

DISABILITY AND DEVELOPMENT

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A growing body of evidence suggests that social and economic benefits may be derived from addressing disability issues from a development perspective. So far, however, work in this area has tended to take place in the absence of a unifying theoretical framework for research. To begin to address this need, the World Bank has assembled a small group of distinguished Economic Development Scholars to meet with Senior Bank Staff to begin the process of drafting such a framework. This paper is intended to form the basis for this discussion, which will be centered on identifying the key components of a research agenda on Disability and Development.

THE ROOTS OF CONTEMPORARY DISABILITY POLICY AND PRACTICE

In the world's affluent countries, segregated institutional systems have evolved over time, initially to care for people with disabilities, then to rehabilitate and educate them. In due course, these systems have raised the functional capabilities of people with disabilities to levels where significant numbers have become capable of mainstream social and economic participation. However, the compartmentalization of disabled people in segregated institutional systems, together with the limited expectations on which these systems are based, have worked against the social and economic inclusion of people with disabilities by perpetuating their isolation and reinforcing longstanding negative stereotypes that to this day significantly impair their ability to make social and economic contributions.¹

These types of expensive disability systems have tended to be beyond the reach of developing countries because of their limited resources for social programs. As a result, most people with disabilities in developing countries have tended to either die, care for themselves, or be cared for by their families and friends. A select few have become clients of charity-based versions of the expensive, segregated institutions developed in the economically advantaged countries but, due to the limited resources typically available through such charities, none have ever achieved the coverage required to have a significant impact.²

Despite these institutional disadvantages, technological change is continuously in the process of improving the socioeconomic circumstances and potentials of people with disabilities. Advances in medicine, rehabilitation and assistive technology work together to increase their functional capabilities, while mainstream technological advances steadily reduce the levels of functionality required for social and economic participation. All of these processes have contributed to the emergence of a large and increasingly empowered disability community, ever more capable of advocating for increased access to social and economic opportunities. Such advocacy first led to policies and commitments on the parts of a few of the most economically advantaged countries

¹ Percy, *Disability, Civil Rights, and Public Policy*; Scotch, *From Good Will to Civil Rights*; Shapiro, *No Pity: People with Disabilities Forging a New Civil Rights Movement*; Thornton and Lunt, *Employment Policies for Disabled People in Eighteen Countries*, 298-301; and Metts, *Disability Issues, Trends and Recommendations for the World Bank*, 10-29.

² Miles, *Engaging with the Disability Rights Movement*, 502.

to “equalizing” social and economic opportunities for people with disabilities. This, in turn, led to parallel commitments by the United Nations, the European Union, the Association of Southeast Asian Nations and other important regional entities, which then spawned national commitments on the parts of most of the world’s remaining countries, resulting in what now amounts to a global commitment to equalizing access to social and economic opportunities for people with disabilities.³

Nations and international organizations are now attempting to develop policies and strategies compatible with this commitment. Unfortunately, this process is taking place within the context of a long history of negative stereotypes about people with disabilities and limited expectations about their capabilities, resulting in a global disability environment characterized by self-reinforcing combinations of social and economic discrimination; inaccessible built environments; and expensive, socially isolating, and often counterproductive disability policies and institutions.⁴ Despite the emergence of new policies and strategies to increase social and economic access for disabled people, the above factors, together with meager information, inadequate data and limited coordination of disability policies, strategies and activities, continue to result in a thin and ineffective global system of disjointed and often contradictory approaches to disability. In developing countries, these problems are exacerbated by resource scarcity, resulting in disability systems too small and ineffective to seriously impact the lives of most people with disabilities.

The roots of the global commitment to equalizing social and economic opportunities for disabled people are both humanitarian and economic. From a humanitarian perspective, it is intended to secure for people with disabilities what are generally agreed to be their basic human rights. From an economic perspective, it is expected to increase the human capital of disabled people, and thus enable them to reduce their dependence on income transfers and other forms of public support. This economic expectation embodies an appreciation of the fact that disability is a development issue.

For disability to begin to be addressed as the development issue that it is, research is now required to determine the most cost-effective ways to overcome the above obstacles and develop disability policies and strategies that increase the economic contributions of disabled people, reduce their marginalization and, in so doing, foster economic development. Such research will require a much better understanding of the disability experience than we have today, particularly those aspects of the disability experience that affect functionality and social and economic access.

UNDERSTANDING DISABILITY

Disability is a normal phenomenon in the sense that it exists in all societies, affecting predictable and identifiable proportions of each population. Therefore, it should be possible to estimate the sizes of the various disability populations, determine their needs and develop appropriate and cost-effective strategies to meet those needs. This is yet to be accomplished however, largely because disability is a complex interconnected bio-medical, social and environmental phenomenon that is yet to be fully analyzed and understood.

³ Metts, *Disability Issues, Trends and Recommendations for the World Bank*, 15-23.

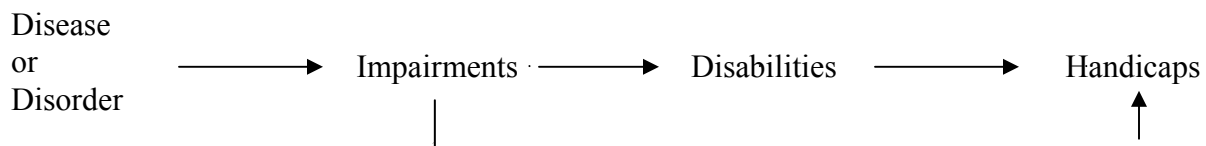
⁴ European Commission, *Guidance Note on Disability and Development*, 3.

Led by the World Health Organization (WHO), the most recent attempt to improve our understanding of disability has been underway for over twenty-five years. An important breakthrough came in 1980, when the WHO developed the International Classification of Impairments, Disabilities and Handicaps (ICIDH), which was the first conceptual framework of its kind to incorporate the influences of personal, social and environmental factors on people with disabilities. As such, the ICIDH was the first framework for analyzing disability issues to be compatible with the emerging understanding that medical restoration, rehabilitation, assistive devices and personal assistance can reduce the functional limitations of people with disabilities, and thus increase their capacity to take advantage of social and economic opportunities, and that social and environmental policies can alter the societal contexts of disability (e.g. social and economic institutions, built environments, cultures and beliefs) and thus increase the social and economic access of disabled people.

The ICIDH Framework

The ICIDH conceptualized disablement as comprising three separate but interrelated elements; impairments, disabilities and handicaps. A *disability* was defined as “a restriction or lack of ability to perform an activity in [a] manner or within [a] range considered normal for a human being.”⁵ Disabilities were seen to be caused by *impairments*, which were defined as losses or abnormalities of psychological, physiological or anatomical structure or function. Impairments and disabilities were both seen to be causally linked to *handicaps*, which were defined as disadvantages that limit or prevent the fulfillment of a role considered to be normal.

Figure 1: The Disablement Phenomena as Conceptualized in the Original ICIDH



Source: World Health Organization, *ICIDH-2*, 11.

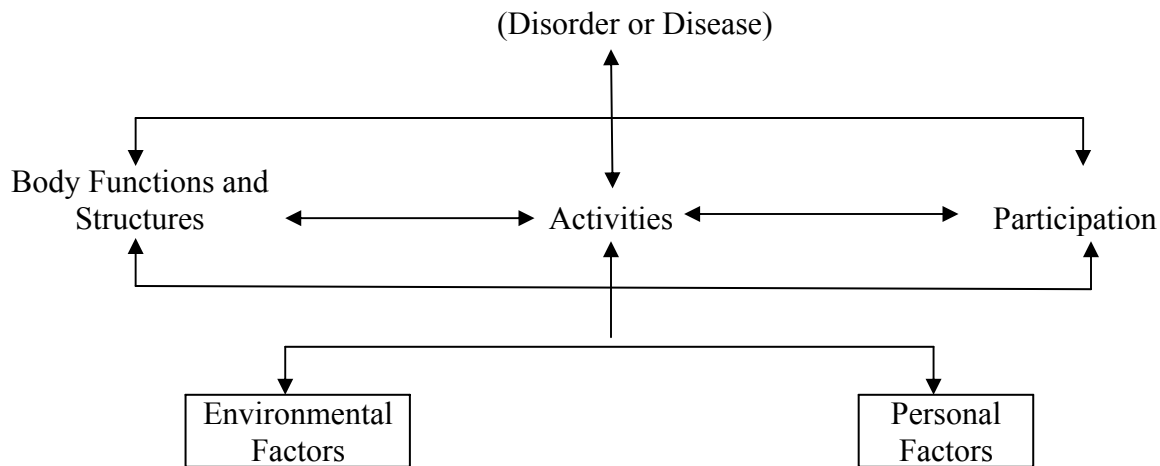
Within this framework, depicted in Figure 1, an *impairment* (caused by a disease or disorder) may result in a *disability* which, in turn, may lead to a *handicap*, as is the case when polio (a disease) results in paralysis (an impairment) which limits a person’s mobility (a disability), which, in turn, limits the person’s ability to find employment (a handicap). It is also possible for an impairment which does not result in a disability to still lead to a handicap, as is the case when a facial disfigurement (an impairment) limits a person’s ability to socially interact (a handicap), even though it does not result in a functional limitation (a disability).

The ICF Framework

In order to incorporate subsequent improvements in the understanding of the interactions between the personal, social and environmental elements of disability, the WHO engaged in a process that led to the replacement of the ICIDH with the International Classification of Functioning, Disability and Health (ICF), the framework of which is depicted in Figure 2.

⁵ UNSO, *Disability Statistics Compendium*, 1.

Figure 2
Interactions Between the Components of the ICF
Health Condition



Source: World Health Organization, *ICF*, 18.

Within the ICF framework, health conditions are defined as disorders or diseases, body structures are defined as anatomical parts of the body, body functions are defined as the physiological functions of body systems, activity is defined as the execution of a task or action by an individual, and participation is defined as involvement in a life situation. Environmental factors comprise the physical, social and attitudinal environments in which people live and conduct their lives, and personal factors include gender, race, age, fitness, lifestyle, habits, upbringing, coping styles, social background, education, profession and a variety of other possible characteristics of individuals.⁶

A person's functioning at the level of the body, and his or her ability to execute tasks (activities) and/or participate in life situations are all functions of complex relationships between health conditions and personal and environmental factors. This conceptualization allows those employing the ICF to take into account the fact that people may:

- Have impairments without capacity limitations (e.g. a disfigurement in leprosy may have no effect on a person's capacity);
- Have performance problems and capacity limitations without evident impairments (e.g. reduced performance in daily activities associated with many diseases);
- Have performance problems without impairments or capacity limitations (e.g. an HIV-positive individual, or an ex-patient recovered from mental illness, facing stigmatization or discrimination in interpersonal relations or work);

⁶ WHO, *International Classification of Functioning, Disability and Health: Introduction*.

- Have capacity limitations without assistance, and no performance problems in the current environment (e.g. an individual with mobility limitations may be provided by society with assistive technology to move around);
- Experience a degree of influence in a reverse direction (e.g. lack of use of limbs can cause muscle atrophy; institutionalization may result in loss of social skills).⁷

Though the ICF is rather cumbersome, and, therefore, remains somewhat of a work in progress, it is based on the most accurate conceptualization of disability currently available and, therefore, appears to embody the best conceptual framework available for data collection and policy research related to disability and development.

DISABILITY DATA

The ICIDH and ICF were designed to provide standardized disability definitions to be systematically employed in data collection strategies using the United Nations Framework for Integration of Social, Demographic and Related Statistics.⁸ Despite the advances in the conceptualization of disability embodied in the ICIDH and ICF, the formulation of disability policy is still significantly hampered by inadequate disability data and statistics.

Though disability researchers had been aware of the inadequacy of disability data for decades, formal evidence on a global scale was first provided by the creation of the United Nations Disability Statistics Data Base (DISTAT-1) in 1988. This database included national data from population censuses, household surveys and registration systems from 67 studies in 55 countries during the period 1975-87. The DISTAT-2, an extension of the DISTAT-1, now includes at least 179 national studies on disability from virtually all regions of the world. Unfortunately, these data have been found by researchers at the United Nations to be scarce, random and inadequate for analyses of national and regional disabled populations, or for comparisons of the circumstances of people with disabilities across social and geographic categories.⁹

Researchers at the United Nations Statistical Office (now the United Nations Statistical Division) have also found that differences in the types of disability screens employed in the survey instruments used by different countries have resulted in data unsuitable for cross-country comparisons. This problem has arisen because there have been two types of screens used by countries to identify people with disabilities, impairment screens and disability screens. Impairment screens, which ask respondents to identify losses or abnormalities of body structure or physiological or psychological function, are more prevalent in developing countries. Disability screens, which ask respondents to identify their activity limitations, are more prevalent in more economically advantaged countries. These differences in disability screens have caused a significant downward bias in the disability proportion estimates for the world's less economically advantaged countries for the following reasons:

[Disability screens] for identifying disabled persons in surveys lead to higher rates of disability than do [impairment screens]. This is because a single question assessing functional limitations, or disability, typically embraces behaviours

⁷ Ibid., 19.

⁸ United Nations, *Toward a System of Social and Demographic Statistics*.

