

The Health of the Low-income Workforce: Integrating Public Health and Occupational Health Approaches

An Issue Paper for Discussion at the Eliminating Health and Safety Disparities at Work Conference, Chicago, Illinois, September 14 and 15, 2011

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Discussion Questions

The authors propose the following questions for discussion at the conference:

In our paper we discuss how work-related and non work-related factors interact to affect the health of low income workers. We then look at examples, opportunities and challenges to implementing integrated public health prevention programs in the workplace, in community health centers, by health departments, and through community-based programs.

1. Based on the examples we provided (and other similar programs you may be aware of) what are the most important steps we need to take to promote and develop more integrated public health prevention programs?
2. What are the most important lessons learned--both opportunities and challenges--from previous attempts?
3. Are there important examples of successes or different approaches to integration that are missing?
4. Who are the key players that need to be brought together (either locally or nationally) to better achieve integration across programs?
5. What are the key research priorities to further develop and evaluate the importance of integrated prevention programs?

I. Background: Why We Need Integrated Public Health Programs

Close to one out of every three workers in the United States (approximately 39 million workers) were considered low-income during 2009 and 2010. A low-income worker is defined as earning a weekly wage that is less than 150% of what a worker who is paid the federal minimum wage would earn in a 40-hour workweek ($\leq \$435$). Low income workers are disproportionately women, African-Americans, Hispanics, foreign born, lack high school diplomas, and are young (i.e., <24 years of age) (Table 1). The occupations that, on average, pay the lowest wages and employ the largest number of workers include cashiers, food services occupations, personal and home care aides, housekeepers, hand packagers, and child care workers (see Table 2). The proportion of the workforce that is low-income is likely to increase since over half of the approximately 51 million job openings projected between 2008 and 2018 require no postsecondary education (USBLS 2009).

The low-income population has a lower life expectancy compared to others earning higher incomes (Clark et al., 2010; Lin et al. 2003; Singh & Siahpush, 2006) and is more likely to suffer from many chronic health problems including diabetes, hypertension and obstructive lung diseases (Diez-Roux et al., 2002; Kanervisto et al., 2011, Kanjilal et al., 2006; Braveman et al. 2011b). The existence of systematic health disparities between more and less advantaged groups is a question of fundamental human rights and thus often considered a question of health equity (Braveman, 2010). To remedy such inequity requires identifying the critical cause(s) and developing appropriate strategies for each one.

The Causes of Socioeconomic Health Inequities

Socioeconomic health inequalities have been attributed to a wide range of factors: unequal access to quality health care services and understandable health information, unhealthy behaviors such as smoking and physical inactivity, and higher exposure to hazards in the working environment and in the community (Braveman, Egerter & Williams, 2011b; Chardola et al., 2005; Diez-Roux et al., 2000; Morello-Frosch et al., 2011; Smedley et al. 2003;). These

factors are not necessarily mutually exclusive and are likely to interact with each other (Lallukka et al., 2004; Megan et al., 2011). Health disparities have been documented in societies with universal free or low cost health services suggesting that health care access is not the only factor driving health inequities (Alter et al., 2011).

Work-related causes of injuries and illness range from toxic chemicals to heavy and repetitive physical labor (Clougherty, Souza & Cullen, 2010). These exposures are disproportionately common in many of the jobs where low-income workers are employed (Figure 1). Low-wage immigrant workers, especially the estimated 8 million ((Passel and Cohn, 2011) who lack authorization to work, may be particularly at risk as their immigration status and economic desperation drive them to take jobs that others have refused because of low pay and hazardous conditions (Benach et al., 2010). Temporary workers or others with insecure jobs due to down-sizing may feel powerless to speak up about the hazards (Quinlan & Bohle, 2009; Virtanen et al., 2005). The combination of language barriers, lack of familiarity with programs and laws to protect workers, and fear of “speaking up” may compound the inherent risk for all these groups of low wage workers (Benavides et al., 2006).

