

# WORLD HEALTH & POPULATION

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Editorial - A Missing Link: The Influence of Societal Beliefs on  
Integration among the World's Emerging Population of Persons with  
Disabilities (PWDs)

Disability: A View from Selected Cultural Perspectives

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Re-positioning the Role of Traditional, Complementary and Alternative Medicine as  
Essential Health Knowledge in Global Health: Do They Still Have a Role to Play?







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## From the Editor-in-Chief

**T**his volume of *World Health & Population* presents papers that have been published online by *WHP* and are selected here as representative of outstanding recent contributions to the journal. The papers in this issue include (1) an editorial and a lead article describing the impact of cultural perspectives and societal beliefs on disability, (2) three papers on specific health issues (two contributed from African settings, and one from South Asia), and (3) a concluding essay on re-positioning the role of traditional, complementary and alternative medicine in global health.

It is well-documented that low income, resource-constrained developing countries bear a disproportionate amount of the world's poverty, disease, and pollution (WHO 2009). In his editorial on the lead article in this issue, Michel Landry also points out that this extends to the level of disabilities, with about 80% of the world's 600 million disabled people living in these regions. Once again it is those who can afford it the least being affected the most. The impact of disability, although not included directly or indirectly in any of the Millennium Development Goals, can act, however, to make the achievement of the MDGs more difficult. Landry concludes his editorial with an anecdote that effectively illustrates the situational/contextual nature of definitions of "disability," which can help keep our preconceptions (and prejudices) under control.

In the lead article, Michael Eskay of the University of the Cumberlands in Kentucky gives a very comprehensive and informative overview of cultural issues and societal beliefs that define attitudes and services for persons with disabilities. First, a culture's belief regarding the role and function of the body is critical in understanding the culture's view of a disability. When the body is seen primarily as a vessel for the soul, as in some societies, outward imperfections/disabilities do not take on the same significance as they do when the body is seen as an expression of physical beauty (which is also highly culturally-based). Second, stigma is defined by the apparently "able-bodied," and there appears to be no middle ground: either disabled people are stigmatized or they are fully accepted into the daily activities of society. Eskay additionally cites a study that found when people are stigmatized their disability becomes their primary identity and constrains their potential in society. It is equally important to realize, however, that disabled people are as diverse as the rest of the population, and that grouping them under the label "disabled" implies a false homogeneity. Eskay goes on to describe the differences between conceptualizations of disability and available services in "small-scale" and "large-scale" societies. In summary, Eskay's study is based upon study and observations in a number of countries worldwide. It is a very interesting and valuable contribution to our broader understanding of disability in a global context.

Moving from the large conceptual framework of the Eskay article, the next three articles in this issue are more concerned with very practical public health issues. In the first of these articles, "Pregnancy Intention and Antenatal Care Use in Two Rural North Indian States" Lindsey Barrick and Michael Koenig from Johns Hopkins University report on a study of antenatal care (ANC) in northern India, and whether or not the pregnancy under study was sought by the mother. Using the National Family Health Survey-2 (NFHS-2) data, the researchers encouragingly found that overall utilization of ANC was generally not delayed in unwanted pregnancies. Certain subgroups of mothers, however, were identified as higher risk for delaying ANC care, and it is these groups that the researchers suggest should become the focus for ANC outreach efforts.

In "Individual- and Contextual-Level Determinants of Social Inequities in Under-Five Mortality in Nigeria: Differentials by Religious Affiliation of the Mother" Diddy and Justina Antai from the Karolinska Institute use data from the 2003 Nigerian Demographic and Health Survey (DHS) to examine the role of religion (versus religious belief or practice) as an additional demographic/social

factor to predict health outcomes. Both individual characteristics of the mother (religion, age, education, birth order and intervals, etc.) and descriptive community health characteristics (percent hospital deliveries, percent children immunized, etc.) were included in logistical regression models. Religion as a category remained a significant predictor of child mortality throughout all the models.

The fourth paper in this issue, “Bacteriological Assessment of Stethoscopes Used by Medical Students in Nigeria: Implications for Nosocomial Infection Control,” by Uneke and colleagues discusses prevention of nosocomial infection in medical school training in Nigeria. The fact that such simple preventive measures as hand washing and instrument cleaning are well-known issues of non-compliance even in the most sophisticated of settings make it even more critical for resource-constrained settings where simple, low-cost practices are absolutely necessary (Goldman 1992; Marinella, Pierson et al. 1997). The relevance and importance of safety and quality from a global perspective, moreover, is emphasized in an interesting address by Don Berwick, MD, President and CEO of the Institute for Healthcare Improvement (IHI), at the 2008 International Forum on Quality and Safety in Health Care. (See <http://www.axisto.com/webcasting/bmj/paris-2008/index.htm>.)

Finally, this issue includes a detailed discussion of the role of traditional, complementary and alternative medicine (TCAM) in global health. Daniel Hollenberg, David Zakus and colleagues provide an extremely informative overview and update on the issues of TCAM. The World Health Organization acknowledged the role and potential of TCAM more than 30 years ago; however, TCAM approaches still languish in most global health programs. Beyond the established efficacy of many of these approaches, their general cost-effectiveness and cultural appropriateness (leading to better chances for compliance) is also noteworthy. Hollenberg et al. provide examples of the application of TCAM for very different, but critically important areas: HIV/AIDS, malaria, and disease prevention/health promotion through home herbal gardens. The article concludes with policy recommendations regarding TCAM and global health.

In summary, we hope that you find the articles in this issue of interest and value, and that you will additionally consult other papers recently released online at [www.worldhealthandpopulation.com](http://www.worldhealthandpopulation.com). *WHP* remains committed to its mission to provide a forum for researchers and policy makers worldwide to publish and disseminate health- and population-related research, and to encourage applied research and policy analysis from diverse global settings. Note also that *WHP* is indexed on MEDLINE and accessible through PubMed. We look forward to continued enthusiastic submission of manuscripts for consideration, peer-review, and publishing. The editors and publishers of *WHP* are always interested in any comments or suggestions you might have on the articles or journal. Please feel free to write or e-mail us.

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Editorial

## A Missing Link: The Influence of Societal Beliefs on Integration among the World's Emerging Population of Persons with Disabilities (PWDs)

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**M**ore than 30 years ago, the *Declaration of Alma-Ata* reported that “an acceptable level of health for all the people of the world by the year 2000” was possible, and urgently expressed the need for collective action to protect and promote health worldwide. At the time, the United Nations boldly challenged the global community to eliminate the inequality in the health status of people across developed and developing nations (WHO and UNICEF 1978). In the decades that have passed since Alma-Ata, the goal of health as a basic human right to which all individuals are entitled has remained largely unfulfilled.

In recognition of a widening gap in health disparities between so-called developed and developing nations, the United Nations Development Program (UNDP) led a global initiative known as the Millennium Development Goals (MDGs) project. MDGs were adopted in 2000 as a strategy aimed at reducing disparities in human development within the international community by the year 2015. There are eight MDGs and a series of 180 related indicators, all geared at reducing health, social and economic disparities in a “timely” fashion. Although some countries have made advances, the odds are rather poor that the MDGs will be reached within the next 6 years (Koblinsky et al. 2008; Molyneux 2008).

In his article, Dr. Eskay weighs in on this debate regarding human development and argues that persons living with a disability are often marginalized and stigmatized by the attitudes, beliefs and behaviours that collectively form the cultural context in which they live. It is staggering to consider the estimation that over 600 million people worldwide live with a disability, and about 80% of persons with disabilities (PWDs) live in developing nations where standards of living are poor and access to healthcare is scarce (WHO 2001; Allapat et al. 2007). It may also be worthy to note that while disability is inherently linked to a nation's prospect for human development, it was not included (directly or indirectly) as an MDG (Landry et al. 2007). The direct and indirect loss of human potential due to disability is an expense that all countries will continue to struggle with in this new century. This may be particularly true as, due to medical advances, illnesses and conditions previously linked to high mortality such as cardiovascular disease and HIV/AIDS have emerged as chronic disabling conditions.

Dr. Eskay provides impressive insight into the cultural lens through which societies, whether small-scale or large-scale, view disability and PWDs. Moreover, the scientifically interesting (but at times morally reprehensible) rationale that forms the basis of rather pessimistic and paternalistic perspectives provides an understanding of the barriers that face PWDs on a daily basis. The link created between the culturally interpretive context of disability and access to health and social services for PWDs is a powerful social policy message. Overall, Dr. Eskay interprets the outcomes of poor access and low provision of services as a function of negative socio-cultural perceptions, and he argues reasonably well that community–culture context drives the way PWDs are perceived. In a sense, Dr. Eskay is suggesting that the cultural perception of disability and subsequent policy within a community is a strong predictor of the degree to which health and social services will be offered to PWDs in that same community. In other words, cultural perception in a community drives policy formulation, which in turn frames service delivery. This logic has also been reported among mothers of children with disabilities; if the mother has a positive attitude toward the disability and the future, she is more likely to seek services than her counterparts with poor or negative perceptions (Danesco 1997; Diken 2006).

I was recently reminded of this precarious missing link regarding cultural perspectives on disability and inclusion. We were implementing a development project aimed at scaling up education and capacity in the area of disability management among health and social sector workers in a low-income South Asian country. We invited a panel of PWDs to speak directly with the cohort of approximately 25 able-bodied persons (or as some might say, persons who are “not yet disabled”). The panel consisted of a person who had deafness, a person who had blindness, a person who used a wheelchair due to paraplegia and a person who used prosthetic limbs due to double amputations following a landmine blast. All panellists had planned to arrive early and were prepared to begin the session well ahead of time. On the other hand, all the participants in the session were, for one reason or another, delayed, and the panel discussion began hours later than scheduled. Notwithstanding the conceptualization of time in countries other than my own, persons who can't talk, can't see or can't walk were able to manage the chaotic morning traffic and architectural barriers of a capital city in a South Asian country and beat 25 so-called able-bodied persons to the education session. I wondered, who among us should be considered “disabled” and from which viewpoint? Based on this isolated event, it was surely not the panellists whom I would have considered disabled on that day. Dr. Eskay creates a framework through which to interpret the meaning of events such as the one describe here and reminds us that perception is indeed reality.

By all accounts, the global number of PWDs is growing, and the ramifications of disability will reach well beyond the health and social sector. Left unchecked they will undoubtedly affect economic and social infrastructure at the local, regional, national and international levels.

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# Disability: A View from Selected Cultural Perspectives

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## **Abstract**

The concept of disability has been examined from various cultural perspectives across the globe. The author explores how services and specific support networks have been provided to people with disabilities. Small-scale and large-scale societies have had to deal with unique challenges in monitoring services for the disabled, regardless of their geographical location; financial resources, accountability and adequate staffing are primary problems in delivery of services to the disabled. Prospects and challenges facing people with disabilities require policy reforms and advancements in special education in all countries.

## **Introduction**

In every culture, disability is perceived differently, and such perceptions shape the kind of services the disabled receive. Services in large-scale societies may, for example, include delivery of educational, counselling, health coverage and many other related services, while in small-scale societies, services may not be available. These smaller societies may partially or totally “excommunicate,” or exclude, those with disabilities. One reason for the lack of services and excommunication is that these societies perceive people with disabilities negatively. For example, people with varying levels of disability are assumed cursed, or their forefathers must have committed unforgivable sins against the gods who guard society (Obiakor 2004).

Because of the way they are perceived, people with disabilities are denied education, counselling, health coverage and many other services. Even money from the United Nations Educational and Cultural Organization (UNESCO 2004) earmarked for helping these people is not used for that purpose in these small-scale societies.

This article is organized into three major components: characteristics of culture and disability, concepts across cultures and services available. The first section examines the concept of disability and culture. The second discusses the common concepts found across multiple cultures and the third discusses services available to the disabled.

### Characteristics of Culture and Disability

Characteristics of disability, and interpretation of those characteristics, are dramatically influenced by the culture in which the disabled person resides; government bureaus responsible for overseeing programs for the disabled are affected by both the culture and the handicapping condition. Labelling people with disabilities imposes severe limits on them from a cultural, social and economic perspective; this limitation isolates them from the culture and the workplace.

### Culture

Culture can be seen as “tradition;” a written or oral method of passing cultural heritage from one generation to another. The development of genetic theory viewed culture in a traditional sense as a “kind of gene pool” existing at the level of social symbolism and meaning rather than biology, and with ideation rather than material existence (Kroeber cited in Banks and Banks 2001).

Prior to the twentieth century, the term *culture* was used by elite and powerful groups to reinforce perceived limitations of others and their related cultures to maintain a status quo. People who were knowledgeable in history, literature and fine arts were said to possess culture (Gollnick and Chinn 1998); those who did not possess this knowledge were viewed as lacking in culture.

Early in the 1900s, this view of culture was seen as narrow, biased and highly suspect. At this time, culture was defined and viewed differently from previous perspectives. According to Erickson (in Banks and Banks 2001), culture can be seen as “cultivation.” This implies a distinction between culture and nature. For example, cultivating the soil leads to having fewer weeds than leaving the soil in its natural state; one needs to know that the distinction between what is considered a weed and what is considered a plant is cultural.

Bourdieu (1977) and Barth (1989) saw culture as a “social process”; their works emphasized the diversity emanating from the richness of individual cultural knowledge. Culture, as a social process from the perspective of Bourdieu and Barth, emphasized three points: (1) there is a systematic process in the allocation of power; (2) a social conflict uses both tradition and conflict to systematically generate a new order of behaviour within and outside that culture; and (3) human interactions, agreement and conflict are cultural tools a culture may use to realize a new order or restructure an older one.

Culture can be seen as a construction. Culture constructs us, and we in turn construct it. Cultural construction implies that all thoughts, feelings and human activity are not natural, but the result of historical experiences that become an integral part of culture. Comparing small-scale (agrarian) with large-scale (industrialized) societies, culture is seen to be different across the globe. These differences emphasize the way and manner people with disabilities are, and have been, perceived and treated.

Blue jeans, popular music, cowboy boots and popular clothing are regarded as diverse examples of artifacts of a large-scale culture. These examples could be valued positively in the large-scale society; however, a small-scale one, those same examples would be regarded as without value.

The concept of culture has many connotations in contemporary use. If used metaphorically, culture may mean an attitude, a fashion, a behaviour or a way of doing things. It is common for a new design of clothing to be marketed in a way that allows the wearer to dress in a trendy style and to express cultural pride (Fashion Trends 2007). In South Africa in 1994, the government viewed popular trends as counter to their interpretation of pride; they attempted to ban Zulus from carrying spears, shields and machetes in political rallies (Yanis 1994). The Zulus responded that they should be allowed to carry the items because they were “cultural” tools. The Biafran Igbos use war dance as an important function of their culture; this exhibition of Igbos cultural heritage was seen negatively and interpreted to mean the Igbos were waging wars against neighbouring countries. It was not until the Igbos’ cultural pride and exhibitions had been explained that an understanding between their culture and the government was reached.

Today, the academic world and the mass media are full of stories with reference to “youth culture,” “political culture” and “organizational culture.” The term culture has become so trendy that it is used as a substitute for more specific words. Most cultural anthropologists would define

culture as a total way of life for a society, its traditions, habits or beliefs (LaGuardia and Guth 2003). Specifically, Goodenough (1987: 21) sees culture as “a way of perceiving, believing, evaluating, and behaving.” His views of culture provide a blueprint for examining how individuals may think, feel and behave within a society. LeVine (1984:9-10) sees culture as “...a shared organization of ideas that includes the intellectual, moral and aesthetic standards prevalent in a community and meanings of community actions.”

Culture denotes an identifiable pattern of behaviour that people exhibit in response to diverse phenomena in their environment, where a specific meaning is often attached to individual and group encounters. People create meaning from their interactions with their environment; these meanings and interpretations about man, nature and life give rise to a philosophy about that society. It is from this philosophy that individuals establish a reference point from which to judge the actions, or non-actions, of a society. A culture is learned and can vary over time. Language is a key feature differentiating it from other cultures and it, too, varies over time.

### Disability

There are difficulties in determining a definition of *disability* applicable to all cultures. As a culture varies over time, the definition of disability that culture uses changes over time as well.

The World Health Organization (1990: 96) defines disability as

an impairment or abnormality of psychological, physiological or anatomical structure or function; a disability is any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being; a handicap is a disadvantage for a given individual, resulting from an impairment or a disability, that prevents the fulfillment of a role that is considered normal (depending on age, sex and social and cultural factors) for that individual.

This definition draws attention to three terms: impairment, disability and handicap; the terms are often used interchangeably, resulting in confusion between – *disability* and *impairment* and between *disability* and *handicap*

During the 1970s, organizations representing people with disabilities and professionals in the field of disability reacted strongly against the terminology of the time (Smith 2007). The terms *disability* and *handicap* were often used in an unclear and confusing way, giving poor guidance for policy making and those providing service. The terminology reflected a medical and diagnostic approach that ignored the imperfections and deficiencies of the wider society.

In 1990 and then in 2000, The World Health Organization (WHO) adopted an international classification of impairments, disabilities and handicaps; this classification system suggested a more precise approach to defining disabilities from an international perspective. The International Classification of Impairments, Disabilities, and Handicaps (Bickenbach et al. 1999) differentiated between the three conditions. The system has been used in areas such as rehabilitation, education, statistics, policy, legislation, demography, sociology, economics and anthropology.

### A Collective View of Disability and Culture

Disability and culture are central to determining the position or status the individual is given in a specific society. Someone whose disability conforms to social expectations is frequently rewarded for that behaviour; the culture tends to accept those who are willing to conform to given values, standards of behaviour and ethical concerns. Cultural understanding is also shaped by the meanings attached to various behaviours; through social and economic organization of a given society, or other internal and external cultural dynamics, a culture imposes standards upon all citizens. Murphy (1990) indicated that disability has been defined by society and is given meaning by a culture; therefore, there are various cultural perspectives of what disability is and how disability in people is perceived and treated.

From the cultural viewpoint, large- and small-scale societies perceive disability differently. In small-scale societies, close interactions between individual members are the norm; each individual may have extended and multi-stranded relationships with other members of that society (Scheer and Groce 1988). Individuals may interact in the course of economic production, during leisure time, or while participating in the arts or ceremonies. The social identity in these small-scale societies is based on family clan and other characteristics and not on the individual's physical characteristics.

Eskay (2002: 69) maintained, "The cultural perceptions of special education administrators in developed and non developed countries," which supported the work of Scheer and Groce. Similar research was conducted by Obiakor (2004) regarding the present perception of people with disabilities in Africa. Obiakor agreed with the findings presented by Scheer and Groce (1988) and Eskay (2002) concerning the cultural perceptions and treatment of people with disabilities in small-scale societies. In his research on the reasons for negative perceptions on people with disabilities in Nigeria, Obiakor (2004: 59) found that people with disabilities did not meet certain societal objectives. These objectives were important reasons for such negative perceptions in most small-scale societies, such as Nigeria. The objectives discovered are: (a) to develop the latent physical skills; (b) to inculcate respect for elders and those in a position of authority; (c) to develop intellectual skills; (d) to develop character; (e) to acquire specific vocational training and develop a healthy attitude towards honest labour; and (f) to understand, appreciate and promote cultural heritage of the community at large.

### **Conceptual Concepts across Cultures**

As we grow in our knowledge of the dynamics surrounding the concepts of culture and disability, we begin to realize that individual perceptions and language play a vital role in our understanding of who we are as a people and as a culture. According to Beatrice Wright (1960: 346), "language is not merely an instrument for voicing ideas but...it also plays a role in shaping ideas by guiding the experience of those who use it." Scheer and Groce (1988) point out that when different cultures use positive language to describe individuals with disabilities, these individuals end up integrating well into the society.

### **Body**

Across cultures, the human body was universally recognized as having a purpose, a function and a value that aided in the survival and advancement of a given society. The purpose and the value placed upon the body were derived through a number of factors (i.e., industrialization, social status or gender). Although the body was capable of having multiple purposes and varying degrees of value, it was perceived as functioning as a complete whole, a oneness within itself. The whole body was perceived as being incomplete if one aspect of it was amiss. The concept of "spreading" was applicable to various levels of disability and in various contexts (physical, social or events) across different cultures. For example, if a woman was incapable of walking, she was also perceived as being incapable of having children. If a blind person could not see, it was sometimes assumed that he could not hear, though there was no connection. The ethnographic essays in Whyte and Ingstad (1998) provide three different functional concepts of the body: a symbol of physical beauty, a storehouse for the soul and a medium for action.

When cultures used the body as an instrument or outward sign of physical beauty, individuals within that society were seen as focusing their time, energy and efforts to conform to that standard. They were categorized as conforming or not conforming to that image. Therefore, it would be expected that individuals in key positions representing a particular culture would be considered beautiful and able-bodied. For instance, politicians, entertainers and athletes in the United States are generally considered beautiful and able-bodied. Understandably then, individuals who did not conform, either intentionally or unintentionally, to this physical image of beauty were shunned and/or rejected by the larger society. The disabled, individually and as a group, contravened all the values of youth, virility, physicality and physical beauty that most Americans cherished. The disabled

were seen as subverters of the American ideal (Murphy 1990).

In the Punan Bah culture of Central Borneo, the body played a different role from that of physical beauty exemplified in American society. For the Punan Bah, the body was a storehouse for the soul. Punan Bah society emphasized and valued the soul(s) of their people, as opposed to the body, which stored the soul. Thus when the body was not normal, due to physical impairments such as blindness, deafness, or motor disability (e.g., limping), the individual was still considered human and not held responsible for the condition. Unlike American cultures, where the disabled tend to be shunned, in Punan Bah culture the impaired were embedded in society. They were expected to partake in all social activities, daily household chores and work activities, to the extent of their ability. For the Punan Bah, the issue was not with the physical but the spirit, which had taken hold of the body (Nicolaisen 1995).