⁹ UNSD, *The collection and dissemination of statistics on disability at the UNSD*, 4 and UNSO, *Disability Statistics Compendium*, 30.

associated with a broad range of impairment conditions. “Difficulty climbing stairs”, for example, may be due to musculo-skeletal, visceral, disfigurement or other impairments. Impairment screening questions, in contrast, are more directly related to specific conditions. For example, “profound visual impairment of both eyes”, or blindness, as well as “profound hearing loss in both ears”, or deafness, are all highly specified descriptions of relatively unique impairment conditions. It appears to be easier for individuals to initially discuss whether they have difficulty climbing stairs, or hearing conversations across a dining table, than it is to describe specific impairment conditions. In addition, disability questions seem to throw out a wider net which captures more reports of mild and moderate disablement. In order to cover the same ground that one or two disability questions can cover during a survey interview, a number of more detailed impairment questions must be utilized.¹⁰

In an effort to improve the collection of disability data in developing countries, the United Nations Statistical Division formed the Washington Group on Disability Statistics consisting of representatives from national statistical agencies. The World Bank has provided support for this group to help arrange regional meetings, subsidize the attendance of developing country representatives and to conduct field tests of the questions. The group is now working on two tasks aimed at developing disability measurements that will be comparable cross-nationally. First, in order to facilitate the gathering of basic disability information throughout the world, the group is guiding the process of developing a small set of general disability measures for use in censuses and sample based national surveys. Second, the group is preparing recommendations for extended sets of survey items related to general measures that can be used as components of population surveys or supplements to specialty surveys. The ICF framework will be used to develop the measures.

DISABILITY DEMOGRAPHICS

Measuring national, regional and global, disability populations is virtually impossible at this time due to the above-mentioned problems with disability data and definitions. More sophisticated statistical analyses of specific issues related to the demographics of disability are even more problematic. In the absence of adequate data, conflicting claims are made about total disability populations, the geographic distribution of people with disabilities, and about their age, gender, education and employment profiles.¹¹ To avoid having this discussion of the relationships between disability and development become lost in a quagmire of conflicting statistical estimates, the author will confine his discussion of the demographics of disability to general population estimates.

¹⁰ UNSO, *Disability Statistics Compendium*, 28.

¹¹ Elwan, *Poverty and Disability*, 7, 8, 10; Eide, et al, *Living conditions among people with activity limitations in Zimbabwe*, 12-13; Eide, van Rooy and Loeb, *Living conditions among people with activity limitations in Namibia*, 10; and Masset and White, “Are Chronically Poor People being Left Out of Progress Towards the Millennium Development Goals (MDG)?”, 291-2.

Global, Regional and National Disability Populations

The WHO estimates that people with disabilities represent 7-10% of the global population, with individual country prevalence rates ranging between 4% and 20%.¹² The United States Agency for International Development estimates the disabled proportion of the global population to be 10% or more.¹³ The United Nations Development Program (UNDP) estimates the disability prevalence to be 9.9% in High Human Development (HHD) countries, 3.7% in Medium Human Development (MHD) countries and 1% in Low Human Development (LHD) countries.¹⁴

Table 1:
Estimated Ranges of Populations of People with Disabilities

Human Development Category	Total Disability Population: Low Estimate Using UNDP Proportions	Total Disability Population: High Estimate Using UNDP Proportions	Total Disability Population: Using DISTAT – 2 Proportions
High Human Development	117,942,545	117,942,545	129,260,264
Medium Human Development	156,443,309	418,591,558	103,806,478
Low Human Development	7,263,000	71,903,700	8,657,649
Total Disabled Population	281,648,854	608,437,803	241,724,238

Using the UNDP proportions and 2002 data from three sources, the author has estimated ranges for the disabled populations of 178 of the world's HHD, MHD and LHD countries or areas, and for the world as a whole.¹⁵ Table 1, which contains a summary of the results, reveals that the estimated range for the total global disabled population is between 281.7m and 608.4m persons, with between 117.9m and 129.3m residing in HHD countries, between 156.4m and 418.6m residing in MHD countries and between 7.3m and 72.0m residing in LHD countries.¹⁶

The author then estimated these disability populations again, this time utilizing United Nations data on the prevalence of disability by age and sex for 70 countries (DISTAT-2 Data).¹⁷ Using the DISTAT-2 prevalence estimates for each of these countries, the author calculated weighted

¹² WHO, *Disability and Rehabilitation*, 1.

¹³ USAID *Disability Policy Paper*, 1997, 2.

¹⁴ UNDP, *Human Development Report*, 1997, 176-77, 207.

¹⁵ See Appendix A.

¹⁶ To address the aforementioned possibility that disability prevalence may be underestimated in LHD and MHD countries, the author has employed the following sensitivity analysis. To calculate the low end of the ranges, the estimated HHD proportion (9.9%) was applied to the population data for the HHD countries, the estimated MHD proportion (3.7%) to the population data for the MHD countries and the estimated LHD proportion (1.0%) to the population data for LHD countries. To calculate the high end of the ranges the estimated proportion for HHD countries (9.9%) was applied to the population data for all of the countries in all three Human Development categories.

¹⁷ Data, for 75 countries during the period 1970-96, covering the prevalence of disability by age and sex, are now available on the United Nations Statistic Division website.

averages of the prevalence estimates in each of the Human Development Categories.¹⁸ The resulting aggregate prevalence estimates were 10.85% for HHD countries, 2.46% for MHD countries and 1.19% for LHD countries. These proportions were then applied to the total population estimates for all 178 countries for which the UNDP prevalence estimates were used. This process resulted in an estimated global disabled population of 241.7m, of which 129m were estimated to reside in HHD countries, 104m in MHD countries, and 8.7m in LHD countries.

The combined results of the two analyses suggest that the total global disabled population is between 241.7m and 608.4m, with a combined total of between 112.5m and 490.5m disabled people residing in LHD and MHD (i.e. developing) countries. The World Health Organization estimates that there are 600m people with disabilities in the world, and that 480m of them live in low-income countries.¹⁹ This would put the WHO estimate at the very highest end of the range estimated by the author.

THE ECONOMIC COSTS OF DISABILITY

Disability tends to reduce economic output by reducing or eliminating the economic contributions of certain members of society, particularly people with disabilities and their family members and close friends. The amount by which economic output is reduced in this way constitutes the net economic cost of disability. It is inappropriate when estimating the economic costs of disability to add the costs of disability activities because disability activities are economic activities, which generate economic output and income just like other economic activities. Nevertheless, expenditures on disability are typically viewed as constituting an economic burden. This likely stems from the fact that most expenditures on disability have traditionally come either from government budgets, making them burdensome to taxpayers, or charitable remittances, making them charity, which necessarily implies a burden. Also, disability services have traditionally been viewed, not as investments in people with disabilities for which society should expect a return, but as unavoidable costs for their care. This reduces the economic potential of disability activities, turning what should be investments into burdensome expenditures.

To get some idea of the magnitude of disability induced reductions in global output and income, the author has estimated the Gross Domestic Product (GDP) lost due to disability in High, Medium and Low Income Countries, and globally, by extrapolating the results of a study of GDP lost as a result of disability in Canada.²⁰

Table 2:
GDP Lost Due to Disability

Value of GDP Lost (US\$)	Low Estimate	High Estimate
High Income Countries	1,224,014,055,600	1,594,439,361,900
Medium Income Countries	377,700,686,120	492,004,841,130
Low Income Countries	110,495,236,440	143,934,584,310
TOTAL	1,712,209,978,160	2,230,378,787,340

¹⁸ See Appendix A.

¹⁹ WHO, *Disability and Rehabilitation*. Website.

²⁰ See Appendix B for the methodology employed.

Table 2 reveals the estimated range for global GDP lost due to disability to be between \$1.71 trillion and \$2.23 trillion annually, which amounts to between 5.35% and 6.97% of total global GDP.

DEVELOPMENT ORIENTED DISABILITY POLICY

Development oriented disability policies and strategies are those that seek to reduce the economic costs of disability by increasing the functionality of people with disabilities and reducing the barriers that impede their access to social and economic opportunities. They are intended to increase economic output by increasing the economic contributions of disabled people and their family members and friends who, under the present circumstances, must limit their economic activity in order to provide care in the home. Since the adverse effects on the families and friends of people with disabilities are primarily associated with being absent from the formal economy to provide such care, strategies to increase the economic potential of disabled people should also increase the economic potential of their families and friends by freeing them from this responsibility.

Such investments in disabled people are justified on economic grounds as long as the resulting increases in economic output exceed the costs of the strategies themselves. Combining the author's estimates of GDP lost as a result of disability with his global disabled population estimates reveals an estimated annual loss of output per disabled person of between \$2,814 and \$7,919. If one conservatively assumes that properly designed investments in disabled people are capable of recapturing only 50% of this loss, the world is still left with somewhere between \$1,400 and \$4,000 per disabled person per year to invest in such strategies.

The Three Stages of Physical and Social Integration

The economic potential of all people, including people with disabilities, tends to be a composite function of their functional capabilities, and their access to social and economic opportunities. To maximize their functionality and achieve the social and economic access necessary to make meaningful social and economic contributions, people with disabilities must overcome the physical, social and environmental barriers identified in the ICF, and pass through three distinct but interrelated stages of physical and social integration.²¹

In the first stage, they are concerned with surviving the disability and beginning to recover. The barriers associated with this stage tend to reside within the person. The types of institutional support associated with this stage are, therefore, primarily rehabilitative in nature and include physical and mental restoration, physical therapy, assistive technology, prosthetic devices and appliances, personal assistance, information, advocacy and training in all of the activities associated with surviving and beginning to overcome a disabling condition.

In the second stage, they must become as self-reliant as possible and gain social and economic access. The barriers associated with this stage tend to reside not only within the person, but within society and the built environment as well. The types of individual support associated with this stage are, therefore, both rehabilitative and empowering in nature, and include mobility training, assistive technology and access to housing, transportation, education, and recreation. Facilitating the passage of people with disabilities through this stage also requires the removal and prevention of architectural and design barriers and the removal of the types of social barriers

²¹ Metts, *Disability Issues, Trends and Recommendations for the World Bank*, 36-39.

that restrict people with disabilities from fully participating in their families, communities, and societies.

In the third and most advanced stage, they must gain access to the types of activities that give life meaning and purpose. For most people, this translates into some combination of productive employment, contribution to family and community, and active participation in society as a whole. This requires access to education, training and recreation, and support for employment and social participation. It also requires social policies and strategies to reduce the types of discrimination against people with disabilities that restrict their access to all types of social opportunities including education, training and gainful employment.

The Need for Comprehensive Integrated Disability Strategies

Policies and strategies to increase the economic contributions of people with disabilities must facilitate their passage through as many aspects of the three stages of physical and social integration as possible by addressing all three elements of disabling conditions simultaneously. They must also take into account the fact that disability is a very heterogeneous phenomenon.²² Some people will require specialized support services throughout their lives simply to survive. Others will require various forms of lifetime support (e.g. ongoing personal assistance services) to be consistently capable of making social and economic contributions. Still others will require specialized support services (e.g. specialized training, rehabilitation and modifications to homes and workplaces) at various times in their lives to overcome specific temporary obstacles.²³

Investments in piecemeal disability interventions will never be cost-effective because people with disabilities must pass through as many of the stages of physical and social integration as possible to be in a position to maximize the economic contributions that constitute the returns to such investments. Successfully rehabilitating disabled people will not significantly increase their education levels if they are denied access to schools. And educating disabled people will not result in their becoming productively employed if they are denied access to the workplace, transportation to the workplace or the personal assistance they need to take showers, prepare breakfasts and get ready for work.

Systematic efforts are, therefore, required to include people with disabilities in all aspects of civil society, and to remove and prevent all known avoidable social and environmental barriers. Addressing all of the elements of the disability experience in this way will require comprehensive overarching systems made up of integrated combinations of,

- Physical restoration and rehabilitation strategies,
- Inclusionary policies and affirmative strategies to include people with disabilities in mainstream health related, educational, vocational, civic and recreational activities,
- Systematic efforts to remove and prevent architectural and design barriers, and

²² Mont, *Disability Employment Policy*, 6; European Commission, *Guidance Note on Disability and Development*, 6; ILO, *Disability and Poverty Reduction Strategies*, 5.

²³ ILO, *Disability and Poverty Reduction Strategies*, 5.

- Cost-effective strategies to provide personal assistance and assistive technology.

Physical restoration and rehabilitation strategies: Physical restoration and rehabilitation strategies are necessary to facilitate the passage of people with disabilities through the first two stages of physical and social integration. In the economically advantaged countries, activities in this area tend to attract the most resources, arguably at the expense of equally important activities to alter the social and environmental contexts of disability. In developing countries where resources are scarce physical restoration and rehabilitation tend to be unavailable to most people with disabilities, with devastating consequences on their functionality and socio-economic status. Development oriented disability policies must embody a recognition of the fact that physical restoration and rehabilitation are necessary but not sufficient conditions for increasing the social and economic output of people with disabilities. Policymakers must, therefore, seek to provide them in the right amounts at the right times in combination with the remaining elements of the overarching strategy.

Inclusionary policies and strategies: People with disabilities in most societies have long been subjected to social and economic discrimination that tends to limit their access to social and economic opportunities. The misperceptions and negative stereotypes underlying this discrimination also contribute to a self re-enforcing climate of low expectations for disabled people that further limits their potential. Overcoming such entrenched discriminatory patterns requires public education and explicit policies and affirmative strategies to foster the inclusion of people with disabilities in all aspects of public life. At the institutional level such commitments are expressed through mandates to recruit and employ people with disabilities, and to design, implement, and evaluate all policies, practices and activities in ways that take into account the needs, rights, and concerns of people with disabilities.

The removal and prevention of architectural and design barriers: Architecture and the design of the built environment are key environmental factors associated with stages one and two of the process of physical and social integration. As suggested by the ICF, the environmental contexts in which disabled people live have direct impacts on their functionality, on the types of activities in which they may engage, and on the levels at which they may participate in their communities and societies.

By restricting the activities available to people with disabilities and limiting their social and economic participation, architecture and design barriers reduce their economic contributions and, therefore, contribute to lost output. They also generate indirect costs in the form of resources needlessly expended to care for disabled people who become either unemployed or under-employed as a result of such barriers, and they reduce the economic output of all members of society during periods of illness, and at times in their life cycles in which they typically experience below normal functional capabilities (e.g. infancy, childhood, motherhood and old age). This group of so-called “special needs users” is estimated by the WHO to comprise more than 25% of the world’s population.²⁴ The benefits of environmental accessibility are, therefore, the associated reductions in all three of these categories of costs.

