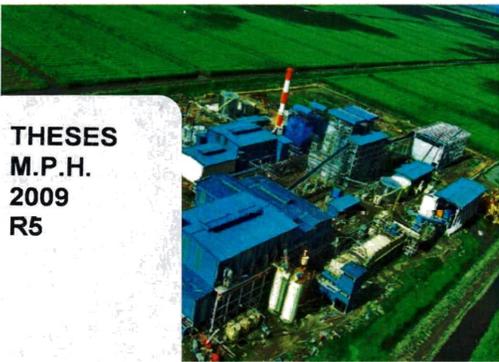
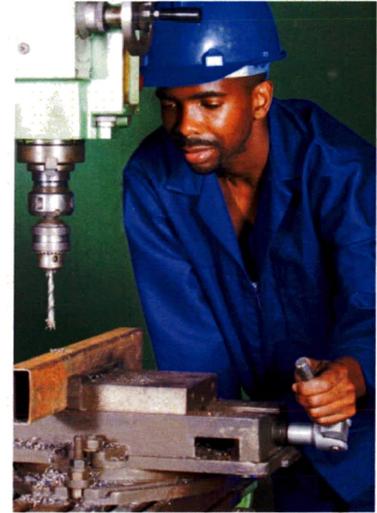




Occupational Health and Safety as a Global Public Health Concern, and the Situation in Guyana

Lundie Richards



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2009
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Final Project Report towards the fulfilment of requirements for the degree of Master of Public Health

April 2009

Research Project

**Occupational Health and Safety
as a Global Public Health Concern, and the
Situation in Guyana**

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April, 2009

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Acknowledgement

I wish to thank my supervisor Dr. Sharon Dale Stone for giving me the professional guidance necessary to undertake this research project so ably, and to Dr. David Cassidy, whose comments have facilitated its completion. As well, I am extremely grateful to my two youngest children, Che'-Fidel & Ti'-Amo, for their patience during the last few months.

Introduction

I now wish to turn to ... workers in whom certain morbid affections gradually arise from ... some particular posture of the limbs or unnatural movements of the body called for while they work. [Regarding] maladies that afflict the clerk [:] Incessant driving of the pen over paper causes intense fatigue of the hand and the whole arm ... Those who sit at their work ... become bent, humpbacked, and hold their heads down like people looking for something on the ground; this is the effect of their sedentary life and the bent posture of the body as they sit and apply themselves all day to their tasks. (Ramazzini, 1713/2001, p. 1380)

Two thirds of the world's population is involved in paid work. More often than not, this involvement is a necessity and the means through which workers, as well as economies seek to gain and maintain economic progress and by extension provide access to or provision of services such as education and health. An occupation on the one hand can provide satisfaction, elevate one's self esteem, and give a sense of order and identity (Stone, 2003). On the other hand, workers may be exposed to hazards that can adversely affect their health.

Work related injuries are not a new phenomenon; they were well described over 400 years ago by Ramazzini, who, because of his contribution to the recognition of the

current subject, is today referred to as “the father of occupational medicine” (Ramazzini, Fee, & Brown, 2001, p. 1382). Through direct worker observation and pointed interviews, Ramazzini was able to determine that different ailments of workers were not purely from exposures to chemical or physical hazards, but also resulted directly from their adoption of abnormal postures over prolonged periods, as well as the act of carrying out certain violent, irregular and repetitive movements causing varying degrees of injuries and musculoskeletal problems (Ramazzini, et al. 2001). These injuries are still recognized today and often referred to as repetitive strain injury; a syndrome characterized by pain in soft tissues such as tendons and muscles without external physical manifestation and associated with work of a repetitive nature (Pritchard, Pugh, Wright, & Brownlee, 1999). Occupational health conditions are multifactorial and have various consequences; selected conditions will be discussed in this document.

This research aims to discuss occupational health as a global public health issue. It also seeks to review occupational health in developed countries as compared to developing countries, and to examine the challenges faced by Caribbean territories with special emphasis on Guyana, and to make recommendations where possible.

Occupational Health and its Connection with Public Health

Public health is the arm of medical science involved in disease prevention, health promotion, and improved lifespan through the organized efforts of society in general (McMichael, & Beaglehole, 2000). It is broadly population based, and thus

concerned principally with the health of the wider society rather than of individuals (Kass, 2001). Public health also encompasses the identification and assessment of threats to the health of populations, development of public policies and application of measures to minimize or prevent possible adverse health events, and in addition seeks to assure access to health services (Mann, 1997). Public health includes a concern with occupational health; the latter term was jointly defined in 1950 by the World Health Organization (WHO) and the International Labour Organization (ILO). The WHO-ILO Joint Committee stated:

Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological equipment and, to summarize: the adaptation of work to man and of each man to his job. (WHO, 2005, p. 3)

As argued by Rutstein, Mullan, Frazier, Halperin, Melius, & Sestito (1983), injuries, diseases and death due to workplace hazardous exposures are largely preventable, and the occurrence of such sentinel health events indicate failures in the public health / occupational health surveillance system, ineffective measures of prevention and or inadequate treatment. Moreover, as WHO data show, occupational injuries and diseases are the 10th leading cause of morbidity and mortality globally (WHO, 2005). In developing countries morbidity and mortality associated with occupational injuries and diseases is 10 to 20 times higher than in the established market economies (WHO, 2006b). Workplace health hazards include air contaminants,

chemical, biological, physical, ergonomic, psychosocial and accident factors (Giuffrida, Iunes & Savedoff, 2001; WHO, 2002). Exposures to occupational health hazards may lead to a multiplicity of adverse health conditions as described by Giuffrida et al. (2001) and WHO (2002). For example:

- toxic chemicals may lead to malignant conditions, problems with reproduction, and even death;
- lifting and movement of heavy loads over time may harm the musculoskeletal system, namely muscles, joint, bones, as well as cause nerve injury;
- exposure to extreme temperatures may be associated with arthritic pain, peripheral vascular disease, systemic cardiovascular illness, as well as adverse effects on reproduction; and
- psychosocial stress, including sexual harassment and discrimination, in addition to physical distress, may lead to burn out and other forms of human suffering.

Globally, there are at least 135 diseases and injuries, for which occupational exposure has been the proven causative or aggravating factor (Nelson, Concha-Barrientos, Driscoll, Steenland, Fingerhut, & Punnett, et al., 2005). The world wide annual incidence of occupational injuries and occupational diseases is estimated to be 270,000,000 and 160,000,000 respectively (ILO, 2002), while associated deaths approximate two million (Driscoll, Takala, Steenland, Corvalan, & Fingerhut, 2005; ILO,

2002; Leigh, Macaskill, Kuosma, & Mandryk., 1999; WHO, 1994; WHO, 2005; WHO-AFRO, 2004).

The World Health Organization, and Occupational Health and Safety

The World Health Organization first addressed the importance of occupational health only two years after its formation. As discussed in the previous section; in 1950 the WHO joined with the ILO to form the Joint ILO/WHO Committee on Industrial Hygiene (WHO, 2005). Since then, the WHO has sponsored a number of initiatives aimed at promoting occupational health and safety worldwide.

In 1990, the Network of the WHO Collaborating Centres in Occupational Health was created to contribute towards the achievement of the WHO goal of occupational health for all. During the Second Meeting of the WHO Collaborating Centres in Occupational Health, held in Beijing, China, 11-14 October 1994, the convention acknowledged the critical need for the development of occupational health, because of the changing circumstances and activities affecting workers, as well as the environment in all countries at that particular time. Thus, the members approved the *Declaration on Occupational Health for All* and developed a proposed implementation strategy (WHO, 1994). In developing the strategy some important issues taken into consideration included:

- The high burden of occupational diseases and injuries globally, as well as the disproportionately high impact in developing countries where 70% of the global working population lives;
- Over two thirds of all populations are employed and their health status has a direct impact on a country's socioeconomic development; this suggests that investing in worker health is cost effective and economically viable;
- Access to occupational healthcare in all countries should be non-discriminatory, as it is a fundamental right for all workers as set out in various international agreements and articles such as:
 - The Constitution of the WHO;
 - The Alma Ata Declaration on Primary Health Care;
 - The WHO Global Strategy on Health for All; and
 - The ILO Conventions on Occupational Safety and Health;
- The need for programmes to address health risks due to hazardous waste and the transfer of technologies (obsolete and new) to developing countries;
- That the way to a new healthy working life was through the implementation of health promotion and illness prevention at the workplace, the development and implementation of legislation and policies to address occupational health, and the development of integrated, multidisciplinary occupational health services; and
- The need for worker participation in the whole process.

The *Global Strategy on Occupational Health for All*, which was adopted at the 1994 meeting, presented situation analyses for occupational health globally, and proposed policy principles and objectives which would lay the framework for the future improvement of occupational health at national and international levels, tackling the rising incidence of workplace related injuries, diseases and death which weaken the global workforce and negatively impact global public health. The strategy was meant to give political momentum to primary prevention efforts and the management of risks for occupational and work-related diseases and injuries, and strengthen the political will for taking action at the level of the local workplace, nationally and internationally, as well as aid in the planning, delivery and assessment of essential occupational health interventions and catalyze advances in occupational health services for the labour force (WHO, 1995).

As a follow-up to the *Global Strategy on Occupational Health for All*, in 2006 the WHO Collaborating Centres for Occupational Health issued a *Declaration on Workers Health*, reiterating that using simple cost effective measures within the workplace could prevent injury, disability, disease and premature death. This declaration also addressed the changing world of work and the ways in which changes present challenges in protecting worker health and safety. For example, the declaration identified: growing health inequities which exist within and between countries; the ethical and moral issues of worker exposure to health hazards which are inextricably linked to social and economic conditions; the influence of globalization which brings new employment patterns and conditions and new methods of production; and global shifts which

threaten the health of workers as there is an increased risk of epidemic and pandemic diseases. In order to adequately face these challenges the WHO strongly advocates for the enforcement of occupational health legislation for the protection of the health of the workforce (WHO, 2006a).

At the 60th World Health Assembly in May 2007, members endorsed the *Workers' Health: Global Plan of Action 2008 -2017*. The *Plan of Action* recognizes the importance of addressing the ways in which occupational hazards affect the health of workers, and the need to develop healthy work environments through interventions such as health promotion and injury and disease prevention. The *Plan of Action* further recognizes the major inequities within and between countries as they relate to exposure to health hazards at the workplace and access to health services, and argues that for sustained productivity and economic expansion, healthy workers are indispensable. In the interest of improving worker health, the *Plan of Action* urges member states to implement and if necessary adapt activities to fit their unique circumstances (WHO, 2007). The objectives to be met include:

- The development and implementation of policy instruments on workers' health including legislation, identification of stakeholders and financial resources, strategies for injury and disease prevention, and a framework for risk assessment;
- Health protection and promotion at the workplace, achievable through health promotion, risk assessment and risk management, risk reduction interventions and enforcement of regulations;

- Access to high quality occupational health services by having sufficient human resources, as well as meeting the basic requirements for the effective delivery of healthcare;
- The provision and communication of evidence for action and practice. This objective is to be met through the development of functional surveillance, data and information systems, the strengthening of research and the inclusion of viable communication with stakeholders; and
- The incorporation of workers' health into other policies such as economic development trade policies, employment policies and poverty reduction, therefore enabling intersectional cooperation and leading to the minimization of the transfer of international or local occupational health hazards.