For individuals not born with a disability, the process of coming to terms with its impact on the body involved a huge psychological and physical re-adjustment. Conceived as a medium for action, when the body was no longer able to perform the functions or the roles it had in the past, life ceased to exist as the person knew it. What once was a form of self-identity (roles and responsibilities conducted by the body) now became subordinate to the disability. Research from Monks and Frankenberg (1995) in the United Kingdom recognized the body as functioning in three different and integrated modes: incarnate, corporeal and somatic. It was impossible to impact one mode of the body without intruding upon the ability or the function of the other two. The incarnate body encompassed a notion of a historical and actively experienced and experiencing body, in the phenomenological sense of being in the world. The corporeal (or, loosely, physical) body referred to a bounded biological entity, while the somatic body was one defined by medical technologies and was usually fragmented (Frankenberg 1990). According to Monks and Frankenberg's research on the three modes, the following describes what the most newly impaired individual was likely to experience:

The body – its corporeal or physical aspect – was no longer an efficient and reliable instrument. It seemed to set its own agenda and have its own requirements, which competed with and inconvenienced preferred activities. In that the physical body provided means through which the self, as incarnate body, performed its social roles, these too had to be re-negotiated. (Monks and Frankenberg 1995: 111)

### **Identity (Stigma)**

Identities and stigmas across different cultures were universally imposed upon the disabled by able-bodied individuals. It appears, based on the research conducted by Whyte and Ingstad (1998) that the values held by society would ultimately determine how disabled people would feel about themselves and their disability. Unfortunately, there was no middle ground: either disabled people were stigmatized or they were fully accepted into the daily activities of the society.

According to Murphy (1995), in the United States, regardless of what physically challenged people may think of themselves, they are given a negative identity by society, and much of their social life is a struggle against this imposed image. Murphy found that if people were stigmatized, the disability was considered their primary identity, while previous jobs, roles or activities were perceived as secondary or of little importance by the able-bodied. Cultures that stigmatize individuals with disabilities create an environment that fosters a preoccupation with the disability. As a result of this stigmatization, individuals with disabilities are often cast into the same lot and social status as criminals and certain minority groups; all are seen as outsiders, deviants from social norms. One's identity as a disabled person becomes paramount in one's own mind, and the disability is traditionally seen by that society as a result of one's actions. Furthermore, other people's reactions to the handicapped person are overwhelmed by the flaw (Murphy 1995). Those reactions feed into the disabled person's insecurities, thus creating a cycle of insecurity, stigmatization and identity disassociation. In the United States, people who are physically challenged carry the stigma that bad

things happen only to bad people; physical challenges were looked upon as something that did not happen to respectable people.

The stigmatization of disabilities was also seen in the cultures of Japan and Uganda. In those countries, an aura of contamination was believed to surround the disabled person and become attached to other family members. In Uganda, this aura of contamination caused the disabled persons to become outsiders or outcasts, often having to fend for themselves for survival. The stigma was believed to linger even after death (Talle 1995).

Conversely, cultures that avoided stigmatizing the disabled perceived their abilities and roles differently. For example, the Maasai of Kenya did not stigmatize, regardless of the extent of the disability. According to research by Aud Talle (1995), physically challenged persons were expected and encouraged to marry, become parents and participate in all communal activities to the best of their abilities. For the Songye of Zaire, congenital deviations in the body could induce a higher, lower or undetermined status in comparison with able-bodied people. Therefore, not all deviation was stigmatized, and not all people with disabilities were marginalized because of their disability.

Research conducted by Frank Bruun (1995) on the disabled person in Nicaragua showed how disabled war veterans were given a positive identity for their heroic efforts in serving in their country. During the war, disabled individuals were regarded in a positive light and given preferential treatment compared with individuals who were disabled by other means (e.g., congenital or through farming accidents). Although many soldiers were unable to fulfill their former roles (through work or in social events), the identity the government conveyed on them often resulted in a new status that was higher than their previous one.

### Labelling

Disabled people are as diverse as the rest of the population, both in terms of personalities and impairments, and grouping them together under the label “disability” encouraged a false homogeneity in the way they were perceived (Lewis 1995). The process of labelling presupposed a certain familiarity with the contents under the label, and it provided a method for categorization.

Research conducted by Scheer and Groce (1988) found that the process of labelling was displayed more often in complex societies than in small-scale ones. In smaller societies, during the eighteenth and nineteenth centuries regular face-to-face contact between community members was the process for communicating and interacting. Individuals were related and connected to each other in diffuse social roles and contexts. In such situations, a single personal characteristic, such as a physical disability, was not generalized to define the person’s social identity. On the other hand, in complex societies, social relationships and contexts were more impersonal and task specific, and individuals were not related to each other in varied contexts. Accordingly, visible physical characteristics were commonly used to classify and represent the individual’s identity.

Whyte and Ingstad (1998) validated the research findings of Scheer and Groce and indicated that the label of “disability or handicap” was not a universal concept. A proportion of the developing cultures represented had no formal categorization or label of “disabled or impaired” for describing individuals with body parts that were not functioning to their fullest potential. More commonly, disabled people tended to be addressed and discussed in terms of the specific disability they suffered from. For example, a person missing an arm was often talked of and addressed as *gacanley* or *gacamey*, meaning “armless.”

### Liminality

Turner (1967) coined the term *liminality* to describe the process of changing status that an individual with a newly acquired disability would experience. However, the term was used across different cultures and with slightly different interpretations. It was interesting to note the difference in perception of the liminality phase between the able-bodied and the disabled. As liminal people, the disabled comforted each other as whole individuals, not separated by social distinctions, and often exhibited a level of comfort not displayed in relationships between the able-bodied. This lack of clarity on

identity and social roles often caused able-bodied individuals to resolve their indeterminacy by segregating or avoiding liminal people (Murphy 1995).

In an effort to understand disability as a social deviancy, Murphy et al. (1988) used the framework of the liminality concept. According to Murphy's research, the life histories of people with disabilities were seen as arrested and dramatized in a "rite of passage" frozen in its liminal stage. Liminality, a concept closely related to rites of passage, had three phases: isolation and instruction of the initiate, ritual emergence and reintegration into society in the new role. During the transitional phase from isolation to emergence, the person was said to be in a liminal state, literally, at the threshold – a kind of social limbo in which the impaired person was left standing outside the formal social system. Thus for a newly impaired individual, his or her state of being was clouded and indeterminate, falling ambiguously between sickness and wellness, living and death, participation and exclusion (Murphy 1995).

Monks and Frankenberg's usage in the United Kingdom, on the other hand, referred to liminal phases of an expressive quality within the course of disablement or chronic sickness. It provided a framework for comparison that highlighted the procedural nature of sickness and incorporated the personal endeavour as well as social constraint (Monks and Frankenberg 1995). In their research findings on multiple sclerosis (MS), they used "liminal" to describe a period of hospital admission or other seclusion from previous routines. This seclusion from life or the daily routine was often sparked by perceived changes in the physical body of a person with MS.

The concept of liminality varied even more when used in small-scale societies in comparison with complex societies. For disabled children in the Songye culture, their condition was considered liminal, not their personhood. For the Songye, the issue was not the visible disability, but a solution for the disability. Thus a person with a disability was seen not as abnormal, marginal or deviant, but as having potential and with a right to development (Devlieger 1995).

Liminality within the Punan Bah culture, similar to Songye, had nothing to do with disability, but rather with either kinship or personhood. Failure to marry or have children placed a person in a liminal state, where they were neither child nor fully adult, but an in-between person, a child-woman or child-man (Nicolaisen 1995).

### Personhood

The concept of personhood can be categorized into three different dimensions or into three different characteristics. Personhood, according to Whyte and Ingstad (1995) was characterized as something an individual could deny another person, similar to individuality, respect or livelihood. In other contexts, Gollnick and Chinn (1998) described personhood as having a cultural dimension that was seen as central to the cultural understanding of disability and was characterized as a phenomenon capable of being shaped.

As with previous concepts discussed in the context of multiple cultures, personhood also took on different connotations. It is important to note the fine distinction between the connotations of personhood in small-scale societies and large, complex ones. In small-scale societies an individual's personhood was directly connected to his or her social function, the individual ability to contribute to day-to-day activities in the society, whereas in complex societies, an individual's personhood was directly linked to the appearance of his or her physical body and social interactions.

In the Punan Bah culture, personhood was not determined by an individual's physical or mental conditions, and individuals were not denied personhood if they had physical or mental disabilities. However, a distinction was made between non-human and human individuals, and between non-persons and persons. At birth every individual was defined as non-human. Human status was given to individuals only after they reached the age of at least 6 months, when they were designated as a person or non-person. This designation was based on the legitimacy of their birth. According to Nicolaisen (1995), the concept of personhood was described as the fulfillment of a socially significant career, of which parenthood was the alpha and the omega, the beginning and the end. Individuals were denied full personhood if they failed to marry or produce offspring.

Similar to Punan Ban culture, the Hubeer and Somali did not define person or personhood by physical ability (Nicolaisen 1995). The concept of person was never a given, never completed, but rather represented by an array of continuously shifting influences that grew with the accumulation of experience and age. The Hubeers' notion of personhood appears to have had some very marked implications for their attitudes toward deviance in general and for some types of disabilities in particular. Although personal deviance was to some extent supported by the system rather than condemned by it, other forms of disability were not supported by the system, especially when such disability was assumed to be a society course.

In the United States and the United Kingdom, personhood was closely linked to the physical body. Therefore, the able-bodied denied personhood to individuals with physical disabilities. This denial took the forms of avoidance, attributing auras of contamination or devaluation. Disabled individuals, who internalized this denial of personhood, often participated in self-devaluation. In accordance with the ills of contamination, the disabled in America were seen to withdraw into themselves because of their own sense of loss and inadequacy, an impulse that conspired with their devaluation by society to push them further into isolation (Murphy 1995).

### **The Impact of Recognition on Disability**

The theme of recognition was identified in both small- and large-scale societies in social interactions between the non-disabled and the disabled. The importance of this theme lies in its identification and in understanding its potential impact, positively or negatively, on the disabled.

In the analysis of the recognition theme, Gutzman and Taylor's (1994), and Choi, Nisbett, and Norenzayan (1999) views on multiculturalism was applied. In their research on multiculturalism, they wrote that:

...our identity is partly shaped by recognition or its absence, often by the misrecognition of others, and so a person or group of people can suffer real damage, real distortion, if the people or society around them mirror back to them a confining or demeaning or contemptible picture of themselves (Taylor 1994: 25).

Taylor's work is significant in understanding the social interactions and relationships.

Although the concept of recognition existed across the different cultures, there was a distinction between large- and small-scale societies in their perception of the disabled. This distinction raises the question, "How is it that societies can recognize the same phenomenon but arrive at different conclusions about the phenomenon's value"? One could argue that the perceived value of a phenomenon, meaning its ability to aid the development of its society, will determine whether it is seen positively or negatively. Inherent in this claim is the argument that once a phenomenon changed its ability to aid society, its perceived value would also change. However, in looking at the plight of ex-convicts, minorities or the disabled, it becomes clear that there are other factors used in determining the value associated with a specific phenomenon. Despite their ability to add value or to further the development of their society, ex-convicts, minorities and the disabled in America are to a certain degree still perceived negatively.

One could also argue that the perceptions associated with a specific phenomenon are based on the beliefs, opinions and attitudes of the society. If this is a valid argument, the question then becomes, how are beliefs, opinions and attitudes created and changed? Are ingrained and societal attitudes, opinions and beliefs capable of being changed? How long would this change process take? In looking at the attempts of other groups (e.g., women and minorities) to change their identity and the recognition that they were receiving from the dominant society, it becomes a sobering reality that change may take longer than anticipated or desired.

Change in recognition was possible. Intimate interactions between the disabled and non-disabled individuals normally led to changes in the way that the latter perceived the former. Additional research indicated that close acquaintance can lead to judgment of the disabled person on the

basis of personality characteristics rather than on their disability (Sentumbwe 1995). According to Murphy (1995), the greatest impediment to a person taking full part in their society was not their physical flaws, but rather the myths, fears and misunderstandings that society attached to them. What made the disabled particularly threatening was the psychological mechanisms of projection and identification through which people imputed their feelings, plans and motives to others and, in turn, incorporated others' feelings as their own (Murphy 1995). Further, when the non-disabled individuals recognized the disabled individuals, there was either a positive recognition or a negative recognition. Conversely, when the non-disabled individuals recognized the disabled negatively, they had a tendency to either treat them like children or regard them with utter disgust, disdain or fear (Murphy 1988; Monks and Frankenberg 1995; Scheer and Groce 1988). When the non-disabled individuals recognized the disabled individuals in a positive light, the disabled were treated as an integral part of the culture and society. They were given jobs or important roles in social functions. Research also showed that employment was important for persons with disabilities. It could provide economic security and independence and give them value and status as individuals. It helped with integration and acceptance by non-disabled individuals and, most importantly, it gave life a purpose (Boylan 1991). Thus, as long as physical disability is linked with shame, inferiority, disdain or fear, realistic acceptance of one's position and one's self is precluded from the life of the disabled (Wright 1960).

### **Services Available**

Services for the disabled could be considered as simple as identifying assistance for transportation to and from a specific store, or as complex as obtaining funding for a community health project. Whether one is considering small-or large-scale societies, according to Jones & Reed (2006), Shukshin (2005), and Ferguson, Ferguson & Taylor (1992), there are many internal and external factors imposing barriers to adequate and appropriate services for the disabled.

### **Small-Scale Societies**

A key internal factor that militates against small-scale societies receiving adequate service is that of funding; this has been linked to social perceptions (Gross et al. 1999: 188).

The amount of...funding for research on a disease is associated with the burden of the disease; however, different measures of the burden of disease may yield different conclusions about the appropriateness of disease-specific funding levels.

Whyte and Ingstad (1998) indicated that small-scale societies have a tendency to include and expect the disabled individual to participate in the day-to-day activities of that particular culture. Accepting the disabled person as fully functional within the total social structure of the society is a key element of the small-scale society; far too frequently, disabled individuals have limited economic resources available to them compared to the non-disabled within the culture.

Since the Year of the Disabled (1981) and the Decade for Disabled Persons (1983–1992), many questions have arisen about how to understand and deal with disability in a multicultural world. To what extent can programs developed in one place be successfully implemented elsewhere? What kinds of cultural and social differences matter and how can they be taken into account (World Health Forum 1998)?

In some small scale societies, creation of service and rehabilitation centres has met with resistance from both the citizens and local governments. According to Roth (1983), this resistance has resulted in diverting aid intended for opening rehabilitation centres to other projects. Local governments have not viewed these centres with the same sense of urgency as the disabled. Without appropriate aid, the disabled will continue to receive inadequate rehabilitation, education and job training (2005). Roth suggests that more human resources (e.g., special education teachers, experts in rehabilitation programs) be included in attempts to develop rehabilitation centres or programs,

instead of providing financial resources (Roth 1983).

Policy makers in either small or large societies impact the daily lives of the disabled directly and indirectly (Roth 2005). Within small societies, the policy maker has greater interest in getting re-elected and providing service to more influential community leaders than in considering minority groups such as the disabled. As policy makers consider appropriation bills, budgets and funding within this small society, the disabled lack a powerful voice to express their position and needs. Being excluded from budgets and appropriations presents a never-ending cycle of neglect and a worsening of existing conditions. For the disabled, exclusion from appropriation bills will mean less educational resources and a decreased opportunity to be mainstreamed into the dominant society. Unfortunately, the few politicians who do understand the needs of the disabled carry very little political clout. After becoming frustrated, these individuals will often turn their attention to international sources for funding needed to erect rehabilitation centres.

### **Large-Scale Societies**

The disabled in large-scale societies, with the help of international organizations such as the WHO, International Labor Organization (ILO) and other political/social organizations, have been successful in using the political organizations to gain recognition and integration into mainstream society (Shukshin 2005). Many large-scale societies are noted for their rapid recognition and integration of various interest groups; examples would be the United States, England and Wales, New Zealand, Finland, Norway and Sweden (Mazurek and Winzer 1994). Within these countries, the disabled enjoy the same rights and privileges availed to their able-bodied counterparts (see generally Disability Rights 2007). As a result of their efforts, a number of public policies and laws have been passed protecting the interests and rights of the disabled on issues of education and discriminatory practices found in the public and private sector.

With common and shared ideology that all disabled individuals should be recognized as equal citizens, treated with respect and enjoy the rights and privileges of the able-bodied, large-scale societies have begun to spread a common message and have used various resources to strengthen that message – the disabled should be treated with equity. Yet many small-scale societies have been quite slow in responding to this flow of information. With support from international organizations such as the WHO and ILO, large-scale societies had begun to sponsor rehabilitation programs in small-scale ones through funding, research monies, human resources, ideological transfer, equipment and maintenance. Due to language, culture and ideology barriers, however, rehabilitation centres have been less successful in some small-scale societies than in their large-scale counterparts. Traditional barriers have imposed a long history of neglect for much of the disabled population. Few small-scale communities have been able to create, fund or maintain rehabilitation centres successfully over a long period of time.

The DAM (Disability Awareness Missions 1997) project, although waiting funding, is an example of a rehabilitation initiative sponsored by a large-scale society and being implemented in a small-scale society. DAM is sponsored by Global Alliance for Africa, a nongovernmental organization (NGO) that, like all NGOs, is a nonprofit, nonsectarian and nonpartisan organization registered by the NGO Coordination Bureau. The DAM project is being implemented in the semi-arid region of northwest Kenya. DAM's target areas of disabilities include hearing impairment; visual, mental and physical handicaps; and epilepsy. The goal of DAM is to improve community education, health standards, socio-economic levels and the moral conditions of the disabled and their community through the detection and prevention of mistreatment and development of a sustainable intervention. In addition to the need for funding, other strategies for ensuring that the program will not collapse after the large-scale representative leaves will need to be implemented (Roth 1983).

### **Services for the Disabled**

There are many gains to be had by implementing services in both large and small societies. From many different perspectives, the gains are seen in quality of life for the disabled; much of the research

has reflected benefits to the entire economy through an increased supply of human capital and an increase in productivity by disabled workers.

From various countries and many different governments, the disabled have been reported as generating a greater sense of belonging and an increased state of self-actualization when they were made to feel included in that society. Society is able to ensure this feeling of belonging by providing the appropriate resources (medical attention, employment opportunities, job training, education and adequate housing) to the disabled and their families (Batemann 1992). Appropriate job training and education for the disabled create a sense of financial freedom and independence; failure to provide the appropriate services could result in psychological complications or even death (Hardman and Wolf 1993). Additionally, the disabled and their families could be subjected to ignominy resulting in public embarrassment for both parties. A driving force for change within the educational services has been connected to federal, state and local government-enforced laws and policies.

Many political and social activists credit the US Civil Rights Movement (1955–1965) as a catalyst for a renewed interest in the rights of the disabled (Freedom House 2003). The issue at that time, which continued to 2007, was “whether any institution could provide a humane environment that allowed maximum personal freedom and self actualization for any individual” (Kaufman and Hallahan 1992). These social and political activists believed that people with disabilities should be treated as “equal citizens” (Whyte and Ingstad 1995). When the National Commission on Excellence in Education published *A Nation at Risk* (1983), this report paved the way for additional governmental intervention into the field of education, which also included the disabled and all of the associated rights and benefits. For example, *Public Law 94-142, part B of the Education of the Handicapped Act* (1975), states that all disabled children in the United States are entitled to a free and appropriate public education. Provisions were also made to include services around employment and medical services and to public and private accommodations (e.g., hotels, theatres, restaurants, grocery stores).

## Conclusion

In any dynamic society (large or small scale), all areas of human activity are undergoing tremendous changes. New ways of doing things and new problems emerge as old ones are resolved. Both large- and small-scale societies have made tremendous efforts to combat problems facing people with disabilities in their respective countries. Despite some of these efforts, small- scale societies compared with large- scale ones are in most cases still struggling to recognize and accept people with disabilities into the mainstream society. This is mostly due to the ingrained cultural beliefs of these people with disabilities.

Disability is defined, perceived and treated differently in every culture, and the definition, assignment of meanings and perception of disability account for the reason for legislation, legal mandates, service delivery and the kind of education given.

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# Pregnancy Intention and Antenatal Care Use in Two Rural North Indian States

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## Abstract

**Objectives:** Many studies have shown strong effects of pregnancy intention on antenatal care (ANC) behaviour in developed countries, but studies from developing settings have shown mixed results. Few investigators have utilized a prospective measure of pregnancy intention. This paper will analyze the association of pregnancy intention and the utilization of antenatal services in two states in northern India, using a prospective measure of whether a future pregnancy would be wanted or unwanted.

**Methods:** A prospective cohort study was conducted between 1998 and 2003 in Jharkhand and Bihar, India, of 2028 women with one or two pregnancies resulting in the live births of singleton infants during the study period.

**Results:** Antenatal care utilization was not found to be significantly associated with prospective pregnancy intention (OR=1.18 [95% CI 0.91, 1.52]). Among women who received ANC (N = 701), initiation of care was not delayed in unwanted pregnancies. Significant differences existed between the numbers of women who reported their pregnancy unwanted retrospectively compared with prospectively. These differences were not associated with the utilization of antenatal care services or timing of care initiation. The exception to these findings were women who consistently reported their pregnancies unwanted both before and after conception, who were twice as likely to delay ANC initiation as women with consistently wanted pregnancies.

Conclusions: Demographic characteristics of reproductive-age women, such as age and parity, seem to predict more closely the use of ANC services than pregnancy intention in Bihar and Jharkhand. Delayed ANC initiation may be significantly associated with unwanted pregnancy, but only when pregnancies were most decisively identified as unwanted.

### **Introduction**

Family planning and antenatal care (ANC) services are both highly underutilized in the rural North Indian states of Bihar and Jharkhand. As a consequence, high numbers of unwanted pregnancies are reported (IIPS and Macro Int. 2007), and such pregnancies have been linked to poor maternal health behaviours and infant outcomes (Gipson et al. 2008). A large volume of literature has examined the relationships between unwanted pregnancy and maternal health behaviours, the vast majority of which has been produced in the United States. Specific to antenatal care initiation, these domestic studies have largely found a positive association between unwanted pregnancy and delayed initiation of ANC services and decreased frequency of visits (Gipson et al. 2008). The few studies completed internationally (Marston and Cleland 2003; Magadi et al. 2000; Gage 1998; Eggleston 2000; Ni and Rossignol 1994) have yielded mixed results. Additionally, these are retrospective studies of pregnancy intention, a method recently questioned by Koenig et al. (2006) and Stephenson et al. (2008), given the limitations of retrospective measurement.

