

The Future of Occupational Safety and Health

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In 1870, Louis Pasteur said “Science knows no country because it is light that illuminates the world.” Like science, contagious diseases, like HIV/AIDS, SARS and pandemic influenza know no country either. In 2033, and indeed many years before, we realized that there were no security barriers to prevent their migration across international borders or around the world’s time zones--their movement is as free as that of the interconnected delivery system of goods, services, and workers in a globally-integrated economy. As we learned back in 2008, and in the years of the global recession that followed the financial services sector meltdown, each country's social and economic activities are interconnected—even their national systems of worker protection from occupational safety and health risks.

Some thirty years into the 21st century, Americans have now left behind their national "exceptionalism," and have learned to play a crucial role in building a new global paradigm for the 21st century practice of occupational safety and health. Back in 2008, we began to understand *globalism* to be an increase in the frequency and duration of linkages between countries leading to similarities in the activities of individuals and non-governmental organizations, the practices of businesses, and the policies of governments.¹

In the interim, globalism has achieved a lot, but the early 21st century globally-integrated economy did not achieve a narrowing of the economic gap between the 85% of the world's population living in developing countries--earning only 21% of the world's income--and the 15% of the world living in developed countries--earning 79% of the world's income. In 2008, globalism was even more starkly uneven as the gross national annual income per capita of the 20 poorest countries was \$200, and the 20 richest countries was \$28,350--or between the life expectancy at birth of 44 years in the 10 poorest countries, and the 78 years in the 10 richest countries.

At the end of the 20th century, the United Nations began reporting on an annual Human Development Index (HDI), which is a summary composite index that measures a country's average achievements in three basic aspects of human development: longevity, knowledge, and a decent standard of living. The HDI is used to capture the attention of policy makers, media and non-government organizations, and to draw their attention away from the more usual economic statistics to focus instead on human outcomes. The HDI was created to re-emphasize that people and their capabilities--including their *work ability*--should be the ultimate criterion for assessing the development of a country, not economic growth alone. Indeed, for us who are concerned about development of worker health and safety, an emphasis on such human development must be the cornerstone value of our global cooperation. And, given the

state of worker health and safety development globally, we have much work to do to increase the HDI before we reach 2033.

In 2008, there are more than 2.7 billion workers in the world, including 170 million children aged 5 to 17 years--the majority of which are involved in the agricultural sector. The International Labor Organization (ILO) estimates that there are about 2 million work-related fatalities, 270 million non-fatal injuries, and 160 million nonfatal illnesses per year. And, only 10 to 15% of the global workforce has access to any type of occupational hygiene, safety or medical services. Any achievement in reducing the global burden of worker injury, illness and death cannot become sustainable unless linkages are developed between those national and multinational entities doing business in-country and national, regional and local governmental institutions. Worldwide, the power of the dot.coms, dot.govs, dot.orgs and dot.edus must be linked together if we are to sustain healthy globalism. Indeed, by 2033, a new, network-based form of governance would have to replace our narrow 2008 bipolar view that either "government" or "the market" is the solution. New policymaking mechanisms will evolve for joint communication, coordination, and collaboration among global government, business, and civil-society actors.

Why should we in the worker safety and health dot.com, dot.org and dot.gov communities concern ourselves with the endless globalization chatter--the transnational movement of capital and goods, the setting of trade tariffs, human rights under differing political structures, and the intricacies of the periodic rounds of world trade talks?

We should care because all that global economic activity arises from work, and from a global economic perspective, if for no other reason, work can generate economically inefficient costs, such as worker injuries, illnesses and death. These types of costs, if you are solely defined by your economics (as opposed to more humanistic sentiments), impair profit maximization, degrade equity and smother growth. More than global economics, though, work is the archetypal human social activity. Without work, there is no society. Therefore, it is incumbent on all of us to rise above some of our national tendencies toward "*exceptionalism*" -- and no one country suffers from this particular "ism" more than we Americans -- and begin to construct a global paradigm for the practice of occupational safety and health across national boundaries and political systems.