It is envisaged that with cooperation between member states and WHO, as well as inter-country and inter-region cooperation, the action plan will be implemented and the key goal of improved health for the global workforce will be achieved. However, this will take sustained effort and commitment, as well as leadership from governments, the participation of civil society in general and the workers in particular (WHO, 2007).

Meanwhile, the WHO has helped to facilitate the promotion of occupational health and safety globally by providing numerous working tools in the form of published manuals and guidelines. Examples of publications include:

- *Regional Guidelines for the Development of Healthy Workplaces* (WHO, 1999). The rationale for the guidelines was to establish the framework for the development of health-promoting policies and workplaces throughout the WHO's Western

Pacific Region and to support existing legislature in occupational health and safety and environmental health, as well as to improve on national standards to cover aspects such as organizational environment, health promotion, family and community health, which all impact on workers' health. Included in the guidelines are a synopsis of a healthy workplace and the importance of health promotion within the working environs, discussion of the process of implementing a healthy workplace initiative at all levels, information regarding monitoring and evaluation, and a discussion of methods of strengthening national healthy workplace initiatives;

- *Preventing Health Risks from the use of Pesticides in Agriculture* (WHO, 2001). This manual is for use by anyone who uses agro-chemicals and is intended to promote health and safety and safe working procedures among agriculture workers by giving an overview of agro-chemicals, how they should be handled, and the health risks associated with their use;
- *WHO Aide Memoire on Healthcare Worker Safety* (WHO, 2003). A strategy to protect health workers from infection due to contact with blood borne viruses, which outlines the precautions to be taken to minimize exposure to body fluids which may contain infectious biological agents, prophylaxis and post exposure management; and
- *Work Organization and Stress: Systematic Problem Approach for Employees, Managers and Trade Union Representatives* (Leka, Griffiths, & Cox, 2004). This booklet provides a discussion of the various components of work stress, prevention

strategies, risk assessment and management. Workers are often exposed to unhealthy psychosocial working conditions, such as poor social organization, confrontational or non participatory management styles, sexual harassment, discrimination, racism, marginalization and poor social relationships in the workplace, which all play essential roles in the development of work stress; often leading to back pain, hypertension and other cardiovascular diseases, worker burn out and absenteeism. The WHO, in keeping with the definition of occupational health, has continuously advocated for work to be adapted to workers, and emphasizes the recognition that the mental and physical statuses of the workforce are of equal importance. Therefore, special attention, surveillance and interventions for improved mental health of the worker are merited (WHO, 2006b).

The Pan American Health Organization and Occupational Health

In the region of the Americas, the Pan American Health Organization (PAHO) serves as the Regional Office of the WHO. The region consists of both developed and under-developed countries. In 2001, PAHO developed a comprehensive, multifaceted and integrated *Regional Plan of Action* for workers in the Americas (PAHO, 2001). In this *Plan*, PAHO committed to mobilize resources, empower, support, lead and assist member states in improving living and working conditions for the labour force, principally through strengthening technical and institutional capacity for the development of effective prevention and protection policies for workers' health. The

main areas of focus being: improvement in the quality of the working environment; legislative and regulatory policy formulation; health promotion among workers; and the delivery of comprehensive health services. For successful implementation, the *Plan* calls for collective responsibility and the active participation of stakeholders such as civil society, employers, workers, scientific institutions and the State, at the international, regional and national levels.

PAHO hopes to develop a single harmonized system of surveillance through which data on workers' health can be easily obtained (Choi, Tennassee, & Eijkemans, 2001). This would allow for the improved prevention and control of occupational hazards and a healthier workforce. According to Choi, et al. (2001) it is difficult to assess correctly the burden of occupational health events in the region because of a dearth of trustworthy surveillance information, difficulties in the diagnosis of occupational diseases, and problems with notification systems. The difficulties associated with inadequate data on occupational health and safety are not unique to the Americas but remain a global problem (ILO, 2002).

Occupational Health & Safety Issues in the Developed World

Although developed countries share some similarities in terms of addressing occupational health and safety issues, in general the focus of each country tends to be somewhat different. In contrast to developing countries, industrialized countries tend to have fair or well-developed occupational health and safety systems with the necessary legislation in place. To mention a few examples: the *Occupational Safety and Health Act of*

1970 (United States, 1970); the *Canada Labour Code* (Canada, 1985); the *Occupational Health and Safety (Commonwealth Employment) Act 1991* (Australia, 1998) and the *Health and Safety at Work etc Act 1974* (United Kingdom, 1974).

Notwithstanding the enactment of occupational health and safety legislation and the availability of a considerable body of research about evidence based practice for occupational health and safety, as well as advances in public health in general, industrialized countries have their fair share of occupational health and safety related concerns, and there are often factors that are prohibitive in allowing them to attain the utopian target of eliminating all workplace injuries, illnesses and fatalities (WSIB, 2008).

The gathering of surveillance data, for example, is a problem around the world. With regard to occupational health, surveillance information can describe the extent to which the problem is a public health concern, allow for the identification of risk factors and workers at risk and allow for the prioritization of prevention strategies and evaluation of their usefulness (Thomsen, McClain, Rosenman, & Davis, 2007). In some developed countries, although surveillance systems are fairly well established, insufficient data gathering is a concern regarding occupational health and safety. Below are some examples of problems with gathering surveillance data.

In the province of Ontario, Canada, *The Workplace Safety and Insurance Act 1997* (Ontario, 1997) is a piece of legislation enacted to promote workplace health and safety, and provide a workers' compensation system in the event of occupational injury, disease or death. The Act also establishes guidelines for the application of rates for the

payment of insurance premiums by employers, which may be adjusted up or down based on an appraisal system that considers:

- Whether the employer had adequate safety measures to avert accidents to workers or if the conditions of work are considered sufficiently safe for workers;
- The safety record of the employer and the conformity of tools and appliances of work with acceptable standards to minimize workplace accidents;
- Employer compliance with regulations under the Act and or the *Occupational Health and Safety Act* respecting first aid; and
- Occurrences of occupational accidents among workers and the cost of those injuries, if higher than average within the particular industry (Ontario, 1997).

In summary, employers' premium payments depend on the health and safety risk of and type of commercial activity, the number of employees, and the health and safety record of the entity. This therefore means that employers may choose to under-report occupational incidents so as to avoid high premium payments, and may even have their premiums lowered when they do not report accidents.

In the United States of America (USA), the surveillance system of work-related illnesses and nonfatal occupational injuries is incomplete and fragmented, and data are obtained largely from employers (Thomsen, et al. 2007), which means that data may be subjected to under-reporting. In contrast, under-reporting is not a feature of the national surveillance system for work related mortality (Thomsen, et al. 2007); as all deaths are duly reported and registered, it is very difficult to conceal them. Rosenman, Kalush, Reilly, Gardiner, Reeves, & Luo, (2006) in a review of the national surveillance

system of the USA, estimate that it fails to capture as much as two thirds of the occupational injuries and diseases occurring in Michigan annually.

In New Zealand, data on morbidity and mortality, and gender issues relative to occupational health and safety are also insufficiently acquired or recorded (Driscoll, Mannelje, Dryson, Feyer, Gander, & McCracken, et al., 2004). In Australia, while the Australian Bureau of Statistics (ABS) systematically collects information on general aspects of the workforce and population health through surveys, data on the health of the labour force are not usually generated, are poorly documented or are generally unavailable in publications (Korda, Strazdins, Broom, & Lim., 2002). Supplementary data on work-related disorders may be obtained from general medical practitioners; however, clarity regarding the mode of collection, methodology, and uniformity is lacking (Driscoll & Hendrie, 2002), making such statistics difficult to use with any degree of confidence.

In Canada, between 1982 and 2007, there was a 34% decline in the numbers of accepted time-loss occupational injuries (AWCB, 2008). While under-reporting may play a role, there are other factors contributing to this decline as indicated from some studies, as discussed below.

In order to determine those factors leading to a reduction of injury rates even in high hazard industries, Breslin, Tompa, Mustard, Zhao, Smith, and Hogg-Johnson (2007), conducted a study involving the review of lost-time claim rates by industrial sector, based on data from the Ontario Workplace Safety & Insurance Board (WSIB) and the Canadian Labour Force Survey from 1990 to 2003. The researchers found that in

Ontario, claim rates for injuries declined by 51% overall. There were significant declines even among traditionally high risk occupations such as construction, forestry and manufacturing, each registering declines in excess of 50%. According to the authors, the reasons for the decline in claims and apparent injury rates seem to be associated with the decrease in manual labour, the export of hazardous jobs overseas, and the increased use of advanced technology with superior safety features.

Among a cohort of construction workers from British Columbia, followed between 1989 and 1997, Alamgir, Demers, Koehoorn, Ostry, and Tompa (2007) found a decline in injuries over time. The negative trends observed in injuries were attributed to an increased awareness of occupational hazards, more automation of the work process, and improved health and safety training programs, as well as a shift from more severe injury to less severe injuries which may not be reported. Other reasons for lowering are that some persons may choose not to be seen at hospitals, and hospitals may code and report erroneously. Under-reporting may be a contributing factor to what seems like a paradox, because as the reported injury claims decreased over the past decade, deaths increased by 39% between 1993 and 2007 (AWCB, 2008). While injuries may be concealed by the worker or the employer, deaths are obligatory reported events.

Organizational practices in response to market demands may also have an impact on the provision of and delivery of occupational health services. In the United States, Kaminski (2001) examined the unintended consequences of organizational practices which, in response to market demands expose workers to hazards. These include performance-based pay, use of temporary employees, overtime/hours worked

per week, training, teams, and the use of a production line. As Kaminski explains, performance based pay is a very strong incentive for any worker; but this requires that they work at a much faster pace than they might otherwise work, leading to a greater risk of injury. Additionally, there is less down time for machines, and the servicing of equipment may be delayed so as to increase output, or machines may be serviced inadequately, increasing the risk of machine malfunction and worker injury.

Performance based pay may encourage workers to ignore /bypass important safety steps at their peril. As well, the use of temporary workers leads to the risk of occupational injury, as they are usually less skilled and poorly paid. Kaminski also points out that when workers work overtime or longer than usual working hours, the lack of adequate rest between shifts increases the risk for accidents.