### **Unwanted Pregnancy and Antenatal Care Studies in Developed Countries**

In the United States and Europe, the effects of pregnancy intentions on maternal behaviours during pregnancy such as smoking, drug and alcohol use, caffeine intake and vitamin use have generally been shown to be nominal or mixed (Gipson et al. 2008; Korenman et al. 2002; Joyce et al. 2000; Kost et al. 1998). However, significant effects of pregnancy intention on antenatal care behaviours have been demonstrated in developed settings. According to Gipson et al. (2008) and Pagini and Reichman (2000), numerous studies have found a significant positive effect between unwanted pregnancy and delayed initiation of antenatal care, as well as the total number of antenatal care visits. Moreover, the delay in initiating antenatal care persisted among unwanted pregnancies, even after controlling for the delayed recognition of the pregnancy (Kost et al. 1998).

The applicability of these findings to a developing setting such as rural India, however, is questionable. For instance, many of these studies found that the antenatal care effects of pregnancy intention were modified by marital status, with an increased effect for unmarried women (Korenman et al. 2002; Kost et al. 1998). Where social standards of early and almost universal marriage are found, such as in Bihar and Jharkhand, the modifying effects of marriage may be nonexistent. Additionally, use of antenatal care is quite normative in the United States and Europe, but this is not the case in northern India. Only 3.5% of births receive late or no antenatal care in the US, while in Bihar, 65.9% of pregnant women did not receive a single ANC visit. (National Center for Health Statistics, 2007; IIPS and Macro 2007) Such dramatic differences in the perception and utilization of antenatal care and the context of unwanted pregnancy question the validity of US studies for a developing setting such as rural northern India.

### **Unwanted Pregnancy and Antenatal Care Studies in Developing Setting:**

Far fewer studies exist from developing countries examining the relationships between unwanted pregnancy and antenatal care, and only one study has included an Asian country: the Philippines (Marston and Cleland 2003). Moreover, these investigations have not demonstrated the strong relationships seen in the developed-setting studies, instead generating mixed results. For instance, a study performed by Magadi et al. (2000) in Kenya found delayed initiation of antenatal care with unwanted or mistimed pregnancy status, while a separate study by Gage (1998) in Kenya and Namibia found no significant relationship between pregnancy intention and antenatal care initiation during the first trimester. Findings from a five-country study by Marston and Cleland (2003) highlight the heterogeneity of these associations. Significant associations between delayed

antenatal care initiation and unwanted pregnancy were found in two countries (Peru: OR=1.39 [95% CI 1.24, 1.56]; the Philippines: OR=1.21 [95% CI 1.01, 1.46]), while two countries showed no association (Bolivia: OR=1.17 95% [CI 0.98, 1.40]; Kenya: OR=1.20 [95% CI 0.90, 1.59]), and a protective effect was demonstrated in one country (Egypt: OR=0.79 [95% CI 0.66, 0.95]) (Marston and Cleland, 2003).

According to Gipson et al. (2008), the studies already performed in developing settings have significant methodological issues. Kost et al. (1998) demonstrated the importance of controlling for the delayed recognition of pregnancy among those that were unintended; such adjustments were not made in the developing-setting studies. Complex modelling was also found to be lacking in these studies. Finally, nearly all of the studies performed to date have utilized a retrospective measurement of pregnancy intention, a measurement approach recently questioned by Koenig et al. (2006).

### **Prospective vs. Retrospective Measurement of Unwanted Pregnancy**

Pregnancy intention has historically been determined retrospectively, either during antenatal visits or immediately following the birth of the baby (Joyce et al 2002; Lakha and Glasier 2006; Koenig et al. 2006; Schünmann and Glasier 2006; Gipson et al. 2008). However, several researchers have identified temporal inconsistencies between pregnancy intention statuses measured during pregnancy and after birth (Joyce et al. 2002; Bankole and Westoff 1998). When comparing retrospective measures of pregnancy intention data established during pregnancy with prospective data gathered prior to pregnancy conception, Koenig et al. (2006) found that the retrospective measures significantly underestimated the proportion of unwanted pregnancies. The inconsistencies in retrospective measurements are largely thought to arise from maternal rationalization of the pregnancy and inevitable birth after conception, shifting the status from unwanted to wanted (Bankole and Westoff 1998; Koenig et al. 2006; Joyce et al. 2002).

### **Study Objectives**

This analysis examines associations between prospectively determined pregnancy intention and maternal ANC behaviours in the developing setting of rural North India. Pregnancy intention was determined by prospective measures of whether a future pregnancy would be wanted or unwanted. We hypothesized that women with unwanted pregnancy are less likely to access antenatal care, compared to women with wanted pregnancies. Additionally, among women who received one or more antenatal checkups, we hypothesized that initiation of care is delayed more often in unwanted pregnancies.

## **Methods**

### **Study Setting**

Bihar and Jharkhand are two rural states in eastern North India with a combined population larger than that of Mexico, the world's 11th most populous country (Government of Bihar 2001). With the highest poverty rate in India, nearly 40% of Bihar lies below the poverty line, and this poverty is mainly rural (World Bank 2005). The status and autonomy of women in this region is far less than that of women in South India. Bihar has the worst female literacy statistics in India, with 62.1% of women reporting illiteracy; Jharkhand has the third worst female illiteracy rate, at 58.5%. A higher proportion of women require permission from their husbands to seek medical assistance, including antenatal care (46.6% and 38.8% in Bihar and Jharkhand, respectively, vs. 26.8% in the southern state of Tamil Nadu). Many other indicators of female status and autonomy are lower in Bihar and Jharkhand than the country average, including household decision making and age at first marriage, while general fertility rates and teenage pregnancy rates are higher than average (IIPS and Macro 2007).

Antenatal care utilization in Bihar and Jharkhand is significantly lower than in the rest of the country. Only 34.1% and 58.9% of mothers in Bihar and Jharkhand, respectively, received at least one antenatal care visit, compared with an average of 94% in South Indian states. Additionally, the frequency and quality of ANC indicators for the two states, as measured by the number of ANC

component services provided at each visit, are significantly worse than those for the whole of India (IIPS and Macro 2007).

### **mData**

The National Family Health Survey-2 (NFHS-2) was carried out in 1998–1999 to gather state-level and national-level information on fertility, family planning, infant and child mortality, reproductive health, child health, nutrition of women and children, and the quality of health and family welfare services. Demographic data on households and information regarding the quality and availability of village services were collected. Data specific to women's health issues were gathered, including socio-demographic characteristics; fertility behaviour and intentions; use, knowledge and quality of family planning services; and maternal and child healthcare. A two-stage stratified systemic design was used to ensure that the sample was representative of corresponding areas of the state. Response rates for NFHS-2 were high for the two states represented in this study, averaging 96.2% (IIPS and ORC Macro 2000). Questions from NFHS-2 provided the basis for the prospective baseline of fertility preferences for the sample population. The cross-sectional data gathered were valuable, but did not provide insights about temporal associations.

A follow-up study was conducted in 2002–2003, in which women from four rural Indian states who had completed the NFHS-2 survey were re-interviewed. Data from only two of these states, Bihar and Jharkhand (part of Bihar at the time of the NFHS-2 study), are included in this analysis, because antenatal care utilization is almost universal in the other two states included in the follow-up survey, Tamil Nadu and Maharashtra. As previously stated, 34.1% and 58.9% of the population in Bihar and Jharkhand had at least one antenatal visit according to the NFHS-2 survey, compared with over 90% in both Tamil Nadu and Maharashtra (IIPS and ORC Macro 2000).

### **NFHS-2 Follow-up Study Questionnaire**

The follow-up questionnaire is shown in Appendix 1. It was printed both in English and Hindi, the state language of Bihar and Jharkhand. Survey questions addressed respondents' background characteristics, reproductive behaviour and intentions, quality of family planning care, use of family planning methods and services, antenatal care and immunization, women's status and domestic violence, and included an event calendar covering the intervening months between the baseline (NFHS-2) and the follow-up survey (to assess inter-survey pregnancies, pregnancy outcomes and monthly contraceptive use status). Women who resided in rural areas, were married, were usual residents of the household, had completed the NFHS-2 survey and were aged 15–39 at the time of the NFHS-2 survey were eligible to participate. Participants were first informed verbally about the follow-up interview and were subsequently asked to provide written consent to be re-interviewed.

Response rates of the NFHS-2 follow-up survey were 80.4% and 81.8% from Bihar and Jharkhand, respectively. Reasons cited for not agreeing to participate in the follow-up study included out-migration, having not actually been interviewed for the NFHS-2 survey and "located but not re-interviewed." Analyses showed that non-responders were generally similar to survey responders but were slightly younger in Bihar and in Jharkhand. Additionally, respondents and non-respondents had similar age distributions until age 39, after which they diverged. Non-responders were more literate and of higher socio-economic status.

### **Definition of Unwanted Pregnancy**

For the purposes of this analysis, determination of future unwanted pregnancies was made prospectively during the initial NFHS-2 survey, when women were asked when they wanted to bear their next child. Responses were categorized (as soon as possible, within 2 years, after 2 years or do not want more children) and provided the prospective measure of birth intention. Three to four years later, during the NFHS-2 follow-up survey, these same women provided information on recent births, including those occurring during the inter-survey period. Pregnancies occurring in women

who had indicated they did “not want more children” or were recorded as sterilized on the NFHS-2 survey were defined as unwanted pregnancies.

Previous literature has often stratified wanted/planned, mistimed and unwanted pregnancies (D’Angelo et al. 2004; Eggleston 2000; Joyce et al. 2000; Kost et al. 1998). Because the mistimed pregnancies are ultimately wanted, and because studies have shown reduced or non-significant differences between the wanted and mistimed compared to the differences between wanted and unwanted groups (Marston and Cleland 2003; Eggleston 2000), in this study mistimed pregnancies were included with wanted pregnancies.

### Measurement of Antenatal Care Utilization and Initiation

The NFHS-2 follow-up survey asked women a series of questions regarding their most recent pregnancy, including whether or not they sought an antenatal checkup, whether a health worker visited the home for an antenatal checkup, the gestational month during which first antenatal care was received and the number of antenatal checkups during the pregnancy (Appendix 1). In this analysis, women who received one or more antenatal checkup visits either in a clinic or at home were considered to have received antenatal care. Additional data describing the gestational month of antenatal service acquisition provided a measure of the timing of these visits. Utilizing the gestational month provided, the timing of these visits was grouped into initiating care during the first 5 months of gestation or after. Previous studies from developing settings have defined early entry into ANC as 3–6 months (Marston and Cleland 2003; Eggleston 2000); the first 5 months were chosen to define early entry in this analysis because it was expected that the vast majority of women would have recognized their pregnancy by this time.

### Analyses

The main outcomes measured in this analysis were a binary measure of any antenatal care service provision (1, received care; 0, care not received) and a binary measure representing the early and late periods of pregnancy during which antenatal care was first provided (0, initiation of care during first 5 months’ gestation; 1, initiation of care after 5 months). All bivariate analyses were carried out using the z-statistic test of proportion equality. Logistic regressions used explanatory variables identified by previous literature, and the model controlled for age, parity, maternal education, paternal education, an index of autonomy and an index of assets. Only the first, singleton births to women during the study interval were included for the ANC utilization analysis. The autonomy index was scored on a scale of 1 (low) to 3 (high), and it represents a measure of independence felt by the women interviewed. The index was determined by counting the weighted responses to 13 questions regarding household decision making. An asset index was scored on a scale from 1 (low) to 3 (high). It was created by counting the number of assets held by the household, including presence and type of toilet, electricity, radio, television, bicycle, motorcycle, car, refrigerator and telephone. An asset index score of 1 indicates one household asset, 2 indicates two to three household assets and 3 indicates more than four household assets. Some explanatory variables were found to be insignificant at the  $\alpha = 0.05$  level but were maintained in the model to elucidate their relationships in this analysis.

A multivariate logistic regression was executed stepwise to predict the odds of seeking antenatal care in Bihar and Jharkhand. Next, interaction terms between covariates were tested individually; all were found to be insignificant and no interaction terms were included in the final model for antenatal care utilization (Table 3). The model was validated using the Pearson’s  $\chi^2$  goodness-of-fit test.

A second stepwise logistic regression was carried out in the same manner to predict the timeliness of first antenatal service utilization among women who had received care (Model E). Due to smaller sample sizes, many covariates used in the model were categorized into fewer groups than in the previous models (A–D).

Finally, the prospective measures of pregnancy intention gathered during the NFHS-2 survey in 1998–1999 were compared with the retrospective measures captured during the NFHS-2 follow-

up survey. In the NFHS-2 follow-up, women were asked, “At the time you became pregnant with (name of child), did you want to become pregnant then, did you want to wait until later, or did you not want to become pregnant at all?” Responses were then grouped as either “wanted,” representing the responses “wanted then” and “wanted later,” or “unwanted,” representing the response that the pregnancy was wanted “not at all.” The retrospective analyses in this study were based on the first child born during the study interval, which was the first child birthed after the participant declared her future pregnancy intentions during NFHS-2 and the same pregnancy utilized for the prospective analysis. Z-tests of proportional equality were performed to examine the similarities between prospective and retrospective measures of unwanted pregnancy. All analyses were carried out using Stata 10.0 software (StataCorp, LP, College Station, TX).

## Results

In total, 3666 women from Bihar and Jharkand states were re-interviewed in the follow-up study. Of these interviewees, 2079 women aged 18-49 experienced at least one pregnancy during the inter-survey period. The final study population included 2028 (97.5%) women who had one or two pregnancies and complete data (Figure 1). Unwanted pregnancy accounted for 637 (31%) of pregnancies in this study (Table 1). Approximately 80% of the women included in this study resided in Bihar. Over 83% reported having no formal education, while over 47% of husbands had no schooling. Thirty-three percent of households surveyed were identified by NFHS-2 survey classification as members of the scheduled caste or tribe, while an additional 52% of participating households were identified as “other backward class.” The dominant religion was Hindu (81.3%), and Islam was also prevalent (17.6%). Women reporting unwanted pregnancies were significantly more likely to be over the age of 30 than those reporting wanted pregnancies ( $p = .000$ ). Having more than four children was also found to be a significant predictor of unwanted pregnancy ( $p = .000$ ).

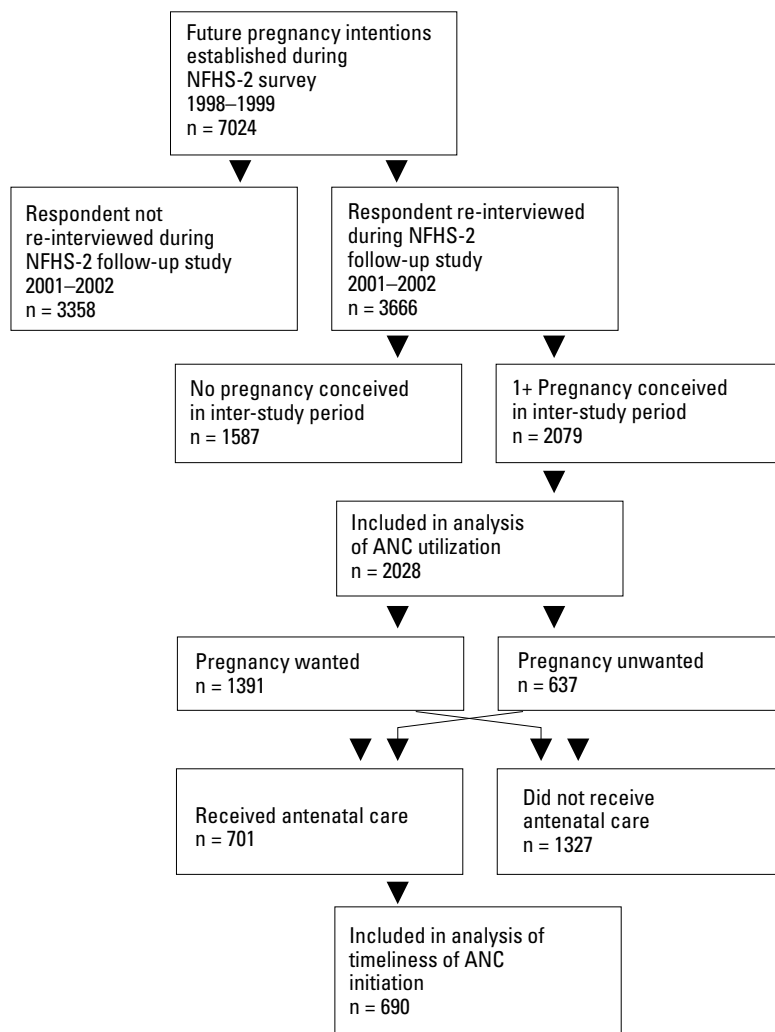
**Table 1. Demographic indicators of study participants, stratified by prospectively determined pregnancy intention of most recent pregnancy, Bihar and Jharkhand states, India**

No. (%)	Total (%)	Wanted	Unwanted	p-value
Total	2028 (100.0)	1391 (68.6)	637 (31.4)	.000a
Antenatal care				
Yes	701 (34.6)	512 (36.8)	189 (29.7)	.080
No	1327 (65.4)	879 (63.2)	448 (70.3)	.010a
Age (yrs)				
24	624 (30.8)	574 (41.3)	50 (7.9)	.000a
25–29	671 (33.1)	513 (36.9)	158 (24.8)	.005a
30–34	482 (23.8)	231 (16.6)	251 (39.4)	.000a
35–39	197 (9.7)	57 (4.1)	140 (22.0)	.002a
40+	54 (2.7)	16 (1.2)	38 (6.0)	.441
State				
Bihar	1620 (79.9)	1102 (79.2)	518 (81.3)	.326
Jharkhand	408 (20.1)	289 (20.8)	119 (18.7)	.631
Parity				

0–2 children	544 (26.8)	530 (38.1)	14 (2.2)	.006a
3–4 children	754 (37.2)	566 (40.7)	188 (29.5)	.006a
5–6 children	448 (22.1)	202 (14.5)	246 (38.6)	.000a
>6 children	282 (13.9)	93 (6.7)	189 (29.7)	.000a
# Born during study time interval				
1 child	1301 (64.2)	842 (60.5)	459 (72.1)	.000a
2 children	727 (35.9)	549 (39.5)	178 (27.9)	.005a
Maternal education				
No education	1695 (83.6)	1148 (82.5)	547 (85.9)	.076
Primary	96 (4.7)	76 (5.5)	20 (3.1)	.661
Secondary	213 (10.5)	151 (10.9)	62 (9.7)	.796
Higher	24 (1.2)	16 (1.1)	8 (1.3)	.297
Paternal education				
No education	964 (47.5)	633 (45.5)	331 (52.0)	.055
Primary	249 (12.3)	173 (12.4)	76 (11.9)	.912
Secondary	619 (30.5)	444 (31.9)	175 (27.5)	.285
Higher	196 (9.7)	141 (10.1)	55 (8.6)	.750
Asset index				
Low	1451 (71.6)	973 (70.0)	478 (75.0)	.997
Med	364 (18.0)	259 (18.6)	105 (16.5)	.997
High	213 (10.5)	159 (11.4)	54 (8.5)	.085
Caste				
Scheduled caste/tribe	674 (33.2)	460 (33.1)	214 (33.6)	.898
“Other backward class”	1065 (52.5)	740 (53.2)	325 (51.0)	.508
Other	289 (14.3)	191 (13.7)	98 (15.4)	.696
Religion				
Hindu	1650 (81.3)	1133 (81.5)	517 (81.2)	.885
Muslim	357 (17.6)	243 (17.5)	114 (17.9)	.926
Christian	9 (0.4)	5 (0.4)	4 (0.6)	.966
Other	12 (0.6)	10 (0.7)	2 (0.3)	.948
Autonomy index				
Low	712 (35.1)	523 (37.6)	189 (29.7)	.052
Med	1022 (50.4)	699 (50.3)	323 (50.7)	.905
High	294 (14.5)	169 (12.2)	125 (19.6)	.082

TABLE FOOTER: significant at  $\alpha=0.05$ .

Figure 1.



ANC = antenatal care.

### Antenatal Care Outcome

Only 701 (35%) of women had received at least one antenatal checkup. The unadjusted odds of receiving any antenatal care were significantly lower if the pregnancy was unwanted (OR=0.75 [95% CI 0.61, 0.92]), but this significance was lost in the adjusted model (Tables 2, 3). Women with more than two children were significantly less likely to receive care, regardless of pregnancy intentions. Age and parity were shown to be major confounders of pregnancy intention on antenatal care utilization. Both maternal and paternal education above primary schooling were found to be significant positive predictors of seeking ANC services. Individuals with high asset scores were significantly more likely to receive care, regardless of pregnancy intention, as were women with a high autonomy index (Table 3).

### Timeliness of Antenatal Care Initiation

Of the 701 women who had received antenatal services, 690 (98.4%) were included for the timing of care analysis due to completeness of data. Among these women, 418 (60.6%) had received their first

antenatal care services during the first 5 months of gestation, while 272 (39.4%) received them after the fifth month. Women with unwanted pregnancies had no delayed care utilization, compared with women who had wanted pregnancies (Table 2). Additionally, no demographic indicators predicted delayed entry to care (Table 4).

**Table 2. ANC outcomes by prospectively determined pregnancy intention, Bihar and Jharkhand, India**

	<b>Total N (%)</b>	<b>Wanted N (%)</b>	<b>Unwanted N (%)</b>	<b>Crude OR (95% CI)</b>	<b>Adjusted OR (95% CI)</b>
ANC					
No	1327 (65.4)	879 (63.2)	448 (70.3)	1.00	1.00
Yes	701 (34.6)	512 (36.8)	189 (29.7)	0.72 (0.59, 0.89) a	1.18 (0.91, 1.52)
Month of ANC initiation					
≤5 months	418 (60.6)	310 (61.5)	108 (58.1)	1.00	1.00
>5 months	272 (39.4)	194 (38.5)	78 (41.9)	1.15 (0.82, 1.62)	1.24 (0.83, 1.85)

ANC = antenatal care.

a significant at  $\alpha = 0.05$ .