There is evidence to suggest that the incorporation of Universal Design principles into new construction is the most cost-effective way to improve the accessibility of built environments.²⁵

²⁴ World Health Organization, *Report on Disability Prevalence*.

²⁵ See Appendix C.

Universal Design is a school of thought based on the premise that properly designed built environments cost-effectively serve a much wider range of users than do most of the built environments that exist today. Universal Design proponents argue that today's built environments are not cost-effective because they artificially create a class of special needs users requiring truly costly special provisions. Believing that it is more cost-effective to address the needs of special needs users in the basic design of projects than to add special provisions to overcome design obstacles that are unnecessary in the first place, they seek to replace traditional accessibility standards with design principles that increase access for everyone.

One of the flagships of Universal Design is the mass transportation system in Curitiba, Brazil. As part of its goal to provide a public transportation system so good that citizens would find little need for private transportation, the city incorporated Universal Design into all of its aspects. The result is a cost-effective system of busses used by disabled people in the same way as their non-disabled peers.²⁶ The 1990 modernization and expansion of the headquarters for the Lighthouse for the Blind in New York City successfully incorporated Universal Design elements, including a highly functional system for guiding blind persons within and around the facility, which included universal signage and symbology and a variety of features designed to accommodate the needs of people with other disabilities. The Lighthouse headquarters is now regarded as a "Universal Design Laboratory" and, as such, continues to generate feedback used in the development and further refinement of the Universal Design principles.²⁷

An illustration of Universal Design by default is the case of Oxo Good Grips Kitchen Utensils, which were designed for persons with limited hand function due to arthritis. The sizes of the handles were increased in a way that created a useful and esthetically attractive product with broad appeal to consumers with a wide range of functional capabilities. Oxo utensils are now marketed successfully to the general population throughout the United States.

Strategies to provide assistive technology and personal assistance services: Because disabilities involve functional limitations, it is often difficult or impossible for people with disabilities to interact with their communities and societies without assistive technology. This technology can be highly technical and disability specific. Often, however, the provision of access for people with disabilities to a mainstream technological innovation is more cost-effective than creating a specialized technology. For example, e-mail has revolutionized the communicative abilities of people with hearing impairments at a fraction of the cost of the highly specialized communication equipment previously developed for their use; and personal computers, the Internet and e-mail have increased the social and economic access of people with impaired verbal capabilities in a similarly cost-effective way. Whether they be specially designed to meet the needs of people with disabilities (e.g. Braille writers, prosthetic devices, wheelchairs and hearing aids) or innovative adaptations of mainstream technological innovations (e.g. e-mail, the Internet and personal computers), assistive technologies are vital to the process of providing social and environmental access to a significant cross-section of people with disabilities.

Many people with disabilities require personal assistance with various activities of daily living to pass through the first two stages of physical and social integration. Costs for providing such services in community settings are typically equal to or lower than the costs associated with

²⁶ Steinfeld, "Public Transportation in Curitiba, Brazil" and Alvarez, *Pathways to Accessibility*, 18-19.

²⁷ Center for Universal Design, *Universal Design File*.

institutionalized custodial care.²⁸ Moreover, personal assistance services, unlike custodial care, tend to empower disabled people to make social and economic contributions. Because the value of such contributions offsets the public costs of providing the service, investments in personal assistance services are typically more cost-effective than investments in institutionalized custodial care.

In developing countries, the consumers of assistive technology and personal assistance services tend to be poor. The markets for these things have, therefore, tended to be almost non-existent because of the poverty of the consumer base and the previously mentioned scarcity of resources for social programs. This began to change, however, with the 1976 introduction by the WHO of the concept of Community Based Rehabilitation (CBR). CBR strategies have spread throughout the developing world, and they are now as varied as the cultural settings in which they are being applied. Much has been written about CBR. For the purposes of this discussion, however, the following quotation from a researcher engaged in CBR activities worldwide sums up the current situation nicely:

There are arguably as many different types of CBR as there are programmes in existence. Most CBR programmes, however, include the following activities: the selection and training of village-based CBR workers; the identification, assessment and referral, where appropriate, of disabled children and adults; the design of aids and appliances by local craftsmen; and the teaching of simple rehabilitative techniques for use with their disabled child. Awareness raising, public education, counseling, multi-sectoral collaboration, community development and the promotion of integrated education are also key ingredients of CBR programmes. CBR may be integrated into existing health, education or social welfare structures or they may be vertical programmes run by NGOs. Increasingly CBR services are being developed at village level as part of community development programs, with relatively little input from rehabilitation professionals. Although a CBR programme may contain some or all of the ingredients discussed above, its flavour will depend upon the cultural context in which it is implemented. Each programme is therefore unique. Differences exist not only between CBR programmes in different cultures, but also between villages in one geographical area.²⁹

Disability Policy and the Millennium Development Goals

Though the rights and needs of people with disabilities are not specifically addressed in the Millennium Development Goals, at least three of them are directly relevant,

- Eradicating extreme poverty and hunger,
- Achieving universal primary education and
- Developing a global partnership for development.

²⁸ Tobis, *Moving from Residential Institutions to Community-Based Social Services in Central and Eastern Europe and the Former Soviet Union*, 29 and Fox and Götestam, *Redirecting Resources to Community Based Services*, i and 1.

²⁹ Miles, "Engaging with the Disability Rights Movement," 502-3.

Eradicating Extreme Poverty and Hunger: There is strong evidence to suggest that disabled people are typically among the poorest of the poor in developing countries. The World Bank, for example, estimates that disabled people make up from 15% to 20% of the poor in developing countries though they typically represent only 10% of the general population.³⁰ The UN estimates that 82% of disabled people live below the poverty line in developing countries.³¹ The links between disability and poverty are strong, and there is evidence that these links run in both directions.³² Disability fosters poverty by decreasing the functional capabilities of people with disabilities and limiting their access to healthcare, nutrition and social and economic opportunities, particularly education and employment. Poverty fosters disability through inadequate sanitation, malnutrition, limited availability of vaccination programs, poor hygiene, limited availability of health and maternity care, elevated exposure to risks due to war and conflict, and dangerous working and living conditions.

It appears from the data that the two targets associated with this Millennium Development Goal (halving both poverty and hunger by 2015) could be met without including people with disabilities in the effort. The result would simply be that the proportion of the poor consisting of people with disabilities would rise to between 30% and 40%. However, a United Nations study on human rights and disability completed by the Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities has estimated that the adverse affects of disability impact 25% of the entire population.³³ It appears, therefore, that if the proportion of this group that currently lives in poverty is added to the proportion of the total disabled population that currently lives in poverty, it would be difficult if not impossible to meet the poverty and hunger targets without raising the living standards of people with disabilities.

Achieving Universal Primary Education: At present, it is estimated that fewer than 2% of children with disabilities participate in the formal education system.³⁴ To achieve universal primary education, therefore, disabled children must be included.

Developing a Global Partnership for Development: Target 12, which is related to this Millennium Development Goal, is to develop further an open, rule-based, predictable, non-discriminatory trading and financial system. This includes a commitment to good governance, development and poverty reduction-both nationally and internationally. As described in the body of this paper, people with disabilities experience discrimination and elevated rates of poverty. It appears that the poverty rates for people with disabilities are so high, in fact, that the Millennium poverty reduction targets cannot be met without their reduction. Efforts to hit target 12, therefore, necessarily require international and national efforts to reduce poverty amongst disabled people, which is most efficiently accomplished through development oriented disability strategies of the kind discussed in the body of this paper.

DISABILITY PREVENTION

Prevention of disabilities contributes to economic development by decreasing the proportion of the population with the most limited capacity to make economic contributions. However, because disability prevention primarily involves preventing the causes of disability, it tends not

³⁰ Elwan, *Poverty and Disability*, 15 and World Bank, *Challenges Facing the World Today*, May 2004.

³¹ European Commission, *Guidance Note on Disability and Development*, 1.

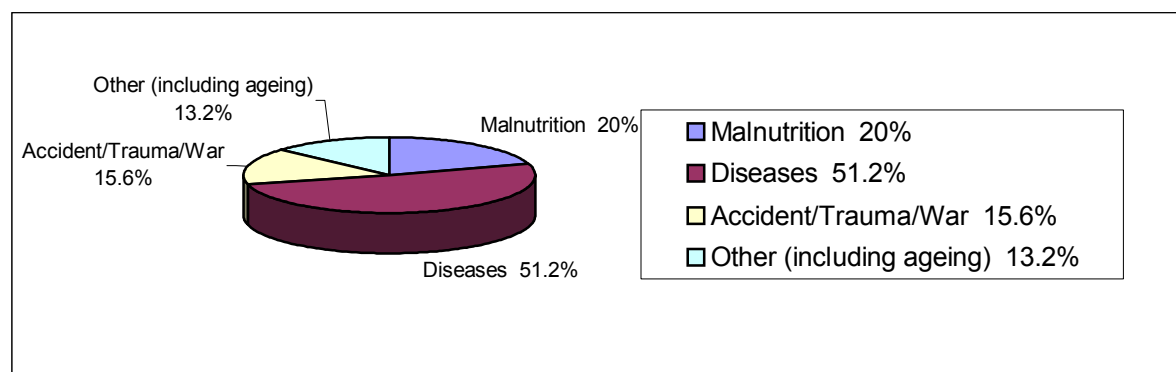
³² DFID, *Disability, poverty and development*, 3. Elwan, *Poverty and Disability*, 21-24.

³³ Despouy, *Human Rights and Disabled Persons*, as cited in DFID, *Disability, poverty and development*, 4.

³⁴ UNESCO. *Education for All: Is the World On Track?*

to be an end in itself, but instead a positive externality of successful efforts to achieve broader development goals. According to the United Nations, the primary causes of disability are disease; malnutrition; accidents, war and trauma; and other causes including aging. The proportions of total disability attributable to each cause are depicted in Figure 3.

Figure 3
Causes of Disability



Source: UN Figures in *Overcoming Obstacles to the Integration of disabled People*, UNESCO, DAA, March 1995.³⁵

Widespread malnutrition and the high incidence of disease in developing countries are both directly linked with poverty and each other. Four of the Millennium Development Goals, Eradicating Extreme Poverty and Hunger; Reducing Child Mortality; Improving Maternal Health; and Combating HIV/AIDS, Malaria and Other Diseases are directly related to these causes of disability. Two more, Ensuring Environmental Sustainability and Developing a Global Partnership for Development, have targets directly related to disease prevention. The relevant target related to environmental accessibility is to reduce by half by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation. The relevant target related to the global partnership is to provide access to affordable essential drugs in developing countries. Though the achievement of these goals and the meeting of these targets will reduce the sizes of disability populations, with all of the economic benefits attached thereto, the tasks involved are not disability activities per se, but are instead development activities, with disability related external benefits.

Three of the four other causes of disability cited by the United Nations; accidents, war and trauma, are also responsible for large numbers of disabled people in the world's poorest countries. War, especially civil war, has been shown to be highly correlated with poverty and economic decline.³⁶ Road and industrial accident rates are also higher in resource scarce environments, and the outcomes of trauma tend to be more severe due to inadequate medical care. The prevention of these causes of disability are again, however, development activities, for which reducing disability is simply an external benefit.

Policy makers and researchers typically characterize disability prevention measures as being in direct competition for resources with measures to support existing disabled populations.

³⁵ As cited in DFID, *Disability, poverty and development*, 3.

³⁶ Collier, *The Market for Civil War*, 40-45.

Resource allocations made on the basis of this misconception necessarily result in inappropriate allocations of the costs and benefits of disability prevention measures because the benefits accrue to members of society as a whole, who enjoy reductions in their probabilities of experiencing disabling conditions, while the costs accrue only to people who have already become disabled. This, of course, makes no sense, as it is illogical to saddle victims of war with the expenses associated with peace efforts, or accident victims with the costs of highway safety measures. It is equally inappropriate to burden malaria sufferers or those with HIV/AIDS with the costs of preventing malaria and HIV/AIDS. That said, it is still true that, in addition to their other economic and social benefits, efforts to prevent the causes of disability also generate the economic benefits associated with their ability to reduce disability rates.

DEVELOPMENT ORIENTED DISABILITY RESEARCH

Development oriented disability policy emphasizes increasing the economic contributions of disabled people. Therefore, the disability research agenda must be expanded beyond epidemiology, disability prevention and social protection to include the personal, social and environmental issues that affect the ability of people with disabilities to make such contributions. This involves simultaneously engaging in three general categories of research,

- *Environmental Access,*
- *Social and Economic Access, and*
- *The Provision of Disability Related Goods and Services.*

Each category requires its own specialized body of information in addition to accurate detailed demographic data. Census and household survey data must, at the very least, become internationally comparable and adequate for accurately estimating prevalence rates and geographic distributions. Additional data are then necessary to analyze disability as the heterogeneous phenomenon that it is. Disabilities vary across multiple dimensions. Therefore, disability data on at least gender, age, health, education, employment and income, are required across disability types, causes, ages at onset and impacts on functionality. Data collection and analysis in these areas should be designed to facilitate an understanding of the rehabilitation and inclusionary activities necessary to empower people in each type of disability circumstance to maximize their economic and social contributions, which can then be employed to analyze the economic impacts of competing disability policies and strategies.

Environmental Access

Evidence presented earlier suggests that there are significant economic returns to successful efforts to improve the accessibility of built environments, particularly when Universal Design principles are incorporated into new construction. Existing research on the relative costs and benefits of accessible design has demonstrated that research to evaluate the impacts of increasing the accessibility of the built environment is both valuable and easily undertaken.