In some countries various primary prevention programs have been implemented at the workplace to minimize adverse occupational events. To broadly assess the effectiveness of these interventions, a systemic review was conducted to analyze various workplace prevention programmes; and the summary presented by the Institute for Work and Health (IWH, 2008) indicated that there was diversity regarding where the studies were performed and who participated, with over 50% being conducted in the USA and Canada alone. The evaluative assessment of the data on the effects of prevention programs on worker injury, illness and compensation claims/costs indicate that:

- Employers have the option of choosing from a wide array of workplace injury/illness prevention controls (IPCs), yet they prefer to be guided by regulatory needs and product marketing instead of scientific evidence;
- Data supporting the usefulness of disability management /return- to-work programs are strong;
- There is only moderate evidence for benefit from programs such as workstation adjustments with ergonomic training, supervisor practices to support safety, and exercise programs; and
- Economic concerns on the part of employers are a prohibitive factor.

Employers are often concerned about the financial implications of investing in workplace health and safety interventions, and whether these programs are economically viable. The IWH (2007) presented a summary of a systemic review of studies of interventions in both primary and secondary prevention, to determine the costs and consequences of workplace based health and safety interventions. The findings indicate that occupational health programmes are diverse in different industries and range in scale and intensity, some requiring much labour and time input (exercise programs), while others, such as installing patient lifts in hospitals, necessitated high capital investments. They also determined that common interventions included prevention of ergonomic and musculoskeletal disorders (MSD), occupational disease prevention programmes, disability management programs, health promotion and violence reduction programs, and multi-faceted programs which include multiple interventions in the same setting. With regard to the economic evaluation of these

interventions, there is strong evidence supporting disability management interventions across multiple sectors, and mixed evidence in support of ergonomic and MSD prevention interventions (IWH, 2007).

Training is required for the effective implementation of occupational health and safety measures. Typically however, little training in occupational health and safety is conducted by employers, leading to a workforce with few occupational health and safety skills and an increased risk of injuries (Kaminski, 2001). Using data from three cross-sectional national surveys in Canada, Smith and Mustard (2007) found that only 13% of female and 19% of male employees reported any training in occupational health and safety in the previous 12 months; additionally, only 20% of employees reported being trained in occupational health and safety during their first year of being on the job.

Multivariate studies conducted in Canada (Breslin & Smith, 2005) indicate that adolescents and young adults were at higher risk for work injuries, especially those of the acute and traumatic nature, than adults over 35 years old. The increased incidence of injury among young workers may be related to the nature of their work, their short time on the job and apparent work overload (Breslin, Pole, Tompa, Amik, & Smith, 2007; McCloskey, 2008). Breslin and colleagues therefore call for increased vigilance over the younger workers who are more susceptible to injury, and advocate for the development of customized training in the field of practice, as well as occupational health and safety measures to minimize preventable and unnecessary injuries.

New and emerging diseases are as much a problem in developed countries as in developing countries. The world has seen the HIV / AIDS pandemic and although science has seen the development of numerous antiretroviral drugs which are effective in decreasing viral load and prolonging lives, a cure has yet to be developed. Recent challenges to occupational health and safety and public health include Severe Acute Respiratory Syndrome (SARS) and Avian Flu. The fragility of occupational health and safety systems and the need for improved public health measures even in developed countries, was demonstrated during the SARS epidemic in 2002-2003, when over 20% of all SARS cases occurred among health care workers (HCW) (Halpin, 2005). By the end of the epidemic, Canada had recorded the highest percentage of SARS cases among HCW, and together with Singapore, occupationally-acquired SARS accounted for 40% all cases (Gomersall, et al. 2006; Halpin, 2005; Hugonnet & Pittet, 2004; Loeb, et al. 2004). Avian influenza has been shown to be transmitted from birds to bird handlers and remains a major occupational health, as well as a public health concern. As with SARS, HCW are at increased risk of being infected with Avian influenza should it become a pandemic, and such a crisis could be a public health catastrophe; thus, public health authorities around the world are understandably very concerned (Halpin, 2005).

Challenges faced by Developing Countries

The status of occupational health and safety in developing countries is significantly worse than in the established market economies. As discussed in this section, the risks which promote ill-health may be 20 times higher than in developed

countries, and only about 10% of the population has access to occupational health and safety services in developing countries, compared to 20% – 50% in developed countries (WHO/AFRO, 2004).

In developing countries, there is a lack of political will for the implementation of occupational health and safety measures. Nuwayhid (2004) argues that the issue suffers from a cycle of neglect: it receives low priority from governments and this means there is inadequate funding for research. Consequently, limited local data are available to support evidence based practice, while opportunities for the development of wider partnerships and further interest in occupational health and safety are minimized. The implementation of occupational health and safety measures in developing countries is therefore hindered by competing economic, social, and political demands, as well as the lack of research (Nuwayhid, 2004).

In general, empirical evidence suggests that there is a direct link between good quality occupational health practices, a healthier workforce and increased productivity (Joubert, 2002; Nuwayhid, 2004), but policy makers still consider occupational health and safety to be a luxury rather than an important public health good and they choose the options which appear to be more urgent politically, less problematic, and more marketable to the general public (Nuwayhid, 2004). A balance of priorities has to be achieved by governments, as most developing countries are faced with great problems such as communicable diseases, high population growth, and malnutrition such that the needs of occupational health are overshadowed (Wo, 1983).

Other contemporary challenges include high unemployment, HIV / AIDS, devaluing currencies and weakening economies (Joubert, 2002).

Other important considerations which may prevent the development of occupational health and safety measures in poor countries include the need to attract investors from the global market, which can make governments reluctant to impose occupational health and safety measures which may make investors uncomfortable (Joubert, 2002). Additionally, widespread unemployment forces workers to accept substandard working conditions partly because of the need to survive. As well, they often do not have a full understanding of the health consequences which may affect them (Joubert, 2002).

Global economic integration (globalization) has brought with it a sense of newness in technology, new work organization and a shift from “blue collar” to “white collar” jobs (Loewenson, 2001). There has also been job creation and the potential for individual, family, community and global economic improvement. These positive consequences of the new world order, however, have mainly been seen in the industrialized countries. In developing countries, globalization has largely been associated with the transfer of obsolete and hazardous technologies, chemicals, processes and wastes, including asbestos and pesticides which are no longer used in the industrialized countries (Loewenson, 2001). These technologies and substances are often banned in industrialized countries because they are known to adversely affect the health of workers and the population generally.

Developing countries have not benefitted from globalization, given that poorer countries have been marginalized from investments and markets (Loewenson, 2001), creating widening inequities between rich and poor nations and forcing poor nations to compete aggressively against each other for a share of the pie, further weakening their returns. Globalization may also contribute to widening disparities within a country, as seen in South Africa where the highest paid 20% of the population controls 10 – 20 times the income of the lowest paid 20% (Loewenson, 2001). This without doubt causes inequities in access to health care.

In developing countries, globalization has had negative effects on employment and working conditions, including: a restructuring of the labour force; the increased use of machinery; increased competition; and job insecurity and instability, all of which cause immense work stress (Kortum, 2007). Such negative impacts can be observed in Central America, in the newly created “export-processing zones” where 90% of employees are women or children, and workplaces are often characterized by unstable jobs, low wages, long working hours, sexual harassment, temporary contracts and subcontracting (Kortum, 2007). Similar conditions are described by Loewenson (2001) for Southern Africa. The health concerns of women usually are not appropriately addressed and job stress along with exposure to hazardous substances often cause reproductive problems including miscarriage and foetal developmental conditions (Loewenson, 2001).

In Mexico and Southern Africa, working in these industries is associated with an increased incidence of machine-related accidents, exposure to dust, noise, and poor

ventilation (Kortum, 2007; Loewenson, 2001). In Southern Africa's agriculture, forestry, and mining sectors there is also a high incidence of injury from mechanical, physical and electrical hazards, with workers injured at an alarming rate of >30 per 1000 workers, and workers often face the challenge of exposure to hazardous chemicals (Loewenson, 2001). Paradoxically, while industries and the economy may grow, stresses leading to cardiovascular and psychological disorder, as well as accidents and toxic exposures negatively impact the health of the workforce (Kortum, 2007; Loewenson, 2001).

Developing countries also suffer from inadequate numbers of trained occupational health professionals (Loewenson, 2001). Training of personnel in occupational health and safety and data gathering are not usually priority issues because of the general lack of understanding of the relationship between occupation and health (Wo, 1983). The general population, governments, and academic experts tend to associate work-related health conditions with industrialization and have failed to appreciate that agriculture and small industry constitute a greater total risk in developing countries.

Given the need to develop occupational health and safety measures in the world's poorest countries, the importance of research into how to do this cannot be underestimated. Such research needs to be conducted as part of a multidisciplinary venture, to allow for the inclusion of a wide array of perspectives on occupational health. Nuwayhid (2004) indicates that research should be broad, addressing issues such as globalization, the importation of health hazards, migrant workers, women at

work, and child labour, in addition to addressing narrower economic and social issues and the general burden of occupational injuries and diseases. This approach to research may increase public interest, increase the cadre of occupational health and safety professionals, boost community and union participation, and in turn create pressure on governments, forcing them to prioritize occupational health and safety as critical to addressing the wider public health issues (Nuwayhid, 2004).

Specific Challenges faced by CARICOM Members

The Caribbean Community (CARICOM) includes a block of 15 independent developing Caribbean nations, five associate members (all British overseas territories) and seven observer countries. Guyana, the only English speaking country on the South American continent, currently houses the secretariat of CARICOM (Head Quarters). CARICOM's main functions are to promote economic integration and cooperation among member states, ensure equitable distribution of benefits from the economic union, and to make joint agreements on some foreign trade and foreign policy issues. The labour force within the region, including Latin America, is the fastest growing in the world, almost doubling from 112 million to 212 million between 1980 – 1998 (Giuffrida, Iunes & Savedoff, 2002).

Occupational health and safety issues receive similar attention and treatment throughout the region. As with other regions around the world, CARICOM has its problems dealing with injury and disease prevention, access to primary healthcare and occupational health and safety services. Additionally, workers often face exposure to

hazards such as toxic chemicals, dust, fumes, high temperatures, communicable diseases, noise, stress and injuries due to the non-application of ergonomic principles (Giuffrida, et al. 2002; ILO, 1999). Commonly, some hazards may go unrecognized and others do not produce immediately detectable adverse effects, such as chemical carcinogens. The exact burden of occupational illness in the CARICOM region is unknown because many accidents are never reported and work-related diseases are largely unrecognized (ILO, 1999). Reportedly however, Latin America and the Caribbean have the highest work-related death toll in the world: 3.2% of all deaths (Giuffrida, et al. 2002), compared with China (2.8%), Asia (2.7%), and established market economies (2.2%).