My presentation this morning is not about predicting the future, but it is about building on the foundation of our present knowledge and extrapolating from it to consider new future applications like wearable computers; ever-fitting respirators; tissues grown to replace aging body parts; respirator filters whose filtering capacity can be regenerated; cheap solar and wind energy; antibiotics that microbes cannot mount resistance against; protective clothing ensembles with internal milieu controls; hacker and tamper-proof voting machines; smart buildings and sentient cities that can monitor everything from leaky pipes to lost children; blogspheres that amount to gigantic reactive apparatuses of the body politic; global wireless communications that are secure and viral-proof; diplomacy that actually reduces global tensions; genetic tests that are used to protect workers, not discriminate against them; "nexus" states that integrate multiple modes of governance from a global perspective; and a risk-based OSHA safety and health management standard that is understandable and capable of being implemented without adding hundreds of new pages to the *Federal Register*.

Indeed, if we are to reach 2033 in better shape than we are now in, we will need to face and conquer five occupational safety and health challenges in 2009—the changing demographics of the **workforce**; the changing structure of **employment**; the changing nature of 21st century **work**; the changing emphasis from **work-related** safety and health to **worker** safety and health; and, most importantly, the challenge of making the current federal **government approach** to occupational safety and health more sustainable than it currently appears to be.

1. Changing Demographics of the Workforce

In the most developed countries of Europe, North America, Japan and China, the age composition of the workforce is shifting and putting significant social and economic strain on these economies. In the U.S., for example, there were 16 workers supporting each retiree in 1950. By 2005, only 3.3 workers supported each retiree. In 2020, only 2 workers will support each retiree—a burden that is too large for any economy to sustain. And, by 2017, when the 44th U.S. president will hope to relinquish office after a second term, a combination of demography and the rising costs of America's huge entitlement programs—Medicare and Medicaid—will be starting to bankrupt the country.

As a result, 4 to 6% economic growth in rich countries will not be enough growth as their labor forces contract and public finances get hammered by the soaring ratio of retirees to workers. More and more countries are realizing that it is not their health entitlement and pensions systems that need fixing so much as it is the health and longevity of its workers. For instance, delaying workers' retirement has become a common response.

In 2008, both Germany and Britain considered raising the retirement age to 67 and keeping the pension age rising with life expectancy. When countries raise the pension age, what happens to the workforce. New Zealand pushed its retirement age from 60 to 65 in 1992. As a result, workforce participation rates for New Zealanders in their 60s went from 33% to 64% for men and from 16% to 42% for women. What will be the effect on worker safety and health if that happens in the U.S.?

The average age of workers is indeed increasing which challenges our ability to ensure musculoskeletal health protection and to provide reasonable accommodations for medical conditions more common in a chronologically-gifted cohort. Further advances in medicine in the coming decades may further lengthen human life spans in the developed world increasing the challenge of how best to protect a workforce made up of a greater proportion of later life workers. In hard labor industries, like mining and agriculture, the challenge of age is indeed a significant one—think robotics.

At the same time, the flow of immigrants from developing countries into developed countries is both responsible for increasing the racial and ethnic diversity of such developed countries' national workforces, but more than that, it is responsible for challenging our ability to create a transcultural workplace safety paradigm.

By 2033, transcultural workplace safety and health became the dominant training paradigm and emphasized risk communication strategies that are interactive and responsive to the multi-cultural composition of the American workforce—which became a global one sometime after 2017. Indeed, the forces of both emigration and immigration affected every country's workforces in the 21st century. For instance, from 2005 to 2050, the more developed regions of the world are projected to have about 2.2 million

more immigrants than emigrants each year, and the U.S. is expected to receive about half of these immigrants each year.ⁱⁱ And, the transition from a predominantly native workforce to a predominantly immigrant one can be a most difficult one.