Job stress, or more formally *psychosocial strain at work*, is another cause of health problems for low-wage workers. Low decision latitude, or lack of control, is a particularly critical stressor with respect to many health outcomes, including cardiovascular, mental/emotional, and musculoskeletal conditions (Sultan-Taïeb H et al., 2011; Landsbergis et al., 2003; Markovitz et al., 2004). Lack of respect for one’s job function from others in the organization, lack of authority in interacting with clients, and lack of access to resources and employment benefits also contribute to work-related stress (Hagberg et al., 2001) among low-wage workers. Since many are disproportionately racial and ethnic minorities, immigrants and/or women, they may also face the added burden of racial or sexual discrimination at work (Bond et al., 2004; Bhui et al., 2005). These issues and their contribution to health disparities are discussed in detail in other issue papers prepared for this conference.

Just as workplace conditions can affect health and well-being, exposures and conditions outside of work can also influence health, work productivity, and susceptibility to occupational

exposures during work (Braveman et al, 2011a; Hutch et al. 2011). Low-income workers, and especially those from racial and ethnic minorities, are more likely to live in communities with higher levels of air, water and soil contamination. (Morello-Frosch & Lopez 2006a);, The 2007 *Toxic Wastes and Race at Twenty* report documents that people of color make up the majority (56%) of those living in neighborhoods within two miles of the nation's commercial hazardous waste facilities and an even larger majority (69%) live in neighborhoods with clustered facilities (Bullard et al. 2007). These exposures contribute to adverse health outcomes including respiratory and cardiovascular disease and cancer (Morello-Frosch et al., 2006b). In short, minorities who are also low-income often face a double burden, because they work in some of the most hazardous occupational settings and live in the most contaminated communities.

Low-income workers are more likely to experience “food insecurity,” defined as having difficulty at some time during the year providing enough food for all their family members due to a lack of resources. In 2009, almost 35% of those who lived at or below 1.85% of the poverty level were food insecure (USDA 2011). Moreover, residents of low-income, minority, and rural neighborhoods are most often affected by poor or no access to supermarkets. In contrast, fast-food restaurants and other unhealthy but low-cost foods are more readily available in lower-income and minority neighborhoods (Walker, Keane & Burke, 2010; Larson, Story & Nelson, 2009; Morland, Diez-Roux & Wing 2006).

Low-income populations are also more likely to engage in unhealthy behaviors such as cigarette smoking, physical inactivity and eating diets high in carbohydrate and low in fresh fruits and vegetables (Boone-Heinonen et al. 2011; Booth, Pinkston & Poston 2005; Giles-Corti & Donovan 2002; Gordon-Larsen et al. 2006; Kanjilal et al., 2006). While historically these were seen as individual behavior choices, there is increasing understanding of how opportunities and constraints imposed by external factors influence these health behaviors. Neighborhood walkability, food availability, and physical safety all contribute to promoting healthy communities (Mujahid et al. 2008; Hutch et al. 2011; Woolf et al., 2011). Yet communities with a high proportion of minorities and overall low educational levels have fewer recreational facilities; this, in turn, is associated with a higher average weight of community residents (Booth,

Pinkerston & Poston 2005; Gordon-Larsen et al., 2006). Newer research has further blurred the line between work and non-work risk factors by demonstrating that the psychosocial work environment – especially low control with high demands – is linked to cigarette smoking, lack of leisure-time exercise, and obesity (Brisson et al., 2000).

The many problems faced by low-income workers and the complex interplay of overlapping occupational and non-occupational issues pose significant challenges to creating effective public health promotion programs. Even for the most innovative programs designed to address the underlying structural causes of ill health for low income communities, unanticipated barriers for the working poor can create obstacles to success. For example, in some low-income communities, the development of local farmers markets and community gardens attempt to promote healthier food choices (Cyzman, Wierenga & Sielawa, 2008). However, for low income workers with long or irregular work hours, work schedules may conflict with the market's hours or preclude engagement in community gardening.