Several factors contribute to the high burden of occupational health events in the region, including the growth in the informal economy and small businesses which, because of their independent operations and non-compliance with regulations (health and otherwise) and the general tendency of self-employment, are often associated with poorer safety records. As well, the labour unions play important roles in advocating for workers, usually for improved wage packages and general terms of employment, but have given little focus to worker health issues, so that the importance of occupational health is watered down. The extended hours at work in the traditionally hazardous fields such as agriculture, mining, construction, fishing and transportation, increase worker exposure to health risks and make them more susceptible to adverse health events; additionally, there are disproportionately high numbers of untrained workers, especially women and children who are more likely to be involved in accidents or who

may suffer injuries with potentially long term effects. While it is incumbent on governments to ensure that workers have access to occupational health services, the region as a whole has competing economic activities of political significance and therefore has not invested sufficiently in human capital or provided the financial resources necessary for the implementation of adequate occupational health and safety measures (Giuffrida, et al. 2002).

The general lack of awareness of the significance of occupational health and safety at all levels, and the ignorance with regard to health hazards in the working environment, as well as limited institutional capacity and infrastructure, further prohibit the development and maintenance of adequate occupational health and safety systems in CARICOM (Giuffrida, et al. 2002; ILO, 1999). As with developed countries and other regions, a major impediment is the inadequate gathering of data that can be used for evidence based occupational health practice in the region (Giuffrida, et al. 2002; ILO, 1999). Within CARICOM, there is a general failure of regional governments to enact legislation and enforce regulations related to occupational health and safety, and this remains a major hindrance to advances in this field (Giuffrida, et al. 2002; ILO, 1999).

Although there is in CARICOM countries the increasing use of technology considered obsolete in developed countries, the necessary protective laws may be non-existent, deficient or not implemented (ILO, 1999). Informal economies of micro-enterprises, domestic services and self employment have grown significantly at the same time that formal employment within the region has declined (Giuffrida, et al.

2002). The marked unemployment and poor economic conditions often override any thought of the health and safety of workers. Additionally, for each job there are usually a number of applicants with several dependents trying to get the position, which creates fierce competition and sometimes forces workers to compromise their own health, just to hold the position (Giuffrida, et al. 2002; ILO, 1999).

Expansion of the regional labour market to include service sector industries such as tourism and offshore activities, as well as the expansion of informal economies bring new challenges for occupational health and safety (Giuffrida, et al. 2002; ILO, 1999). With this expansion, workers are likely to be offered insecure work with temporary or part-time contracts, or may be employed through outsourcing arrangements. These precarious situations are all associated with worse occupational health and safety outcomes (Giuffrida, et al. 2002). Other challenges are associated with poor ergonomic health principles, including repetitive strain injury and carpal tunnel syndrome (ILO, 1999).

The workers of the Caribbean are mostly rural and they encounter variations in climatic conditions; they are often infected with communicable diseases, and they are often exposed to toxic substances from the indiscriminate use of agro-chemicals (ILO, 1999). Caribbean workers tend to work for very long hours (in excess of 50 hours per work week) which can lead to excessive exposure to occupational hazards, which even at low doses may accumulate to toxic levels more quickly than in those doing the same job with same exposure dose but less exposure time (Giuffrida, et al. 2002). Some sectors of the Caribbean workforce are especially vulnerable to occupational hazards such as

chemical poisoning and rapid dehydration and these include children, malnourished people, pregnant women, and the elderly (Giuffrida, et al., 2002).

Occupational Health and Safety Legislation

Occupational health and safety legislation in the Caribbean dates back to the 1940s, following the visit of Lord Moyne from England who had been appointed to investigate disturbances on sugar estates throughout the territories during the late 1930s (ILO, 1999), although legislation governing occupational health and safety has never been uniformly enacted or enforced throughout CARICOM. The *Factories Act of Jamaica 1943* and *Factories Act of Trinidad and Tobago 1949* were among the first to be passed in the region; however, these statutes were not without difficulties for implementation. The Jamaican Act (1943) was an enabling law, which reserved the standards until the development of regulations, therefore delaying immediate implementation (regulations enforce the law). On the other hand, in Trinidad and Tobago the law was basically also the regulation, which allowed for prompt enforcement (ILO, 1999). Other countries that enacted versions of the Factories Act include Guyana with the *Factory Act 1947*, Bermuda with the *Health and Safety at Work Act (1982)* (an enabling law), and Barbados with the *Factories Act 1984* (statute includes most regulations).

The pieces of legislation governing occupational health and safety in the region today are to a large extent replicas of the British format from the middle of the last century. As such, they are no longer relevant and are obsolete (ILO, 1999).

Amendments to these laws have been long in coming, for example the *Jamaica Factories Act (1943)* does not address current issues such as noise control, hazardous chemicals and other important issues in the field of occupational health. This Act was last amended in 1968, and a further review for amendment has been before a Chief Parliamentary Council since 1995 awaiting pertinent changes (Jamaica Gleaner, 2008). Some countries, such as St. Kitts and Nevis which passed a *Factories Act* in 1955, never had amendments while others such as Anguilla, Bahamas and Cayman Islands have no occupational health and safety legislation at all (ILO, 1999).

CARICOM has played a major role in the advancement of occupational health and safety among member states. The *CARICOM Declaration of Labour and Industrial Relations 1998*, Principles Article 29, Occupational Health and Safety, strongly advocates for member states to develop, enact and enforce national policies on occupational health and safety, and stipulates that it is the responsibility of employers to provide workers with healthy and safe working environments in accordance with occupational health and safety laws and regulations (CARICOM, 1998). Following the Declaration, with the help of the ILO, CARICOM developed a model law on occupational health and safety for regional countries to adopt (CARICOM, n.d.). The document is current and relevant to the region as it moves away from the concept of a "Factories Act" which has very limited application to contemporary conditions. It is more comprehensive and calls for the designation of occupational health and safety officers and establishment of safety committees within the places of work, and several regional countries now have draft legislation based on this model. Additionally, the

model law makes provision for the self-employed, thus expanding coverage to the informal sector (CARICOM, 2002).

Guyana

Guyana is the only English speaking country of South America; it spans 215,000 square kilometres bordering Venezuela, Brazil, and Suriname (ILO, 2006; PAHO, 2007; USAID, 2003). Four main types of land forms are found in Guyana and include a clayed belt along the flat coastal sub-sea level plains where most agricultural activities occur, a sand belt to the south which includes the Intermediate Savannas rolling central plains which comprise more than half the country and include the thick rain forests where abundant mineral deposits exist, and the high mountains found in the mid-western area (ILO, 2006). As of mid-2006, the population was estimated to be 767,000 with approximately 90% living in close proximity to the main coast line (ILO, 2006; PAHO, 2007; USAID, 2003). The life expectancy at birth (2009 est.) for the whole population was 66.68 years (males 64.09 females, 69.4 years), the crude birth rate (2008 est.) was 17.85 births/1,000 population, and the total fertility rate (2009 est.) was 2.03 children born/woman (CIA, 2008).

Guyanese Economy

Guyana is rich in natural resources such as productive soil, water resources with the potential for hydroelectricity, bauxite, gold, diamonds, oil and gas, and the country has high grade interior rain forests with huge potential for eco-tourism and

timber exploitation, yet Guyana remains one of the poorest countries in the Western Hemisphere (ILO, 2006; PAHO, 2004; PAHO, 2007). In 2001, Guyana's debt was estimated to be G\$32 billion, or 23.4% of the gross domestic product (GDP), so that Guyana qualified for debt relief under the Highly Indebted Poor Countries (HIPC) Initiative. This led to a debt reduction of G\$3.3 billion by the International Monetary Fund in December 2005 (PAHO, 2007).

In 2000, the per capita income was US\$770, with a third of the population considered to be living in gross poverty as they earned less than US\$510 per year (PAHO, 2004). There is a distinct difference between those in the urban as compared to the rural communities, especially with regard to access to social services. Access to healthcare for example is a "right" which has been established in the constitution; however, because of the vast land mass and topography, as well as the scarce and unbalanced distribution of resources (especially in the hinterlands), access to health services is inequitable, and approximately 13% of the population of Guyana is without any access at all (PAHO, 2004). As well, about 20% of the population has limited or no access to safe water and sanitary facilities (PAHO, 2007). In 2003, Guyana was ranked 92nd out of 173 countries on the United Nation's Development Program Human Development Index (PAHO, 2004; USAID, 2003).

The economy depends largely on the exploitation of natural resources, which directly or indirectly accounts for 55% of the GDP (agriculture, forestry, fishing - 30.3%, mining and quarrying - 10.5%, manufacturing - 8%, construction - 6.2%), while services account for 45% (ILO, 2006; PAHO, 2007). In agriculture, sugar and rice are the main

produce grown on a large scale basis, with sugar cane cultivation and production being the largest agricultural activity in the country. The state-owned sugar company Guyana Sugar Corporation (Guysuco) controls most of the enterprises, occupying in excess of 66,000 hectares of coastal farmlands and employs about 16,000 workers, and being the largest foreign exchange earner contributes to about 15% of the GDP. Rice is the second most important agricultural commodity, managed by large state-owned and privately managed corporations, as well as smaller entities operated by families; and this enterprise provides a major source of income in rural Guyana, employing over 18,000 workers (ILO, 2006).

Mining and quarrying activities are found mostly in the hinterlands, employ 15,000 to 20,000 workers and are operated by foreign-owned, as well as state-owned corporations; but problems such as the use of obsolete technology and equipment, as well as unreliable electrical power supply impede production activities. Manufactured products are mainly consumed locally, but in 2005 their contribution to GDP grew by 2% because of increased foreign and local investments which enabled the expansion of small and micro-enterprises. Investment in construction is principally through foreign and local entrepreneurs, who are usually involved in projects of large or small scale including road and bridge construction, housing and other projects. The service industry is widespread and includes transport and information technology, and with the influx of call centres which employ mostly women, this sector has seen a boost in recent times (ILO, 2006).

Guyanese Workforce

Approximately two thirds of the population of Guyana is of working age, and about a third of this group work in and around the home, while 7% attend school.

Males account for just over 50% of the paid workforce, and are less likely than females to be unemployed. Among those of working age, 66% of females and 22% of males are not gainfully employed (PAHO, 2007).

In general, there is an unequal distribution of the economic and social burden between males and females, as women are more likely to be living in poverty, and are the ones entrusted with the tasks of home care and child rearing. In both the public and private sectors, women tend to have lower-paying jobs and are less likely to be in decision-making positions. Additionally, with the shrinking economy, more women can only find work that pays subsistence level wages. It must be noted, however, that statistics can be misleading and do not generally capture those women in the informal sector who are unpaid but work in family businesses and agriculture, or who are responsible for the maintenance of the home and child rearing (USAID, 2003).