Demographics tell us that historically-native populations in Europe are reproducing slowly and aging fast. Without continued immigration, by 2050 the number of Germans will have shrunk from 83 to 63 million; Italians will go from 57 million to 44 million. In the same period, among the North African and Middle Eastern countries surrounding Europe, the population will double. And that demographic contrast may yet save E.U. economies. For Spain alone to keep its economy growing at the robust rate it has seen for the last decade, it has to have 1 million new immigrant workers per year.

And the situation is not much different in the U.S.. In the late 20th century, for instance, the flow of immigrants in the United States was responsible for increasing the richness of the racial and ethnic diversity of the American workforce. In addition, immigration was, and is still, responsible for maintaining a positive workforce growth rate in America.

For instance, new immigrants to the U.S. accounted for 50.3 percent of the growth in the US civilian labor force during a three year period (1999-2001).ⁱⁱⁱ In other words, during this period, one out of two net new labor force participants in the US was a foreign immigrant^{iv} -- the vast majority from Mexico. Some scholars^v in the US have noted that there are important ways that the current Mexican immigration differs from previous waves of European and Asian immigrants who came to America from the 17th through the 20th centuries.

The most obvious difference is that Mexican immigrants' country of origin is *contiguous* with the United States. This proximity makes it easy for Mexican immigrants to maintain contact with friends and family, which may impair assimilation into the American cultural paradigm. Another difference is rarely noted, but Mexican immigrants differ historically from other immigrant groups. No other national immigrant group has asserted, or could assert, a historical claim to U.S. territory. Parts of Texas, New Mexico, Arizona, California, Texas, Colorado, Nevada and Utah were a part of Mexico until 1848. Indeed, the native cultural heritage of nearly the entire American Southwest is that of the indigenous Mexican culture. Third, the dimensions of the current Mexican immigration exceed that of any other category of immigrants. Mexican immigrants to the U.S. constituted 27.6 percent of the total foreign-born US population in 2000 (US Census Bureau). In 1990, the Latino population of the US represented 9% of the American population, by 2000 it was 12.5%, and by 2050, Latinos will represent one out of every four persons in the US.

2. Changing Structure of Employment

During the last three decades of the 20th century, employers began changing their employment practices. An initial indication was the rapid growth in temporary or contingent employment. Between 1980 and 1990, the number of employees working for temporary agencies in the U.S. doubled from 500,000 to 1,000,000. By 1993, *Fortune* magazine reported that *Manpower, Inc.*, a temporary employment agency, had become the largest employer in the United States.^{vi}

In 1996, the *Upjohn Institute* reported that 78 percent of private sector firms were using flexible staffing arrangements. By the last decade of the 20th century, as Katherine

Stone writes in her 2004 book *"From Widgets to Digits: Employment Regulation for the Changing Workforce,"* employers no longer sought to erect internal labor markets, even for their "regular" workforce.^{vii} The world of long term stable employment--the 20th century conventional model of a full-time job of indefinite duration at a facility owned by the employer--came to an end. Indeed, the continued exclusive use of that that mid-20th century model by the governmental and private occupational safety and health communities will also become anachronistic long before 2033.

The rise of precarious employment--work that has no explicit or implicit promise of longevity--requires us in the safety and health community to face a different employment paradigm in the 21st century than we faced in the 20th century. Increasingly, we must expand our vision about who fits into the category of the precariously employed.

Not only are those workers who are expressly contingent to be included, but also those "regular" workers who are hired or retained with a different understanding of employment than their 20th century predecessors. And these formerly "non-standard" arrangements of employment such as contingent work, precarious employment, work-at-home, together with a breakdown of the traditional, legally-defined employer-employee relationship, may indeed have profound effects on worker safety and health protection given the current employment limitations of the mid-20th century Occupational Safety and Health Act.