Some problems do exist, however. For example, the costs of architectural and design barriers in terms of lost output are difficult to isolate from the total output lost due to disability, which is a composite function of all of the interrelated elements that limit the social and economic participation of people with disabilities. It is also difficult to measure the costs of caring for those people with disabilities who become either unemployed or under-employed as a result of

inaccessible architecture and design. This is because there are many possible strategies related to such care, including not caring for them at all, imposing responsibility for their care on their families and friends, or removing them from mainstream society to custodial care institutions. Since each strategy has its own structure of costs and benefits, the mix of approaches a society chooses affects the levels of care costs associated with the inaccessibility of its built environments.

The costs of increasing accessibility are easier to measure because improving environmental accessibility involves either retrofitting for accessibility or incorporating accessibility into the original design. The cost of retrofitting is a composite function of the configurations of the structures involved and the types of environments in which they exist. Generally speaking, the proportional cost of retrofitting a structure decreases as the size of the structure increases. The proportional cost of retrofitting a very large building or complex is usually quite small, while the proportional costs of retrofitting a small building can be much higher, occasionally approaching 20% of the building's value, especially in domestic scale buildings.³⁷ Integrating accessibility into projects at the earliest stages of the design process is almost always much less expensive than retrofitting. The cost of integrating accessibility into new buildings and infrastructure is typically very small, usually less than 1% of the capital development cost.³⁸

In light of the central importance of environmental access to the success of a development oriented approach to disability, and in light of the apparent cost-effectiveness of incorporating Universal Design principles into new construction, a significant portion of a development oriented research agenda and budget should be earmarked for research in this field. A useful initial activity for an institution like the World Bank would be to develop and employ a standardized and user-friendly research methodology for estimating and assessing the economic and social impacts of activities that affect environmental accessibility.

Social and Economic Access

The removal and prevention of social and economic access barriers for people with disabilities involves engaging in activities to increase access in all aspects of each of the following areas of civil society:

- Healthcare
- Education and training
- Employment
- Housing
- Political processes
- Legal processes
- Government services
- Transportation
- Recreation

The initial research agenda related to social and economic access should include, at the very least, strategies to measure the baseline circumstances of people with disabilities in each of these

³⁷ South African Disability Institute, *Special Housing for Disabled People*, data provided by Philip Thompson, Africa Chair, International Commission on Technology and Accessibility.

³⁸ Based on evaluations by the Department of Public Works in South Africa, presented in Appendix C.

areas of civil society, and to determine the nature of the social barriers they face in each, if any. Despite the existence of specific disability issues related to each area, there are four types of barriers that they all share:

- Barriers to physical access
- Inhibitory policies and legislation
- Discrimination
- Limited expectations

Research into disability access will necessarily involve efforts to identify and understand the effects on people with disabilities of each type of barrier in each area of civil society. It will also involve additional research into their interconnectivities. This is because the different barriers tend to act together in mutually reinforcing ways. For example, blind people were legally prevented from signing binding documents when the author first visited Kenya in 1982 because they could not see what they were signing. In this case, limited expectations resulted in discriminatory legislation that limited the ability of blind people to have checking accounts, sign employment contracts, buy houses, etc. When the author first consulted with the International Labor Organization in 1993, the street entrance of its Geneva Headquarters was not made accessible because it was for people who arrived on the bus, which was not accessible. Here, one physical barrier spawned another. In the late 1960s in the United States, when quadriplegics first begin to survive their injuries, regulations prevented them from flying on commercial airliners because it was thought that they could not physically board the aircraft. Here, a physical barrier led to a discriminatory regulation. Many more cumulative effects exist.

Research in this area necessarily spans all fields relevant to public policy. Therefore, a development oriented approach to this research must begin with systematic efforts to educate policymakers and researchers in all fields on disability issues. The Poverty Reduction Strategy Paper (PRSP) process and the system of Country Assistance Strategies used to assess needs for concessionary assistance from the World Bank and the International Monetary Fund (IMF) provide appropriate vehicles for initiating such integrated and coordinated approaches to disability, while simultaneously opening channels for disabled people to begin to have a voice in the allocation of development resources.³⁹

The Provision of Disability Related Goods and Services

The previous two categories of disability activities involved altering society as a whole to render it more accommodative to the needs of people with disabilities. This category involves providing disabled people with the goods and services required to maximize their functionality and make social and economic contributions.

For the purposes of this discussion, disability related goods and services may be viewed as falling into two broad categories. One is medical and rehabilitative in nature. Goods and services in this category include medical interventions related to physical restoration, prosthetics and orthotics. Their provision tends to be expensive because of the skills and technology involved in their production. The other category has to do with the provision of information, training, assistive technology, personal assistance and advocacy. The provision of these goods

³⁹ For an in depth discussion of the advantages of including disability issues in the PRSP process, see ILO, *Disability and Poverty Reduction Strategies*.

and services tends to be less technical and skill intensive and, therefore, less costly than those of the first type.

Since both categories involve microeconomic activities associated with providing goods and services, research in this area should focus on the traditional microeconomic issues of productive and allocative efficiency, externalities of production and consumption, and forward and backward economic linkages. Productive efficiency research in this area should be concerned with improving the quality and driving down the costs of production of physical restoration, prosthetics and orthotics, information, training, personal assistance and advocacy. Research related to allocative efficiency should be concerned with increasing the total utility derived from the mix of goods produced.

CBR deserves close scrutiny for best practices in the provision of disability goods and services not only in terms of productive and allocative efficiency, but also in terms of its ability to generate positive externalities and forward and backward linkages. Unlike formal or institution based rehabilitation strategies CBR strategies often produce unanticipated positive social and economic outcomes. For example, in a refugee camp the author visited in northern Kenya, a CBR program put in a garden for rehabilitation purposes. The garden was so successful that the eventual sale of produce funded other program activities at the camp. A charity based prosthetics producer and distributor in Nairobi recognized that its factory and office had become a gathering place for people with disabilities, and took advantage of that fact by offering the facilities to the local disability community to house a full fledged CBR program. Some programs pay family members to get their disabled children to school, thus simultaneously educating the disabled children and generating income for their families. In the resource scarce environments in which CBR is typically applied, the consumers are normally cost conscious and, often, creative. With proper incentives, these traits can be translated into increased efficiency, and constructive employment of externalities and economic linkages.

The Work of the International Development Community

The inclusion of people with disabilities in all aspects of mainstream society is a new concept that will ultimately require widespread acceptance of a new way of thinking about people with disabilities. In this way, it is much like the ongoing effort to increase social and economic access for women. The common thread that has stitched together all of the efforts around the world to provide equal social and economic access for women was the resolve of the international development community. This resolve manifested itself in policies at the international agencies themselves to include women in all aspects of everything they do, and in requirements that women be included in the work of all subcontractors and beneficiaries. The gender strategies and programs initiated by the international development institutions were designed to contain measurable objectives to be used in analyses aimed at improving future efforts.

Though the circumstances of people with disabilities are not identical to the circumstances of women, the need for explicit commitments to their inclusion in the mainstream activities of the international development organizations is at least as strong and probably stronger because of the wide range of technical issues that must be addressed to increase the functionality of people with disabilities, improve the accessibility of built environments and to increase their access to social and economic opportunities. For such a commitment to be serious and sustainable, it must be accompanied by affirmative inclusionary strategies with measurable outcomes that can be used to evaluate the strategies and improve them over time.

APPENDIX A

NATIONAL AND GLOBAL DISABLED POPULATION ESTIMATES

Using disability data collected by the United Nations Statistics Division (UNSD) and general population data collected by the United Nations Development Program (UNDP), the author has estimated the total global disabled population and the disabled populations of the 178 countries or areas that have been classified in the UNDP Human Development Index. The author has then estimated the same populations using prevalence estimates from the DISTAT-2 database.

Methodology

The disabled populations of 178 countries have been estimated by multiplying United Nations population estimates for each country by estimated disability proportions derived by UNDP in the 1997 Human Development Report.

Countries are annually categorized by UNDP as either High Human Development (HHD), Medium Human Development (MHD) or Low Human Development (LHD) using a Human Development Index (HDI) which measures a country's average achievements in three dimensions of human development: longevity, knowledge, and standard of living. UNDP has estimated the following proportional rates of disability for HHD, MHD and LHD countries:⁴⁰

HHD: 9.9%.
MHD: 3.7%
LHD: 1.0%.

It is possible to estimate the disabled population of a country by multiplying its total population by the proportional disability rate assigned to its HDI category by UNDP. Research conducted by the UNSD, however, strongly suggests that the resulting estimates of the disabled populations of the MHD and LHD countries are likely to understate their actual disabled populations because of a systematic downward bias in the UNDP disability proportion estimates caused by differences in disability data collection procedures in HHD, MHD and LHD countries.

The DISTAT-1 was the first attempt of the United Nations Statistic Office (now known as UNSD) to bring together existing national disability data from around the world. There has been no international coordination of the techniques employed in the collection of the DISTAT-1 data. The database contains disability statistics from 55 countries, collected through national household surveys, population censuses, and population or civil registration systems. UNSD research indicates that differences in the types of survey screens employed to identify people with disabilities in the survey instruments used by the different countries have caused significant downward biases in the disability proportion estimates for MHD and LHD countries. To the extent that such biases exist, they will produce downward biases in disability population estimates for MHD and LHD countries based upon the UNDP proportions.

⁴⁰ UNDP, *Human Development Report 1997*, 176-77, 207.

The problem arises because there have been two types of screens used by the participating countries to identify people with disabilities, impairment screens and disability screens. Impairment screens ask respondents to identify losses or abnormalities of body structure or of physiological or psychological function. Disability screens ask respondents to identify their activity limitations. The types of screens chosen have the following effect on the reported rates of disability:

[Disability screens] for identifying disabled persons in surveys lead to higher rates of disability than do [impairment screens]. This is because a single question assessing functional limitations, or disability, typically embraces behaviours associated with a broad range of impairment conditions. “Difficulty climbing stairs”, for example, may be due to musculo-skeletal, visceral, disfigurement or other impairments. Impairment screening questions, in contrast, are more directly related to specific conditions. For example, “profound visual impairment of both eyes”, or blindness, as well as “profound hearing loss in both ears”, or deafness, are all highly specified descriptions of relatively unique impairment conditions. It appears to be easier for individuals to initially discuss whether they have difficulty climbing stairs, or hearing conversations across a dining table, than it is to describe specific impairment conditions. In addition, disability questions seem to throw out a wider net which captures more reports of mild and moderate disablement. In order to cover the same ground that one or two disability questions can cover during a survey interview, a number of more detailed impairment questions must be utilized.⁴¹

The effects of the screens employed can be seen in Figure A.1 which compares the disability rate estimates of countries that employed survey instruments using impairment screens with those that employed survey instruments using disability screens. The disability rate estimates for countries that employed impairment screens (which ranged from 0.16% to 5.49%) were unambiguously lower than those for countries that employed disability screens (which ranged from 7.10% to 20.88%). The High Human Development countries of Europe and North America tend to employ disability screens, while the Low and Medium Human Development Countries of Africa, Asia and South America tend to employ impairment screens.⁴² Therefore, at least some of the large and otherwise unexplained differences in the UNDP disability proportion estimates for the HHD, MHD and LHD countries may be attributed to systematic differences in the types of screens used to collect disability data.

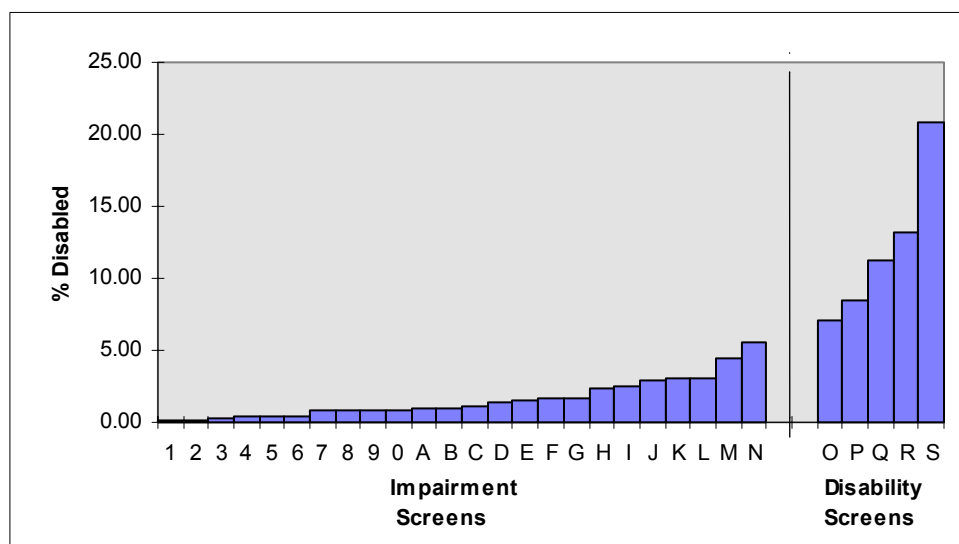
To address this problem the author has conducted a sensitivity analysis in which the estimated ranges for the disabled populations of the MHD and LHD countries were calculated. To calculate the low end of the ranges, the estimated HHD proportion (9.9%) was applied to the population data for the HHD countries, the estimated MHD proportion (3.7%) to the population data for the MHD countries and the estimated LHD proportion (1.0%) to the population data for LHD countries. To calculate the high end of the ranges the UNDP estimated proportion for HHD countries (9.9%) was applied to the population data for countries in all three Human Development categories. This was done under the assumption that the relatively high HHD proportion may have actually prevailed in MHD and LHD countries as well, but were probably

⁴¹ UNSO, *Disability Statistics Compendium*, 28.

⁴² *Ibid.*, 30.

underestimated by UNDP due to the aforementioned widespread use of impairment screens in MHD and LHD countries.