Child Labour

In Guyana, child labour is prohibited by law: the legal age for employment is above 15 years old (Guyana Bureau of Statistics and UNICEF). However, according to Danns (2003), the employment of minors (under 15 years old) appears to be culturally entrenched in Guyana, as they represent an important segment of the workforce. As well, Danns and USDL (2008) estimate that overall, 27% of children aged 5 – 14 years

are actively employed. According to the *Guyana Multiple Indicator Cluster Survey 2006, Summary Report* (Bureau of Statistics and UNICEF, 2008), employment of minors in the rural hinterlands is as high as 36% compared to 13% in the urban areas, and 29% among the poorest households as opposed to 4% among the rich. A previous assessment conducted in 2001 by UNICEF suggested that among those involved in child labour, 45% were from the remote interior, 22% were from the urban coast and 26% were from the rural coast, and a higher proportion of boys than girls were involved (29% versus 25%). As well, the same survey indicated that within some specific townships and villages, child labour ranged from 20% to 75%. Danns (2003) suggests that if the legal age of employment in Guyana were 18, then child labour would approximate 54%.

Published discussions of the issue of child labour do not, however, adequately recognize that it is an accepted part of Guyanese culture for children, when not in school, to help on family farms, assist their parents in the markets and even in small grocery stores, without wages. Further, education in Guyana is a legal requirement from age 5 years 9 months to 14, and currently 60% of those up to age 18 years attend school, while 90% of those required by law to be in school (5 years 9 months to 14) are also currently enrolled (PAHO, 2007). It would seem, therefore, that there are not large numbers of children in the labour market instead of attending school. The high level of poverty in Guyana no doubt contributes to child labour involving formal employment with pay (cash or in kind); however, considering the cultural expectation that when children are not in school they will assist their parents with work, published statistics may be misleading.

A survey conducted in 2004 to evaluate the circumstances surrounding working children in eight commercial districts in Guyana, established that the youths were mainly involved in marketplace and street vending activities, agricultural or fishing activities. Others worked as porters, domestic servants, and wait staff in bars and restaurants, or as labourers in sawmills (cutting timber, operating machinery used to shape logs), and others were involved in mining, commercial sex work and the illicit drug trade (Danns, 2003; PAHO, 2007; USDL, 2008). Although no formal medical examination was conducted on these children, in the eyes of the researchers most of them appeared to be in good health; however, the demands of the tasks being performed raise health and safety concerns such as the risk for physical disorders and injuries, especially those related to the back because of the frequent lifting of heavy objects and toxic exposure to agro-chemicals (PAHO, 2007). There is also the risk of physical and sexual abuse as well as the possibility of being exposed to sexually transmitted infections (Danns, 2003; PAHO, 2007; USDL, 2008).

Occupational Health Issues and Specific Sectors of the Workforce

This section reviews occupational health conditions which are relevant to Guyana. These include those which affect workers in agriculture, carcinogenesis from exposure to chemicals, as well as respiratory and specific communicable diseases which may have a higher prevalence among workers in forestry and mining. These conditions are areas of focus because these sectors are well established sources of employment and play significant roles in the economy of Guyana (PAHO, 2007). Occupational health

conditions among health care workers (HCW) are also discussed because of the high burden of communicable diseases prevalent in Guyana, such as Human Immune Deficiency Virus (HIV), Tuberculosis (TB), Dengue and Malaria (PAHO, 2004; PAHO, 2007) and the high risk of potential exposure for HCW. There is also the problem of new and emerging diseases such as Avian Influenza and Severe Acute Respiratory Syndrome (SARS) which have the potential to cause pandemics and adversely affect HCW when appropriate prevention measures are not applied. While the burden of occupational health conditions among HCW in Guyana is unknown, this discussion will serve to raise awareness generally and form the framework for preparedness to mitigate some of these conditions.

Agriculture

It is estimated that about half the global workforce is involved in agriculture, with developing countries accounting for the highest proportions (two thirds) compared to their developed counterparts which account for less than one tenth of the global agricultural labour force (Forastieri, 1999). The hazards associated with agriculture are described as especially dangerous because over 50% of annual occupational fatalities occur in the agricultural sector (Forastieri, 1999), and in some countries the fatality rate in agriculture may be twice that of other industries. In Guyana, work related injuries and fatalities are much higher among agricultural workers than workers in any other industry (see Table 1, p 59).

Agricultural fatalities are most often related to the use of machinery such as harvesters and tractors (Forastieri, 1999). Other frequent causes of injuries are transportation incidents, contact with objects or equipment including electrocution, falls, assaults and violence (Buckley, Sestito, & Hunting, 2008). The most frequent injuries include fractures of the limbs, spine, trunk, skull and open wounds (Forastieri, 1999; Lizer, & Petrea, 2008; Saar, Dimich-Ward, Kelly, & Voaklander, 2006); and men appear to be more often affected than women. All of these findings apply to the situation in Guyana (see Table 1, p 59).

A survey conducted among Illinois farmers (Lizer, & Petrea, 2008) indicated that accidents with tractors are largely preventable and could be reduced by 40% if seat belts and roll-over protection measures were used; additionally, 82% of tractor fatalities could be prevented by using the appropriate safety methods. Therein lies the importance of knowledge of safety features and the use of preventive mechanisms aimed at minimizing tractor and other agriculture-related injuries.

Agro-Chemicals Use

In order to maintain productivity and continued growth, developing countries such as Guyana invest heavily in the use of agro-chemicals to control weeds, fungi, small animals and other pests (PAHO, 2007). There is therefore a higher risk of pesticide poisoning among agricultural workers than non-agricultural workers (Calvert, Karnik, Mehler, Beckman, Morrissey, & Sievert, et al. 2008). Exposure to poisons from pesticides and other agro-chemicals may have acute toxic effects or may lead to chronic

conditions such as cancer (Forastieri, 1999; Saar, Dimich-Ward, Kelly, & Voaklander, 2006). In Guyana, acute poisoning from agro-chemicals is a recognized problem; and as was highlighted at a 2005 workshop, contributing factors include the inadequate implementation of regulations, scarce resources, the persistent use of highly toxic pesticides, a dearth of safety education, and poor availability and use of personal protective equipment (PAHO, 2007). Additionally, over two thirds of suicides committed in Guyana are via ingestion of liquid poisons, the majority of which are agro-chemicals (PAHO, 2007).

Organophosphate pesticides which are frequently used in developing countries in agriculture, industrial work and for pest control may cause acute toxic effects, resulting in high morbidity and even death, as well as chronic neurological conditions in humans (Jagal, & Dharmani, 2003). In addition to direct personal contact, there is also the indirect exposure of family members and others to low doses of chemicals which are often in the clothes of handlers. Measures aimed at decreasing exposure such as personal protective devices, hand washing with soap, and the wearing of clean clothes are therefore invaluable. Notwithstanding these measures, it has been shown that pesticide users still have unacceptably high levels of chemicals in their blood and urine (Salvatore, Bradman, Castorina, Camacho, Lopez, & Barr, et al. 2008). This indicates that despite primary protective measures, exposures remain significant, and the cumulative effects could be catastrophic. The public health implications of exposure to toxic agriculture chemicals cannot be underestimated. In developing

countries such as Guyana the use of pesticides is widespread, less regulated than in developed countries, and there is a dearth of primary protective measures.

Exposure to poisonous and vector bearing animals and plants is not uncommon in agriculture; and this may give rise to several conditions such as allergies, respiratory illnesses, parasitic and zoonotic diseases, which may lead to the development of epidemics in unexposed communities (Forastieri, 1999). In 2001, a case of suspected human rabies was reported in Guyana, and since then 22 cases have been diagnosed clinically among cattle; and in 2004 over 25 animals died of equine encephalitis with three confirmed non-fatal human cases (PAHO, 2007). Understanding the public health implications is essential and the application of preventive measures within the work environment may to a large extent avert and or minimize the propagation of diseases throughout the wider community.

In agriculture there are other health hazards, the effects of which are usually recognized only after prolonged exposure. Some of these include high morbidity from the nuisance of noise, which causes hearing impairment and can even induce conditions which may cause death; musculoskeletal abnormalities due to the lifting of heavy loads and abnormal posture (Forastieri, 1999), and accompanied stress and psychosocial disorders which further compound the situation. These conditions add to the ever-growing global burden of diseases, weaken the workforce, reduce earning power and negatively impact the socioeconomic and health status of workers, families and society.

Carcinogen Exposure

Cancer is a recognized major public health concern globally, and in 2000 approximately 10 million new cases were diagnosed (WHO-IARC, 2003). Given what is known about the pathogenesis of cancers, at least a third are preventable by simply minimizing and where possible eliminating exposure to carcinogens such as chemicals in the form of benzene, industrial dusts, and agrochemicals, or biological agents such as HIV, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Human T Lymphotropic Virus (HTLV) and Epstein Barr Virus (EBV), and introducing healthy lifestyles and other public health measures (PAHO, 2002; WHO-IARC, 2003). Malignancies may also be minimized by reducing exposure to: ionizing radiation, radioactive materials and radon; passive or environmental smoking; and diesel engine exhaust (PAHO, 2002). There are at least 150 carcinogenic agents listed by the IARC, several of which can readily be found in the working environment (Driscoll, Steenland, Prüss-Üstün, Nelson, & Leigh, 2004; Nelson et al. 2005).

Occupational cancers contribute significantly to the global burden of disease and in 2000 accounted for about a third (640,000) of all occupational deaths (ILO, 2002), and of this total approximately 100,000 were attributable to asbestos exposure. A high proportion of workers, especially in the mining industry, continue to be exposed to beryllium, cadmium, chromium, diesel exhaust, nickel, arsenic, asbestos, and silica, which are strongly associated with the occupational cancers of trachea, bronchus, and lung (Driscoll et al. 2005; Nelson et al. 2005). There is a link between asbestos and lung cancer as indicated in the findings of Hughes & Weill (1991), who conducted a

prospective mortality study among 839 men employed in the manufacture of asbestos cement products, and found with X-ray film evidence of asbestosis and an excess risk of lung cancer. This is in keeping with the view that because of the high fibrinogenicity of asbestos it is a lung carcinogen.

There are other cancers for which research has shown a relationship between occupational exposure and their development. Cancers which may develop from occupational exposures to carcinogens include endometrial cancers linked to silk dust contact in textile industries (Wernli, Ray, Li Gao, Fitzgibbons, Camp, & Astrakianakis, et al., 2008), laryngeal cancer due to wood dust exposure (Ramroth, Dietz, Ahrens, & Becher, 2008), and urinary bladder cancer due to exposure to solvents and gasoline (Lohi, Kyyronen, Kauppinen, Kujala, & Pukkala, 2008), as well as haematological malignancies (chronic lymphocytic leukaemia and multiple myeloma) from benzene exposure (Costantini, Benvenuti, Vineis, Kriebel, Tumino, & Ramazzotti, et al., 2008).