Furthermore, non-standard employment arrangements will challenge our traditional 20th century workplace safety paradigm, especially on the governmental level. For these new arrangements, national government efforts setting occupational exposure limits (as we saw with Department of Labor redefining as a matter of policy the average working life assumption of 40 years), fashioning occupational health standards for risks that arise not from chemical, physical or biologic agent exposure, but from psychosocial exposures, and developing recommendations and guidance will have to become responsive to the changing nature of employment in the 21st century or continue to atrophy and eventually become vestigial.

Indeed, even in 2008, if we looked hard enough we saw the future of employment. We began to see a growing decentralization in business organizations made possible by information technology--workers in large organizations having enough information to make sensible decisions for themselves instead of being told what to do by someone above them in a hierarch who supposedly knows more than they do. Furthermore, we saw some of our future in *eBay*. *eBay* uses cheap communication to invent a new way to do retailing. In effect, *eBay* has outsourced almost all the functions of retailing--merchandising, customer service, order fulfillment--to independent sellers, who are not *eBay* employees or even contractors. *eBay* doesn't even pay them--they pay *eBay*!

3. Changing Nature of 21st Century Work

The 21st century will be even richer in the introduction of new technologies than the 20th century was. And these new technologies will challenge our risk assessment and risk management abilities, which given the pace of 21st century technological innovation, may be left in the dust unless we can learn how to adapt them to a new century.

An *Ernst & Young* survey of 130 major global investors representing funds running into trillions of dollars found investors are demanding that companies be more transparent

regarding their approach to environmental risk management. Eighty-two percent of investors are willing to pay a premium if they see evidence of good risk management, but many admit that they are currently making decisions based on the absence of risk information. This is no where more true than in the new field of nanotechnology.

Nanotechnology is the manipulation of matter on a near-atomic scale to produce new structures, materials, and devices. This technology has the ability to transform many industries and to be applied in many ways to areas ranging from personalized cancer medicine to stronger, but lighter, than steel. Research in nanoscale technologies is growing rapidly worldwide. By 2015, the US National Science Foundation estimates that nanotechnology will have a \$1 trillion impact on the global economy and will employ 2 million workers [Roco and Bainbridge 2001].

Nanomaterials present new challenges to understanding, predicting, and managing potential health risks to workers. As with any new technology, following our staid 20th century historical practices, by the time a material is in commerce, scientific data on the health effects in exposed workers or the public--especially long term health effects--are largely still unavailable and a government risk management that is specific is still decades away. In the case of nanomaterials, the uncertainties are magnified because the characteristics of nanomaterials may be different from those of the larger particles with the same chemical composition. And our mass-based paradigm for characterization of risk through workplace sampling may have to be modified. Indeed, studies have shown that a large percentage of inhaled nanosized particles are deposited in the lower airspaces of the lung, and animal studies have shown that when there, these deposited particles elicit inflammation and fibrosis. One study published in May of 2008 even demonstrated that the biological effect produced by single-walled carbon nanotubules was identical to that produced by asbestos.

Not only nanotechnology, but also genetically modified animals and foods, biotechnology, genomic medicine, and advances in materials sciences, will challenge our existing occupational safety and health paradigm. As we forge ahead with these 21st century technologies, we must simultaneously take a hard look at our current risk characterization, risk control and risk communication methods--configured as they were in the last century--and ask ourselves: "Are they the ones that will best serve as effective tools to help us achieve our global occupational safety and health goals in a changing 21st century world?" This question is not only applicable to the traditional tangible chemical, physical, and biologic hazards we faced in the 20th century and will continue to face in the 21st century, but especially to those "intangible" hazards associated with stress, harassment and work organization that we will increasingly face in the 21st century workplace of telecommuters, work-at-homers and electronic free-lancers or "e-lancers."^{viii}

4. Changing Emphasis from *Work-related Safety and Health* to *Worker Safety and Health*

Regardless of demographic profiles, the global worker of the 21st century needs more from its safety and health professionals than it received in the 20th century. It is not enough for us to say that our job is to ensure that workers go home from work as healthy as they came to work. We need to assist workers in returning to work the next day as healthy as we sent them home from work the day before. Therefore, highway safety, recreational safety, home safety--all these safety endeavors--along with ensuring healthy

lifestyle choices, will also be our challenge in the 21st century. If we are to be true stewards of worker safety and health, then it is the "worker" under our care that we must ensure is the safest, healthiest and secure he or she can be. Our responsibility is not just limited to *work-related* injuries and illnesses, but should be expanded to *worker* injury and illness.