**Table 3. Unadjusted and adjusted odds of receiving ANC among women who had 1 or 2 pregnancies during the study interval (n = 2028), Bihar and Jharkhand, India**

<b>Characteristic</b>	<b>Nested number</b>	<b>Antenatal care N (%)</b>	<b>Crude OR (95% CI)</b>	<b>Adjusted OR (95% CI)</b>
Pregnancy intention				
Wanted	1391	512 (36.8)	1.00	1.00
Unwanted	637	189 (29.7)	0.72 (0.59, 0.88)	1.18 (0.91, 1.52)
Age				
≤24 yrs	624	259 (41.5)	1.00	1.00
25–29 yrs	671	248 (37.0)	0.83 (0.66, 1.03)	1.10 (0.84, 1.43)
30–34 yrs	482	138 (28.6)	0.57 (0.44, 0.73)a	0.89 (0.64, 1.25)
35–39 yrs	197	44 (22.3)	0.41 (0.28, 0.59)a	0.79 (0.49, 1.28)
40+ yrs	54	12 (22.2)	0.40 (0.21, 0.78)a	0.82 (0.39, 1.74)
Parity				
1–2 children	544	269 (49.4)	1.00	1.00
3–4 children	754	255 (33.8)	0.52 (0.42, 0.65)a	0.48 (0.37, 0.62)a
5–6 children	448	119 (26.6)	0.37 (0.28, 0.48)a	0.41 (0.28, 0.58)a
>6 children	282	58 (20.6)	0.26 (0.19, 0.37)a	0.34 (0.21, 0.54)a
Maternal education				
No education	1695	507 (29.9)	1.00	1.00
Primary	96	41 (42.7)	1.75 (1.15, 2.65)a	1.07 (0.69, 1.68)

Secondary	213	135 (63.4)	4.06 (3.01, 5.46) <sup>a</sup>	1.95 (1.36, 2.81) <sup>a</sup>
Higher	24	18 (75.0)	7.03 (2.77, 17.81) <sup>a</sup>	2.77 (1.00, 7.65) <sup>a</sup>
Paternal education				
No education	964	250 (25.9)	1.00	1.00
Primary	249	75 (30.1)	1.23 (0.91, 1.67)	1.14 (0.83, 1.56)
Secondary	619	261 (42.2)	2.08 (1.68, 2.58) <sup>a</sup>	1.57 (1.23, 2.00) <sup>a</sup>
Higher	196	115 (58.7)	4.05 (2.95, 5.58) <sup>a</sup>	1.84 (1.23, 2.76) <sup>a</sup>
Asset index				
Low	950	250 (26.3)	1.00	1.00
Med	849	310 (36.5)	1.61 (1.32, 1.97) <sup>a</sup>	1.11 (0.85, 1.44)
High	229	141 (61.6)	4.49 (3.31, 6.07) <sup>a</sup>	2.01 (1.42, 2.86) <sup>a</sup>
Autonomy index				
Low	712	246 (34.6)	1.00	1.00
Med	1022	351 (34.3)	0.99 (0.81, 1.21)	1.17 (0.94, 1.45)
High	294	104 (35.4)	1.04 (0.78, 1.38)	1.51 (1.11, 2.06) <sup>a</sup>

ANC = antenatal care.  
<sup>a</sup> significant at  $\alpha = 0.05$ .

**Table 4. Logistic regression analysis of initiating ANC services after the first 5 months of gestation (n = 6 90), Bihar and Jharkhand, India**

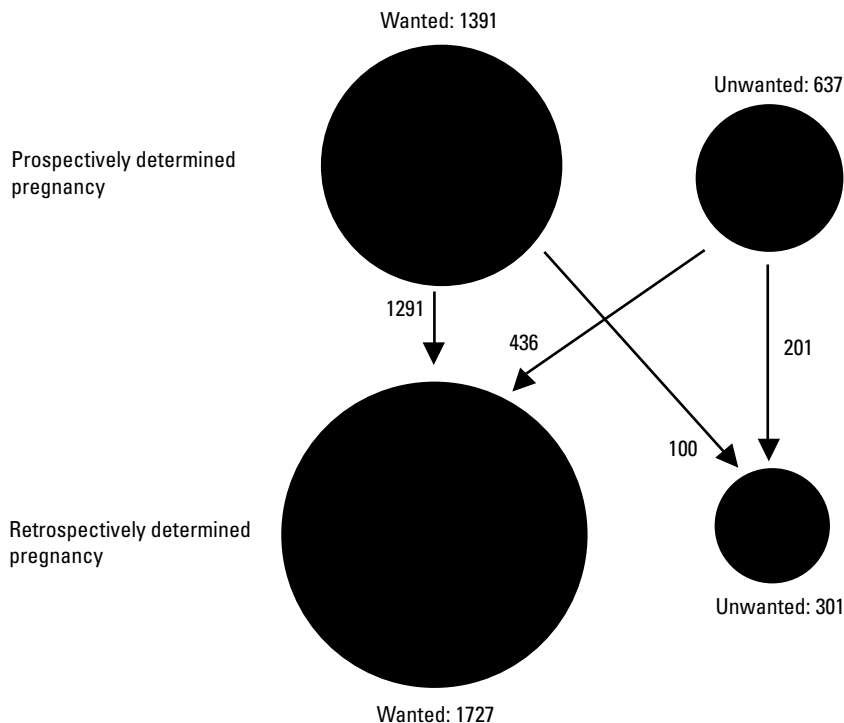
Characteristic	Adjusted OR (95% CI)
Pregnancy intentions	
Wanted	1.00
Unwanted	1.24 (0.83, 1.85)
Age	
≤29 yrs	1.00
30+ yrs	1.01 (0.67, 1.51)
Parity	
1–3 children	1.00
4+ children	0.90 (0.61, 1.34)
Maternal education	
No edu+ primary	1.00
Secondary+ higher	0.82 (0.51, 1.30)
Paternal education	
No edu+ primary	1.00

Secondary+ higher	0.71 (0.50, 1.30)
Asset index	
Low	1.00
Med	0.95 (0.63, 1.43)
High	0.73 (0.45, 1.18)
Autonomy index	
Low	1.00
Med	0.99 (0.71, 1.39)
High	0.65 (0.39, 1.07)

**Retrospective Versus Prospective Pregnancy**

To examine the validity of the prospective measures of pregnancy gathered during the original NFHS-2 and used during this analysis, the prospective measures were compared with the retrospective assessments of the same pregnancies taken later, during the follow-up survey. Significantly fewer women reported retrospectively that their pregnancies were unwanted than prospectively ( $p = .000$ ) (Table 5), and, in fact, 68% of prospectively measured unwanted pregnancies were later deemed wanted in the retrospective survey (Figure 2). It was somewhat unexpected to find that a full one third of pregnancies retrospectively identified as unwanted were originally considered wanted in the prospective measure. Similar to the prospective data, the retrospective analysis showed no difference in the odds of antenatal care among women with unwanted pregnancies compared to those with wanted pregnancies (retrospectively OR=1.13 [95% CI 0.83, 1.54]; prospectively OR=1.18 [95% CI 0.91, 1.52] ).

**Figure 2. Diagram showing distribution of prospectively and retrospectively determined pregnancy intentions, Bihar and Jharkhand, India (n = 2028)**



**Table 5. Comparison of prospectively reported numbers of unwanted pregnancy (measured on the NFHS-2 survey) with prospectively reported numbers of unwanted pregnancy (measured on the NFHS-2 follow-up survey), Bihar and Jharkhand, India**

	Total	Prospective unwanted N(%)	Retrospective unwanted N(%)	p-value
ANC				
Yes	701	189 (27.0)	88 (12.6)	.008a
No	1327	448 (33.8)	213 (16.1)	.000a
Month of ANC initiation				
≤5 months	418	108 (25.8)	46 (11.0)	.040a
>5 months	272	78 (28.7)	47 (17.3)	.151

NC = antenatal care.  
a significant at  $\alpha = 0.05$ .

Women who consistently qualified their pregnancy as either wanted or unwanted, both prior to and after conception ( $n = 1492$ ), were analyzed separately using the same logistic models in an effort to assess the associations of consistently unwanted pregnancies upon antenatal care outcomes. Results showed no difference in utilization of antenatal services among women with consistently unwanted pregnancies compared with women who consistently identified their pregnancies as wanted. Unlike the previous analyses, however, women with consistently unwanted pregnancies were twice as likely to delay ANC initiation, compared to women with consistently wanted pregnancies (consistently reported OR=2.08 [95% CI 1.06, 4.11]); prospectively OR=1.24 [95% CI 0.83, 1.85]; retrospectively OR=1.63 [95% CI 0.98, 2.71]) (Table 6).

**Table 6. Comparison of adjusted odds of receiving any ANC and delayed initiation ANC services by definition of pregnancy intention, Bihar and Jharkhand, India**

	Prospectively unwanted		Retrospectively unwanted		Consistently unwanted	
	N	Adjusted OR (95% CI)	N	Adjusted OR (95% CI)	N	Adjusted OR (95% CI)
ANC	2028		2028		1492	
No		1.00		1.00		1.00
Yes		1.18 (0.91, 1.52)		1.13 (0.83, 1.54)		1.09 (0.71, 1.67)
Month of ANC initiation	690		690		527	
≤5 months		1.00		1.00		1.00
>5 months		1.24 (0.83, 1.85)		1.63 (0.98, 2.71)		2.08 (1.06, 4.11)a

Note. Reference group for pregnancy intention in all three categories: wanted pregnancies.  
ANC = antenatal care.  
a significant at  $\alpha = 0.05$ .

## Discussion

Results from this analysis indicate that parity best predicts the receipt of antenatal care services in North India, whereas pregnancy intention failed to significantly affect ANC utilization in the final model. The inability of pregnancy intention to predict ANC utilization was in line with some studies (Gage 1998) but not others (Eggleston 2000; Magadi et al. 2000). The importance of parity in

predicting antenatal care usage is in keeping with the study by Marston and Cleland (2003), which found that birth order and family size were more important predictors of antenatal care use than pregnancy intention. Though they represent different characteristics of women, age, parity and pregnancy intention are closely related in many developing settings like North India. Additional models demonstrated that age and parity largely confounded the effect of pregnancy intention in this analysis.

The lack of association between prospectively determined unwanted pregnancy and delayed initiation of ANC in the final adjusted model was not in accordance with published literature (Magadi et al. 2000; Eggleston 2000; Marston and Cleland 2003). However, the results of the same model using only consistently unwanted pregnancies did yield results consistent with previous work. Such findings may indicate that the degree of association between pregnancy intention and antenatal care timeliness may be dependent upon the strength of the mother's feelings toward the pregnancy. Delayed entry into care by mothers with unwanted pregnancies had been found in previous studies and was hypothesized to result from delayed recognition of pregnancy symptoms and time lost to pregnancy termination (Kost et al. 1998). Indeed, in their analysis of pregnancy intention and maternal antenatal care behaviours, Kost et al. (1998) emphasized the importance of controlling for delayed recognition of pregnancy and/or delays due to pregnancy termination decision making when analyzing the timing of the first ANC visit. Though such controls could not be included in this analysis due to limitations in the survey, the conservative use of the first 5 months of gestation representing "early" entry into care conceivably allowed for delayed pregnancy realization and decisions to terminate.

Implicit in the definition of unwanted pregnancy as it is used in this analysis is the assumption that women's prospectively determined reproductive intentions remained fixed throughout the inter-survey period. Results from this analysis indicate that this assumption may be largely correct, but not universal. One hundred (4.9%) women in the study prospectively determined any future pregnancies to be wanted, but after the subsequent birth of a child, unexpectedly retrospectively identified the pregnancy as unwanted. Such findings may illustrate the dynamic nature of pregnancy intentions.

Pregnancy intentions of women with live births were measured in this study, which failed to account for pregnancies that were either spontaneously or intentionally terminated. By not including such pregnancies, sample selection bias may have affected the antenatal care utilization rates found in this analysis. Additionally, grouping mistimed with wanted pregnancies may have underestimated the relative differences found between unwanted pregnancies and the wanted group. Only women's pregnancy intentions were sought in the survey, so no information about the pregnancy intentions of husbands was included; they may carry greater weight in this paternalistic society.

Two important aspects of antenatal care were not considered in this study, namely frequency and quality of ANC. Kost et al. (1998) clearly illustrated the expected associations of delayed first antenatal visit with the total number of visits during pregnancy. In Bihar and Jharkhand, women received their first ANC visit at an average 4.4 months, but nearly 40% of women did not initiate care until the sixth month of gestation or later. It is expected that late initiation of care directly impacts the frequency of ANC visits, as women with delayed initiation will have less gestation time to receive the recommended additional three visits. The quality of ANC has been shown to vary across India, and quality of care in northern states including Bihar and Jharkhand was found to be substandard (Rani et al. 2008). With no measures of the quality of care included in the NFHS-2 follow-up survey (Appendix 1), quality assessment was not possible in this study. It is probable, however, that for the 33% of women in this study who received ANC, the quality of the service was severely lacking.

According to Gipson et al. (2008), previous studies from developing settings have found that pregnancy intentions are related to maternal antenatal care behaviours, but such findings have been modest, varied greatly by country context and lacked stringent methodology. The results of the adjusted analyses in this paper did not support Gipson's assessment, finding no association of prospective pregnancy intention status upon antenatal care utilization. The effects of pregnancy intention upon utilization of care were found to be heavily confounded by the effects of age and

parity, perhaps indicating that such demographic measures may be better predictors of antenatal care usage. In the timeliness of care analysis, no association between prospectively defined unwanted pregnancy and delayed ANC initiation was found, yet when only pregnancies deemed consistently wanted or unwanted were considered, delayed entry to care was indeed established. Thus, it is possible that the effects of pregnancy intention upon the timeliness of ANC initiation may be related to the strength of the feelings toward the pregnancy, and mothers with the strongest feelings of pregnancy unwantedness may be at the highest risk of late care. These findings illustrate the complexity of pregnancy intention and maternal ANC behaviours.

### Conclusions

Fundamentally, utilization rates of antenatal care services require improvement throughout Jharkhand and Bihar, regardless of pregnancy intention. In this analysis, it was shown that maternal antenatal care behaviours were not affected by the mother's desire for a future pregnancy prior to its conception. With the health and survival benefits of antenatal care clearly established for both mother and child, this study highlights the importance of reducing maternal and child morbidity and mortality by targeting women with demographic profiles showing reduced likelihood of ANC utilization, such as having more than four children and an age above 30 years. Results also indicate that women with the strongest feelings of unwantedness toward their pregnancies had delayed entry to care, highlighting a vulnerable subset of mothers with unwanted pregnancies. This study demonstrated inadequacies in family planning among study participants, as 37% of the women re-interviewed during the follow-up survey (n = 2079) reported two or more prospectively determined unwanted pregnancies during the inter-survey period. If the utilization of antenatal care dramatically increases, as it has in South India (Rani et al. 2008; IIPS and Macro Int. 2007), perhaps incorporating family planning referrals and/or services into antenatal visits may help prevent additional unwanted pregnancies. Finally, retrospective measures of pregnancy intention were found to under-report the proportion of unwanted births in this study; as validated in other recent studies (Koenig et al. 2006; Stephenson et al. 2008), prospective measures of fertility preferences are preferred.

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APPENDIX 1. NFHS-2 Follow-up Survey

I would now like to collect some information about all the live birth (s) which you have had since March, 1, 1999. whether currently alive or not. RECORD NAMES OF ALL THE LIVE BIRTHS IN 204. RECORD TWINS AND TRIPLETS ON SEPARATE LINES AND MARK WITH A BRACKET. FIELDS COMPLETE 205-207 FOR EACH OF THE BIRTH (S). THEN FOR EACH BIRTH, STARTING FROM 208 ASK HORIZONTALLY FOLLOWING THE SLIP PATTERN. MOVE TO NEXT BIRTH (S) AT THE END OF THE TABLE GO TO 216.

205	206	207	208	209	210	211	212	213	214	215
ASK AND RECORD SINGLE OR MULTIPLE STATUS.	Is (NAME) a boy or a girl?	In what month and year was (NAME) born? PROBE: What is his/her birthday?	Is (NAME) still alive?	How old was (NAME) at his/her last birthday? RECORD AGE IN COMPLETED YEARS.	IF ALIVE: A/E IF DEAD: Y	How old was (NAME) when he/she died? IF "1 YEAR" PROBE How many months old was (NAME)? RECORD DAYS IF LESS THAN 1 MONTH, MONTHS IF LESS THAN TWO YEARS, OR YEARS.	At the time you became pregnant with (NAME), did you want to become pregnant then, did you want to wait until later, or did you not want to become pregnant at all?	Were you using any contraceptive method when you became pregnant with (NAME)?	Which method were you using?	Thinking back to the time you became pregnant with (name), how did you feel about the pregnancy? Please look at this picture and tell me how happy or unhappy you were to be pregnant. SHOW & EXPLAIN DIAGRAM ON NEXT PAGE. RECORD NUMBER BELOW.
SING..1 MULT..2 (NAME)	BOY..1 GIRL..2	MONTH..... YEAR..	YES..1 NO..2 V 211	AGE IN YEARS [ ]	YES..1 NO..2 V 212	DAYS...1 MONTHS..2 YEARS...3	WANTED THEN.....1 WANTED LATER.....2 NOT AT ALL.....3	YES.....1 NO.....2 V 215	01 02 03 04 05 06 07 08 09 96	[ ]
SING..1 MULT..2 (NAME)	BOY..1 GIRL..2	MONTH..... YEAR..	YES..1 NO..2 V 211	AGE IN YEARS [ ]	YES..1 NO..2 V 212	DAYS...1 MONTHS..2 YEARS...3	WANTED THEN.....1 WANTED LATER.....2 NOT AT ALL.....3	YES.....1 NO.....2 V 215	01 02 03 04 05 06 07 08 09 96	[ ]
SING..1 MULT..2 (NAME)	BOY..1 GIRL..2	MONTH..... YEAR..	YES..1 NO..2 V 211	AGE IN YEARS [ ]	YES..1 NO..2 V 212	DAYS...1 MONTHS..2 YEARS...3	WANTED THEN.....1 WANTED LATER.....2 NOT AT ALL.....3	YES.....1 NO.....2 V 215	01 02 03 04 05 06 07 08 09 96	[ ]
SING..1 MULT..2 (NAME)	BOY..1 GIRL..2	MONTH..... YEAR..	YES..1 NO..2 V 211	AGE IN YEARS [ ]	YES..1 NO..2 V 212	DAYS...1 MONTHS..2 YEARS...3	WANTED THEN.....1 WANTED LATER.....2 NOT AT ALL.....3	YES.....1 NO.....2 V 215	01 02 03 04 05 06 07 08 09 96	[ ]

CODE FOR Q214 01 PILL, 02 IUD/LOOP, 03 INJECTABLES, 04 DIAPHRAGM/FOAM/JELLEY,  
05 CONDOM, 06 FEMALE STERILIZATION, 07 MALE STERILIZATION, 08 PERIODIC ABSTINENCE, 09 WITHDRAWAL,  
96 OTHER



# Individual- and Contextual-Level Determinants of Social Inequities in Under-Five Mortality in Nigeria: Differentials by Religious Affiliation of the Mother

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## **Abstract**

In sub-Saharan Africa, social factors such as religion have been linked with significant child morbidity and mortality. In religiously multi-denominational societies, one dominant religious group tends to subject the other groups to some form of economic, social or political discrimination, resulting in inequities in child survival. This study assessed the influence of individual- and community-level indicators underlying the association between religion and under-five mortality using multilevel logistic regression modelling. There is a significant association between religion and under-five mortality, which is considerably attenuated by sequentially adjusting for other risk factors. The effect of religion on under-five mortality is influenced by contextual-level characteristics of the community. Traditional religion is associated with under-five mortality, which is attributed to individual- and community-level indicators. Policy measures aimed at tackling child health inequities due to social factors such as religion need to consider the significance of the context in which mothers in different communities live, when healthcare interventions are being planned.

## **Background**

Focus on child survival in developing countries has shifted from individual-level factors to wider social determinants – public health systems, gender-role, and maternal and child healthcare services within communities (Mosley and Chen 2003; Andes 1992; Braithwaite et al. 1989). Often, structural socio-economic stratification, women's empowerment, access to healthcare services and cultural

practices either facilitate or constrain the accessibility of health-promoting resources to individuals within a community. Viewing under-five mortality within the religious context involves examining possible structural forces influencing mortality at the community level. Since many public health interventions are context-specific, documenting underlying contextual determinants of under-five mortality among religious groups may improve the impact of health interventions aimed at specific populations (Victora et al. 2005).

Social factors have been identified at the root of many of the gross inequalities in health within and between countries (World Health Organization [WHO 2004]). Social inequities in child health (i.e., differences in child health status that are directly or indirectly generated by social, economic and environmental factors, and structurally influenced lifestyles) are systematic, socially produced, modifiable and unfair (Braveman and Gruskin 2003; Whitehead and Dahlgren 2006) and should therefore be amenable to changes in policy.

In sub-Saharan Africa, besides socio-economic determinants of health, social factors such as religion, ethnicity and gender have been shown to influence child health (Van Poppel et al. 2003). For instance, societies that are religiously multi-denominational tend to be divided along religious lines, with one dominant religious group subjecting the other groups to some form of economic, social or political discrimination (Van Poppel et al. 2003). Recent studies have reported the manipulation of religious symbols and beliefs in the struggles for political power and influence in Africa (Nzeh 2002). In contemporary African countries, religious or political elites seeking political influence have used religion to gain legitimacy and to attract sympathy and support from those of similar faith (Antai et al. 2008; Nzeh 2002). This has had serious ramifications for child health and survival in Nigeria and other developing countries (Antai et al. 2008).

## Introduction

Nigeria's population is about 50% Muslim (mostly Sunni) and 40% Christian; about 10% practices traditional indigenous or other religions (National Population Commission [NPC] 2004). There is a strong correlation between religious, ethnic and regional diversity in Nigeria, with the northern regions being predominantly Muslim and dominated by the large Hausa and Fulani ethnic groups. The southern regions are predominantly Christian and dominated by Igbo, Yoruba and other ethnic groups (International Religious Freedom Report [IRFR] 2003). Muslims and Christians in the north and south of Nigeria commonly adhere to traditional indigenous practices (Geissler 1998). However, the existence of multiple doctrinally diverse religions within a single society (i.e., religious pluralism) and different religious faiths within a single society have been reported to result in the somewhat weakened influence of a particular religion within that society (Haralambos et al. 2000). This may prevent the dominance of the religious values of a particular religion on those of the entire community (Haralambos et al. 2000).