In Guyana there are no data that directly link malignancies and specific occupational exposures; however, the total numbers of recorded cases was 2,236 between 2001 – 2005, at an incidence rate of 301.3 per 100,000 population, and with a tendency to increase during the period; however, this may be attributable to improvements in the cancer registry data collection (PAHO, 2007). Of the recorded cases, breast cancer accounted for 15.4%, prostate cancer 14.6%, cervical cancer 12.9%; while cancers of the colon, stomach, lung, uterus, and liver ranged from 3.1% to 5.6%. The data presented should, however, be interpreted with much caution as they may not

adequately reflect the reality due to limited access to high quality investigations, diagnosis and registration (PAHO, 2007).

Respiratory Exposure

Respiratory complaints are quite common and they cause severe morbidity and sometimes death. Globally, chronic obstructive pulmonary disease (COPD) and asthma account for 13% and 11% respectively of occupational complaints (Nelson et al., 2005; WHO, 2005), and occupational deaths attributable to COPD are estimated at 37% (Nelson et al., 2005). Exposure to wood dust and particles in saw mills, cabinet and other furniture-making facilities poses severe pulmonary health risks leading to respiratory symptoms, such as chest tightness, coughing, wheezing, rhynorrhea, the induction of or worsening of asthma, and can cause COPD, chronic bronchitis and restrictive lung disease (Glindmeyer, Roy, Rando, Lefante, Freyder, & Brisolaro, et al. 2008). Those who work in the wood industry may also be exposed to mould, bacteria, and fungi among other microbes which when inhaled may cause severe debilitating pneumonitis and sometimes death (Glindmeyer, et al. 2008).

Bronchitis may also be found at especially high levels among workers exposed to raw fibre in cotton textile industries. This condition tends to develop after 10 or more years of continual exposure to the irritant and usually occur more rapidly with tobacco use; however, if the exposure is sufficiently high, the condition may develop even among non-smokers (Krstev, Ji, Shu, Gao, Blair, & Lubin, et al. 2008). While the incidence of smoking in Guyana is unknown, the Global Youth Tobacco Survey 2004,

conducted among students 11- 16 year old, indicated that 32% of students interviewed had ever smoked, 18% were current smokers of different forms of tobacco, 11% currently use cigarettes, 9% use any other form of tobacco product and 11% of never smokers were likely to smoke in the next year (CDC, n.d.). As well, the report indicated that about 40% of students live in homes where others smoke in their presence; 60% were exposed to smoke in public places, while over 30% have parents who are smokers. By extension, it can be assumed that prevalence of smoking among Guyanese in general could be about 40% or higher. Other documented respiratory irritants which sometimes lead to allergy and asthma symptoms include rye flour which may cause Bakers' Asthma (Letran, Palacin, Barranco, Salcedo, Pascual, & Quirce, 2008) and allergens from working in the fish industry, that may lead to different forms of allergy including asthma (Jeebhay, Robins, Miller, Bateman, Smuts, & Baatjies., et al. 2008).

The occurrence of such medical events may indicate the absence or inadequacy of occupational health and safety measures such as dust and other allergen reduction methods, prevention through the use of protective devices, inadequate training on the use of devices, and the need for universal health precautions, adequate ventilation, and worker surveillance. The ill health of the exposed is not limited to their remaining actively in the work environment, but there is a greater public health impact as 86.5% of affected individuals may continue to experience chronic asthma even after removal from the offending environment (Klusackova, Pelclova, Levedova, Marckova, & Brabec, 2006).

Pneumoconiosis is a preventable, chronic, severe, debilitating, inflammatory lung disease, caused by prolonged exposure to industrial dusts. Those who work in mining, quarrying, drilling, tunnelling operations and sandblasting, as well as stone-cutters, pottery, foundry, ground silica, and refractory brick workers are generally exposed to silica dust which is a well known cause of pneumoconiosis (Bang, Michael, Attfield, Wood, & Syamlal, 2008; Xiao, Morinaga, Wang, Xu, Ma, & Zhang, et al. 2006). The onset of pneumoconiosis in any setting may be delayed or prevented with adequate occupational health and safety interventions (Attfield, & Castellan, 1992), as evidenced by studies of interventions in the USA (Bang et al. 2008).

Other public health risks may also be minimized with the implementation of adequate surveillance in the workplace. It is not uncommon to find concomitant infectious disease transmission among miners with chronic lung disease, owing to the fact that individuals work closely together in poorly ventilated environments, and in general do not use universal health precautions. Importantly, chemicals used in mining areas such as mercury (to purify gold) may also weaken the immune system and the body's ability to fight diseases. A survey conducted among 779 retired gold miners in Southern Africa found that 25% of respondents had silicosis while 85% of non-respondents had died of lung disease, 26% had a history of TB while 2% were on active TB therapy, and 13 were also positive for HIV (Girdler-Brown, White, Ehrlich, & Churchyard, 2008).

Gold mining is a major source of employment within the Amazonian countries such as Brazil, Suriname and Guyana. Among workers in these gold mines

there is an especially high prevalence of malaria and studies have also confirmed high levels of mercury in urine and blood as a result of exposure during gold processing, and or from consumption of contaminated water and fish. Within the mines, open trenches filled with water create ideal breeding areas for the malaria causing mosquito (*Anopheles*), the *Aedes aegypti* which transmit the dengue virus, as well as other disease spreading organisms; thus making small scale gold mining areas the centres for malaria and other tropical disease transmission (Heemskerk, 2001; Silbergeld, Nash, Trevant, Strickland, de Souza, & da Silva, 2002). According to PAHO (2007) more than 50% of miners in Guyana are affected by malaria; while the dengue surveillance data indicate that over 200 cases were reported in 2002.

Healthcare Workers (HCW)

Healthcare workers include physicians, nurses, porters, laboratory personnel, and therapists who are all among an exceptional group, whose primary function is that of health promotion, illness prevention and management of those who become ill. They are unique, in that although they may be considered the guardians of health, they themselves, being exposed to various occupational hazards, are at risk of having sentinel health events or may further breach the public health barrier by being the engine through which infectious diseases are transmitted.

Influenza is usually a community-acquired infection to which both HCW and the community at large are susceptible, and in the USA annual epidemics are responsible for 136,000 deaths and 114,000 hospitalizations. HCW are frequently exposed to this

viral condition through close contact with patients and their relatives who are carriers of the virus, and may themselves become infected (Bridges, Kuehnert, & Hall, 2003). In Guyana acute respiratory infections (ARI) also cause significant morbidity and mortality each year. There are about 50,000 cases with over 2,000 needing in-patient hospital care and 200 deaths annually, which predispose HCW to a higher than normal risk of infection (PAHO, 2007). In 2003 the ARI rate was 6,553 per 100,000 population and increased to 7,111 per 100,000 in 2004 and the death rate was 23.8 per 100,000 (PAHO, 2007).

The epidemic of Severe Acute Respiratory Syndrome (SARS) during 2002-2003 demonstrated that HCW, and especially those HCW in the intensive care (ICU) setting, may be susceptible to infection if appropriate public health measures are not taken pre-emptively. The early and appropriate use of personal protective procedures may reduce or prevent disease transmission between patients and HCW as demonstrated in a Hong Kong hospital where transmission to HCW was minimized (67 confirmed patients including 5 HCW), while in a more sophisticated ICU in Singapore, where pre-emptive measures had been taken, 39 patients were admitted and no HCW were infected (Gomersall, Joynt, Ho, Ip, Yap, & Derrick, et al. 2006; Hugonnet & Pittet, 2004). This contrasts greatly with the situation in Canada, where early and consistent actions were not instituted, thus resulting in transmission mostly among HCW, and eight of 32 ICU nurses who were caring for three patients became infected (Hugonnet & Pittet, 2004; Loeb, McGeer, Henry, Ofner, Rose, & Hlywka, et al. 2004).

Tuberculosis (TB) is a respiratory communicable disease, more prevalent in developing countries and according to a review conducted by Joshi, Reingold, Menzies, & Pai, (2006), HCW are at a very high risk of becoming infected. The review indicated that the prevalence of TB among HCW was between 33% and 79% (mean 54%) and the annual incidence ranged from 69 to 5,780 per 100,000 per year. Joshi, et al. (2006) further noted that the risk of HCW being infected depends on the amount of exposure, and the disease was most prevalent among those who worked in the TB laboratories or in-patient wards (closer contact with ill patients or infected specimen). Menzies, Fanning, Yuan, & Fitzgerald (1995) in their review also concluded that the risk of nosocomial transmission of TB to HCW was high, especially, among those conducting autopsies, those working in laboratories or on internal medicine wards, and when there is delay in the diagnosis of a patient.

Tuberculosis and HIV are major public health concerns in Guyana, and represent important risks to which HCW are commonly exposed. Incident cases for TB rose from 20 in 1984 to 80 in 2004, and this may be attributable to a combination of factors including improved surveillance and increased numbers of disease cases through TB-HIV co-infection, as HIV prevalence among adults increased over five fold from 0.5% to 2.7% during the same period. Meanwhile, annual mortality attributable to TB increased from 1.9 to 5.3 per 100,000 population between 2000 and 2004, likely due to TB/HIV co-infection (PAHO, 2007).

Exposure to body fluids places HCW at risk of contracting several other infections including Hepatitis B virus (HBV), Hepatitis C virus (HCV), and HIV in the

occupational setting (Chalupka, Markkanen, Galligan, & Quinn, 2008; Luckhaupt, & Calvert, 2008; Rapiti, Prüss-Üstün, & Hutin, 2005). Moloughney (2001), in a review, indicated that the risk of transmission between patients and HCW was dependent on the rate of exposures, prevalence of the condition in the source populations and the effectiveness of post-exposure management. It is estimated that the risks associated with contaminated needle-stick or other sharp objects causing a percutaneous lesion is such that globally among HCW, 40% of HBV & HCV as well as 4.4% of HIV infections may be caused through that route (Nelson et al. 2005; Rapiti, et al. 2005).

In addition to HIV, HBV and HCV, exposure to body fluids and contaminated sharp objects increases the risk of acquiring other serious blood borne infections such as, tuberculosis, diphtheria, herpes, malaria, Ebola plague, and Epstein-Barr infection. Healthcare support staff such as porters, cleaners, and laundry personnel are also at an increased risk of contracting disease because they often come in contact with medical waste and may also be injured by contaminated sharps (Rapiti, et al. 2005).

In addition to public health concerns with regard to infectious disease transmission to and by HCW, other occupational health risks include mental distress from abuse, work stress leading to or worsening chronic conditions such as hypertension and cardiovascular disease, and physical strain from lifting patients and long working hours. In Jamaica (a CARICOM member state), the exposure of HCW to high degrees of violence (verbal abuse 38.6%, bullying 12.4% and physical violence 7.6%) coupled with long working hours, causes severe mental distress, and high rates of

absenteeism and attrition (Jackson, & Ashley, 2005). Depression and burn-out from work stress and long working hours among HCW is not uncommon (Buddeberg-Fischer, Klaghofer, Stamm, Siegrist, & Buddeberg, 2008), but is a preventable condition, which requires early recognition and appropriate management to prevent deleterious consequences.