Figure A.1: Percentage Disabled by Country or Area, Year of Data Collection and Type of Screen



Country	Year	Country	Year	Country	Year
1	Peru	1981	A	Fiji	1982
2	Ethiopia	1981	B	Bahrain	1981
3	Egypt	1976	C	Indonesia	1980
4	Sri Lanka	1981	D	Turkey	1975
5	Kuwait	1980	E	Egypt	1979-1981
6	Pakistan	1981	F	St. Helena	1976
7	Thailand	1981	G	Comoros	1980
8	Tunisia	1975	H	Japan	1980
9	Hong Kong	1981	I	Swaziland	1983
0	Tunisia	1984	J	Neth. Antilles	1981
			K	Nepal	1980
			L	Mali	1976
			M	Philippines	1980
			N	Ethiopia	1979-1981
			O	Poland	1978
			P	United States	1980
			Q	Canada	1983
			R	Australia	1981
			S	Austria	1976

Source: United Nations, *Disability Statistics Compendium*, 29

To check the accuracy of the UNDP proportion estimates using what little additional data is available, the author also estimated the disability populations of 70 countries for which the United Nations provides data on the prevalence of disability by age and sex in the DISTAT-2.⁴³ Using the prevalence estimates from the DISTAT-2 for the 70 countries, the author calculated weighted averages of the prevalence estimates across the countries in each of the Human Development categories. The resulting aggregate prevalence estimates were 10.85% for HHD countries, 2.46% for MHD countries and 1.19% for LHD countries. These proportions were applied to the author's own estimates of the total population of people with disabilities for all 178 countries used to calculate the UNDP prevalence estimates.

⁴³ Data for 75 countries, during the period 1970-96, covering the prevalence of disability by age and sex are now available on the United Nations Statistical Division website. However, information for 5 countries was insufficient for use in this calculation

Results

Table A.1 presents a summary of the results. The total global disabled population using UNDP proportions is estimated to be between 281.65m and 608.44m persons; the total disabled population of the HHD countries is estimated to be 117.94m; the range for the MHD countries is estimated to be between 156.44m and 418.59m (from 55.6% to 68.8% of the total); and the range for the LHD countries is estimated to be between 7.26m and 71.90m (between 2.6% and 11.8% of the total). Using the DISTAT proportion, the total disabled population is estimated to be 241.72m, of which 129m (53.5% of the total) are estimated to be in HHD countries, 103.81m (42.9% of the total) in MHD countries and 8.66m (3.6% of the total) in LHD countries.

Table A.1: Estimated Range of Global Population of People with Disabilities

Human Development Category	Total Disability Population: Low Estimate Using UNDP Proportions	Total Disability Population: High Estimate Using UNDP Proportions	Total Disability Population: Using DISTAT – 2 Proportions
High Human Development	117,942,545	117,942,545	129,260,264
Medium Human Development	156,443,309	418,591,558	103,806,478
Low Human Development	7,263,000	71,903,700	8,657,649
Total Disabled Population	281,648,854	608,437,803	241,724,238

The following three Tables present disabled population estimates using UNDP proportions and DISTAT-2 proportions. Table A.2 contains estimates of the disabled populations of all of the HHD countries. Table A.3 contains high UNDP, low UNDP and DISTAT-2 estimates of the disabled populations of each of the MHD countries. And Table A.4 contains high UNDP, low UNDP and DISTAT-2 estimates of the disabled populations of each of the LHD countries.

**Table A.2:
Disabled Population Estimates for High Human Development Countries**

Country	Total Population*	Disabled Population using UNDP Proportion	Disabled Population using DISTAT-2 Proportion
Antigua and Barbuda	100,000	9,900	10,850
Argentina	38,000,000	3,762,000	4,123,000
Australia	19,500,000	1,930,500	2,115,750
Austria	8,100,000	801,900	878,850
Bahamas, The	300,000	29,700	32,550
Bahrain	700,000	69,300	75,950
Barbados	300,000	29,700	32,550
Belgium	10,300,000	1,019,700	1,117,550
Brunei Darussalam	300,000	29,700	32,550
Canada	31,300,000	3,098,700	3,396,050
Chile	15,600,000	1,544,400	1,692,600
Costa Rica	4,100,000	405,900	444,850
Croatia	4,400,000	435,600	477,400
Cuba	11,300,000	1,118,700	1,226,050
Cyprus	800,000	79,200	86,800
Czech Republic	10,200,000	1,009,800	1,106,700
Denmark	5,400,000	534,600	585,900
Estonia	1,300,000	128,700	141,050
Finland	5,200,000	514,800	564,200
France	59,800,000	5,920,200	6,488,300
Germany	82,400,000	8,157,600	8,940,400
Greece	11,000,000	1,089,000	1,193,500
Hong Kong	7,000,000	693,000	759,500
Hungary	9,900,000	980,100	1,074,150
Iceland	300,000	29,700	32,550
Ireland	3,900,000	386,100	423,150
Israel	6,300,000	623,700	683,550
Italy	57,500,000	5,692,500	6,238,750
Japan	127,500,000	12,622,500	13,833,750
Korea, Republic of	47,400,000	4,692,600	5,142,900
Kuwait	2,400,000	237,600	260,400
Latvia	2,300,000	227,700	249,550
Lithuania	3,500,000	346,500	379,750
Luxembourg	400,000	39,600	43,400
Malta	400,000	39,600	43,400
Mexico	102,000,000	10,098,000	11,067,000
Netherlands	16,100,000	1,593,900	1,746,850
New Zealand	3,800,000	376,200	412,300
Norway	4,500,000	445,500	488,250
Poland	38,600,000	3,821,400	4,188,100
Portugal	10,000,000	990,000	1,085,000
Qatar	600,000	59,400	65,100

(Continued)

Table A 2: (Continued)

Country	Total Population *	Disabled Population using UNDP Proportion	Disabled Population using DISTAT-2 Proportion
Saint Kitts and Nevis	38,836	3,845	4,214
Seychelles	100,000	9,900	10,850
Singapore	4,200,000	415,800	455,700
Slovakia	5,400,000	534,600	585,900
Slovenia	2,000,000	198,000	217,000
Spain	41,000,000	4,059,000	4,448,500
Sweden	8,900,000	881,100	965,650
Switzerland	7,200,000	712,800	781,200
Trinidad and Tobago	1,300,000	128,700	141,050
United Arab Emirates	2,900,000	287,100	314,650
United Kingdom	59,100,000	5,850,900	6,412,350
United States	291,000,000	28,809,000	31,573,500
Uruguay	3,400,000	336,600	368,900
Total	1,191,338,836	117,942,545	129,260,264

*UNDP, *Human Development Report 2004*, 152-3.

Table A 3
Disabled Population Estimates for Medium Human Development Countries

Country	Total Population*	Disabled Population using UNDP Low Proportion	Disabled Population using UNDP High Proportion	Disabled Population using DISTAT-2 Proportion
Albania	3,100,000	114,700	306,900	76,108
Algeria	31,300,000	1,158,100	3,098,700	768,446
Armenia	3,100,000	114,700	306,900	76,108
Azerbaijan	8,300,000	307,100	821,700	203,773
Bangladesh	143,800,000	5,320,600	14,236,200	3,530,434
Belarus	9,900,000	366,300	980,100	243,055
Belize	300,000	11,100	29,700	7,365
Bhutan	2,200,000	81,400	217,800	54,012
Bolivia	8,600,000	318,200	851,400	211,139
Bosnia and Herzegovina	4,100,000	151,700	405,900	100,659
Botswana	1,800,000	66,600	178,200	44,192
Brazil	176,300,000	6,523,100	17,453,700	4,328,341
Bulgaria	8,000,000	296,000	792,000	196,408
Cambodia	13,800,000	510,600	1,366,200	338,804
Cameroon	15,700,000	580,900	1,554,300	385,451
Cape Verde	500,000	18,500	49,500	12,276
China	1,294,900,000	47,911,300	128,195,100	31,791,090
Colombia	43,500,000	1,609,500	4,306,500	1,067,969
Comoros	700,000	25,900	69,300	17,186
Dominica	100,000	3,700	9,900	2,455
Dominican Republic	8,600,000	318,200	851,400	211,139
Ecuador	12,800,000	473,600	1,267,200	314,253
Equatorial Guinea	500,000	18,500	49,500	12,276
Egypt	70,500,000	2,608,500	6,979,500	1,730,846
El Salvador	6,400,000	236,800	633,600	157,126
Fiji	800,000	29,600	79,200	19,641
Gabon	1,300,000	48,100	128,700	31,916
Ghana	20,500,000	758,500	2,029,500	503,296
Georgia	5,200,000	192,400	514,800	127,665
Grenada	100,000	3,700	9,900	2,455
Guatemala	12,000,000	444,000	1,188,000	294,612
Guyana	800,000	29,600	79,200	19,641
Honduras	6,800,000	251,600	673,200	166,947
India	1,049,500,000	38,831,500	103,900,500	25,766,275
Indonesia	217,100,000	8,032,700	21,492,900	5,330,022
Iran, Islamic Rep.	68,100,000	2,519,700	6,741,900	1,671,923
Jamaica	2,600,000	96,200	257,400	63,833
Jordan	5,300,000	196,100	524,700	130,120
Kazakhstan	15,500,000	573,500	1,534,500	380,541
Korea, Dem. Rep.	22,697,553	839,809	2,247,058	557,248
Kyrgyzstan	5,100,000	188,700	504,900	125,210

(Continued)

Table A 3 (Continued)

Country	Total Population*	Disabled Population using UNDP Low Proportion	Disabled Population using UNDP High Proportion	Disabled Population using DISTAT-2 Proportion
Lao People's Dem.Rep.	5,500,000	203,500	544,500	135,031
Lebanon	3,600,000	133,200	356,400	88,384
Libyan Arab Jahamiriya	5,400,000	199,800	534,600	132,575
Macedonia, FYR	2,000,000	74,000	198,000	49,102
Malaysia	24,000,000	888,000	2,376,000	589,224
Maldives	300,000	11,100	29,700	7,365
Mauritius	1,200,000	44,400	118,800	29,461
Moldova	4,300,000	159,100	425,700	105,569
Mongolia	2,600,000	96,200	257,400	63,833
Morocco	30,100,000	1,113,700	2,979,900	738,985
Myanmar	48,900,000	1,809,300	4,841,100	1,200,544
Namibia	2,000,000	74,000	198,000	49,102
Nepal	24,600,000	910,200	2,435,400	603,955
Nicaragua	5,300,000	196,100	524,700	130,120
Occupied Palestinian Territ.	3,400,000	125,800	336,600	83,473
Oman	2,800,000	103,600	277,200	68,743
Panama	3,100,000	114,700	306,900	76,108
Papua New Guinea	5,600,000	207,200	554,400	137,486
Paraguay	5,700,000	210,900	564,300	139,941
Peru	26,800,000	991,600	2,653,200	657,967
Philippines	78,600,000	2,908,200	7,781,400	1,929,709
Romania	22,400,000	828,800	2,217,600	549,942
Russian Federation	144,100,000	5,331,700	14,265,900	3,537,799
Saint Lucia	100,000	3,700	9,900	2,455
Saint Vincent & Grenadines	100,000	3,700	9,900	2,455
Samoa (Western)	200,000	7,400	19,800	4,910
Sao Tome and Principe	200,000	7,400	19,800	4,910
Saudi Arabia	23,500,000	869,500	2,326,500	576,949
Solomon Islands	500,000	18,500	49,500	12,276
South Africa	44,800,000	1,657,600	4,435,200	1,099,885
Sri Lanka	18,900,000	699,300	1,871,100	464,014
Sudan	32,900,000	1,217,300	3,257,100	807,728
Suriname	400,000	14,800	39,600	9,820
Swaziland	1,100,000	40,700	108,900	27,006
Syrian Arab Republic	17,400,000	643,800	1,722,600	427,187
Tajikistan	6,200,000	229,400	613,800	152,216
Thailand	62,200,000	2,301,400	6,157,800	1,527,072
Tonga	100,000	3,700	9,900	2,455
Tunisia	9,700,000	358,900	960,300	238,145
Turkey	70,300,000	2,601,100	6,959,700	1,725,935
Turkmenistan	4,800,000	177,600	475,200	117,845
Ukraine	48,900,000	1,809,300	4,841,100	1,200,544

(Continued)

Table A 3 (Continued)

Country	Total Population*	Disabled Population using UNDP Low Proportion	Disabled Population using UNDP High Proportion	Disabled Population using DISTAT-2 Proportion
Uzbekistan	25,700,000	950,900	2,544,300	630,961
Vanuatu	200,000	7,400	19,800	4,910
Venezuela, RB	25,200,000	932,400	2,494,800	618,685
Viet Nam	80,300,000	2,971,100	7,949,700	1,971,445
Total	4,228,197,553	156,443,309	418,591,558	103,806,478

* UNDP, *Human Development Report 2004*, 153-4.

**Table A 4:
Disabled Population Estimates for Low Human Development Countries**

Country	Total Population*	Disabled Population		Disabled Population
		using UNDP		using UNDP
		Low Proportion	High Proportion	Proportion
Angola	13,200,000	132,000	1,306,800	157,344
Benin	6,600,000	66,000	653,400	78,672
Burkina Faso	12,600,000	126,000	1,247,400	150,192
Burundi	6,600,000	66,000	653,400	78,672
Central African Republic	3,800,000	38,000	376,200	45,296
Chad	8,300,000	83,000	821,700	98,936
Congo, Dem. Rep.	51,200,000	512,000	5,068,800	610,304
Congo	3,600,000	36,000	356,400	42,912
Cote d'Ivoire	16,400,000	164,000	1,623,600	195,488
Djibouti	700,000	7,000	69,300	8,344
Eritrea	4,000,000	40,000	396,000	47,680
Ethiopia	69,000,000	690,000	6,831,000	822,480
Gambia, The	1,400,000	14,000	138,600	16,688
Guinea	8,400,000	84,000	831,600	100,128
Guinea-Bissau	1,400,000	14,000	138,600	16,688
Haiti	8,200,000	82,000	811,800	97,744
Kenya	31,500,000	315,000	3,118,500	375,480
Lesotho	1,800,000	18,000	178,200	21,456
Madagascar	16,900,000	169,000	1,673,100	201,448
Malawi	11,900,000	119,000	1,178,100	141,848
Mali	12,600,000	126,000	1,247,400	150,192
Mauritania	2,800,000	28,000	277,200	33,376
Mozambique	18,500,000	185,000	1,831,500	220,520
Niger	11,500,000	115,000	1,138,500	137,080
Nigeria	120,900,000	1,209,000	11,969,100	1,441,128
Pakistan	149,900,000	1,499,000	14,840,100	1,786,808
Rwanda	8,300,000	83,000	821,700	98,936
Senegal	9,900,000	99,000	980,100	118,008
Sierra Leone	4,800,000	48,000	475,200	57,216
Tanzania	36,300,000	363,000	3,593,700	432,696
Timor-Leste	700,000	7,000	69,300	8,344
Togo	4,800,000	48,000	475,200	57,216
Uganda	25,000,000	250,000	2,475,000	298,000
Yemen, Rep.	19,300,000	193,000	1,910,700	230,056
Zambia	10,700,000	107,000	1,059,300	127,544
Zimbabwe	12,800,000	128,000	1,267,200	152,576
Total	726,300,000	7,263,000	71,903,700	8,657,496

* UNDP, *Human Development Report 2004*, 154-5.