A *WorkLife* focus for global occupational safety and health is based on the importance of the human being to the success of any enterprise, on the importance of health for workers who want to advance their own well-being and longevity, and to the scarce global workforce for which we are all stewards.

A new emphasis on the "people asset" of any enterprise suggests that human productivity should be related to a more holistic view of health than our current occupational vs. non-occupational paradigm. Holistic approaches to enhancing work ability health will also contribute to creating a sustainable future for the medical care systems--especially in countries like the U.S. where current medical care expenditure trends are unsustainable. Can we in safety and health create programs that integrate reduction of risks arising from both occupational and *WorkLife* factors, and thereby ensuring that we are responsible stewards of worker health essential for global economic stability and sustainability? As we learn more and more about how individual workers respond to their work environment, we will be faced with how to protect sensitive workers—those workers who respond to molecular quantities of particular chemical agents, or those workers whose genetic profile makes them more susceptible to a particular work environment agent. We will have to grapple with the genetic screening of beryllium workers, workers with multiple chemical sensitivity conditions, and other similar issues.

We will learn than the passage of the federal Genetic Information Non-Discrimination Act of 2008, or GINA, as it is known is probably only the first of several federal laws protecting the information arising from the study of the human genome that may have to be enacted in this and the following decades. GINA represents only the beginning of the public policy debate about the gene-environment interaction and how we can adapt to the information genetic science is producing. In the interim between 2008 and 2033, we will learn so much more about how genes determine risks. And, we will see the proliferation of individual genetic tests for this or that risk, and those tests will further propel us into genetic policy debates.

One fork in the genetic road may lead us to "designing out" risk, to crafting more engineering solutions to control total risk, and to exposure assessments at the parts per billion and parts per trillion range. Another fork may lead to an employer's liability for damages sustained by a worker for the employer's failure to screen their workforce for a known genetic risk, or for an employee's liability for failure to inform an employer about a genetic variation that increased his or her risk to work environment exposure.

No doubt there may be more cases in our future like the 2002 *EEOC v. the Burlington Northern Santa Fe Corp* case where the Equal Employment Opportunity Commission won a \$2.2 million settlement in a discrimination suit against Burlington Northern based on the federal agency's belief that a purported genetic test for carpal tunnel syndrome actually does nothing but unfairly discriminates against workers.

5. Sustainability of the Current Federal Government Approach to Occupational Safety and Health

Even though the future of occupational safety and health in 2033 may depend less on what the American national government does, and more on what happens in global governance structures, in the near-term, what can we expect of federal government occupational safety and health in the post-Bush era?

First, there's the **budget**. Certainly, fiscal constraint will be a significant issue for the near-term and will lead to intense scrutiny of how the OSHA budget is currently allocated. How much of the OSHA enforcement budget is expended on compliance assistance versus enforcement? How many enforcement personnel are actually performing compliance assistance? What have the results been?

Second, there's the **research, education and assistance** function performed by OSHA through compliance assistance and through State consultation program grantees and by NIOSH, but presently in an uncoordinated way. How can OSHA collaborate with NIOSH to achieve a unified government consultative approach to worker safety and health improvements? What is the budgetary impact of supporting the current 2000, or more, VPP entities? Has anyone done a program evaluation of what the return is on that budgetary investment? Do OSHA alliances and partnerships actually achieve worker injury and illness reduction or are they a form of public relations?