Occupational Health and Safety Legislation

Since emancipation in the early 1800s there is a history of workers in Guyana advocating for better working conditions and workers' rights, as evidenced by the birth and subsequent growth of the trade union movement, dating as far back as the early 1900s (Nageer, 1998). The labour movement in Guyana has been instrumental in the development of labour laws which form the legal framework within which the trade unions operate (Anonymous, 1999).

Entrenched in the Laws of Guyana are a number of pieces of pro-occupational health legislation (CARICOM, n.d; GINA, n.d.). One of the earliest appears to be the *Steam Boilers' Regulations (1907) Cap. 95:04*, which was enacted to establish safety guidelines for the use of steam boilers used for generating steam, a major form of energy in factories, railways, ships and locomotives during the early 20th Century. Since workers were at high risk for serious accidents or death, the workability and safety of the boilers had to be assured and the law provided for penalties in case of the failure of employers to meet the requirements established within the law.

The high rates of accidents and deaths as a result of workplace injuries prompted the passage of *Accidental Death and Personal Injuries (Damages) Act 1916 Cap. 99:05* (CARICOM, n.d; GINA, n.d.) which allowed for the employer to be held responsible if safety mechanisms were not adequate at the time of worker injury. If the employer was found guilty of a breach, an assessment of damages was done in court and an award was made to the plaintiff or his dependent.

Consistent with the 1919 convention of the ILO with regard to the employment of minors in general and on ships in particular, the *Employment of Young Persons and Children Act (1938) Cap.99:01* was enacted (CARICOM, n.d; GINA, n.d.). Under this law, children under the age of fifteen years should not be employed; neither should young persons (16yrs) work at nights or on ships. Additionally, young people who are employed should be officially registered. As well, employers having under their jurisdiction children working may be convicted and required to pay a fine.

The *Guyana Factories Act 1947 Cap. 95:02* (Anonymous 1999; CARICOM, n.d; GINA, n.d.) was a model of the Jamaican Act of 1943, being an enabling law (discussed previously). This Act provides for the registration and regulation of factories and applies to docks, buildings, construction and mines, as well as the State. Some important requirements include the registration of factories, submission to inspection to ensure suitability for specified operations, the inclusion of safety mechanisms, the prohibition of the employment of minors, and the specification of working hours for labourers with provisions for shifts, overtime and holidays. Under this law, the Minister

is conferred with the power to make regulations and to determine the penalties for noncompliance.

The *Labour (Conditions of Employment Certain Workers) Act (1978) Cap. 99:03* (Anonymous 1999; CARICOM, n.d; GINA, n.d.) serves to regulate the conditions of employment for certain workers. Under this Act, service workers such as those in restaurants, guest houses, hotels, discotheques, retail shops, night clubs, etc., have the right to a minimum wage package, time off, medical care, overtime pay for working beyond the specified working hours, luncheon interval, meal and uniform allowances, weekly holiday, and accommodation where necessary. As well, this Act provides for a strict ratio of workers to clientele, and establishes the conditions for the institutionalization of a Department of Labour to regulate the relationship between employers and employees and settle differences between them.

The enactment of the *Household Service Workers (Hours of Work) Act (1980) Cap.99:07* (CARICOM, n.d; GINA, n.d.) ensured appropriate working conditions for household workers and regularized their expected hours of work. Prior to this, employers would have had them work prolonged hours without additional monetary reward or time off.

In keeping with the need to modernize the laws to better protect workers' health, the *Occupational Safety and Health Act (1997) Cap. 99:10* (Anonymous, 1999; CARICOM, n.d; GINA, n.d.) was enacted. Although similar to, it preceded the CARICOM Model Law on Occupational Safety and Health and the Working Environment by about nine years (CARICOM, n.d.), making Guyana the first country

in the region to have enacted a modern law on occupational safety and health (CARICOM, 2002).

This Act applies to all industrial establishments, private dwellings and self-employed persons as well as those involved in home-work. Additionally, it outlines the roles and functions of the statutory body (National Advisory Council on Occupational Health and Safety Committees), safety and health representatives and inspectors. As well, there are provisions for safety and health (buildings, equipment, prohibition of employment of minors), the management of hazardous materials, and the notification of accidents and diseases, and the roles and responsibilities of employers and workers are discussed. The Act also confers power to the Minister for the administration of relevant regulations and stipulates a monetary penalty for those found in breach of the law.

Guyana depends greatly on agriculture and uses a lot of agro-chemicals to reduce pests; however, as discussed previously this increases the risk of direct toxicity to handlers and indirect toxicity to others who are in close contact. In order to minimize those possible ills the *Pesticide and Toxic Chemical Control (2001) Cap.68:09* (CARICOM, n.d; GINA, n.d.) was enacted. This Act ensures that the manufacture, importation, transportation, storage, and disposal of agro-chemicals and other toxic substances are regulated. The Act also provides for the establishment of a pesticide and control board, the authority through which all activities surrounding the use of such substances is governed.

Guyana has also ratified International Conventions such as the *Occupational Safety and Health Convention (No. 155) and Recommendation (No. 164) of 1981* which allows for the approval of national occupational safety and health policies, and establishes the framework for how governments and enterprises should operate in order to create better occupational safety and health and improved working conditions. Also ratified was *Convention No. 161 and Recommendation No. 171, of 1985*, which outlines the format for the establishment and implementation of occupational health and safety at the enterprise level (GINA, 2005).

Since the Occupational Health and Safety Act was enacted in 1997, Guyana has also established a National Occupational Safety and Health Council and has prepared regulations which relate to occupational diseases, construction safety, personal protective equipment, mining, and chemicals, as well as the agricultural, forestry, industrial and manufacturing sectors (GINA, 2005). Additionally, in keeping with the requirements established by the ILO, there have been further steps to improve the health of workers, including the establishment of an Occupational Health and Safety Division within the Ministry of Labour in 2007, which is the legislated body to monitor and advise on health and safety issues related to occupation, as well as to provide training in the field.

Occupational Health and Safety Statistics Guyana

The Occupational Health and Safety Division of the Ministry of Labour, Guyana, has the task of collecting and organizing all data relevant to work related

injuries, diseases and death. Since 2000 these statistics have been compiled and released in the *Quarterly Statistical Bulletin*. The annual statistics report 2000 – 2008 (Table 1) shows a general downward trend in reported injuries from industrial accidents between 2000 and 2006, except for 2007 when a sharp rise was seen, but this was followed by a 40% drop in 2008; agriculture accounts for 79% - 95% of all reported injuries. Reported fatalities from industrial accidents (Table 1) also show a downward trend between 2000 and 2004; there was a sharp rise in 2005, and then reported fatalities began to decline again through 2007. The data for fatalities in 2008 show twice the number of deaths due to industrial accidents over the previous year.

Table 1: OCCUPATIONAL SAFETY & HEALTH ANNUAL COMPARISON OF
INDUSTRIAL ACCIDENTS

TYPE of INDUSTRY	TOTAL PER YEAR 2000 - 2008								
	2000	2001	2002	2003	2004	2005	2006	2007	2008 (totals only)
Agriculture	2,346	2,242	2,053	2,135	2,087	1,124	1,047	1,600	
Mining & Quarrying	16	14	21	15	12	6	0	47	
Manufacturing	88	79	76	68	49	86	39	209	
Forestry	26	76	19	16	1	12	22	0	
Electricity, Gas & Water	10	11	22	19	15	16	12	29	
Commerce	12	10	9	3	4	21	50	5	
Service- Medical & Health	12	19	7	4	6	11	6	43	
Communication [Telephone]	7	8	17	130	10	6	3	4	
Construction	6	4	18	8	18	0	4	-	
Hotels	-	-	-	-	-	-	-	40	
Basic Metal	-	-	-	-	-	-	-	17	
Transport	-	-	-	-	-	-	-	5	
Storage & Warehousing	-	-	-	-	-	-	-	0	
TOTAL	2,523	2,399	2,242	2,281	2,202	1,282	1,183	2,031	1,221

FATAL ACCIDENTS	14	8	5	4	4	10	7	5	10
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Source: Guyana (2007, 2008).

The downward trend observed in reported industrial accidents may be due in part to improved safety at the workplaces as there are increased numbers of

occupational health and safety inspectors and inspections in 2008 increased 33% over 2007. These circumstances force employers to be more compliant with occupational health and safety laws. As well, there is increased industry registration, augmented staff training, and greater public awareness through campaigns (GINA, 2009).

Globally, agricultural accidents account for most occupational injuries and deaths (Forastieri, 1999) and this is also true in Guyana. However, it should also be recognized that there may be a more developed system of data gathering and reporting of injuries in the agricultural sector, and since it is one of the industries with the largest numbers of employees, there is the likelihood of greater numbers of injuries. Some sectors which are traditionally known to be more hazardous for workers, such as forestry, report significantly lower numbers of injuries than would be expected, especially in a country where occupational safety and health is still in the infant stage of development, while other industries such as storage and warehousing, transport, hotel, and basic metal have no reported occupational injury prior to 2007. It is unlikely that this is the case. Rather, data gathering and reporting on occupational injury may not be coordinated or may not have been enforced prior to 2007. Indeed, reports of workplace injuries and fatalities in general are suspiciously low, which suggests that there might be problems related to documentation.

In 2006, the principal modality for industrial injuries was stepping on or striking against objects, followed by over exertion or strenuous movements (Guyana, 2006). As would be expected, these modalities of injuries were most often seen in the agricultural and forestry industries. In Guyana this involves largely manual labour,

including much movement in the fields on foot which increases the risk of stepping on sharp or blunt objects. Sometimes there is also the lifting and transporting of heavy loads at fair distances through at times hilly areas, which contributes to physical strain on the musculoskeletal system. According to statistics for July to September, 2008 (Guyana, 2008), superficial wounds were the most frequently observed injuries, and most were located on the lower limbs, followed by the upper limbs and trunk. Men were more likely to be reported as injured than women (97.4% vs. 2.6%), perhaps because more males work in agriculture and in forestry. Women, on the other hand, are likely to work as maids and cooks or are not formally employed, so that when they are injured they are not counted. Most occupational injuries occur in the densely populated coastal areas associated with the highest sugar production.

Problems with Gathering Surveillance Data and Enforcing Occupational Health and Safety Regulations

As discussed in this section, there are numerous data-gathering challenges in Guyana, but none of them are unique to Guyana and several have been identified even in developed countries.