ANNEX B

ESTIMATES OF GDP LOST DUE TO DISABILITY

The author has extrapolated the results of research conducted by the Roeher Institute in Toronto Canada in order to provide rough estimates of the annual value of Gross Domestic Product (GDP) lost as a result of disability globally and in each country.

Methodology

The technique used to estimate the annual value of GDP lost due to disability is a variation of a technique developed by the Roeher Institute in Toronto Canada to extrapolate the results obtained in a study of the economic costs of disability in Canada (the Canadian Study) to the economic circumstances of the United States and Latin America.⁴⁴

The Canadian Study estimated the GDP lost in Canada in 1998 as a result of long-term and short-term disability. The value of productivity lost due to long-term disability was estimated for two populations, “household disabled” and “institutionalized disabled,” using National Population Health Survey data and the methodology presented below. The results for both populations were then summed to arrive at an estimate of the total Canadian GDP lost due to long-term disability.

The National Population Health Survey (NPHS) household component provides the number of people who reported a long-term disability by diagnostic category, age group and sex. These figures are adjusted for severity and annual average length of long-term disability, applying distributions from the Quebec Health and Social Survey. Weights are assigned to account for lost productivity at different levels of long term disability.

The NPHS institutional component provides the number of people living in Canadian long-term health care facilities by age and sex. These figures, multiplied by the distribution of long-term disability in institutions according to diagnostic category, age group and sex and the annual average length of stay in institutions, provide estimates of the number of people in long-term health care facilities by diagnostic category, age group and sex. Weights are applied to account for productivity loss at different levels of long-term disability.

The adjusted figures for long-term disability by diagnostic category, age group and sex for the household and institutionalized populations are summed. These figures, multiplied by the 1998 annual average value of labour force work, adjusted for wage supplements and unpaid work, are used to estimate the total value of productivity lost to long-term disability by diagnostic category, age group and sex.⁴⁵

Assigning a weight of 0.8 (very severe) to the institutionalized disabled population and a weight of 0.3 (minor limitations) to the household disabled population, the study estimated the GDP lost due to long term disability in 1998 to be \$32.2 billion, of which \$30.3 billion was attributable to

⁴⁴ Health Canada, *Economic Burden of Illness in Canada, 1993* and Rioux, *Enabling the Well-Being of Persons with Disabilities*, 9-11.

⁴⁵ Health Canada, *Economic Burden of Illness in Canada, 1998*.

the household population and \$1.9 billion was attributable to the institutionalized population. A sensitivity analysis assigning ranges of severity weights from 0.8 to 1.0 for the institutionalized population and from 0.0 to 0.2 for the household population resulted in an estimated range of lost GDP from \$32.2 billion to \$42.9 billion where the mid-point estimate is \$37.6 billion.

The amount of productivity lost due to short-term disability was estimated using National Population Health Survey data and the following methodology:

The National Population Health Survey provides the average number of days of short-term disability by age and sex for two levels of severity: “days in bed” or “days of reduced major activity.” Weights are assigned to these levels to account for the loss of productivity at different severity levels of short-term disability: 0.8 for “days in bed” and 0.5 for “days of reduced major activity”. A sensitivity analysis of productivity losses using weights of 0.8 and 1.0 for “days in bed” has also been conducted.

The adjusted values are applied to the general population to estimate total annual days of productivity lost due to short-term disability by age and sex. Annual days of productivity lost due to short-term disability by diagnostic category, age group and sex are generated by applying these values to the distribution of days lost due to short-term disability by diagnostic category, age group and sex obtained from the Quebec Health and Social Survey.

The number of annual days of productivity lost according to diagnostic category, age group and sex is then multiplied by an average value per day of labour force work, adjusted for wage supplements and unpaid work, to estimate the value of productivity lost to short-term disability by diagnostic category, age and sex. Labour force earnings and the value of unpaid work are available by age and sex.⁴⁶

Using the above weightings for “days in bed” and “days of reduced major activity,” the study estimated the total 1998 Canadian GDP lost due to short-term disability to be \$9.8 billion. A sensitivity analysis assigning a range of severity weights for “days in bed” from 0.9 to 1.0 resulted in estimated GDP losses due to short-term disability from \$10.3 billion to \$10.7 billion.

The sum of the Canadian Study’s estimates of GDP losses due to long-term and short-term disability in 1998 was \$47.9 billion, or 6.7% of Canada’s 2002 GDP (\$714.3 billion). The estimated range of Canadian GDP lost in 1998 as a result of disability that resulted from the Canadian Study’s sensitivity analysis was from \$42 billion to \$53.6 billion, or from 5.8% to 7.5% of GDP.

The author has extrapolated the results of this study to 191 countries using the following extrapolation technique developed by the Roehrer Institute. Assuming that the GDP lost due to disability is a positive function of the incidence of exclusion of people with disabilities from the labor force because those who are excluded do not contribute, and a negative function of the general unemployment rate because a lower unemployment rate infers a higher probability of labor market activity, the Roehrer Institute first calculated Canada’s proportion of annual GDP lost due to disability ($\%GDP\ lost_{can}$) as a proportion of its unemployment rate (UR). Canada’s 2002 unemployment rate was 7.6% , resulting in a $\%GDP\ lost / UR$ ratio for 2002 of:

⁴⁶ Ibid.

$$\%GDP \text{ lost}_{\text{can}} / UR_{\text{can}} = 6.7 / 7.6 = 0.88$$

The Canadian %GDP lost / UR ratio was then applied to the 2002 unemployment rate in the United States to estimate the proportion of GDP lost due to disability in the United States (% GDP lost_{us}). Thus, for the United States, with a 2002 unemployment rate of 5.8%, the % GDP lost was estimated to be:

$$\% GDP \text{ lost}_{\text{us}} = (5.8)(0.88) = 5.1\%$$

The GDP lost due to disability in the U.S. (GDP lost_{us}) was then calculated using the formula:

$$GDP \text{ lost}_{\text{us}} = (\% GDP \text{ lost}_{\text{us}}) (GDP_{\text{us}}).$$

The 2002 U.S. GDP was \$10,383.1 billion resulting in an estimated annual GDP loss due to disability in the United States (GDP lost_{us}), of:

$$GDP \text{ lost}_{\text{us}} = (0.051)(\$10,383.1 \text{ billion}) = \$529.5 \text{ billion}$$

The annual GDP lost as a result of disability in the world's high income, medium income and low income countries have been estimated using the above approach with the exception that the ranges of annual GDP lost for each country have been estimated by applying each country's unemployment rate data to the ranges of GNP lost_{can} generated by the sensitivity analyses conducted in the Canadian Study.⁴⁷ In estimating the high end of the range, therefore, the high estimate of %GDP lost_{can} (7.5%) from the sensitivity analysis of the Canadian Study was employed, and in estimating the low end of the range, the low %GDP lost_{can} (5.8%) that resulted from the sensitivity analysis of the Canadian Study was employed.

Results

TABLE B1: TOTAL ANNUAL VALUE OF GDP LOST DUE TO DISABILITY

	Total GDP	Low estimate of GDP lost due to disability (US Dollar)	Proportion of total GDP lost	High Estimate of GDP lost due to disability (US Dollar)	Proportion of total GDP lost
High Income Countries	25,667,210,000,000	1,224,014,055,600	4.77%	1,594,439,361,900	6.21%
Medium Income Countries	5,145,735,000,000	377,700,686,120	7.34%	492,004,841,130	9.56%
Low Income Countries	1,174,372,000,000	110,495,236,440	9.41%	143,934,584,310	12.26%
TOTAL	\$31,987,317,000,000	\$1,712,209,978,160	5.35%	\$2,230,378,787,340	6.97%

Table B.1 contains a summary of the results. The range of global GDP lost annually due to disability is estimated to be between \$1.71 trillion and \$2.23 trillion. For the world's high income countries, the range is estimated to be between \$1.22 trillion and \$1.59 trillion, for the

⁴⁷ The 2004 UNDP classifications, which classify High Income Countries as those with a GNP per capita of above \$9,076 in 2002, Medium Income Countries as those with a GNP per capita of between \$736 and \$9,075 in 2002, and Low Income Countries as those with a GNP per capita of \$735 and below in 2002, were used.

medium income countries it is estimated to be between \$377.70 billion and \$492.00 billion, and for the low income countries it is estimated to be between \$110.50 billion and \$143.94 billion.

The annual global GDP lost due to disability per disabled person has also been estimated. The high end of the range has been estimated by dividing the high estimate of annual GDP lost due to disability by the low estimate of the global disabled population, and the low end of the range has been estimated by dividing the low estimate of annual GDP lost due to disability by the high estimate of the global disabled population.

Table B2: GDP Lost Per Disabled Person

	Low Estimate of GDP lost per disabled person (US\$)	High Estimate of GDP lost per disabled person (US\$)
HHD Countries	10,378	13,519
MHD Countries	902	3,145
LHD Countries	1,537	19,818
Total	2,814	7,919

The resulting range of annual global GDP lost due to disability per disabled person, presented in Table B2, is between \$2,814 and \$7,919. The estimated range of GDP lost due to disability per disabled person per year is between \$10,378 and \$13,519 for High Income Countries, between \$902 and \$3,145 for Medium Income Countries and between \$1,537 and \$19,818 for Low Income Countries.

Table B3 contains estimates of the ranges of annual values of GDP lost due to disability in each of the world's High Income Countries, Table B4 contains estimates of the ranges of annual values of GDP lost due to disability in each of the world's Medium Income Countries, and Table B5 contains estimates of the ranges of annual values of GDP lost due to disability in each of the world's Low Income Countries.

Table B3: Annual Value of GDP Lost Due to Disability for High Income Countries

COUNTRY	GDP (\$US)	UR% Year	%GDP Lost		\$GDP Lost	
			High	Low	High	Low
Andorra	1,300,000,000 ‡	0 ‡ 1996	0	0	0	0
Antigua and Barbuda	700,000,000 †	11 ‡ 2001	10.89	8.36	76,230,000	58,520,000
Australia	409,400,000,000 †	6.3 † 2002	6.237	4.788	25,534,278,000	19,602,072,000
Austria	204,100,000,000 †	5.3 † 2000	5.247	4.028	10,709,127,000	8,221,148,000
Bahamas, The	4,800,000,000 †	6.9 ‡ 2001	6.831	5.244	327,888,000	251,712,000
Bahrain	7,700,000,000 †	15 ‡ 1998	14.85	11.4	1,143,450,000	877,800,000
Barbados	2,500,000,000 †	10 ° 2002	9.9	7.6	247,500,000	190,000,000
Belgium	245,400,000,000 †	7.3 † 2002	7.227	5.548	17,735,058,000	13,614,792,000
Brunei Darussalam	6,500,000,000 ‡	10 ‡ 2001	9.9	7.6	643,500,000	494,000,000
Canada	714,300,000,000 †	7.6 † 2002	7.524	5.776	53,743,932,000	41,257,968,000
Cyprus	10,100,000,000 †	5 ° 2000	4.95	3.8	499,950,000	383,800,000
Denmark	172,900,000,000 †	4.5 † 2002	4.455	3.42	7,702,695,000	5,913,180,000
Finland	131,500,000,000 †	9.1 † 2002	9.009	6.916	11,846,835,000	9,094,540,000
France	1,431,300,000,000 †	9 † 2002	8.91	6.84	127,528,830,000	97,900,920,000
Germany	1,984,100,000,000 †	8.1 † 2002	8.019	6.156	159,104,979,000	122,141,196,000
Greece	132,800,000,000 †	10 † 2002	9.9	7.6	13,147,200,000	10,092,800,000
Hong Kong	161,500,000,000 †	7 ° 2002	6.93	5.32	11,191,950,000	8,591,800,000
Iceland	8,400,000,000 †	3.3 † 2002	3.267	2.508	274,428,000	210,672,000
Ireland	121,400,000,000 †	4.4 † 2002	4.356	3.344	5,288,184,000	4,059,616,000
Israel	103,700,000,000 †	10 ° 2002	9.9	7.6	10,266,300,000	7,881,200,000
Italy	1,184,300,000,000 †	9.1 † 2002	9.009	6.916	106,693,587,000	81,906,188,000
Japan	3,993,400,000,000 †	5.4 † 2002	5.346	4.104	213,487,164,000	163,889,136,000
Korea, Rep.	476,700,000,000 †	3.1 † 2002	3.069	2.356	14,629,923,000	11,231,052,000
Kuwait	35,400,000,000 †	1 ° 2000	0.99	0.76	350,460,000	269,040,000
Luxembourg	21,000,000,000 †	3 † 2002	2.97	2.28	623,700,000	478,800,000
Malta	3,900,000,000 †	7 ° 2000	6.93	5.32	270,270,000	207,480,000
Monaco	870,000,000 ‡	3.1 ‡ 1998	3.069	2.356	26,700,300	20,497,200
Netherlands	417,900,000,000 †	2.3 † 2002	2.277	1.748	9,515,583,000	7,304,892,000
New Zealand	58,600,000,000 †	5.2 † 2002	5.148	3.952	3,016,728,000	2,315,872,000
Norway	190,500,000,000 †	4 † 2002	3.96	3.04	7,543,800,000	5,791,200,000
Portugal	121,600,000,000 †	5.1 † 2002	5.049	3.876	6,139,584,000	4,713,216,000
Qatar	17,500,000,000 †	2.7 ‡ 2001	2.673	2.052	467,775,000	359,100,000
San Marino	940,000,000 ‡	2.6 ‡ 2001	2.574	1.976	24,195,600	18,574,400
Singapore	87,000,000,000 †	4 ° 2000	3.96	3.04	3,445,200,000	2,644,800,000
Slovenia	22,000,000,000 †	7 ° 2000	6.93	5.32	1,524,600,000	1,170,400,000
Spain	653,100,000,000 †	11.4 † 2002	11.286	8.664	73,708,866,000	56,584,584,000
Sweden	240,300,000,000 †	4 † 2002	3.96	3.04	9,515,880,000	7,305,120,000
Switzerland	267,400,000,000 †	3.1 † 2002	3.069	2.356	8,206,506,000	6,299,944,000
United Arab Emirates	71,000,000,000 †	2 ° 2000	1.98	1.52	1,405,800,000	1,079,200,000
United Kingdom	1,566,300,000,000 †	5.2 † 2002	5.148	3.952	80,633,124,000	61,900,176,000
United States	10,383,100,000,000 †	5.8 † 2002	5.742	4.408	596,197,602,000	457,687,048,000
Totals	\$25,667,210,000,000				\$1,594,439,361,900.00	\$1,224,014,055,600

† UNDP, *Human Development Report 2004*, 184-185,206.