Third, is OSHA's **insularity** its biggest problem? Is the "go it alone" attitude at OSHA the attitude that is most cost-effective and makes the OSH Act more or less sustainable?

If you look at ORC's three recommendations for the Workplace Safety and Health Policy for the new administration, all three involve some degree public engagement—a national dialogue about adopting systems-based approaches to safety and health risks; a public process for developing recommendations about stagnant standard-setting; and transparent mechanisms for stakeholder participation in OSHA policy initiatives.^{ix}

Fourth, there is the issue which has plagued OSHA and BLS for years. How accurate is the Survey of Non-Fatal Occupational Injuries and Illnesses? How can we best investigate the "undercount" issue in injury and illness recordkeeping?^x Can we fashion a collaborative approach by utilizing NIOSH, OSHA, BLS and NGOs to investigate this issue?

Fifth, how can we tackle the slow pace of OSHA **standards development**?

General Standards Issues. Since risk regulation on the federal level started in the 1960s and 1970s, and became a captive of cost-benefit analysis in the 1980s, the output by OSHA of occupational health standards has significantly decreased—to the point where critics have charged that the OSHA standards setting process is "ossified."^{xi} A more pragmatic approach may occur in the future that may resurrect the process. Why would this be important?

Probably the biggest reason is that OSHA is becoming irrelevant, and by 2033, would cease to mean anything to anybody—to workers or employers—unless the increasing irrelevance is corrected. The issue that contributes most to the argument that OSHA has become irrelevant is the lack of connectivity between the current causes of worker injury, illness and death, and the absence of standards that address such causes.

Existing OSHA standards are not matched to the existing causes of worker injuries and illnesses in America.

How would the standards setting process be restarted? What is preventing the standards-setting process as set forth in the mid-20th century from being sustainable?

- Is it, as some say, a lack of political will?
- Is it a failure by OSHA to allocate adequate internal resources to standards development or to coordinate better internal review processes?
- Is it due to excessive interference by the OMB Office of Information and Regulatory Affairs (that reviews all proposed governmental regulations)?
- Or, is it the accumulation of procedural and substantive requirements that have been added to the standards setting process by all three branches of government since the mid-1980s? For instance, do OMB bulletins and memos requiring peer review, good guidance practices, statistical analysis and sound risk assessment principles published during the Bush Administration rulemaking represent how the rulemaking process at OSHA can be slowed?
- Is it all of these? And, what are the solutions--internal to OSHA--or are the solutions legislative?

Specific Standards. If successful at stimulating the moribund process of standard setting at OSHA, what specific standards should be on the to-do list and what priority order should they be given?

- Should a risk-based occupational safety and health management system regulation be first? Some might say yes, if for no other reason to harmonize OSHA's own promotion of such risk safety and health management systems for their voluntary programs, with their reticence to consider placement of a risk-based management standard on its regulatory agenda for all employers.

Certainly, the "success" hypothesis has been touted not only by OSHA, but also by Australia and New Zealand in their standard on risk management, AS/NZS 4360:2004.^{xii} But, some American employers adhere to a "paper tiger" hypothesis about any risk standard suggesting that many risks are ignored by such systems and that they generate great deal of paper work without producing tangible results. Others tout a "sham" hypothesis. They are openly critical of risk-based occupational safety and health standards because they create obstacles to worker involvement and are just a pretext for deregulation.^{xiii}

- Should a musculoskeletal disorder prevention standard be first on the list? Some would say yes because such disorders represent about 40% of all work-related injuries. If so, development of such a standard will be a challenge since the Congressional Review Act requires that any new OSHA MSD standard--replacing the one that was nullified by the CRA in 2001--not be substantially similar. Or should OSHA first restore the MSD column on the OSHA 300 Form and then do a standard later?