Inadequate surveillance, inappropriate data gathering, and the inadequate sharing of and utilization of information on worker injury disease and death are major difficulties. While the legislated body to conduct surveillance is the Occupational Health and Safety unit within the Ministry of Labour, other Ministries such as Geology & Mines, Forestry, Health, and the National Insurance Scheme collect, process and store their own data in a non-coordinated manner.

Guyana is not unique in having a fragmented surveillance system. As Thomsen et al. (2007) indicate for the USA, the surveillance system suffers from under-reporting and is non-uniform, largely because it is the responsibility of employers to do the reporting. As well, data management and surveillance in occupational health and safety in both Australia and New Zealand are also fragmented. A marked similarity between the Guyanese and the Australian system is that private physicians who see patients with occupational injuries and diseases do not usually share the information with the Occupational Health and Safety division of the Ministry of Labour. Much under reporting may also be attributable to the expanse of unregulated small industries (especially rice) or self-employed people who are not formally captured by official surveillance systems.

Guyana covers huge expanses of Amazonian land mass which traverses mountains, rivers and dense rain forests. This geographical challenge works to limit the ability of inspectors to travel to sites for inspection and data collection, and this affects most sectors. For example, industries such as mining and forestry are often located in the deep interior hinterlands, may not be easily accessible by road, and it may take several days to cross huge rivers and mountains.

There is a lack of consensus or clarity regarding what should be considered as occupational injuries and diseases and by extension death. This is a major problem worldwide, and even in Manitoba, Canada, there may be reluctance to initiate compensation for well documented occupational health conditions such as silicosis among foundry workers, miners, and those engaged in jobs where silica is used; or

asbestosis, mesothelioma and lung cancer among those exposed to asbestos (USW, n.d.). Similarly, one Guyanese official indicated that some occupational diseases were not recognized as an issue or problem in Guyana (anonymous, personal communication, 16 February 2009). For example, several well known occupational diseases such as silicosis are not classified as occupational diseases in Guyana; neither are exposures to and infection with malaria in the gold mines and logging areas regarded as work-related diseases. Mercury intoxication among miners is not accepted either.

As well, there is a lack of integration of occupational health and safety with public health and the social sciences. In Guyana, occupational health and safety is not clearly recognized as an area with public health and social implications. Thus, there is little attention paid to the pursuit of research within the field, even though the University of Guyana has been providing training in occupational safety and health through a distance education diploma program since 1987 (Bernard, Simon-Saigoo, Da Silva, & La Rose, 2002).

The program at the University of Guyana developed from the close relationship between the University and the community and is especially useful for those already employed as occupational health officers or those who wish to seek employment in that field (anonymous, personal communication, April 21, 2009). The program aims to respond to the needs of employers and meet the continuous training needs of the workforce. It was designed to produce about 20 graduates annually, most of whom would be fed directly into the various industrial settings as occupational health and safety officers; however, since 2000 the number of graduates per year has

ranged from 0 to 2. Absorbing these graduates into the working environment has been relatively easy as most faculties have institutional ties with individual employers and employers' associations that employ their graduates (Bernard, et al. 2002). To fulfil the requirements of the diploma, the candidates are expected to successfully complete the following courses: Introduction to health and safety; Industrial first aid; Behavioural and organizational aspects to health and safety; Legal aspects of occupational health and safety; Epidemiology; Human anatomy and physiology; Industrial hygiene; and Safety technology (electrical, mechanical and civil). The program culminates with students completing a research project (anonymous, personal communication, April 21, 2009). It is expected that the results of their research will be used to further strengthen the occupational and safety and health system. Overwhelmingly, research that is done is not tied to a public health or social sciences framework, but is geared towards the study of discrete problems and particular situations.

Occupational health and safety officers may also receive further routine basic refresher training, as well as an introduction to aspects of labour inspections through the Ministry of Labour. These training sessions are open to all industries, and are held weekly, but employers are not required to have their occupational health and safety officers participate. This therefore means that there may be numerous employers without adequately trained health and safety officers (university level or the refresher course level). Their ability to deal with occupational health conditions may be deficient, and by extension, there is likely inadequate surveillance, data gathering and analyses taking place.

The legal framework for the appropriate administration of occupational health and safety in Guyana is in place; however, not all employers adhere to the regulations set out in the Occupational Health and Safety Act, 1997. Failures include a lack of documented standard operating procedures for basic steps to follow in the event of an accident, and no provision of and training in the use of personal protective devices (anonymous, personal communication, 16 February 2009). Enforcement of the law through regular inspections to ascertain compliance with regulations remains a challenge because of geography and inadequate human resources.

Other challenges include difficulties with incorporating the informal sector and small enterprises, largely because they are numerous and may not clearly fit one category or the other. Investing in occupational health and safety within these small enterprises has also been seen as an overly costly activity and for this reason many such employers are reluctant to implement health and safety measures. Additionally, the labour unions have played important roles in the drafting and enactment of various labour laws, including those to do with wages, but have put little emphasis on the health of workers. The unions appear to be disproportionately concerned with industrial relation issues such as salaries, hours worked, overtime payment and workers disciplinary actions rather than on the health and safety of the workforce. Finally, the arrival of new industries often means the use obsolete technologies which emit toxic gases, and it can be difficult to regulate this problem.

Compensation for the Injured / Diseased Worker

There are provisions under the law for worker compensation in the event of occupational health events. Firstly, Guyanese workers are covered under a National Insurance Scheme (NIS), which was instituted in 1969. Among other benefits, the NIS provides for workers in insurable employment (Guyana, n.d.). The various benefits under the NIS include sickness, maternity, invalidity, old age, survivor's, and funeral benefits. Remuneration under this scheme is limited, usually relatively small and proportional to prior contributions. Additionally, workers may receive settlements courtesy of the *Accidental Death and Personal Injuries (Damages) Act 1916 Cap. 99:05* (CARICOM, n.d; GINA, n.d.) which provides the worker with the opportunity to go to court to seek compensation from the employer for injuries, and in the case of death to the worker, his dependents may be rewarded. If the employer is found culpable then they are obliged to compensate, sometimes handsomely. These court cases are often filled with frustration for the worker, who may opt not to pursue the issue because of the high costs associated with acquiring legal representation (anonymous, personal communication, 16 February 2009).

It is generally through these compensation packages that the worker may seek the resources required for rehabilitation. Nevertheless, from a public health perspective it is clear that not enough is done with regard to rehabilitating injured workers to as closely as possible resemble pre-incident functioning. Usually there is no direct cost to individuals for health care in the public system; however, the procurement

of rehabilitative devices and the systematic process of continued rehabilitation is not always available in the public system, and so become the responsibility of the injured or diseased. In a worse situation yet are the workers who have not received any form of compensation, and who may be living below the poverty line. These persons have to depend on the State or the family for support, which may be miniscule and limited.

Conclusions and Recommendations

Adverse health events associated with the execution of work have always been present and are recognized globally as a major obstacle in achieving the goal of health for all. In established market economies, the general working conditions, access to occupational health and safety services, data collection, research, and use of technology, etc, are much better than in developing countries; therefore, the burden of occupational injuries, diseases, and deaths is significantly higher in developing countries. Occupational health concerns such as: the increased incidence of injuries and concomitant chronic morbidity; the spread of communicable diseases such as TB, HIV, HBV, HCV, Malaria, SARS, and Avian Flu among others; rising morbidity and mortality from chronic lung diseases and cancers due to long term toxic exposures, as well as from heart disease induced by work stress, are among numerous preventable health conditions which are of public health concern. Occupational health is therefore inextricably linked with general public health. It is clear that the application of public health measures such as health promotion and illness prevention activities,

surveillance, and research within the workplace will reduce the burden of adverse work-related health events.

In the specific case of Guyana, the status of occupational health and safety is typical of that which is expected for developing countries. However, Guyana has the advantage of having the basic infrastructure (Occupational Health and Safety legislation, a governmental department responsible for monitoring and promoting occupational health and safety, the hosting of regular training sessions in occupational health and safety for designated industrial safety officers) necessary for the advancement of safety and health in places of work. The major obstacles seem to be with implementation.

One important step would be to ensure that employers are registered as required under the Occupational Health and Safety Act 1997. As well, to allow for the protection of more members of the workforce, registration needs to be broadened to include small enterprises, the informal economy, and the self-employed.

For the adequate delivery of occupational health and safety in Guyana it is recommended that there be a revision of the criteria for the determination of occupational health events. This is particularly important so as to eliminate inter- and within-sector differences in defining conditions, and this would allow for one standardized system, ensuring that all sectors are gathering data and reporting on the same set of conditions. As well, it is important to replace the existing fragmented method of data collection and harmonize the system of data collection and information sharing with the legislated body, ensuring that the national system is fed with all data

to be analyzed and reported on. Through a harmonized data system a more realistic estimate of the burden of occupational health conditions can be made.

The exact burden of occupational injuries and diseases in Guyana is unknown and it is therefore recommended that more emphasis be placed on research so as to determine the exact incidence and prevalence of occupational injuries and diseases; determine which enterprises are most affected and develop general mechanisms for prevention and management. Currently, information is gathered in a piecemeal manner, so that it is not possible to know what to prioritize in addressing problems. With systematic research, occupational health and safety could be brought more clearly under the umbrella of public health and could be integrated into primary health care, a key recommendation of the WHO.

The occupational safety and health program at the University of Guyana, as well as training for safety officers at the Ministry of Labour should continue and be expanded to build human resource capacity; allowing for the greater availability of health and safety officers and inspectors to meet the increasing human resource demands, and to enforce compliance with the occupational and health safety laws. As well, the Government of Guyana should continue to raise awareness nationally on the important link between occupation and health. This would help to sensitize the public, encourage people to remain vigilant in monitoring hazardous situations, and may even encourage people to report on instances of non-compliance with the law.

Finally, it is recommended that regular systematic inspections to ensure national compliance with occupational health and safety legislation and regulations be

continued, and where necessary maximum penalties are applied to those found in breach. The laws and regulations which have been enacted to protect workers from preventable injury, ill health or death can only serve their purpose to the extent that they are enforced.

A major challenge for Guyana may be related to enforcing compliance with the laws on occupational health and safety, given that there are inadequate human resources and the topography of the vast land mass limits regular inspection. Other obstacles to the implementation of these recommendations include the lack of recognition of occupational health as a public health concern, limited access to occupational health services, and the growth of employment in the unregulated, informal economy. As well, there is no national surveillance system on occupational health and safety, and this fosters the fragmented data management approach.

Guyana has the great advantage of having an ideal legislative system in place and there appears to be political will for the development of occupational health and safety measures. With continued public education through campaigns and the increasing expansion of the workforce trained in occupational health and safety, more places of work will have health and safety officers and committees, improved data collection and usage, and better compliance with the laws. Within the next three to five years, this improved compliance will enable Guyana, a poor nation, to begin the practice of occupational health as declared in the WHO-ILO definition and work towards the goal of achieving health for all.

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