The healthcare system in Nigeria is multidimensional and comprised mainly of orthodox medicine and traditional healing (Odebiyi and Pearce 1987; Okunola 1993). Traditional indigenous religions typically involve spiritual beliefs and deities that primarily serve to provide supernatural guidance in everyday life; for example, spiritual entities are believed to protect adherents from sickness and control supernatural forces of healing (Cohen 2006). It is common for people to adhere to a mixture of traditional and Christian/Islamic faiths and healing practices, sometimes in succession, but often traditional health services perform complementary functions, especially to orthodox medicine (Idehen 2007; Simpson 1994). Gains in the utilization of modern healthcare facilities and Western-style education by Christians in southern Nigeria could be traced back to southern Nigerians' early exposure to Christianity. Islam was introduced into the northern parts of Nigeria during the tenth century by Muslim merchants from North Africa (Laremont and Gregorian 2006).

2003). With the European military conquest of southern Nigeria in the seventeenth century, European missionaries began introducing Christianity primarily into southern Nigeria and, to a lesser extent, into many parts of northern Nigeria (Balewa 1994).

The relationship between religion and mortality is an established one, and several studies have

shown the association between religion and child mortality. This association is attributed in part to the underlying differential use of maternal and child health services (Addai 2000; Akoto 1990; Bairagi et al. 1999; Teeraworn 2002), socio-economic position (Gyimah 2006) and institutional structure (Jones 2004). Religion is also a predictor of child immunization status (Antai 2009; Nath et al. 2007), which increases the risk of child mortality. Recent demographic studies focused on the role of religion in child mortality in sub-Saharan Africa and showed that mother's religious affiliation was significantly associated with increased under-five mortality, attributed to use of maternal and child health services (Antai et al. 2008) and differential access to social and human capital rather than religion per se (Gyimah 2007). These studies, however, did not assess the hierarchical nature of the Demographic and Health Survey (DHS) data and therefore the fact that children of the same mother are more alike than children selected at random from the population.

### **Conceptual Framework – Effect of Religion on Health**

Previous studies have sought to explain the effects of religion on health by tracing its pathways and mechanisms of influence (Goldscheider 1971). Two hypotheses have been used to explain this influence – the “characteristics hypothesis” and the “particularized theology hypothesis.” The characteristics hypothesis suggests that religious affiliation has little or no independent influence on health but, rather, that the demographic, social and economic composition of religious groups largely accounts for observed differences in child survival between the groups (Goldscheider 1971; Goldscheider and Mosher 1988). The particularized hypothesis on the other hand posits that differences in child survival within religious groups are a result of specific doctrines of a religion, that is, the presence or absence of specific religious tenets directly related to child health, and beliefs and values of the different religious groups that influence child health and survival (Goldscheider 1971; Goldscheider and Mosher 1988). The lifestyles that a religious doctrine may prescribe or proscribe, coupled with the regulation of health-related behaviours of its followers, may lead to the adoption of health-damaging or health-promoting behaviours that consequently affect child health and survival. This present study focuses on the influence of contextual factors on the risk of under-five mortality differentials among the religious groups in Nigeria, and thereby goes beyond attempting to prove or disprove the characteristics or particularized theology hypotheses already assessed in previous studies (Antai et al. 2008; Gyimah 2007). Our study therefore uses multilevel logistic regression modelling to examine the effect of individual- and community-level factors on under-five mortality among the religious groups in Nigeria. The objectives of this study were to (1) assess whether under-five mortality varies across contexts, (2) investigate the individual-level relationship between religion and under-five mortality by sequentially controlling for other risk factors, and (3) determine whether contextual explanatory variables account for religious variation in under-five mortality among contexts.

## **Methods**

### **Definition**

Mother's religious affiliation is defined as the identification with a particular religious group (Koenig et al. 2001). Mother's religious affiliation was used in this study due to the absence of multiple measures of religion in the 2003 Nigeria DHS dataset.

### **Data and Methods**

Data from the 2003 Nigeria DHS was used for this study, with a probability sample collected using a stratified two-stage cluster sampling procedure according to the list of enumeration areas developed from the 1991 Population Census sampling frame. Initial sampling involved the selection of 365 clusters (primary sampling units) with a probability proportional to the size (size being the number of households in the cluster). Subsequent sampling involved the systematic selection of households from the chosen clusters, resulting in a nationally representative probability sample of 7864 households. From these households, data were collected by face-to-face interviews from 3725 women aged

15 to 49 years who contributed a total of 6029 live-born children within 5 years before the survey. Information about the aggregate childbearing experience of respondents was also collected, such as the number of sons and daughters who live with the mother, the number who live elsewhere and the number who had died. Information was collected on sex, month and year of birth, survivorship status and current age or, if the child had died, age at death for each of the births. These birth history data were then used to directly estimate the under-five mortality. Further description of the survey methodology is available elsewhere (NPC 2004).

### Measures

The outcome variable is under-five death, defined as a live-born child dying between birth and the fifth birthday.

### Exposures

#### Ethnicity

Mother's religious affiliation was indicated by the question, "What is your religion?" in the Nigeria DHS questionnaire. It was categorized as Christian, Muslim, Traditional religion/others.

#### Individual-Level Risk Factors

Four other child- and mother-level variables of interest were assessed: (a) birth order and interval between births, created by merging "birth order" and "preceding birth interval" and classified as first birth, birth order 2–4 with short birth interval (<24 months), birth order 2–4 with medium birth interval (24–47 months), birth order 2–4 with long birth interval (48+ months), birth order 5+ with short birth interval (<24 months), birth order 5+ with medium birth interval (24–47 months) and birth order 5+ with long birth interval (48 months); (b) mother's age, grouped as 15–18, 19–23, 24–28, 29–33, and 34 years and older; (c) mothers' education, categorized as no education, primary, and secondary or higher education; and (d) place of residence, categorized as rural and urban. Only variables that were significantly associated with mothers' religious affiliation in the bivariate analyses were entered into the multilevel regression models.

#### Community-Level Risk Factors

Four community-level variables were assessed: (a) community mother's education, defined as the percentage of mothers with secondary or higher education in the primary sampling unit (PSU) and categorized as low and high; (b) community hospital delivery, defined as the percentage of mothers who delivered their child in the hospital and categorized as low, middle and high; (c) community child immunization, defined as the percentage of children who received the eight vaccines in the Expanded Program on Immunization (EPI) schedule recommended by the WHO, including Bacillus Calmette-Guérin (BCG) at birth, three doses of diphtheria, pertussis and tetanus (DPT) vaccine at 6, 10 and 14 weeks of age, three doses of oral polio vaccine (OPV) at birth and at 6, 10 and 14 weeks of age, and one dose of measles vaccine at 9 months of age; this was categorized as low, middle and high; and (d) region of residence, categorized according to the six geo-political zones in Nigeria as North Central, North East, North West, South East, South South and South West.

Community-level variables were assessed at the level of the PSUs ( $n = 365$ ). PSUs or clusters are administratively defined areas used as proxies for "neighbourhoods" or "communities" (Diez-Roux 2001; Pearl et al. 2001) and are often relevant when the hypothesis involves policies, when features of the social and physical environment are hypothesized to be of significance. PSUs are small and designed to be fairly homogenous units with regard to population socio-demographic characteristics, economic status and living conditions. They consist of one or more enumeration areas (EAs), the smallest geographic units for which census data are available in Nigeria. Each cluster was made up of a minimum of 50 households; in the case of less than 50 households, a contiguous EA was added (NPC 2004). Table 1 shows a description of the individual- and contextual-level variables used in the multilevel logistic regression models.

**Table 1. Definition of individual- and contextual-level variables used in the multilevel logistic regression models**

Variables	Definition of measures
<b>Outcome</b>	
The risk of under-five mortality (0–59 months)	The probability of dying between birth and the fifth birthday of a child born within 5 years prior to the survey
<b>Exposures</b>	
<i>Individual-level variables</i>	
Religion	Mother's religious affiliation [Christian, Islam, Traditional/Others]
Birth order and birth interval	Birth order and birth interval of the child [first births, 2–4 months birth order & <24 months birth interval, 2–4 birth order & 24–47 months birth interval, 2–4 birth order & 48+ months birth interval, 5+ birth order & <24 months birth interval, 5+ birth order & 24–47 months birth interval, 5+ birth order & 48+ months birth interval]
Mother's age	Mother's age at birth of the child (in years) [15–18, 19–23, 24–28, 29–33, 34+]
Mother's education	Mother's highest level of education [No education, primary education, secondary or higher education]
Place of residence	Place of residence [rural, urban]
<i>Community-level variables</i>	
Community mother's education	Percentage of mothers with secondary or higher education in the PSU [low, high]
Community child immunization	Percentage of children who received full immunization in the PSU [low, middle, high]
Community hospital delivery	Percentage of mothers who delivered in hospital in the PSU [low, middle, high]
Region of residence	Region of residence [North Central, North East, North West, South East, South South, South West]

Note. PSU = primary sampling unit.

### Ethical Consideration

The survey procedure and instruments for the 2003 Nigeria DHS are ethically approved by the Ethics Committee of the Opinion Research Corporation (ORC) Macro International, Incorporated, Calverton, USA, and by the National Ethics Committee in the Federal Ministry of Health, Nigeria. Informed consent was obtained from all participants prior to participation in the survey, and information was collected confidentially. This study is based on analysis of secondary data with all participant identifiers removed. Ethical permission for use of the data in the present study was obtained from ORC Macro Inc.

### Analysis

We estimated the proportions of the total sample using the Stata 10 software package (StataCorp 2001) and used Pearson's chi-square test to estimate the differences in proportions of individual- and community-level characteristics by religious affiliation of the mother. We used normalized sample weights provided in the DHS data for all analyses to adjust for non-response and enable the extrapolation of findings to the general population.

### Multilevel Logistic Regression Modelling

We used a three-level multilevel logistic regression model to account for the hierarchical nature of

the DHS data, with children (level 1) nested within mothers (level 2), who are in turn nested within communities (level 3) (Snijders and Bosker 1999). We fitted five models into the analysis. Model 0 (null model) contained no explanatory variable and focused on decomposing the total variance (VTotal) into its individual (VI) and community (VC) components. Model 1 included religion as the only explanatory variable, and Model 2 added a child-level variable (birth order and birth interval). Model 3 further included the mother-level variables (mother's age, mother's education and place of residence). Model 4 added community-level variables (community mother's education, community child immunization, community hospital delivery and region of residence).

The three-level multilevel model equation is written as follows:

$$\log \text{it} (\pi_{ijk}) = \log \left( \frac{\pi_{ijk}}{1-\pi_{ijk}} \right) = \beta_0 + X_{ijk} + u_{ojk} + v_{ok}$$

where  $\pi_{ijk}$  is the probability of dying for the  $i$ th child of the  $j$ th mother in the  $k$ th community,  $e_{ijk}$  is a child-level error term distributed as Bernoulli constant,  $X_{ijk}$  is a vector of covariates corresponding to the  $i$ th child of the  $j$ th mother in the  $k$ th community including mother's religious affiliation and educational background,  $\beta_0$  is a vector of unknown parameters,  $u_{ojk}$  is the random effect at the mother level and  $v_{ok}$  is the random effect at the community level. The intercept or average probability of dying is assumed to vary randomly across mothers and communities. The multilevel analysis was performed using the MLwiN software package 2.0.2 (Center for Multilevel Modelling 2000). Model estimation was carried out using first order Penalized Quasi-Likelihood (PQL) procedures, which correct for downward bias in standard error, and overstatement of the significance of the exposure variables associated with clustering of observations within primary sampling units (Rashbash et al. 2000).

Measures of association (fixed effects) were expressed as odds ratios (OR) and 95% confidence interval (95% CI). Measures of variation (random effects) were expressed as variance partition coefficient (VPC) and percentage change in variance (PCV). The VPC is a measure of the extent to which members of a family are more like each other than they are like individuals from other families. Large VPC values reflect the importance of mother-level factors in understanding the risk of under-five mortality, while VPC values close to zero show that mother-level factors exert only a small influence on the risk of under-five mortality. Precision of the model was assessed by standard error (SE), and parameters were tested using the Wald statistic, that is, the ratio of the estimated variance to its standard error (Larsen and Merlo 2005). *P*-values were also calculated for each variable entered into the model. Bayesian deviance information criterion (DIC) was used to estimate the goodness of fit of consecutive models by applying Markov Chain Monte Carlo (MCMC) techniques (Browne 2003). The DIC decreases as significant effects (both random and fixed) are added to the model, hence a smaller DIC indicates an improvement of a multivariable model on the previous model (Browne 2003; Spiegelhalter et al. 2002).

## Results

### Demographic and Socio-Economic Characteristics of Children in Each Religious Group (Table 2)

The children were most commonly of 2–4 birth order and 24–47 months birth interval, born to mothers 24–28 years of age with no education and living in rural areas. Individual-level characteristics disaggregated by religion showed that among Christian mothers, children of 2–4 birth order and 24–47 months birth interval were the most common. The Christian mothers were mostly 24–28 years of age at childbirth, had secondary or higher education and resided in rural areas.

Muslim children were mostly of 2–4 birth order and 24–47 months birth interval, and Muslim mothers were mostly 24–28 years of age at child birth, without education, and rural residents. Children of Traditionalist mothers were most commonly of 5+ birth order and 24–47 months birth interval, while Traditionalist mothers were mostly 34 years or older at childbirth, uneducated and

rural residents. There were statistically significant differences in the characteristics of the children and mothers among the different religious groups, except for place of residence.

**Table 2. Proportion of children in each religious group by demographic and socio-economic characteristics**

Characteristics	Total <i>N</i> (%)	Religious affiliation of mother			<i>P</i> -value
		Christianity <i>n</i> (%)	Islam <i>n</i> (%)	Traditional/ other <i>n</i> (%)	
<i>Religion</i>	6029 (100)	2307 (38)	3598 (60)	124 (2)	
<i>Birth order/birth interval</i>					.000
First birth (order 1)	1200 (20)	507 (22)	681 (19)	12 (10)	
Order 2–4 & <24 months	642 (11)	255 (11)	376 (11)	11 (9)	
Order 2–4 & 24–47 months	1563 (26)	625 (27)	915 (25)	23 (19)	
Order 2–4 & 48+ months	416 (7)	193 (8)	213 (6)	10 (8)	
Order 5+ & <24 months	484 (8)	126 (6)	340 (9)	18 (14)	
Order 5+ & 24–47 months	1287 (21)	433 (19)	822 (23)	32 (26)	
Order 5+ & 48+ months	437 (7)	168 (7)	251 (7)	18 (14)	
<i>Mother's age at child birth</i>					.000
15–18	264 (4)	44 (2)	219 (6)	1 (1)	
19–23	1147 (19)	367 (16)	761 (21)	19 (15)	
24–28	1807 (30)	693 (30)	1092 (30)	22 (18)	
29–33	1263 (21)	562 (24)	677 (19)	24 (19)	
34+	1548 (26)	641 (28)	849 (24)	58 (47)	
<i>Mother's education</i>					.000
No education	3033 (50)	408 (18)	2538 (70)	87 (70)	
Primary	1473 (25)	846 (37)	595 (17)	32 (26)	
Secondary or higher	1523 (25)	1053 (45)	465 (13)	5 (4)	
<i>Place of residence</i>					.453
Rural	3911 (65)	1497 (65)	2327 (65)	87 (70)	
Urban	2118 (35)	810 (35)	1271 (35)	37 (30)	

Note. Birth order and birth interval were created by merging "birth order" and "preceding birth interval" and were classified as follows: first births, order 2–4 (<24 months) denotes child is 2nd to 4th in birth order and was born less than 24 months before the next birth; order 2–4 & 24–47 months denotes child is 2nd to 4th in birth order and was born between 24 and 24 months before the next birth; order 2–4 & 48+ months denotes child is 2nd to 4th in birth order and was born 48 months or more before the next birth; order 5+ & <24 months denotes child is 5th or more in birth order and was born less than 24 months before the next birth; order 5+ & 24–47 months denotes child is 5th or more in birth order and was born between 24 and 24 months before the next birth; order 5+ & 48+ months denotes child is 5th or more in birth order and was born 48 months or more before the next birth.

### Multilevel Logistic Regression Analysis of Under-Five Mortality and Religious Affiliation of the Mother (Table 3)

Table 3 presents the multilevel models that sequentially elucidate the relationship between religion and under-five mortality. The bottom of the table shows that each additional model represents a significant improvement in fit over the preceding model.

#### Objective 1: To Assess Whether Under-Five Mortality Varies across Contexts

The null model indicates that there is significant variation in under-five mortality across contexts, that is, by mothers ( $\tau = 0.316, p = .020$ ) and communities ( $\tau = 0.253, p = .001$ ). The intra-mother and intra-community correlations, indicated by the variance partition coefficient (VPC), are 7% and 8%, respectively. These values are relatively small, indicating that a large proportion of the variation in under-five mortality occurs at the individual level.

#### Objective 2: To Elucidate the Individual-Level Relationship between Ethnicity and Child Mortality by Sequentially Controlling for Other Explanatory Factors

Model 1 added random slopes for religion, which was then allowed to vary over contexts (i.e., assigned a random error term) in order to investigate whether its effect is different among contexts. Children of Traditionalist mothers had a twofold increased risk of dying (OR=2.23 [95% CI 1.37, 3.62]) compared with children of Christian mothers, and children of Muslim mothers had a 35% higher risk of dying (OR=1.35 [95% CI 1.13, 1.61]) than children of Christian mothers. The variation in under-five mortality in Model 1 remained significant across mothers ( $\tau = 0.270, p = .043$ ) and communities ( $\tau = 0.216, p = .002$ ). Compared to the null model, the increased intra-mother correlation of 14.6 and the decreased intra-community correlation of 5.7 indicate that controlling for religion slightly increases the proportion of variance in under-five mortality existing between mothers but decreases that existing between communities, respectively. As indicated by the proportional change in variance (PCV), religion explained 7.1% and 14.6% of the variance in the odds of under-five mortality across mothers and communities respectively, indicating that part of the clustering of child mortality within areas is due to the composition of the population of the areas by religion. This is a composition effect.

Model 2 adjusted for birth order/birth interval. The risks of dying remained significant though slightly reduced for children of Traditionalist (OR=2.16 [95% CI 1.34, 3.50]) and Muslim (OR=1.29 [95% CI 1.08, 1.54]) mothers compared with children of Christian mothers. Children of high birth order/interval (5+ birth order and <24 months birth interval) had a twofold increased risk of dying (OR=2.55 [95% CI 1.96, 3.33]), and first births had a 36% increased risk of dying (OR=1.36 [95% CI 1.08, 1.71]) compared with children of Christian mothers.

Compared to Model 1, significant variation in under-five mortality persists across communities ( $\tau = 0.204, p = .002$ ), while mother-level variation became non-significant. The intra-community correlation remained basically unchanged at 5.6%, while the intra-mother correlation became smaller than in Model 1 (3.4%), indicating that birth order/birth interval accounts for some of the community-level variation in under-five mortality. The PCV in this model indicates that 61.4% and 19.4% of the variance in the odds of under-five mortality across mothers and communities respectively was explained by birth order/birth interval. This is also an indication that the composition of the households by birth order/interval of the children is responsible for part of the clustering of child mortality within mothers.

Model 3 added mother's age at birth, mother's education and place of residence. The risks of dying for children of Traditionalist mothers remained persistently higher (OR=1.73 [95% CI 1.07, 2.79]) than that of children of Christian mothers. The risk of dying for first births was attenuated (OR =1.44 [95% CI 1.21, 1.99]) and the risk for children of high birth order/interval (5+ birth order and short birth interval of <24 months) remained unchanged at twofold (OR=2.11 [95% CI 1.56, 2.84]) the risk for children of Christian mothers. Children of high birth order/interval (5+ birth order and high birth interval of 48+ months) had a lower risk of dying than children of the

**Table 3. Individual- and community-level contextual factors associated with under-five mortality by mother's religious affiliation in Nigeria from multivariable multilevel logistic regression models**

Variables	Model 0 <sup>a</sup> (Null model)	Model 1 <sup>b</sup> (Religion)	Model 2 <sup>c</sup> (Child-level variables)	Model 3 <sup>d</sup> (Mother-level variables)	Model 4 <sup>e</sup> (Community-level variables)
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
<b>Fixed effects</b>					
<b>Individual characteristics</b>					
<i>Religion</i>					
Traditional/other		2.23 (1.37, 3.62)**	2.16 (1.34, 3.50)**	1.73 (1.07, 2.79)*	1.72 (1.06, 2.79)*
Islam		1.35 (1.13, 1.61)**	1.29 (1.08, 1.54)**	1.08 (0.88, 1.33)	0.92 (0.70, 1.19)
Christian		1	1	1	1
<i>Birth order/birth interval</i>					
First birth (order 1)			1.36 (1.08, 1.71)**	1.44 (1.21, 1.99)**	1.59 (1.24, 2.05)***
Order 2–4 & <24 months			1.17 (0.88, 1.55)	1.18 (0.89, 1.57)	1.17 (0.89, 1.56)
2–4 & 24–47 months			1	1	1
Order 2–4 & 48+ months			0.73 (0.49, 1.07)	0.72 (0.49, 1.07)	0.74 (0.49, 1.09)
Order 5+ & <24 months			2.55 (1.96, 3.33)***	2.11 (1.56, 2.84)***	1.96 (1.45, 2.64)***
Order 5+ & 24–47mths			1.25 (0.96, 1.64)	1.04 (0.79, 1.36)	0.97 (0.74, 1.28)
Order 5+ & 48+ months			0.75 (0.52, 1.09)	0.59 (0.39, 0.88)*	0.57 (0.38, 0.85)**
<i>Mother's age</i>					
15–18				0.76 (0.50, 1.16)	0.69 (0.45, 1.05)
19–23				0.99 (0.78, 1.26)	0.95 (0.74, 1.21)
24–28				1	1
29–33				1.00 (0.79, 1.28)	1.02 (0.79, 1.30)
≥34				1.28 (0.99, 1.66)	1.34 (1.04, 1.74)*
<i>Mother's education</i>					
No education				1.96 (1.52, 2.54)***	1.71 (1.28, 2.28)***
Primary				1.72 (1.34, 2.22)***	1.68 (1.28, 2.21)***
Secondary or higher				1	1
<i>Place or residence</i>					
Rural				1.46 (1.21, 1.76)***	1.25 (1.02, 1.53)*
Urban				1	1
<b>Community characteristics</b>					
<i>Community mother's education<sup>f</sup></i>					

Table 3. Continued

Low					0.98 (0.74, 1.31)
High					1
<i>Community hospital delivery</i>					
Low					1.23 (0.99, 1.54)
Middle					1
High					0.66 (0.49, 0.89)**
<i>Community child immunization<sup>†</sup></i>					
Low					1.13 (0.91, 1.39)
Middle					1
High					1.01 (0.77, 1.31)
<i>Region of residence</i>					
North Central					1
North East					1.26 (0.94, 1.70)
North West					1.18 (0.87, 1.59)
South East					1.10 (0.74, 1.64)
South South					1.43 (0.99, 2.08)
South West					0.95 (0.64, 1.41)
<b>Random effects</b>	<b>Null</b>	<b>Religion</b>	<b>Child-level</b>	<b>Mother-level</b>	<b>Community-level</b>
Community-level					
Variance (SE)	0.253 (0.074)**	0.216 (0.069)*	0.204 (0.067)*	0.145 (0.061)*	0.114 (0.057)*
VPC (%)	6.6	5.7	5.6	4.1	3.2
Explained variation (PCV) (%)	Reference	14.6	19.4	42.7	54.9
Mother-level					
Variance (SE)	0.316 (0.137)*	0.270 (0.134)*	0.122 (0.127)	0.107 (0.123)	0.114 (0.121)
VPC (%)	8.2	14.6	3.4	3.0	3.2
Explained variation (PCV) (%)	Reference	7.1	61.4	5.9	63.9
<b>Model fit statistics</b>					
DIC	4808	4800	4746	4719	4702

Note. <sup>a</sup>Model 0 contained no variables; <sup>b</sup>Model 1 added religion; <sup>c</sup>Model 2 adjusted for birth order/birth interval; <sup>d</sup>Model 3 additionally adjusted for mother's age at child birth, and mother's education; <sup>e</sup>Model 4 additionally adjusted for region of residence, community mother's education, community hospital delivery and community child immunization.