- If OSHA is to write standards that aim to reduce the most prevalent types of fatalities, then should a motor vehicle accident prevention standard be first on the list? Or should a workplace violence standard be first?
- Given the flight of American manufacturing to other countries, does it make sense to place air contaminants on the list? If so, is there a way to get statutory permission to again incorporate voluntary, consensus occupational exposure limits into OSHA standards? Or should OSHA only work on those air contaminants that have the most exposure in the residual manufacturing workforce in America?
- What about a standard for infectious bioaerosols like pandemic influenza, tuberculosis and other biologic agents? A standard for combustible dust? A standard for diacetyl? Where should these possible standards be placed on our priority list?
- How does OSHA approach other emerging issues, like prevention through design, nanotechnology, genetics-in-the-workplace or organization of work? How does OSHA elevate its contribution to the National Response Plan from its current position of being relegated to a non-self-activating Annex to a self-activating Emergency Support Function?
- Should OSHA engage in generic rulemaking for not just PELs, but also for exposure assessment, medical surveillance and training?
- Should it engage in less quantitative risk assessment and opt as does the Health and Safety Executive of Great Britain for qualitative risk assessment through the tool of control banding?

Sixth, there are several standards **enforcement** issues that will come under scrutiny.

The major one is the perennial one--the number of OSHA inspectors. Other than the option of increasing the number of inspectors, two other options are available to bolster the enforcement of occupational safety and health standards--techniques for greater worker empowerment and inspectorate augmentation by private sector auditors.

- *Worker empowerment.* In addition to the rights granted employees in the OSH Act, can there be greater involvement and control of workplace safety issues by employees themselves through mandatory safety and health committees, or through employees that stand in the place of OSHA inspectors? Can the National Labor Relations Board's holding that Section 8(a)(2) of the NLRA that an employer's dominance or interference with the administration of any labor organization applies to workplace safety and health committees be overcome to provide non-represented workforces the apparent advantages of participation in health and safety committees?
- *Private Sector Audits.*^{xiv} Can employers be required to conduct an annual audit of health and safety in their workplaces? And can they be required to do so AND be required to use only government-certified auditors who would then report the audit results to OSHA?

What type of quality controls would OSHA have to put in place to supervise such an auditor workforce? How would OSHA employ a system of checks and balances to avoid dangers of uneven auditing? What if auditors find deficiencies during the audit that after

the audit is complete, the auditors sell their consultation services to correct? Would the results of the audit be FOIAble? Would audit findings constitute evidence of willfulness? Who would pay the auditors?

The next standards enforcement issue is the jurisdictional **coverage** issue. The traditional--20th century--coverage issue has been the fact that public sector employees in OSHA states are not covered by the federal OSH Act. The second is less traditional--if more and more workers lie outside the jurisdictional boundaries of the employer-employee relationship as defined in the last century--will the OSH Act eventually cover fewer and fewer 21st century American *workers*?

Another issues related to enforcement is applying scarce inspection resources to the highest risk workplaces. Can OSHA do a better job at **targeting** its enforcement resources? Can **any** data collection system improve the predictive capacity of the current targeting system?

Civil penalties are another perennial issue. But, when such penalties are increased, it is important to take into consideration the effect that increased penalties will have on citation adjudication. Enough resources need to be devoted by OSHA to settlement conferences, and by the Review Commission to adjudicative hearings.

Perhaps the hottest button penalty issue concerns criminal penalties. In recent years, most of the worker safety prosecutions have been brought by the Justice Department's Environmental Crimes Section which began a worker endangerment initiative in 2005. The initiative has highlighted the inadequacy of the criminal provisions of the OSH Act. In three of four cases brought by Justice in the past three years, it was not the OSH Act criminal provisions that were used, rather provisions of environmental protection statutes and the general criminal provisions of Title 18 of the US Code were used. Why? The OSH Act criminal provision is limited to willful violations that results in a worker death. In some of the most egregious examples of employer behavior, the worker suffers irreversible coma but lives. And, even if death results, the crime is only a Class B misdemeanor, with a maximum sentence of only six months in jail. Is legislation needed to amend the OSH Act to fix the criminal penalty issue? Some say yes.^{xv}

Lastly, there is the need for a robust **global engagement by OSHA**.