Despite these challenges, public health practitioners, researchers, community and worker advocates are implementing new programs at the workplace and in the community in response to the moral imperative to achieve health equity (Cherniack et al., 2011; Morello-Frosch. Employer concern about the exponential rise of health care costs has led some to recognize the workplace as an important venue in which to promote health (Aldana, 2001). But for many low income workers whose employers are unwilling or unable to provide workplace-based health programs, or for part-time, mobile, contingent workers and workers employed by small businesses, other approaches are needed (Linnan et al. 2008).

Truly integrated programs— programs that address the combined and interacting factors at work, at home and in the community—are challenging to implement. In this article we examine four venues for public health promotion programs targeting the low-income working population: worksite, community health centers, state and local health departments and community-based participatory health programs. We discuss opportunities, challenges, best practices, and lessons learned for creating more integrated programs.

II. A Theory Driven Approach To Developing Integrated Public Health Promotion Programs

Increasingly, investigators have used the social ecologic framework (SEF) presented by Stokols (1992), Green (1996), and McLeroy (1988) and others to conceptualize the multiple levels of influence on a variety of health behaviors and on living and working conditions (Campe et al. 2011; Linnan et al. 2001; Breslow, 1996;). The SEF hypothesizes that disparities in health are caused by factors at multiple levels of influence: *intrapersonal, interpersonal, institutional, community/society, and policy*. Moreover, the model assumes that these levels interact to influence health and create disparities.

For example, at the *intrapersonal* (individual) level, disparities in health are believed to be caused by individual behaviors and their immediate precursors, such as lack of knowledge about how to use workplace protective equipment or prepare healthy meals. At the intrapersonal level, low-income workers may have obtained less or lower-quality education and therefore be less well-informed about health matters or less comfortable interpreting information available from practitioners, through news media, or from other sources (health literacy). They may also have a lower level of confidence about their ability to influence their own health or their working conditions (self-efficacy), as a consequence either of their health literacy; their prior experiences with employers, medical care providers, insurers, housing authorities or others at higher levels of power and decision authority.

At the *interpersonal* level, factors such as lack of co-worker or family support for health choices or practices, or excessive demands by managers to intensify work pace and work hours, may influence health. On the positive side, membership in community-based or religious organizations and/or participation in labor unions or other worker advocacy organizations may provide support, information, and social programs that help individuals confront pressures at work and at home.

At the *institutional* level, specific workplace or community conditions may disproportionately expose low-income workers to environmental toxins or safety hazards.

Institutional factors may also create unequal access to health-promoting services or conditions such as health screenings, training in safe work practices, access to fresh fruits and vegetable outlets, or safe, accessible recreational facilities.

Community or society level influences include political and economic forces that determine the number and types of local industry which may limit local job opportunities, access to transportation, and housing options leading to higher risks to health and well-being and to community environmental contamination. When these influences result in an insufficient total number of jobs for a given community, they can also create financial and psychosocial stress related to un- or under-employment.

Finally, *policy* level influences may produce disparities such as through zoning laws, budget priorities, and labor policies determining minimum wages, benefits and occupational and environment standards and enforcement. These policy level influences interact with intrapersonal, interpersonal, organization and community-level factors to produce (or maintain) disparities in health especially among low-income workers.

The SEF model holds that these levels interact with and influence each other. Chemical exposures in the workplace affect the same body systems as do environmental exposures. The effects on psychosocial strain from working conditions, inequitable distribution of resources, and societal racism all combine to create health inequities (Krieger 2010). The self-efficacy of individuals is influenced by experiences in the community, in the workplace, and in broader civil society, all of which exert a collective influence on attitudes and behaviors (Breslow 1996). Health disparities affecting low-income workers are a complex and persistent problem, and solutions need thoughtful coordination and planning. With SEF as a guiding framework and mindful that health disparities among low-income workers are created and controlled at all these levels we can more thoughtfully consider the elements of integrated programs that are likely to be effective in improving health (Table 3).