<sup>o</sup> Percentage of mothers that delivered in a hospital facility in the sampling unit.

<sup>y</sup> Percentage of mothers with secondary or higher education in the primary sampling unit.

<sup>†</sup> Percentage of children that were fully immunized in the sampling unit.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

VPC = variance partition coefficient; DIC = deviance information criterion; SE = standard error; OR = odds ratio; CI = confidence interval.

Source: 2003 Nigeria Demographic and Health Survey.

reference group (2–4 birth order and medium birth interval of 24–47 months). Children of mothers with no education and with primary education had a 96% (OR=1.96 [95% CI 1.52, 2.54]) and 72% (OR=1.72 [95% CI 1.34, 2.22]) higher risk of dying respectively, compared with children of the reference group (mothers with secondary or higher education). Children of mothers residing in rural areas had a 46% higher risk of dying (OR=1.46 [95% CI 1.21, 1.76]) compared with children of mothers in urban areas.

In comparison to Model 2, the variation in under-five mortality persisted across communities and remained significant ( $\tau = 0.145$ ,  $p = .018$ ). The intra-community correlation became smaller than in Model 2 (4.1%), indicating that mother's education and place of residence accounted for some of the community-level variation in under-five mortality. Intra-mother correlation remained basically unchanged at 3.4%. The PCV in Model 3 indicates that 42.7% of the variance in the odds of under-five mortality across communities, and 5.9% of the variance in the odds of under-five mortality across mothers, were explained by characteristics at the mother-level. This is another composition effect of mother's characteristics within communities.

### Objective 3: Determine Whether Contextual-Level Variables Account for Variation in Under-Five Mortality among the Religious Groups

Model 4 added the effects for the four contextual-level variables for the sampling area: community mother's education, community hospital delivery, community child immunization and region of residence. The risk of dying for children of Traditionalist mothers remained significant and unchanged (OR=1.72 [95% CI 1.06, 2.79]). The risk of dying for first births was attenuated (OR=1.59 [95% CI 1.24, 2.05]), and the risk was reduced for children of 5+ birth order and short birth interval of <24 months (OR=1.96 [95% CI 1.45, 2.64]). The risk for children of 5+ birth order and long birth interval of 48+ months remained unchanged, and lower (OR=0.57 [95% CI 0.38, 0.85]) than that of the reference group. Children of mothers 34 years or older now had a 34% higher risk of dying (OR=1.34 [95% CI 1.04, 1.74]) than children of mothers 24–28 years of age at childbirth, whereas this had been insignificant in the previous model. The risks were slightly reduced for children of mothers with no education (OR=1.71 [95% CI 1.28, 2.28]) and primary education (OR=1.68 [95% CI 1.28, 2.21]) compared with children of mothers with secondary or higher education. The risk was slightly reduced for children of mothers residing in rural areas (OR=1.25 [95% CI 1.02, 1.53]) compared with children of mothers in urban areas.

Community hospital delivery was significantly associated with under-five mortality across religious groups. Children of mothers residing in communities with high a percentage of hospital delivery had a 66% lower risk of dying (OR=0.66 [95% CI 0.49, 0.89]) compared with children of mothers in communities with a low percentage of mothers who delivered in hospital.

In comparison to Model 3, there was a persistent significant variation in under-five mortality across communities ( $\tau = 0.114$ ,  $p = .045$ ). The intra-community correlation reduced further compared to that in Model 3 (3.2%), while the intra-mother correlation remained basically unchanged at 3.0%, signifying that differences in the PSUs regarding the average under-five mortality are partly due to differences in distribution of religious groups across PSUs. The PCV in Model 4 showed 54.9% of the variance in the odds of under-five mortality across communities and 3.2% of across mothers, which were both mainly composition effects. Mother-level variance was largely explained by child-level variables. Community-level variance was mainly explained by religion and other mother-level variables.

As indicated by the smaller values of deviance information criterion (DIC) with each successive model, our model fits the data very well. This implies that the individual- and community-level variables in our model increased the ability of the multivariable multilevel logistic model to explain variations in the odds of under-five mortality by religious affiliation of the mother.

## Discussion

In summary, our findings indicate that

1. There is significant variation in under-five mortality across contexts;
2. There is an association between religion and under-five mortality, and this relationship is considerably attenuated by sequentially adjusting for other risk factors, especially birth order/birth interval, mother's education and place of residence;
3. Under-five mortality indeed varies significantly across communities;
4. Contextual-level factors account for religious variation in under-five mortality over and above the individual characteristics of the mother or child;
5. The effect of religion on under-five mortality at the individual-level is significantly random across communities; and
6. Characteristics of the community (community hospital delivery) influence the effect of religion on under-five mortality, in that children of mothers residing in communities with an overall high percentage of mothers who delivered in hospital are at lower risk of dying compared with children of mothers in communities with a low percentage of hospital delivery.

Estimated proportions indicated significant differentials in under-five mortality among the different religious groups in birth order/birth interval, mother's age at child birth and mother's education. Multilevel logistic regression analysis controlled for individual- and contextual-level factors, and showed that children of Traditional/other mothers have a higher risk of dying before their fifth birthday compared to children of Christian mothers. This could be attributed, at the individual level, to the religious differences in birth order and birth interval, mother's age at childbirth and mother's educational level, which is in agreement with a recent study (Antai et al. 2008). First births, and high order/interval births (i.e., 5+ birth order and short birth interval of <24 months; and 5+ birth order and long birth interval of 48+ months) were found to be significantly associated with an increased risk of under-five mortality. This is in agreement with previous studies that show an inverse relationship between first births, births with short intervals and child mortality rates (Lawoyin 2001; Madise and Diamond 1995; Manda 1999). Child mortality has been shown to be associated with high birth order and short interval births, given that rapid succession of births may deplete the reproductive and nutritional resources of the mother, leading to a higher incidence of premature and weaker births. Increased transmission of infections among closely spaced siblings has also been implicated (Das Gupta).

Older mothers (34 years and older) were associated with higher risk of under-five mortality. This is an expected finding and could be explained by the U-shaped curve shown by the relationship between maternal age (at birth) and neonatal, post-neonatal, infant and under-five mortality. Similar findings have been reported in previous studies (Howlander and Bhuiyan 1999; Woelk et al. 1993). Education of the mother emerged as an important determinant of religious differentials in under-five mortality and is in line with several recent studies (Antai et al. 2008; Caldwell and Caldwell 1993; Madise and Diamond 1995).

Residence in rural areas was associated with an increased risk of under-five mortality. Rural residence is often associated with geographic barriers to maternal and child healthcare services (e.g., immunizations, hospital delivery), unemployment, poverty and lack of health-promoting information, and is an important determinant of child mortality. Similar results have been reported from other studies in developing countries (Rutherford et al 2009; Sastry 2004). The association of a high level of community hospital delivery with the lower risk of under-five mortality in this study is in line with expectations, given that timely access to maternal healthcare (hospital delivery) is one of the most important preventive measures of maternal and child deaths (Khan et al. 2006; WHO 2003; Shakya and McMurray 2001). Community hospital delivery is also an indication of the quality of care received by the mother and infant during delivery and an important determinant of under-five mortality as a whole.

Policy measures to reduce child health inequities due to social factors such as religion must consider the importance of the context in which mothers in these communities live. Healthcare interventions to counter these determinants of child health inequities, such as improving the quality

and access to healthcare services and improving maternal education, among others, should therefore be community-specific.

### Conclusions

Results of this study reaffirm the need for studies into community-level determinants of child health outcomes. Health interventions need to be tailored toward underlying community-level determinants of child health outcomes, rather than focusing on changing health-seeking norms and practices among members of the different religious groups.

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# Bacteriological Assessment of Stethoscopes Used by Medical Students in Nigeria: Implications for Nosocomial Infection Control

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## Abstract

Our study assessed bacteria on swabs taken from the surface of the diaphragm of stethoscopes used by medical students in Nigeria. We found bacterial contamination on 80.1% of the stethoscopes. *Staphylococcus aureus* and *Pseudomonas aeruginosa* were major isolates. Bacterial colonization was highest among stethoscopes cleaned with only water and those never cleaned with any agent or never cleaned at all. The difference was statistically significant ( $\chi^2 = 31.9$ ,  $p < .05$ ). Stethoscopes from students who cleaned them after use on each patient and from those who practised handwashing after contact with each patient had significantly lower bacterial contamination ( $\chi^2 = 26.9$ ;  $p < .05$  and  $\chi^2=31.9$ ,  $p < 0.05$ , respectively). Isolates of *Staphylococcus aureus* showed the highest susceptibility to antibiotics, while the most effective antibiotics were Ciproflox and Erythromycin. Integration of stethoscope care in the training curriculum of medical schools will enhance the control nosocomial infections.

## Introduction

It is estimated that at any one time more than 1.4 million people worldwide are suffering from infections acquired in hospitals (nosocomial infections) (Tikhomirov 1987; Vincent 2003). Healthcare-associated infections occur worldwide and affect both developed and developing countries. Infections are considered nosocomial when they become clinically evident during hospitalization (at least 72 hours after admission) (Orrett et al. 1998). In developed countries, between 5% and 10% of patients

acquire one or more infections, and 15–40% of patients admitted to critical care are thought to be affected (Lazzari et al. 2004; Klevens et al. 2007). In resource-poor settings such as most developing countries including Nigeria, rates of infection can exceed 20% (Pittet 2005; WHO 2008), but available data are scanty and more research is urgently needed to assess the burden of nosocomial infections in developing and transitional countries. Hospital-acquired infections exact a tremendous toll, resulting in increased morbidity and mortality, and increased health care costs (Haley 1985).

Infection transmission in the hospital environment remains a significant hazard for hospitalized patients, and healthcare workers are a potential source of these infections, with many pathogens transmitted by hand and by stethoscopes (PatentStorm 2004). This is the rationale for the time-honoured advice for all to wash their hands before and after seeing each patient. However, transmission of infection through contaminated medical devices is also a possibility. Outbreaks of nosocomial infections have already been linked to devices like electronic thermometers, blood pressure cuffs, stethoscopes and latex gloves (PatentStorm 2004).

The stethoscope is commonly described as an instrument used by physicians and other health professionals to hear the sounds made by the heart, lungs and various other body organs. Stethoscopes used in hospitals by medical doctors, medical students and other health practitioners for assessing patient health have been reported as a potential vector for transmitting infections in the hospital environment in various parts of the world (Cohen et al. 1997; Zuliani-Maluf et al. 2002).

There are increasing reports of the tremendous risk of transmitting antibiotic-resistant bacteria from one patient to another from stethoscopes. Because most hospital-acquired infections are primarily nosocomial and not autoinfections (Hoogkamp-Korstanje et al. 1982), their acquisition in the hospital environment adds to morbidity, mortality, and economic costs (Parmar et al. 2004). Despite the stethoscope's universal use by medical professionals, its proper care is not emphasized enough in the medical curriculum (Osorio et al. 2000). In Nigeria, stethoscope care is hardly covered in undergraduate medical training, and even when students are taught about nosocomial infections, little or no emphasis is placed on the potential of the stethoscope to transmit infections in the hospital environment. This accounts for some of the differences in the knowledge, attitudes and practices among medical students in the use of the stethoscope and its role in nosocomiasis in Nigeria.

The objectives of this study therefore were (1) to assess stethoscope handling and maintenance practices among medical students, (2) to determine the bacterial agents that can contaminate stethoscopes used by medical students, (3) to determine the antibiotic sensitivity of bacterial isolates from stethoscopes used by medical students, and (4) to highlight the relationship between medical students' stethoscope handling/cleaning practices and stethoscope contamination and its implications for nosocomial infection control in Nigeria.

## Materials and Methods

### Study Population/Sampling Methods

The study population consisted of medical students of Ebonyi State University Abakaliki, in south-eastern Nigeria. Study participants were all in their clinical levels, that is, fourth- (400 level), fifth- (500 level) and sixth-year (600 level) medical students. We selected students at these levels because a greater part of their training consists of contact with patients in the hospital. The study took place from July 2007 to March 2008 at the Ebonyi State University Teaching Hospital (EBSUTH) Abakaliki, where the students are undergoing their clinical training. The study was approved by the Infectious Diseases Research Division of Department of Medical Microbiology of Faculty of Clinical Medicine, Ebonyi State University Abakaliki. Sampling was done in the lecture halls, just before the commencement of a lecture. Students were not informed in advance about the research in order to avoid the Hawthorne effect (where subjects improve the specific aspect of their behaviour simply because they know it is being studied). A brief talk was given on the purpose and importance of the study, and the students were encouraged to participate. The rate of compliance was very high: all who had their stethoscopes with them willingly participated. They were assured that all responses would be treated with utmost confidentiality and that the sample collection and analysis had been

designed in such a way that the information could not be linked to a specific participant.

After obtaining informed consent from each participant, we administered an anonymous study questionnaire to gather information on demography, handwashing, stethoscope usage, and handling and maintenance practices. The questionnaire was given only to students who had their stethoscopes with them. A sterile swab stick moistened in a physiological saline was swabbed all over the surface of the diaphragm of each stethoscope and transferred for analysis to the Medical Microbiology Laboratory of Ebonyi State University Abakaliki. All laboratory analyses were done within 1 hour of sample collection.

### Laboratory Investigation

The swabs were directly inoculated on blood agar and MacConkey agar. The pairs of inoculated media were incubated aerobically at 37°C for 24 hours and then examined for bacteria growth according to standard protocol (Cheesbrough 2000). Bacteria were isolated by assessing colony characteristics and Gram reaction and by conducting catalase and coagulase tests; hemolysis, sugar fermentation, and other biochemical tests including indole production, citrate utilization and urease activity; triple sugar iron (TSI) agar test (for glucose, sucrose and lactose fermentation); gas and hydrogen sulphide production tests; and oxidase tests, according to protocols described previously (Cheesbrough 2000). Three or more colony forming units (CFU) were considered before assigning species as a contaminant.

Bacteria isolates were subjected to antibiotic sensitivity analysis using disc diffusion methods (Cheesbrough 2000; WHO 2003) with a commercially available disc (Optun Laboratories Nig Ltd., Lagos Nigeria). Discs for Gram-positive organisms contained the following antibiotics: Ciproflox, Nofloxacin, Gentamycin, Lincocin, Streptomycin, Rifampin, Floxapen, Erythromycin, Chloramphenicol and Ampiclox. Discs for Gram-negative organisms contained the following antibiotics: Tarivid, Peflacin, Ciproflox, Augumentin, Gentamicin, Streptomycin, Ceporex, Ampicillin, Septrin and nalidixic acid. These antibiotics are commonly used in Nigeria and are available at drug stores in the study area.

### Statistical analysis

Differences between proportions were assessed by chi-square analysis. Statistical significance was set at 0.05.

### Results

A total of 201 medical students participated in this study, and 201 stethoscopes from these students were examined, 61 from 400-level students, 88 from 500-level students and the remaining 52 from 600-level students. Of these stethoscopes, 161 (80.1%) had bacterial contamination. The various bacteria isolated and the rates of contamination are presented in Table 1. There was no case of mixed infection. The stethoscopes from the 600-level students were the most contaminated, but the difference was not statistically significant ( $\chi^2 = 5.25$ ,  $df = 2$ ,  $p > .05$ ) (Table 2). Participants' demographic information was related to stethoscope contamination (Table 3), and the result showed a higher proportion of contamination among the stethoscopes from males, individuals above 40 years old and students who were married. However, differences observed with respect to sex ( $\chi^2 = 1.74$ ,  $df = 1$ ,  $p > .05$ ), age ( $\chi^2 = 0.20$ ,  $df = 2$ ,  $p > .05$ ) and marital status ( $\chi^2 = 0.06$ ,  $df = 1$ ,  $p > .05$ ) (Table 3) were not significant.

Stethoscope usage, handling and maintenance (cleaning) practices were related to bacterial contamination (colonization) (Table 4). When colonization was related to the last time the stethoscope was cleaned prior to the survey, the most bacterial colonization was found on stethoscopes that had never been cleaned (93.9%), while the least was found on stethoscopes cleaned 1 week or less (29.2%) before the survey. Statistical analysis showed a significant difference in the trend ( $\chi^2 = 51.9$ ,  $df = 4$ ,  $p < .05$ ). When the cleaning agent was related to stethoscope colonization by bacteria, results showed the highest colonization among stethoscopes cleaned with only water (78.6%) and those

never cleaned with an agent or never cleaned at all (89.9%); the lowest colonization was found among stethoscopes cleaned with methylated spirit (52.5%) and soapy water (50.0%) (Table 4). Again, statistical analysis showed a significant difference in the trend ( $\chi^2 = 31.9$ ,  $df = 3$ ,  $p < .05$ ).

**Table 1. Bacteria isolates from stethoscopes of medical students**

Bacteria isolates	No. (%) isolates	95% confidence interval
<i>Staphylococcus aureus</i>	67 (41.6)	32.8, 50.4
<i>Pseudomonas aeruginosa</i>	49 (30.4)	24.2, 36.6
<i>Escherichia coli</i>	19 (11.8)	5.6, 18.0
<i>Enterococcus faecalis</i>	26 (16.1)	9.9, 22.3
Total	161 (80.1)	74.6, 85.6

**Table 2. Relationship between students level and bacteria contamination of stethoscopes**

Students level	No. of stethoscopes examined	No. (%) of stethoscopes contaminated	95% confidence interval
400 level	61	51 (83.6)	74.8, 92.4
500 level	88	74 (84.1)	75.3, 92.9
600 level	52	36 (69.2)	56.8, 81.6
Total	201	161 (80.1)	74.6, 85.6

**Table 3. Relationship between students demographic parameters and bacteria contamination of stethoscopes**

Parameters assessed	No. of stethoscopes examined	No. (%) of stethoscopes contaminated	95% confidence interval
<b>Sex</b>			
Male	114	95 (83.3)	76.5, 90.1
Female	87	66 (75.9)	66.9, 84.9
Total	201	161 (80.1)	74.6, 85.6
<b>Age</b>			
≤30	167	133 (79.6)	73.4, 85.8
31–40	27	22 (81.5)	66.3, 96.7
>40	7	6 (85.7)	59.7, 111.6
Total	201	161 (80.1)	74.6, 85.6
<b>Marital status</b>			
Single	159	127 (79.9)	73.7, 86.1
Married	42	34 (81.0)	69.1, 92.9
Total	201	161 (80.1)	74.6, 85.6

**Table 4. Relationship between stethoscope cleaning and handling practices and bacteria contamination of stethoscopes**

Parameters assessed	No. of stethoscopes examined	No. (%) of stethoscopes contaminated	95% confidence interval
<b>Last time stethoscope was cleaned</b>			
≤1 week ago	24	7 (29.2)	11.0, 47.4
2–4 weeks ago	41	31 (75.6)	62.5, 88.7
5–8 weeks ago	16	14 (87.5)	71.3, 103.7
≥8 weeks ago	21	16 (76.2)	58.0, 94.4
Never cleaned	99	93 (93.3)	89.1, 98.7
Total	201	161 (80.1)	74.6, 85.6
<b>Agent used to clean stethoscope</b>			
Soapy water	8	4 (50.0)	15.5, 84.5
Methylated spirit	40	21 (52.5)	37.5, 67.9
Water only	14	11 (78.6)	57.1, 100.1
No agent/never cleaned	139	125 (89.9)	84.7, 95.1
Total	201	161 (80.1)	74.6, 85.6
<b>Frequency of stethoscope cleaning</b>			
Once daily	12	4 (33.3)	6.3, 60.3
Once weekly	25	12 (54.5)	35.0, 70.0
Once monthly	22	17 (77.3)	59.8, 94.8
Once yearly	10	9 (90.0)	71.4, 108.6
>Once yearly/never	132	119 (90.2)	85.0, 95.4
Total	201	161 (80.1)	74.6, 85.6
<b>Stethoscope cleaning after each patient</b>			
Yes	18	6 (33.3)	11.8, 54.8
No	183	155 (84.7)	79.5, 89.9
Total	201	161 (80.1)	74.6, 85.6
<b>Handwashing after each patient</b>			
Yes	21	7 (33.3)	12.7, 53.9
No	180	154 (85.6)	80.4, 90.8
Total	201	161 (80.1)	74.6, 85.6

Stethoscope colonization by bacteria was lowest on stethoscopes cleaned once daily (33.3%), compared with those cleaned once yearly (90.0%); the difference was statistically significant ( $\chi^2 = 41.8$ ,  $df = 4$ ,  $p < .05$ ). A total of 18 students reported cleaning their stethoscope after each

patient. Results showed that 33.3% of their stethoscopes were colonized, while 84.7% of stethoscopes from individuals who did not practise this cleaning habit were colonized (Table 4); the difference was statistically significant ( $\chi^2 = 26.9$ ,  $df = 1$ ,  $p < .05$ ). Students who practise handwashing after each patient had statistically significant lower bacterial contamination on their stethoscopes compared with those who did not wash their hands (33.3% vs. 85.6%;  $\chi^2 = 31.9$ ,  $df = 1$ ,  $p < .05$ ).