As the US falls behind the development of occupational and environmental regulatory structures, the more that the European Union becomes the default leaders. For instance, in the EU's REACH regulation for chemical substances (adopted in 2007), we are seeing a basic philosophical shift to new ways to improve the protection of human health and the environment by requiring industry to put on paper the safety and health knowledge about the chemicals they place on the market, and describe how they are dealing with any possible risks from those chemical substances.

Shifting the burden from government *to prove harm post-marketing* to manufacturers and importers *to demonstrate safety pre-marketing* will create a very different world of risk assessment and risk management. So what is the organizational and functional structure for our 21st century global occupational safety and health paradigm to be in 2033?

Increasingly, employers involved in multi-national business have to comply with an increasing number of international safety and health standards in order to engage in global business. Enforcing international occupational safety and health standards in the absence of world government is the biggest challenge to occupational safety and health leadership thinking in the 21st century. Among the most pronounced and rapidly accelerating globalism trends affecting corporate occupational safety and health programs in recent years is the growing influence of voluntary safety and health rules, policies, guidelines and other initiatives designed and promoted outside of particular national governments. For example, European approaches by both governmental and non-governmental entities are beginning to have an effect on the policies and practices of U.S. businesses everywhere if they are a member of a global supply chain. And it is no wonder that such codes are increasing in popularity as mandatory governmental limits and codes lose their timeliness and become obsolete. Voluntary labor safety and health codes can be more readily adapted to particular problems, industries, enterprises and spatial movement of work; they are less controversial than national codes and therefore represent a more effective learning process than do rules adopted through prolonged adversarial processes; and often serve as the basis for mandatory standards at a subsequent time.^{xvi} By 2033, a framework for global governance of occupational safety and health will emerge, but it is not yet clear if the US will be an active participant. If not, it will be our loss and the world's loss.

ⁱ Georgetown University Globalization Project, 2002.

ⁱⁱ Joel E. Cohen, Human Population Grows Up, *Scientific American*, September, 2005, p. 54.

ⁱⁱⁱ Katherine Loh, Scott Richardson, Foreign-born workers: trends in fatal occupational injuries. 1996-2001, *Monthly Labor Review*, June 2004, p. 42-53 (42).

^{iv} *Id.*, p.42.

^v Samuel P. Huntington, The Hispanic Challenge, *Foreign Policy*, March/April 2004, pp. 30-45.

^{vi} *The Tempering of America*, *Fortune*, 1993.

^{vii} Katherine Stone, *From Widgets to Digits: Employment Regulation for the Changing Workplace*, Cambridge University Press, 2004, pp. 68-72.

^{viii} Lynn A. Karoly & Constantijn W.A. Panis, *The 21st Century at Work: Forces Shaping the Future Workplace and Workplace in the United States*, RAND, 2004.

^{ix} Organization Resources Counselors, *Breaking the Cycle: New Approaches to Establishing National Workplace Safety and Health Policy*. September, 2008.

^x John Ruser, Examining evidence on whether BLS undercounts workplace injuries and illnesses. *Monthly Labor Review*, August 2008; 20-32.

^{xi} T.O. McGarity, "Some Thoughts on 'Deossifying' the Rulemaking Process, 41 *Duke Law Journal* 1385 (1995).

^{xii} *Standards Australia and Standards New Zealand (2004) AS/NZS 4360;2004, Risk Management*, Sydney, NSW. ISBN 0 7337 5904 1.

^{xiii} Kaj Frick, Per Langaa Jensen, Michael Quinlan, Rom Wilthagen (eds), *Systematic Occupational Health & Safety Management. Perspectives on International Development*. Pergamon Press, Oxford, 2000.

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