‡ Central Intelligence Agency, *The World Factbook 2004*.

° World Bank ,website , *Data Online*.

Table B4: Annual Value of GDP Lost Due to Disability for Medium Income Countries

COUNTRY	GDP (\$US)	UR%	Year	%GDP Lost		\$GDP Lost	
				High	Low	High	Low
Albania	4,800,000,000 †	15.8 ‡	2003	15.642	12.008	750,816,000	576,384,000
Algeria	55,900,000,000 †	30 °	2000	29.7	22.8	16,602,300,000	12,745,200,000
Argentina	102,000,000,000 †	18 °	2002	17.82	13.68	18,176,400,000	13,953,600,000
Armenia	2,400,000,000 †	20 ‡	2001	19.8	15.2	475,200,000	364,800,000
Belarus	14,300,000,000 †	2 °	2000	1.98	1.52	283,140,000	217,360,000
Belize	800,000,000 †	9.1 ‡	2002	9.009	6.916	72,072,000	55,328,000
Bolivia	7,800,000,000 †	7 °	2000	6.93	5.32	540,540,000	414,960,000
Bosnia and Herzegovina	5,600,000,000 †	40 ‡	2002	39.6	30.4	2,217,600,000	1,702,400,000
Botswana	5,300,000,000 †	16 °	2000	15.84	12.16	839,520,000	644,480,000
Brazil	452,400,000,000 †	12.2 ‡	2003	12.078	9.272	54,640,872,000	41,946,528,000
Bulgaria	15,500,000,000 †	16 °	2000	15.84	12.16	2,455,200,000	1,884,800,000
Cape Verde	600,000,000 †	21 ‡	2000	20.79	15.96	124,740,000	95,760,000
Chile	64,200,000,000 †	8 °	2000	7.92	6.08	5,084,640,000	3,903,360,000
China	1,266,000,000,000 †	3 °	2000	2.97	2.28	37,600,200,000	28,864,800,000
Colombia	80,900,000,000 †	18 °	2002	17.82	13.68	14,416,380,000	11,067,120,000
Costa Rica	16,800,000,000 †	6 °	2002	5.94	4.56	997,920,000	766,080,000
Croatia	22,400,000,000 †	15 °	2002	14.85	11.4	3,326,400,000	2,553,600,000
Cuba	31,590,000,000 ‡	3 °	2002	2.97	2.28	938,223,000	720,252,000
Czech Republic	69,500,000,000 †	7.3 †	2002	7.227	5.548	5,022,765,000	3,855,860,000
Djibouti	600,000,000 †	50 ‡	2000	49.5	38	297,000,000	228,000,000
Dominica	200,000,000 †	23 ‡	2000	22.77	17.48	45,540,000	34,960,000
Dominican Republic	21,700,000,000 †	14 °	2000	13.86	10.64	3,007,620,000	2,308,880,000
Ecuador	24,300,000,000 †	9 °	2000	8.91	6.84	2,165,130,000	1,662,120,000
Egypt	89,900,000,000 †	9 °	2000	8.91	6.84	8,010,090,000	6,149,160,000
El Salvador	14,300,000,000 †	6 °	2002	5.94	4.56	849,420,000	652,080,000
Estonia	6,500,000,000 †	14 °	2000	13.86	10.64	900,900,000	691,600,000
Fiji	1,900,000,000 †	7.6 ‡	1999	7.524	5.776	142,956,000	109,744,000
Gabon	5,000,000,000 †	21 ‡	1997	20.79	15.96	1,039,500,000	798,000,000
Grenada	400,000,000 †	12.5 ‡	2000	12.375	9.5	49,500,000	38,000,000
Guatemala	23,300,000,000 †	3 °	2002	2.97	2.28	692,010,000	531,240,000
Guyana	700,000,000 †	9.1 ‡	2000	9.009	6.916	63,063,000	48,412,000
Honduras	6,600,000,000 †	4 °	2002	3.96	3.04	261,360,000	200,640,000
Hungary	65,800,000,000 †	5.9 †	2002	5.841	4.484	3,843,378,000	2,950,472,000
Iran, Islamic Rep.	108,200,000,000 †	15.7 ‡	2002	15.543	11.932	16,817,526,000	12,910,424,000
Iraq	38,790,000,000 ‡	8 °	..	7.92	6.08	3,072,168,000	2,358,432,000
Jamaica	7,900,000,000 †	15.9 ‡	2003	15.741	12.084	1,243,539,000	954,636,000
Jordan	9,300,000,000 †	13 °	2000	12.87	9.88	1,196,910,000	918,840,000
Kazakhstan	24,600,000,000 †	8.6 ‡	2003	8.514	6.536	2,094,444,000	1,607,856,000
Kiribati	79,000,000 ‡	2 ‡	..	1.98	1.52	1,564,200	1,200,800
Latvia	8,400,000,000 †	15 °	2000	14.85	11.4	1,247,400,000	957,600,000
Lebanon	17,300,000,000 †	18 ‡	1997	17.82	13.68	3,082,860,000	2,366,640,000
Libyan Arab Jahamiriya	19,100,000,000 †	30 ‡	2001	29.7	22.8	5,672,700,000	4,354,800,000
Lithuania	13,800,000,000 †	14 °	2002	13.86	10.64	1,912,680,000	1,468,320,000
Macedonia, TFYR	3,800,000,000 †	32 °	2002	31.68	24.32	1,203,840,000	924,160,000
Malaysia	94,900,000,000 †	3 °	2000	2.97	2.28	2,818,530,000	2,163,720,000
Maldives	600,000,000 †	0 ‡	2003	0	0	0	0

Continued

Table B4 : Continued

COUNTRY	GDP (\$US)	UR%	Year	%GDP Lost		\$GDP Lost	
				High	Low	High	Low
Marshall Islands	115,000,000 †	30.9 ‡	1999	30.591	23.484	35,179,650	27,006,600
Mauritius	4,500,000,000 †	8 °	2000	7.92	6.08	356,400,000	273,600,000
Mexico	637,200,000,000 †	2.7 †	2002	2.673	2.052	17,032,356,000	13,075,344,000
Micronesia, Fed. Sts.	277,000,000 ‡	16 ‡	1999	15.84	12.16	43,876,800	33,683,200
Morocco	36,100,000,000 †	19 ‡	2003	18.81	14.44	6,790,410,000	5,212,840,000
Namibia	2,900,000,000 †	34 °	2000	33.66	25.84	976,140,000	749,360,000
N. Mariana Islands	900,000,000 ‡	15 ‡	1996	14.85	11.4	133,650,000	102,600,000
Occupied Palestinian Territories	3,400,000,000 †	8 °	..	7.92	6.08	269,280,000	206,720,000
Oman	20,300,000,000 †	8 °	..	7.92	6.08	1,607,760,000	1,234,240,000
Palau	174,000,000 ‡	2.3 ‡	2000	2.277	1.748	3,961,980	3,041,520
Panama	12,300,000,000 †	13 °	2002	12.87	9.88	1,583,010,000	1,215,240,000
Paraguay	5,500,000,000 †	16.4 ‡	2002	16.236	12.464	892,980,000	685,520,000
Peru	56,500,000,000 †	9 °	2002	8.91	6.84	5,034,150,000	3,864,600,000
Philippines	78,000,000,000 †	10 °	2000	9.9	7.6	7,722,000,000	5,928,000,000
Poland	189,000,000,000 †	19.9 †	2002	19.701	15.124	37,234,890,000	28,584,360,000
Romania	45,700,000,000 †	7 °	2000	6.93	5.32	3,167,010,000	2,431,240,000
Russian Federation	346,500,000,000 †	10 °	2000	9.9	7.6	34,303,500,000	26,334,000,000
Saint Kitts and Nevis	400,000,000 †	4.5 ‡	1997	4.455	3.42	17,820,000	13,680,000
Saint Lucia	700,000,000 †	16.5 ‡	1997	16.335	12.54	114,345,000	87,780,000
Saint Vincent and the Grenadines	400,000,000 †	22 ‡	1997	21.78	16.72	87,120,000	66,880,000
Samoa (Western)	300,000,000 †	8 °	..	7.92	6.08	23,760,000	18,240,000
Saudi Arabia	188,500,000,000 †	25 ‡	2003	24.75	19	46,653,750,000	35,815,000,000
Serbia and Montenegro	24,010,000,000 ‡	34.5 ‡	2003	34.155	26.22	8,200,615,500	6,295,422,000
Seychelles	700,000,000 †	8 °	..	7.92	6.08	55,440,000	42,560,000
Slovakia	23,700,000,000 †	18.6 †	2002	18.414	14.136	4,364,118,000	3,350,232,000
South Africa	104,200,000,000 †	37 ‡	2001	36.63	28.12	38,168,460,000	29,301,040,000
Sri Lanka	16,600,000,000 †	7 °	2000	6.93	5.32	1,150,380,000	883,120,000
Suriname	1,000,000,000 †	17 ‡	2000	16.83	12.92	168,300,000	129,200,000
Swaziland	1,200,000,000 †	34 ‡	2000	33.66	25.84	403,920,000	310,080,000
Syrian Arab Republic	20,800,000,000 †	20 ‡	2002	19.8	15.2	4,118,400,000	3,161,600,000
Thailand	126,900,000,000 †	2 °	2002	1.98	1.52	2,512,620,000	1,928,880,000
Tonga	100,000,000 †	13.3 ‡	1996	13.167	10.108	13,167,000	10,108,000
Trinidad and Tobago	9,600,000,000 †	10.9 ‡	2003	10.791	8.284	1,035,936,000	795,264,000
Tunisia	21,000,000,000 †	14.3 ‡	2003	14.157	10.868	2,972,970,000	2,282,280,000
Turkey	183,700,000,000 †	10.3 †	2002	10.197	7.828	18,731,889,000	14,380,036,000
Turkmenistan	7,700,000,000 †	8 °	..	7.92	6.08	609,840,000	468,160,000
Ukraine	41,500,000,000 †	12 °	2000	11.88	9.12	4,930,200,000	3,784,800,000
Uruguay	12,100,000,000 †	17 °	2002	16.83	12.92	2,036,430,000	1,563,320,000
Vanuatu	200,000,000 †	8 °	..	7.92	6.08	15,840,000	12,160,000
Venezuela	94,300,000,000 †	13 °	2000	12.87	9.88	12,136,410,000	9,316,840,000
Totals	\$5,145,735,000,000					\$492,004,841,130	\$377,700,686,120

† UNDP, *Human Development Report 2004*, 186-187.

‡ Central Intelligence Agency, *The World Factbook 2004*.

.. Data unavailable, number based on calculated averages of available data.

° World Bank, website, *Data Online*.