The antibiotic sensitivity test indicated that the bacterial isolates were resistant to most of the antibiotics assessed (Table 5). Isolates of *Staphylococcus aureus* showed the highest susceptibility (susceptible to Ciproflox, Streptomycin, Erythromycin, Tarivid, Augmentin, Ceporex). The most effective antibiotics were Ciproflox and Erythromycin.

**Table 5. Antimicrobial susceptibility test of bacterial isolates from stethoscopes**

Antibiotics	Abbreviation	Concentration	Bacteria isolates			
			<i>S. aureus</i>	<i>P. aeruginosa</i>	<i>E. faecalis</i>	<i>E. coli</i>
Ciproflox	CPX	10 mcg	66.7	33.3	33.3	33.3
Nofloxacin	NB	30 mcg	R	R	R	R
Gentamycin	CN	10 mcg	R	R	R	R
Lincocin	LC	30 mcg	R	R	R	R
Streptomycin	S	30 mcg	33.3	R	R	R
Rifampin	RD	10 mcg	R	R	R	R
Floxapen	Flx	30 mcg	R	R	R	R
Erythromycin	E	30 mcg	33.3	R	33.3	33.3
Chloramphenicol	CH	20 mcg	R	R	R	R
Ampiclox	Apx	30 mcg	R	R	R	R
Tarivid	Ofx	10 mcg	33.3	R	R	R
Peflacin	PEF	10 mcg	R	R	R	R
Augmentin	Au	30 mcg	33.3	33.3	R	R
Ceporex	CEP	10 mcg	33.3	R	R	R
Nalidixic acid	NA	30 mcg	R	R	R	R
Septin	SXT	30 mcg	R	R	R	R
Ampicillin	PN	30 mcg	R	R	R	R

R = resistant.

## Discussion

The high rate of stethoscope contamination (80.1%) observed in this study indicates that the stethoscopes used by the students could be vectors playing a major role in transmitting microorganisms in the hospital environment. This was not surprising since nearly 50% of the students had never cleaned their stethoscope, largely due to the lack of emphasis on stethoscope cleanliness in their training. Earlier studies have also indicated that insufficient emphasis on consistent stethoscope disinfection practices in the medical curriculum are responsible for the high rate of bacterial contamination on stethoscopes of medical students, physicians and other health workers (Zuliani-

Maluf et al. 2002; Osorio et al. 2000). A number of studies have demonstrated that 71% to 100% of stethoscopes analyzed were colonized by various species of bacterial agent (Cohen et al. 1997; Zuliani-Maluf et al. 2002; Bernard et al. 1999; Jones et al. 1995; Marinella et al. 1997; Saxena et al. 2005; Smith et al. 1996; Wright et al. 1995).

The spectrum of organisms isolated in this study was also isolated in a number of previous studies (Zuliani-Maluf et al. 2002; Sanders 2003; Madar et al. 2005). Of the bacteria isolated from stethoscopes in this study, *Staphylococcus aureus* was the most common. Previous investigations have found it on 15.8% to 89% of stethoscopes surveyed (Marinella et al. 1997; Saxena et al. 2005; Genné et al. 1996; Sengupta et al. 2000; Sood et al. 2000). An earlier report showed that *Staphylococcus* has developed resistance to conventional antibiotics (WHO 2000), and the findings of our study confirm this. The antibiotic sensitivity test conducted in our study indicated that all the isolated bacteria showed high level of resistance to most of the antibiotics assessed. This is worrisome and a serious public health concern in developing countries, including Nigeria, where dysfunctional health services, inadequate drug supplies, non-adherence to treatment strategies, self-medication and dubious drug quality all favour the emergence and sustenance of microbial resistance (WHO 2000; Uneke and Ogbu 2007). It is well proven that these antibiotic-resistant microorganisms are capable of initiating severe nosocomiasis in a hospital environment and could require contact isolation and aggressive treatment to prevent their spread (Gupta et al. 2004; Gastmeier et al 2003; Kerr et al. 2002; Lange et al. 2000).

Our finding reinforces the dire need to revisit the medical curriculum with the view to integrating adequate stethoscope care as a strategy of controlling nosocomial infections. This is imperative, as a number of studies have shown that when medical students graduate to health workers, only 0–3% of them clean their stethoscopes regularly (Marinella et al. 1997; Saxena et al. 2005; Sengupta et al. 2000; Breathnach et al. 1992). In one study, 10% of healthcare workers cleaned the stethoscope only when blood or human secretions soiled it, and only two out of 100 cleaned it at intervals of 1 to 2 months (Parmar et al. 2004).

In most healthcare settings the prevention of nosocomial infections is given serious consideration. Unfortunately however, primary attention to preventing nosocomial infections is usually paid through high-risk invasive diagnostic tools and therapeutic healthcare procedures. The importance of simple procedures such as hand hygiene and less critical healthcare tools including stethoscopes tends to be underestimated (Sengupta et al. 2000; Madar et al. 2005). By the virtue of their constant contact with patients by touch and by their stethoscopes, healthcare workers and medical students become potential sources of hospital-acquired pathogenic agents. All need to wash their hands before and after seeing each patient. Failure to do so could facilitate the introduction of pathogens on any device that the health worker uses frequently, such as the stethoscope.

Our study demonstrates the importance of hand hygiene. The rate of bacterial contamination was lower on stethoscopes of medical students who practised handwashing after each patient, and the difference was significant ( $p < .05$ ). This was not unexpected since most hospital-acquired pathogens are transmitted from patient to patient via the hands of healthcare workers (Larson 1988). Handwashing has been shown as the simplest and most effective, proven method to reduce the incidence of nosocomial infections (Pittet 2000). However, despite being one of the most basic, as well as the most vital infection control measure, it is one of the most neglected practices (Bryan 1986; Pittet et al. 1999; Harris et al. 2000). Identifying effective methods to improve the practice of handwashing would greatly enhance patient safety and result in a significant decrease in hospital-acquired infections.

Stethoscopes from students who cleaned them after seeing each patient had significantly lower rate of bacteria contamination ( $p < .05$ ). Previous studies have shown that this practice substantially reduces the potential of bacteria transmission by stethoscopes (Marinella et al. 1997; Saxena et al. 2005; Sood et al. 2000). Our study demonstrates the importance of cleaning the stethoscope with a disinfectant. There was comparatively less bacterial colonization on stethoscopes of students who used soapy water and methylated spirit as cleaning agents. An earlier study showed that bacte-

rial colony counts were significantly reduced from the stethoscope diaphragm after cleaning with isopropyl alcohol, sodium hypochlorite or benzalkonium chloride (Marinella et al. 1997). Another related report indicated that cleaning the stethoscope diaphragm resulted in immediate reduction in the bacterial count: by 94% with alcohol swabs, 90% with nonionic detergent and 75% with antiseptic soap (Jones et al. 1995). Cleaning with soap and water would be the simplest and most convenient method of disinfecting the stethoscope (Africa-Purino et al. 2000).

## Conclusion

In conclusion, this study makes a case for including stethoscope care in the training curriculum of medical schools. Furthermore, it has been suggested that hospitals need to develop more rigorous programs and protocols for stethoscope disinfection as a standard of care (Bernard et al. 1999). Implementing policies that would facilitate strict adherence to stethoscope disinfection practices by health workers and medical students on their clinical postings will minimize the rate of nosocomial infections and improve the safety of patients, healthcare workers and any other person in the hospital environment.

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# Re-positioning the Role of Traditional, Complementary and Alternative Medicine as Essential Health Knowledge in Global Health: Do They Still Have a Role to Play?

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## **Abstract**

Traditional, complementary and alternative medicine (TCAM), drawn from indigenous medical and/or healing knowledge systems from around the world, has for the last 30 years been recognized by the World Health Organization (WHO) as providing culturally acceptable, affordable and sustainable primary healthcare. TCAM knowledge has been known for some time to assist with birthing practices, acute injuries, infectious diseases and parasites. Although the focus on TCAM began in earnest by the WHO in 1978, and was re-emphasized between 2002 and 2008, TCAM has for the most part been overlooked in large-scale international health programs.

This paper follows recent global interest in TCAM and examines notable developments that have specific relevance for TCAM integration in global primary healthcare. Drawing on established work by Bodeker and others, we focus on how TCAM is used in the context of health promotion, disease

prevention and the reduction of infectious diseases. Specific examples include the use of TCAM practitioners for HIV/AIDS prevention awareness and direct treatment of AIDS-related symptoms; the use of TCAM herbs for the treatment of malaria and the use of home herbal gardens for health maintenance. The final contribution of the paper helps to theorize inherent challenges and possible solutions to integrating TCAM into global health that have not been widely discussed to date.

## Introduction

Traditional, complementary and alternative medicine (TCAM)<sup>1</sup> is now a recognized focus of inquiry across a wide range of disciplines within the biomedical and social sciences. Aspects of TCAM research include basic science and clinical outcome studies examining mechanisms of action and biomedical evidence of efficacy; epidemiological and demographic analyses of disease patterns and use of TCAM; and, most recently, policy analysis relating to the integration and regulation of TCAM with biomedicine – what is being called integrative medicine (IM) and/or integrative healthcare (IHC). Indeed, TCAM research is now recognized as a fast-developing field of inquiry full of new areas for exploration. Yet critical scholars are commenting frequently that TCAM research is consistently dominated by certain paradigms or modes of inquiry, most notably of reductionism stemming from the widespread global entrenchment of the biomedical paradigm across many fields of healthcare research. As Bodeker and Burford state:

In establishing policy, these fundamental theoretical underpinnings of traditional health systems may either be respected and perpetuated, or converted into a biomedical expression and agenda. These approaches result in very different prospects for traditional medical knowledge and its continuity as a cultural health care resource (Bodeker and Burford 2007: 4).

Indeed, one of the most widespread observations by critically informed scholars today is that the majority of evidence models for TCAM have consistently relied on laboratory and outcome studies of mechanism of action and strictly controlled design models that are considered at the top of the evidence-based medicine pyramid. Of particular consequence is that within this pyramid, internally consistent TCAM paradigms and explanatory models, on the whole, do not fit and are discounted as legitimate knowledge (see Harding 1998; Hollenberg and Muzzin 2008). The hegemony of biomedical knowledge is also felt, for example, in the Cochrane Review online database of TCAM research, where meta-analyses of TCAM studies conclude that nearly all TCAM modalities reviewed are clinically ineffective or “require more research.” It is not surprising, then, that the dominance of biomedical modes of inquiry into TCAM has left important pockets of TCAM completely unexplored, marginalized or poorly researched. One of these pockets is the role of TCAM in global health. Global health is understood to refer to healthcare important to populations around the world, especially for those most vulnerable and marginalized from the formal health system, with relevance to diverse aspects of health, illness, disease and wellness.

By choosing the title phrase “re-positioning the role of TCAM” in global health, our main argument is that despite having entered the limelight once again in the international health arena, TCAM remains stigmatized in a way that is not an accurate or fair representation of its full potential for the health of world populations. Thus, by “re-positioning TCAM,” we are proposing that a shift is required to view TCAM more legitimately as an essential health resource for both local communities and wider populations alike. In focusing on the potential and future roles of TCAM, we represent a group of like-minded scholars and healthcare practitioners who recognize the importance of TCAM in international and global health.

In focusing on TCAM, we are aware that we have immediately entered a complex debate that has been ongoing since the WHO targeted TCAM as a primary healthcare resource in 1978. TCAM is

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<sup>1</sup> Although now having various acronyms (e.g., CAM, CM, TM, CIM, etc.), “TCAM” is now widely used by the World Health Organization (WHO), and also includes traditional Chinese medicine (TCM).

neither a pure and untapped resource that will become the “new” primary healthcare technique to rid the world of disease, nor is it merely a vehicle to be appropriated by biomedical knowledge, with TCAM having no richly detailed and clinically effective health knowledge of its own. It is clear that TCAM does have merit, both in the context of primary healthcare and as clinically effective traditional health knowledge. Moreover, as anthropologists have long noted, the issue of “evidence and efficacy” in TCAM remains contentious in many fields of inquiry. Whether it is biomedically recognized or not, in certain contexts TCAM clearly has the ability to affect physical disease categories in ways that closely resemble a biomedical “cure,” and that could be recognized by both biomedical doctors and traditional healers alike. Yet biomedically recognized forms of TCAM represent only a part of what TCAM would consider “effective.” For TCAM, the amelioration of suffering is at times a complex interplay between the relief of physical symptoms and health on multiple other levels that include changes to psycho–emotional–spiritual states and re-integration with one’s family or community. Perhaps baffling to biomedicine, TCAM often recognizes that there could exist “healing without cure” and that healing can comprise multiple and intricate processes (Waldram 2008).

The purpose of this paper is thus to (a) re-examine the role of TCAM in the context of global health by highlighting specific areas where it can be viewed as important, (b) draw on these examples to critically re-position TCAM as legitimate and essential knowledge for global health initiatives today, and (c) discuss, by drawing on a more critical theoretical perspective, the inherent challenges to TCAM that are restricting it from being viewed as an essential part of international health projects.

## Background

It is important to clarify the differences between *traditional* medicine (TM) and *complementary/alternative* medicine (CAM). TM refers to long-standing indigenous systems of healthcare found mostly in developing countries and among the indigenous populations of industrialized countries, where humanity is more directly linked with nature and the environment on a day-to-day basis, where knowledge is often passed down orally through generations, and where the focus is often to restore balance to body, mind and society (Bodeker 2006). As Bodeker et al. further explain:

In most developing countries, traditional health systems are grounded in long-standing cultural and spiritual values. Traditional health knowledge extends to an appreciation of both the material and non-material properties of plants, animals and minerals. Its classificatory systems range in scope from the cosmological to the particular, in addressing the physiological makeup of individuals and the specific categories of *materia medica* (the materials used for therapeutic purposes) needed to enhance health and well-being. Mental, social, spiritual, physical and ecological factors are all taken into account (Bodeker et al. 2007a: 11).

Although clearly related, complementary/alternative medicine (CAM) refers to systems of healthcare distinct from biomedicine that are practised in rich, “developed” nations and may or may not include systems or parts of TM. For example, traditional Chinese medicine (TCM) is the TM system in China; however, TCM and/or acupuncture (a part of TCM) are viewed as a type of CAM when practised in North America, the United Kingdom, Israel and Europe. Although many definitions of TM and CAM continue to be offered and often co-exist, a clear distinction can be made here. Further, biomedical healthcare modalities such as chiropractic, massage therapy, naturopathy and homeopathy, while related to TM, are clearly CAM systems. The majority of the discussion that follows will largely focus on TM in non-Western healthcare settings, as it is TM in particular that has been most overlooked in global health.

As Bodeker (2006) states, the use of TM can be thought of as responding to two fundamental questions: (1) How can countries address the health needs of their people without continuing to rely on expensive, imported medicines? and (2) How can local, existing systems of healthcare be utilized to provide basic health services to rural and poor communities? A now often-cited statistic

is that up to 80% of citizens in non-Western countries use some type of TM for direct primary healthcare needs (although this figure would of course vary country by country). For example, approximately 60% of individuals with HIV/AIDS in sub-Saharan Africa use TM (UNAIDS 2000). The range of TM modalities includes herbal medicines (all forms), physical therapy and other body practices (e.g., massage and acupuncture), meditation, spiritual practices and strategies contributing to health promotion and prevention (e.g., women's health, birthing practices and midwifery). TM also has an extremely wide application, as demonstrated by the indigenous Aboriginal population of North America, who used over 500 medicinal plants to treat such illnesses as wounds, skin eruptions, stomach complaints, coughs/colds/fever, rheumatism/arthritis, freezing/frostbite, burns, cancer, blood poisoning, toothaches and others (Clarke 2004). Contemporary Aboriginal healthcare practices in North America continue to use surviving TM knowledge in the form of herbal and other medicinal practices.

### **Tracing the Patterns of TCAM Marginalization**

A second significant observation that should be noted early on when discussing TCAM is that although it is widely used by millions of citizens globally, its use is not reflected and/or incorporated into the majority of government-funded international health campaigns initiated by Western or "rich" nations (Bodeker and Burford 2007). This conservative biomedical policy, which is ongoing, can be traced to an exclusive reliance on biomedically centred evidence models and, further, rests upon an epistemological bias against indigenous knowledge that stems from colonial times (Harding 1998). This biomedical bias can be viewed theoretically as a major reason why TCAM is not included as an essential aspect of Western-based international health projects, despite use of TCAM globally, often as the first source of care. Following detailed work by anti/post-colonial scholars such as Harding (1998) and Shiva (1993, 1997), we see the colonial view of TCAM as the major "diagnostic problem" leading to the current concept of TCAM in international/global health programs. As anti/post-colonial scholars often note, valuable and legitimate ideas that originate in Southern countries often do not receive the attention they deserve in the "global debate" and are viewed with no confidence. Yet Southern ideas consistently retain the capacity to rebuild local patterns of development (Jentsch and Pilley 2003).

Since 1978, a major part of TCAM, that of traditional medicine, has been recognized by the WHO as important for advances in global health. Recent TM policy documents have been generated (e.g., WHO 2002; WHO 2008) emphasizing the role of TM in healthcare systems. At the same time, the main prevention approach for major global diseases such as HIV/AIDS enacted by development leaders, including UNAIDS, the WHO and most aid organizations, is increased access to biomedical forms of drug-based treatment, such as antiretroviral (ARV) drugs, not TM. Critically informed anthropologists question why the "evidence" and/or science of TM is not included in international development policy and projects. As Pigg states:

Often it is simply assumed, without seeking evidence, that only the medical solutions offered by development save lives, when, in fact, it remains a matter for research and debate just how "efficacy" is to be evaluated and what sorts of medical techniques and therapeutic systems, in precisely what kinds of social contexts, alleviate bodily suffering "best" (Pigg 1995: 49).

As Kaboru et al. (2008) further comment, what remains to be resolved is how this consistent biomedical orientation to large-scale international health projects will operate in various non-Western targeted countries, where biomedical healthcare is out of reach financially to many, and staff are in short supply, overwhelmed or simply non-existent. Physician-to-population ratios in many areas of the world are sometimes as low as one physician for every 100,000 citizens (Bodeker 2006), and the world lacks, in general, 4.1 million health workers.

As Pigg comments:

Mainstream development programs that work with indigenous knowledge ... manage the circulation of discourses in ways that ensure that development knowledge seems to count everywhere, while indigenous knowledge counts in only limited and carefully controlled ways (Pigg 1995: 49).

In certain areas of healthcare policy dealing with TM (e.g., Homsy et al. 2004; WHO 1990; UNAIDS 2000), TM is viewed as a targeted resource discussed as part of scaling up efforts to control diseases such as HIV/AIDS and malaria. The main approach, continuing to reflect a biomedical bias toward TM, is to retrain traditional health practitioners (HPs) to deliver biomedical primary healthcare skills and services, such as public health education and counselling, and condom distribution in the case of HIV infections (see King 1999; Peltzer et al. 2006; UNAIDS 2000). Although biomedical training for traditional HPs remains important, in the minority are new approaches that focus on biomedical HPs and traditional HPs learning together and from each other (see Kaboru et al. 2006) and working together for the general good of their shared populations.

Even with focused efforts toward a more balanced approach to the professional interface between biomedical and traditional HPs, negative biomedical attitudes toward TM continue to surface among biomedical HPs, even in China, where TCM is protected by government policy and is a big part of shared tradition. An optimistic argument has been proposed by some to suggest that the ongoing criticism by biomedical HPs working with traditional HPs reflects a critical awareness process full of conflict and tension, which it is hoped could adapt biomedical HPs to become reflective and capable of questioning their own assumptions, and, also, become more open to new perspectives (see Kaboru et al. 2008: 121). In the professions literature, biomedical HPs are naively portrayed as simply reacting from their perspective of strong professional values that are resistant to new perspectives (Hall 2005).

### **Re-positioning the Role of TCAM from Marginalization to Importance in Global Health**

TM in particular has a long history in pre-colonial indigenous nations of treating a wide array of primary healthcare concerns, extending from first-aid-type treatment for broken bones and burns to treatment for acute physical symptoms associated with infectious diseases such as diarrhea. Much TM knowledge was lost through the direct actions of colonial powers that banned use of TM in the nineteenth and twentieth centuries when Western medicine was professionalizing and expanding globally (e.g., Ayurvedic medicine was banned in nineteenth century India – see Banerji 1981). However, numerous TM traditions and a great deal of health knowledge have re-established themselves and are now essential aspects of healthcare systems in their countries of origin. For example, in countries such as China, India, Vietnam, Japan, Korea, Nepal, Thailand and various countries in Africa (e.g., Ghana), and in many other countries and regions, significant aspects of TM are directly integrated at national levels of healthcare systems (see WHO 2002).

As will be discussed below using various examples, TM has provided and continues to provide direct forms of primary healthcare to global communities. By drawing on local resources, TM also provides important care to communities with low physician-to-population ratios and who have little access to Western biomedicine.

### **Examples of TM and Their Potential Use in Global Health**

As we have pointed out above, the efficacy of TCAM can be interpreted in a number of different ways, depending on one's theoretical orientation and what one counts as legitimate and illegitimate knowledge. The marginalization of TCAM also happens in a number of simultaneously occurring ways. TCAM is overlooked for its potential impact, recognized in only a limited fashion and ignored when biomedical results are produced. In the section that follows, we focus on the last category of biomedical forms of TCAM evidence that have been ignored and underused in international health. Following Waldram (2000) and Pigg (1995), we agree that biomedical TCAM evidence represents

only one type of “evidence” that has been marginalized in international health projects, in addition to other evidence types that include different kinds of healing, from physical to spiritual levels. We have chosen the most biomedically amenable forms of TCAM evidence to highlight that even when TCAM is “proven,” it is largely ignored. As Waldram argues:

It is essential that we comprehend the empirical nature of these medical systems and escape the lingering bonds of the antiquated view that traditional medicine can only be understood in terms of religion, superstition, and magic (Waldram 2000: 610).

