quality of care did not see a decrease the disparity in hospitalizations between African American children and White American children (Lieu et al., 2002).

Limitations with this study include the subjective approach to allocating determinants into ecosocial levels, the identification of interactive pathways between determinants (by reading the

texts), and having a single author analyze this data. A further limitation is that because the intended audiences for the research frameworks differed from clinical to environmental audiences, emphasis on particular ecosocial levels could have reflected this influence. This paper specifically focused on AMD in African American populations and as such should not be generalized to other populations or individuals.

Multilevel interventions as yet are limited in scale and comprise a fraction of investigations on asthma, yet their potential for unraveling the complexities of eliminating population-based disparities in asthma management are compelling. A multilevel study of AMD is a complex undertaking, but should not be thought of as impossible. This study has summarized the extent of knowledge for researchers and clinicians considering such research. Some determinants and their pathways have been well described: stress, poverty, violence/crime, quality of care, healthcare access, and indoor air quality could provide expediency in designing multilevel approaches (J. Krieger, 2009). Investigations into areas of lesser focus such as the simultaneous effects on AMD in the healthcare and community levels, and into the exploration of pathways of interaction between determinants in these levels are beginning and need to be continued (Bell & Standish, 2005; Gupta, Zhang, Sharp, Shannon, & Weiss, 2009). This summary of the frameworks has made clear that the effort of many over the previous decade to explain AMD has succeeded in developing a roadmap for research in the next decade. For this next decade, the measure of how soon we reach the goal of ending disparities will depend on how well we are reading this map.

ACKNOWLEDGMENTS

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