Table B5 : Annual Value of GDP Lost Due to Disability for Low Income Countries

COUNTRY	GDP (\$US)	UR%	Year	%GDP Lost		\$GDP Lost	
				High	Low	High	Low
Afghanistan	20,000,000,000 †	8 ‡	1995	7.92	6.08	1,584,000,000	1,216,000,000
Angola	11,200,000,000 †	50 ‡	2003	49.5	38	5,544,000,000	4,256,000,000
Azerbaijan	6,100,000,000 †	1 °	2000	0.99	0.76	60,390,000	46,360,000
Bangladesh	47,600,000,000 †	3 °	2000	2.97	2.28	1,413,720,000	1,085,280,000
Benin	2,700,000,000 †	12.9 ~	..	12.771	9.804	344,817,000	264,708,000
Bhutan	600,000,000 †	12.9 ~	..	12.771	9.804	76,626,000	58,824,000
Burkina Faso	3,100,000,000 †	12.9 ~	..	12.771	9.804	395,901,000	303,924,000
Burundi	700,000,000 †	12.9 ~	..	12.771	9.804	89,397,000	68,628,000
Cambodia	4,000,000,000 †	3 °	2000	2.97	2.28	118,800,000	91,200,000
Cameroon	9,100,000,000 †	30 ‡	2001	29.7	22.8	2,702,700,000	2,074,800,000
Central African Republic	1,000,000,000 †	8 ‡	2001	7.92	6.08	79,200,000	60,800,000
Chad	2,000,000,000 †	12.9 ~	..	12.771	9.804	255,420,000	196,080,000
Comoros	300,000,000 †	20 ‡	1996	19.8	15.2	59,400,000	45,600,000
Congo	3,000,000,000 †	12.9 ~	..	12.771	9.804	383,130,000	294,120,000
Congo, Dem. Rep.	5,700,000,000 †	12.9 ~	..	12.771	9.804	727,947,000	558,828,000
Cote d'Ivoire	11,700,000,000 †	13 ‡	1998	12.87	9.88	1,505,790,000	1,155,960,000
Equatorial Guinea	2,100,000,000 †	30 ‡	1998	29.7	22.8	623,700,000	478,800,000
Eritrea	600,000,000 †	12.9 ~	..	12.771	9.804	76,626,000	58,824,000
Ethiopia	6,100,000,000 †	12.9 ~	..	12.771	9.804	779,031,000	598,044,000
Gambia	400,000,000 †	12.9 ~	..	12.771	9.804	51,084,000	39,216,000
Georgia	3,400,000,000 †	11 °	2000	10.89	8.36	370,260,000	284,240,000
Ghana	6,200,000,000 †	20 ‡	1997	19.8	15.2	1,227,600,000	942,400,000
Guinea	3,200,000,000 †	12.9 ~	..	12.771	9.804	408,672,000	313,728,000
Guinea-Bissau	200,000,000 †	12.9 ~	..	12.771	9.804	25,542,000	19,608,000
Haiti	3,400,000,000 †	60 ‡	1996	59.4	45.6	2,019,600,000	1,550,400,000
India	510,200,000,000 †	9.1 ‡	2003	9.009	6.916	45,963,918,000	35,285,432,000
Indonesia	172,900,000,000 †	6 °	2000	5.94	4.56	10,270,260,000	7,884,240,000
Kenya	12,300,000,000 †	40 ‡	2001	39.6	30.4	4,870,800,000	3,739,200,000
Korea, Dem. Rep.	22,850,000,000 ‡	1.9 ‡	1996	1.881	1.444	429,808,500	329,954,000
Kyrgyz Republic	1,600,000,000 †	9 °	2002	8.91	6.84	142,560,000	109,440,000
Lao People's Dem. Rep	1,700,000,000 †	5.7 ‡	1997	5.643	4.332	95,931,000	73,644,000
Lesotho	700,000,000 †	45 ‡	2002	44.55	34.2	311,850,000	239,400,000
Liberia	3,261,000,000 ‡	85 ‡	2003	84.15	64.6	2,744,131,500	2,106,606,000
Madagascar	4,400,000,000 †	5.9 ‡	1998	5.841	4.484	257,004,000	197,296,000
Malawi	1,900,000,000 †	12.9 ~	..	12.771	9.804	242,649,000	186,276,000
Mali	3,400,000,000 †	19.9 ‡	2001	19.701	15.124	669,834,000	514,216,000
Mauritania	1,000,000,000 †	21 ‡	1999	20.79	15.96	207,900,000	159,600,000
Moldova, Rep. of	1,600,000,000 †	9 °	2000	8.91	6.84	142,560,000	109,440,000
Mongolia	1,100,000,000 †	4.6 ‡	2001	4.554	3.496	50,094,000	38,456,000
Mozambique	3,600,000,000 †	21 ‡	1997	20.79	15.96	748,440,000	574,560,000
Myanmar	51,500,000,000 †	12.9 ~	..	12.771	9.804	6,577,065,000	5,049,060,000
Nepal	5,500,000,000 †	47 ‡	2001	46.53	35.72	2,559,150,000	1,964,600,000
Nicaragua	4,000,000,000 †	10 °	2000	9.9	7.6	396,000,000	304,000,000
Niger	2,200,000,000 †	12.9 ~	..	12.771	9.804	280,962,000	215,688,000
Nigeria	43,500,000,000 †	28 ‡	1992	27.72	21.28	12,058,200,000	9,256,800,000
Pakistan	59,100,000,000 †	8 °	2000	7.92	6.08	4,680,720,000	3,593,280,000

Continued

Table B5 : Continued

COUNTRY	GDP (\$US)	UR%	Year	%GDP Lost		\$GDP Lost	
				High	Low	High	Low
Papua New Guinea	2,800,000,000 †	12.9 °	..	12.771	9.804	357,588,000	274,512,000
Rwanda	1,700,000,000 †	12.9 °	..	12.771	9.804	217,107,000	166,668,000
Sao Tome and Principe	100,000,000 †	12.9 °	..	12.771	9.804	12,771,000	9,804,000
Senegal	5,000,000,000 †	48 ‡	2001	47.52	36.48	2,376,000,000	1,824,000,000
Sierra Leone	800,000,000 †	12.9 °	..	12.771	9.804	102,168,000	78,432,000
Solomon Islands	200,000,000 †	12.9 °	..	12.771	9.804	25,542,000	19,608,000
Somalia	4,361,000,000 ‡	12.9 °	..	12.771	9.804	556,943,310	427,552,440
Sudan	13,500,000,000 †	18.7 ‡	2002	18.513	14.212	2,499,255,000	1,918,620,000
Tajikistan	1,200,000,000 †	40 ‡	2002	39.6	30.4	475,200,000	364,800,000
Tanzania	9,400,000,000 †	12.9 °	..	12.771	9.804	1,200,474,000	921,576,000
Timor-Leste	400,000,000 †	12.9 °	..	12.771	9.804	51,084,000	39,216,000
Togo	1,400,000,000 †	12.9 °	..	12.771	9.804	178,794,000	137,256,000
Uganda	5,800,000,000 †	12.9 °	..	12.771	9.804	740,718,000	568,632,000
Uzbekistan	7,900,000,000 †	10 ‡	2001	9.9	7.6	782,100,000	600,400,000
Viet Nam	35,100,000,000 †	25 ‡	1995	24.75	19	8,687,250,000	6,669,000,000
Yemen	10,000,000,000 †	35 ‡	2003	34.65	26.6	3,465,000,000	2,660,000,000
Zambia	3,700,000,000 †	50 ‡	2000	49.5	38	1,831,500,000	1,406,000,000
Zimbabwe	8,300,000,000 †	70 ‡	2002	69.3	53.2	5,751,900,000	4,415,600,000
TOTAL	\$1,174,372,000,000					\$143,934,584,310	\$110,495,236,440

† UNDP, *Human Development Report 2004*, 186-187.

‡ Central Intelligence Agency, *The World Factbook 2004*.

.. Data unavailable, number based on calculated averages of available data.

◦ World Bank, website, *Data Online*.

APPENDIX C

ACCESSIBLE DESIGN CASE STUDIES

The following five South African case studies illustrate that accessibility provision can be cost-effectively accomplished in a variety of settings.⁴⁸

Case 1: An Accessible Large International Conference Center

The International Conference Center (ICC) in Durban, South Africa illustrates the cost-effectiveness of incorporating accessibility into a world-class public facility.⁴⁹ At an early stage in its construction, it became apparent that the complex did not meet international accessibility standards. After intervention by accessibility advocates, the design consortium responsible for the project was given a directive to change the design to conform with the ADA Guidelines, ISO TR 9527 and the British Fire Evacuation Code BS 5588. This decision to utilize a combination of international codes was based on various perceived shortcomings in the ADA Guidelines. In addition, communication systems, orientation aids and signage were to be made accessible using Universal Design principles. Accessibility was to be incorporated into the design of the complex using Universal Design principles with minimal, if any, special features exclusively designed for people with disabilities.

The total construction cost for the Center, completed in September 1997, was R280,000,000. The estimated total cost of accessibility provision, including the upgrading to international accessibility standards was R 1,670,000. Expressed as a percentage of the total capital cost, the provision of accessibility was 0.59%. Despite the fact that accessibility issues were not addressed until after initial construction had commenced, thus creating a partial retrofit situation, the proportional cost of accessibility provision was extremely low. Had accessibility been integrated into the original design, the cost may well have been lower.

Case 2: An Accessible Community Center

East of Cape Town, informal settlements are in the process of being transformed from “townships” into formal urban neighborhoods. Community centers are being developed to provide multifunctional space for a range of activities from adult education to sports. One of these, the Ikwezi Community Center in Gugulethu was designed to provide nearly complete environmental accessibility (with the single exception of an inaccessible viewing gallery in the Main Hall). The complex consists of a large multipurpose hall with ancillary accommodation, a smaller sub-dividable hall with adjacent storage space for equipment and furniture, a gymnasium with sports offices, a small open amphitheater, a computer center and an administration center. The complex, completed in 1998, was built with direct community participation by an emerging contractor.

⁴⁸ Information for the five Case Studies was provided by Philip Thompson, BArch (Natal), Arch (BA), Arch(SA), MIAArb, Dip IEM (UCT), Africa Chair, International Commission on Technology and Accessibility based on his experience with the projects in South Africa.

⁴⁹ Information for this Case Study was drawn from the ICC Durban Accessibility Audit prepared by the Architects Consortium Stauch Vorster Architects in Association with Hallen Custers Smith and Johnson Murray Architects, Durban, 1997.

The site is flat, which eliminated the cost of ramping. Accessibility provision included dedicated parking bays, access to all components of the complex (with the one exception mentioned), strong color contrasts around doors and entrances and other way finding support, teletext facilities and the standard unisex accessible toilet. Limited signage was provided in the complex, as the strong color contrasts of the buildings were used to orient building users. By applying Universal Design principles in the design of the majority of the project's spaces and facilities, accessibility related expenses were limited to the following costs for an accessible unisex toilet, teletext facilities and articulated paintwork:

Unisex accessible toilet facility	R 5,500
Integral teletext equipment	R 1,200
<u>Articulated paintwork</u>	<u>R 1,600</u>
TOTAL COSTS	R 8,300

Though paving slabs created a step into one building in the complex, and though the gallery in the Main Hall was not accessible, the Ikwezi Community center was largely accessible and had all the facilities necessary to make it an appropriate facility for the full social integration of people with disabilities into the Gugulethu Community. The final cost of construction was R1,768,700, and the cost of providing accessibility was R 8,300. Thus the proportional cost of incorporating accessibility into the project was only 0.47% of the cost of the project.

Case 3: Retrofitting Accessibility During the Final Stages of School Construction

The Reservoir Hills Secondary School, located in Durban, was retrofitted for accessibility in the final stages of the project. Completed in 1991, the school was designed to accommodate 800 pupils. The format included twenty-seven classrooms, an administrative building, twenty specialist classrooms, a library resource center and toilet facilities. The costs of accessibility provision were as follows:

Two accessible parking bays with cover linked to the covered access-ways.	R 7,600
Raised curb edgings along all accessible walkways which are adjacent to unhardened areas and changes in level.	R 2,500
Kick plates to doors and lever action iron fixtures at required heights.	R14,200
Three unisex accessible toilets with all requisite fittings.	R11,800
Adjustments to fittings and furnishings for accessible work tops, counters and shelving.	R12,600
<u>New signage to facilitate way finding and orientation.</u>	<u>R 5,700</u>
Total Cost	R 53,800

The cost of the retrofit of accessibility into this school during the final phases of the building process (R 53,800) represented only 1.08% of the schools total cost (R 4,955,300).

Case 4: Accessibility Incorporated into the Original Design of a School

The Gamalake Lower Primary School, located on the South Coast of the area now known as the province of KwaZulu Natal, is a standard design format school developed within the framework of the reduced norms and standards introduced by the KwaZulu Government. It consists of twenty-four classrooms, an administrative building, one multipurpose classroom and toilet facilities. Accessibility was incorporated into the original design of the school, which was completed in 1997.

The only additional expenditures identified were the costs of an entrance ramp between the parking level and the school, two unisex accessible toilets and larger signage. Under the South African Code 0400 it is possible to reduce the number of toilet fittings by the number of accessible unisex toilet facilities provided in the building. The net cost of an accessible toilet is thus the additional cost of providing the larger separate cubicle, grab rails and other requisite fittings. Since the school had been designed for accessibility from the outset, all access ways, entrances and circulation systems had been ramped and graded appropriately.

The costs of the additional accessibility items were as follows:

Entrance ramp from the parking area	R 23,000
Additional cost for unisex accessible toilets	R 9,800
<u>Enlarging signage to facilitate way finding</u>	<u>R 3,200</u>
TOTAL COST	R 36,000

The cost of incorporating accessibility into this school's original design (R 36,000) was only 0.78% of the school's total cost (R 4,603,700).

Case 5: Provision of Necessary Separate Facilities at a School

The majority of the topography of the, then, Transkei region of South Africa is rugged with very poor road infrastructure. Schools are located on the most level sites in an attempt to reduce the costs of civil earthworks. It is common practice in this region not to provide schools with interlinking hardened or covered access ways. Due to the lack of reticulated water supplies, toilet facilities are provided in the form of "ventilated improved pit toilets" which are located a distance away from the school buildings. To achieve accessibility, an accessible unisex pit toilet is typically located separately in a locality closer to the school buildings than the other toilets, with uncovered hardened access at suitable gradients.

The Mzomhle Junior Secondary School is such a facility located outside of the town of Sterkspruit. Construction was completed in 1996. The school consists of twelve classrooms in bungalow style classroom blocks, with a very small administration block and the toilet facilities described. The provision of a separate accessible pit toilet for a relatively small number of people with disabilities represented a large proportional outlay for accessibility, as one pit toilet usually serves up to twenty classrooms. The costs of the pit toilet and the associated hardened access, are as follows:

Unisex accessible pit toilet	R 4,700
<u>Hardened access to accessible toilet</u>	<u>R 1,900</u>
TOTAL COST	R 6,600

The total cost of the school complex was R 954,600. Therefore, the proportional cost of this separate provision was only 0.69% of the total cost of the project.

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