For the purposes of our discussion, then, the main strengths of TM that have been overlooked in the context of global health can be generally categorized into two main areas: (1) direct symptom management and reversal of acute diseases, and (2) health promotion, management and prevention related to illness and disease and maintaining well-being. As noted, these two related strengths of TM can be viewed as an integral part of primary healthcare in which TM is used to treat between 60% and 80% of the global burden of disease (Bodeker 2006; Kaboru et al. 2006).

### Symptom Management and Acute Disease

The main point here is that despite the widespread use of TM and integration into non-Western healthcare systems, Western international health campaigns for “big-ticket” infectious diseases such as HIV/AIDS and malaria, among others, are almost uniformly biomedical in their approach (Bodeker and Burford 2007). As HIV/AIDS and malaria are arguably the top killer diseases in non-Western countries, the use of TM for these two diseases will be summarized below. These summaries draw largely on recent in-depth analyses by Bodeker and Burford (2007) and colleagues, who are policy leaders on the use of TM in various aspects of healthcare systems.

### TM and HIV/AIDS

As Bodeker et al. (2007b) clearly outline, a wide array of TM plant-based remedies (and nutrition) have significant effects on opportunistic infections associated with HIV, sexually transmitted diseases (STDs) and on the limitation and/or destruction of the HIV virus itself. As the authors state:

As the medicinal compounds in plants have evolved as defences against bacterial, fungal and viral attack, it is self-evident that traditional systems of health care incorporate a vast array of antimicrobial compounds, many of which are already used very effectively in managing HIV-related illness (Bodeker et al. 2007b: 258).

Although TM does not yet offer a “cure” for HIV, significant *in vitro* results as summarized by Cos et al. (2004), for example, document direct antiviral effects, such as interference with the HIV enzyme responsible for viral replication in the body.

Of equal importance to direct cellular interference with the HIV virus is the ability of TM to stimulate and/or modulate the body’s immune system.<sup>2</sup> As Bodeker et al. state:

Many plants used in traditional medicine have immunomodulatory or immunostimulant properties, which can potentially contribute a great deal to the well-being of people living with HIV/AIDS. Even if the HIV-1 virus cannot be directly inactivated or killed, altering the activity of other components of the human immune system – such as the complement system, macrophages, dendritic cells, helper T cells, natural killer (NK) cells, polymorphonuclear (PMN) leukocytes, and B lymphocytes – may compensate to some extent for the loss of the CD4+ T-cells that are destroyed by the virus (Bodeker et al. 2007b: 260).

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<sup>2</sup> The use of TM referred to here is as an “immunostimulant” or “immunomodulator”.

As the authors document, three well-known medicinal plants from TM traditions in India, China and North America used to aid the immune system compromised by HIV include (1) various parts from the neem tree in India (*Azadirachta indica*), (2) an isolated polysaccharide from the Chinese herbal root *Astragalus membranaceus*, and (3) the now well-known *Echinacea purpurea*, originally used in Aboriginal populations in North America (Bodeker et al. 2007b).

The third and fourth uses of TM in the treatment of HIV are the control of HIV-related opportunistic infections and the ability of TM to promote weight gain among those living with HIV. Two of the most damaging infections to people living with HIV/AIDS are caused by the fungus *Candida albicans* and the bacterium *Mycobacterium tuberculosis* (TB). Concerning the latter, Cos et al. (2004) document the use of a molecule derived from *Calophyllum lanigerum*, a plant used in TM that, to date, is the only identified compound found to fight both drug-resistant TB and HIV viruses simultaneously (Bodeker et al. 2007b). TB can be an unfortunate but common occurrence among immune-compromised people living with HIV/AIDS.

Substantial advances in African traditional medicine using combinations of TM plant remedies have also demonstrated significant weight gain in up to 85% of patients in one study of 62 Senegalese patients from the Ivory Coast (see PROMETRA 2003, in Bodeker et al. 2007b). African TM multi-compound plant remedies have also demonstrated substantial combination effects, including not only weight gain, but also in reducing viral loads of various patient samples (e.g., from 99% to 66%), boosting white cell (CD4) counts (e.g., from 100% to 400%) and reducing fevers and diarrhea (Bodeker et al. 2007b).

### TM and Malaria

Malaria currently infects approximately 300 million people per year, with over two billion febrile episodes resembling malaria annually (Willcox and Bodeker 2007). One of the most deadly types of malaria, *Plasmodium falciparum*, causes more deaths in young African children than any other infectious agent. Combining inter-related social factors such as poverty and the various effects of rural geography of living areas, malaria also accounts for nearly 60% of deaths in the poorest 20% of the world's population, often at the worst of times, such as just before harvest season (Willcox and Bodeker 2007).

Although chloroquine remains the most effective antimalarial in the laboratory environment, chloroquine-resistant malarial parasites have now occurred widely, mirroring the threefold increase of malarial deaths in Africa since 1980 (Willcox and Bodeker 2007). Although insecticide-treated bed nets are now getting wide distribution, at least 40% of the world's population are without access to antimalarial drugs, while lack of political will has severely limited drug-based antimalarial programs.

While certain strains of malaria have been genetically mapped, the cost for reverse-engineered drugs and vaccines will be prohibitive to local rural populations. As noted by Willcox and Bodeker (2007), effective TM measures are available to the poor but have received very little attention from the "big players" in the malaria world. The authors argue:

History has proven traditional medicine to be the surest source of effective anti-malarials. *Chinchona* and *Artemisia annua* have provided the basis for two of the three main classes of anti-malarials, and there is evidence that many other plants contain useful anti-malarial agents. Herbal remedies have several potential advantages, perhaps most importantly, that they are readily available and affordable. Patients, even in the remotest areas, could be empowered to cultivate, prepare and administer effective herbal anti-malarials, thus freeing them from dependency on unreliable supplies of modern medicine from the outside world (Willcox and Bodeker 2007: 242).

The herb *Artemisia annua* has particular relevance in the global control of malaria. Although the active ingredient, artemisinin, has been isolated and prepared as a pharmaceutical form, again it remains expensive and inaccessible to local populations. The herbal preparation of *A. annua*,

however, is much easier to grow and prepare locally and is now being explored widely (Willcox and Bodeker 2007). Although slightly less effective than the synthetic artemisinin, the synergistic effects of the raw herb bioflavonoids represent multiple agents with antimalarial compounds that also prevent development of bacterial resistance. Thus, a wide-scale development program of the raw form of *A. annua* may prove to be the most effective global antimalarial strategy to date. The use of TM herbs for malaria may now be essential in the face of rampant, fake antimalarial drugs and speculation about new strains of artemisinin-resistant malaria now emerging.

### Home Herbal Gardens

Home herbal gardens refer to one aspect of local health traditions usually employed in rural or non-Western communities where, worldwide, thousands of medicinal plants are grown for local use at the residential level. The main types of health problems that can be addressed with home herbal gardens include cold, cough, fever, diarrhea and dysentery, cuts, wounds, insect bites and women's reproductive health (e.g., dysmenorrhea).

Home herbal gardens are viewed as essential components of TM and primary healthcare. For example, in parts of India, Hariramamurthi et al. (2007) report that a typical primary healthcare centre covering 30,000 citizens receives only 30,000 rupees per year, averaging only one rupee per year for each person who may attend the centre. In contrast to this paucity of biomedically based primary healthcare, Hariramamurthi et al. note that:

In India, Local Health Traditions (LHTs) exist in rural communities. There are hundreds of millions of households and more than a million village healers who know about the use of ecosystem resources of plants, animals and minerals for human, veterinary and plant health. It has been documented that in India, 4635 ethnic communities, including one million folk healers, use around 8000 species of medicinal plants (Hariramamurthi et al. 2007: 169).

Select home herbal garden programs have been initiated in various parts of India and now reach more than 6000 villages and hamlets, with approximately 150,000 of these gardens in operation (Hariramamurthi et al. 2007). Establishment of home herbal garden programs includes a participatory community and healthcare provider approach that invites community members and traditional and biomedical HPs to pool their evaluative knowledge of effective medicinal plants in the community. Qualitative and quantitative evaluations have revealed that home herbal gardens are used largely by women and children in extremely poor communities as effective responses to cough, cold and fever (Hariramamurthi et al. 2007). In addition to being effective, these gardens have also proven economical and accessible and, as such, contribute to poverty alleviation by reducing community health expenditures on foreign drugs and healthcare services. It is evident that the cultivation of *A. annua* for malaria could easily be implemented through the home herbal garden framework.

### TM and Health Promotion/Prevention

In addition to the strengths of TM to treat infectious diseases and acute symptoms, TM has always had a wide application in the promotion of health and the prevention of disease and illness in various communities around the world. Traditional HPs, historically, were rooted in a shamanistic healing tradition that linked physical symptoms with the wider social community and to the community's norms and/or mythology. Anthropologists have long documented the role of the local shaman as a combination of healer and cultural broker of social and health relationships in the community, inherently engaging aspects of both health promotion and awareness of the prevention of disease. Caution is always needed when assessing the strengths and weaknesses of any community member designated as "healer," be it a Western doctor or indigenous shaman. The point is that the significance of TM in the context of health promotion/prevention has been noted in the continued widespread use of traditional birth attendants (TBAs) and in the use of traditional HPs to promote HIV/AIDS awareness.

Although still limited to a biomedical approach, traditional HPs have become important for HIV public health education throughout countries in Africa. As Bodeker et al. state:

Traditional health practitioners are often excellent community educators – making important contributions to ongoing HIV/AIDS prevention programmes, increasing condom use, and helping to eliminate risky behaviours. Their high level of community acceptance and respect makes them ideal for such a role (Bodeker et al. 2007b: 257).

For example, one South African program that trained 1510 traditional HPs in 1997 to provide HIV/AIDS awareness reported reaching nearly one million clients within its first 10 months (Green 1997; Bodeker et al. 2007b). Perhaps the most well-known and often-cited example is that of the Ugandan NGO Traditional and Modern Health Practitioners Together against AIDS (THETA), established in 1992. Other similar efforts are occurring in Kenya (WOFAK) and Tanzania (TAWG). As Bodeker et al. note:

THETA has conducted workshops to share knowledge on AIDS prevention and also treatment of opportunistic infections using local herbal remedies. Traditional healers participating in clinical observational studies of their herbal medicines have subsequently sought training in prevention, education, and counselling issues as well as in basic clinical diagnostic skills (Bodeker et al. 2007b: 269).

Also occurring in the health sector context of public health/health promotion methods are the activities of traditional birth attendants. TBAs are active in nearly every WHO region, for example, in 36 countries in the WHO African Region. Bodeker et al (2007c) discuss how Malawi has integrated TBAs into its national health policy since the 1970s. As noted, biomedical primary healthcare approaches have largely focused on training TBAs in biomedical techniques, with sanitation techniques and the recognition of the warning signs of an impending emergency having been of most value for reducing maternal and infant mortality. TBA knowledge, such as the use of hammocks, has in some instances “retrained” biomedical physicians and forged new partnerships between TBAs and obstetricians (Davis-Floyd 2000).

### **Discussion: Theorizing about Challenges to TM in Global Health**

Thus far this paper has argued that, historically and currently, the role of TM has consistently been overlooked and/or neglected in global health initiatives, despite the above-stated strengths that include direct treatment of infectious diseases and health promotion/disease prevention strategies. Arguably, the major reason for this lack of inclusion can be directly linked to an epistemological bias within biomedicine and Western science that devalues the worth of indigenous knowledge and even ignores it when presenting evidence-based information. The devaluation of indigenous health knowledge has created a “conceptual gap,” leaving the potential use of TM in global international health endeavours largely unaddressed.

Although WHO documents have possibly expanded the awareness of TM in the international health community, the response to TM that can be viewed in the international biomedical health literature continues to reflect a reductionist biomedical bias. Moreover, it is fair to say that the majority of policy issues involving TM as endorsed by the WHO have yet to be widely implemented by international health projects “on the ground,” also a likely symptom of the continued biomedical bias against TM. This lack of engagement can be repeatedly observed even with the renewed emphasis on TM by new leaders in the WHO. While stating that “traditional medicine can also help prevent so-called modern lifestyle diseases such as diabetes, heart disease and mental disorders,” WHO leaders insist that “Many traditional medicines have an inadequate evidence base when measured by these [biomedical] standards” (Scharf 2008). For example, health researchers around the world who are working directly with TM in HIV/AIDS patient populations are frustrated with

this contradictory agenda (see Kaboru et al. 2006).

From the pervasive conservative biomedical tradition that has “invaded” international health policy making, TM is viewed colonially as a resource only to be cautiously explored for its potential benefit to increase the effectiveness of biomedical primary healthcare techniques. From the biomedical perspective, the inherent challenge of TM is how to use a valuable resource while attempting to tame or restrict its “wild,” uncontrollable qualities (such as perceived side effects and the misguiding of patients to ineffective treatments). Biomedical critics of TM are quick to ask that if TM can treat infectious diseases like malaria and HIV/AIDS, why has there not been an eradication of these diseases worldwide? The main response to this critique is that while TM is certainly not a “cure all” for infectious disease and drugs are certainly important, TM *can* have efficacy in locally embedded contexts. At the same time, however, the widespread therapeutic effect of local knowledge has been marginalized through colonization, with the overall consequence that TM is undervalued in today’s biomedical and international health communities.

The inherent biomedical bias against TM has additional consequences that directly affects relationships between patients and traditional and biomedical HPs. Just as with CAM in more industrialized nations, patients using TM are hesitant to disclose their use of TM when consulting a biomedical HP, such as in a more formal primary healthcare clinic. Relations between biomedical and traditional HPs have historically been strained, with little communication and cross-referral, similar to tensions between biomedical HPs and CAM providers.

For example, a recent study by Kaboru et al. (2008) evaluated a pilot dialogue-building intervention involving traditional and biomedical providers focusing on STDs and HIV/AIDS care in Ndola, Zambia. The study is the most recent to report statistically significant changes in attitudes to and practices of collaboration between traditional and biomedical HPs. On a positive note, after the intervention 32% more biomedical HPs thought it acceptable to refer a patient to a traditional HP, and 34% more biomedical HPs agreed that traditional HPs can provide good counselling to HIV-positive patients and that biomedical and traditional HPs could easily work together (Kaboru et al. 2008).

Positive changes among traditional HPs were also observed. Nearly 75% more traditional HPs agreed that biomedicine was good for patients with STDs/HIV than before the intervention, and 60% more traditional HPs agreed that it is acceptable for them to refer certain patients to biomedical HPs (Kaboru et al. 2008). Certain results as summarized in data tables, however, were not extensively discussed or analyzed.

While biomedical HPs thought it acceptable to refer patients to traditional HPs, biomedical HPs’ opinion of the effectiveness of TM for patients *decreased* after the intervention, in addition to a decrease in the belief that they could learn new knowledge from traditional HPs (Kaboru et al. 2008). Traditional HPs, on the whole, were perceived by biomedical HPs as being able to convey only biomedical *counselling* to patients, not clinical TM. Perhaps sensing biomedical distrust, the opinion of traditional HPs that biomedical HPs “look down” on them only decreased slightly after the intervention, while 34% *less* traditional HPs thought biomedical HPs were “good people” (Kaboru et al. 2008: 115). In an attempt to maintain optimism, the authors appear to focus on the more positive findings while downplaying the more negative ones that need to be theorized further. A subtle form of co-optation seemed to be occurring, as referrals by traditional to biomedical HPs doubled after the intervention, while those from biomedical to traditional HPs remained non-existent (Kaboru et al. 2008). These contradictory findings continue to reflect the observation that biomedical recognition of TM is couched within a limited recognition of the actual clinical effectiveness and worth of TM knowledge.

The targeting of traditional HPs by foreign development planning has been shown by anthropologists to cause more harm than good, despite “good intentions.” As Pigg (1995) has shown, the category of “traditional HP” can be a Western creation imposed upon various communities with community healers, with the effect that this new category becomes foreign to the community itself through Western misinterpretation and reification of community concepts. At the same time as the

traditional HP category is created and appropriated from a community tradition, traditional health knowledge is devalued in a subtle and yet direct way. As Pigg explains, in Nepal:

Local ideas and practices thus enter into development planning as something to be scrutinized and judged, while the medical message is presented as unassailable. There is little scope for dialogue or an exchange of ideas. Information flows from biomedical obstetrics to Nepalese women, but not from Nepalese women to cosmopolitan obstetrics. The training programs reinforce an asymmetry between the ideas and practices of the trainees and medical knowledge, despite calls to listen to the midwives themselves (Pigg 1995: 56).

### **Establishing Policy Solutions for TM in Global Health?**

Although there are many challenges ahead to re-positioning TM as an essential health resource in international health, it is useful to consider a different approach that might be taken in the future. We propose that at the outset, TM must be considered on its own as legitimate and coherent systems of locally embedded healing knowledge with relevance to the local communities in which it is used. Although this stance does not preclude its wider application to global populations (e.g., the use of the TCM herb *Artemisia* for malaria), TM can be most effectively used at the community level in which it originated and is practised. While TM is certainly not a panacea, substantial areas of health and wellness can be maintained with its use, as noted above. TM also has the inherent strength of being able to work with or alongside other health measures and does not need to be altered by a biomedical agenda. For example, modified and culturally sensitive public health measures such as clean water, effective housing and shelter and access to viable food sources form an ecological system that promotes the efficacy of TM and the health of communities in which it is practised. Evidence already exists demonstrating that when TM is altered and/or synthesized for its component parts, not only does it become less effective, it also contradicts the bio-ethical tenet of non-maleficence by causing increased harm in patient populations (that is, increased side effects and/or pathogen resistance, such as *artemisinin* for malaria).

Viewing TM as both legitimate and clinically effective health knowledge re-positions TM in ways in which it has not previously been widely viewed. For example, this perspective moves past a purely ethnographic viewpoint that classifies TM as only a cultural practice without clinical benefit. It also re-conceptualizes TM as having a healing benefit, not only as a vehicle for biomedical retraining. Some scholars are combining TM, activism and “ecological” perspectives in the development community. As Trickett explains:

[A] new perspective is emerging that localizes interventions in specific sociocultural community contexts, focuses on how preventionists can collaborate with local citizens and organizations, and locates specific interventions in the context of a long-range strategy for community development. Here the emphasis is increasingly on the sociocultural community context, drawing attention to those extra-individual forces and resources which affect the lived experience in communities... The goal of the perspective involves impact at the community as well as individual level. The task is to design interventions which both aid populations at risk and contribute to the development of community resources for longer-range local development. Such longer-range resources can include preventive interventions self-consciously designed to leave a community infrastructure in place when the specific intervention has run its course. They may involve creating new community settings designed to serve hard-to-reach populations. Resources are also created when the skill level of local citizens recruited to carry out preventive interventions is enhanced (Trickett 2002: 158–9).

Trickett (2002) proposes movement away from macro-level international health campaigns toward ecological community-level interventions that directly address community issues by engaging community context and create interventions by enhancing local resources (but without changing

or appropriating them, as Pigg [1995], has cautioned).

Thus, the best way forward could be to forge partnerships between traditional HPs who practice TM and biomedical HPs associated with international primary healthcare projects. Policy makers such as Kaboru et al. (2006) have already imagined how partnerships could operate, despite these professional patterns of interaction having yet to be implemented in many areas of the world. For example, Kaboru et al. argue for the clinical education of both traditional and biomedical HPs in each other's basic knowledge and/or respective paradigms in a way that does not alter or take away the knowledge of traditional HPs, nor does it give biomedical HPs a monopoly on patients. Modified degrees of international policy intervention could also be implemented to recognize when an operational TM system requires little or no assistance from biomedical primary healthcare and, also, when biomedical HPs could be useful, based on community input. Many of these challenges and scenarios mirror developments in integrative medicine where biomedical and CAM practitioners are working together in the same clinic (see Hollenberg 2006, 2007). Although far from resolving the above challenges, IM in more industrialized healthcare settings and countries has identified ideals that while perhaps utopian include such concepts as "trust," "respect" and establishing a "seamless continuum of care."

It should also be re-emphasized that a handful of countries, as pointed out by the WHO, have established systems of TM and biomedicine that already work alongside each other and are at times approaching patterns of integration. For example, China has fully functional TCM–Western IM hospitals. Though there are advances here, even China has not escaped the effect of biomedical marginalization of TCM (see Unschuld 1998; Scheid 2002), pointing to the need to re-position TM as essential knowledge. In China, TCM knowledge is becoming viewed as inferior to Western science and technology. Certain TCM techniques are also being "modified," with as yet unknown side effects. Even TCM researchers in China are being forced to modify their research designs so that their research may be published in Western scientific journals (D. Cai, personal communication, July 1, 2007).

In sum, future TM policy should take into account the following: (1) TM must be evaluated using its own internally coherent systems of healing knowledge, in the context of community-level interventions, without being altered by biomedical techniques or theory that would make the TM system unrecognizable by the respective TM practitioner; (2) TM has inherent clinically effective and pragmatic health benefits, in addition to important symbolic and cultural meaning, which are linked together and at times inseparable from each other; (3) Traditional and biomedical HPs need to work together in a way that does not devalue and/or alter the inherent worth and clinical benefit of TM knowledge and does not give biomedical HPs a monopoly on patients when primary healthcare campaigns are implemented; and (4) wide-scale TM policy initiatives at institutional and governmental levels need to recognize the above and the ongoing effect of Western science on indigenous and/or traditional healing knowledge that is altering the fundamental theoretical tenets and practice of TM worldwide.

## Conclusion

TM is often the first type of care sought by millions of people worldwide, though its place in the national and government-funded health systems of most countries is marginal, and its potential contribution to the well-being of patients and communities is under-appreciated and hardly recognized. New research continues to point to the value of TM in population and personal health, but the vastly dominant biomedical healthcare system and its providers continue to deny TM's widespread recognition and utility. It is possible that not adequately recognizing and ethically employing the strengths of TM over the last 30 years has now led to the widespread side effect of aid organizations not being able to meet their milestone goals of reducing morbidity and mortality in global communities (e.g., HIV/AIDS). For the sake of the vast number of people and communities impoverished around the world and their severe lack of professional biomedical services, it is

important to reconsider the place of TM in overall healthcare and begin to recognize its value for people worldwide.

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