III. Venue 1: The Worksite

The traditional worksite health promotion (WHP) program has been an effective but limited strategy to prevent major chronic diseases for many years (Sorensen et al., 2011; Cherniack et al., 2011). Historically, WHP programs have included education and screening programs aimed at increasing individual workers' awareness of risk factors and suggesting strategies to modify health behaviors. They also promote support and encouragement among coworkers for these healthy behaviors. More recent programs have also included "environmental" or institutional changes in the workplace to promote and reinforce healthy behaviors, including for example, providing exercise opportunities and facilities at the workplace, labeling vending machines with nutritional information, and preferentially pricing healthy choices in worksite cafeterias (Pratt et al., 2007). Employers have been motivated to finance these programs because of their potential for decreasing health care insurance costs and reducing illness-related absenteeism (Aldana 2001; Harris et al. 2001). For those workers motivated to participate, the availability of these free or low cost programs in the worksite improves accessibility and controls out-of-pocket costs.

This type of WHP program has limitations both in scope and reach. A workplace, whether in the private or public sector, is fundamentally an economic organization that exists within a macro-economic and political context. The larger economic context typically defines important financial considerations of the company (market share, profit margin, cash flow, bargaining leverage with insurance companies, etc.) that may limit resources and thus program components. For example, at least half of the working people in the United States do not have access to worksite health promotion programs because they work in small companies or for employers who have employees distributed in small numbers across multiple sites (Linnan et al, 2008).

In addition, public policy may direct or constrain a wide range of institutional policies and practices, including occupational safety and health prevention programs, record-keeping, recognition of and bargaining with employee unions, dissemination of information about toxic substances used or generated within the workplace, and employee medical insurance coverage

and sick leave. Each of these in turn may have effects on employees' working conditions, access to material resources, and access to health information and programs. The work environment may also pose obstacles to healthy behaviors, or to participation in workplace health promotion (WHP) programming. Shift scheduling, involuntary overtime, lack of affordable childcare, lack of adequate transportation and low wages may all directly affect workers' access, free time, or ability to exercise or prepare healthy meals.

The influence of work organization (company or worksite, occupation, and interpersonal levels) on health behaviors is of particular interest because of the central role it plays in influencing the effectiveness of WHP. An increasing body of epidemiologic evidence shows that factors in the work environment, such as night work, occurrence of assaults, low decision latitude and other psychosocial stressors have an effect on health risk factors such as smoking, alcohol use, eating patterns, leisure-time exercise, and obesity (Albertsen, Borg & Oldenburg, 2006; Brisson et al., 2000; Brunner, Chandola & Marmot 2007; Kivimäki et al., 2001; Kouvonen et al., 2005a; Kouvonen et al. 2005b; Ostry et al. 2006; Parkes 2002; Väänänen et al., 2009; Wempe & Rosvall, 2005). In addition, exposure to endocrine-disrupting and other synthetic chemicals has been implicated in the development of obesity (Tang-Péronard et al, 2011). Although behavioral risk factors are often labeled as "personal lifestyle," these recent studies mean that some proportion of this "personal" risk is in fact attributable to the workplace – a fact that is, as yet, not widely recognized.

Traditional WHP programs often have had too narrow a scope, emphasizing personal behaviors and ignoring work organization. Even when they acknowledge the role of job stress, they usually focus on individual coping or stress management skills rather than addressing the underlying causes (Noblet and Lamontagne 2006). In contrast, to be effective, health promotion programs should seek ways to improving organizational features of the workplace (Golaszewski, Barr & Pronk, 2003; Sorensen et al. 2002; Sorensen et al., 2005; Whysall, Haslam & Haslam,2006) as part of an effort to enhance employee well-being.

Health behaviors do represent decisions made by individuals, on the basis of intrapersonal characteristics (knowledge, beliefs, motivation) but also in relation to the physical

and psychosocial environment in which that person lives and works. If a WHP program seeks to motivate healthy decision-making by individuals, over the long-term, then the work environment should itself reinforce employee competence in decision-making (Koelen and Lindstrom, 2005). Such work environments are sadly uncommon, especially for low-income workers. Yet the fundamental contradiction is rarely acknowledged: that if the work environment is experienced as negating the individual's autonomy and decision-making capacities, then health messages (and other educational programs) will be more likely experienced as hectoring rather than empowering. For example, many WHP programs promote walking for fitness, but that has little perceived value for employees who are already on their feet all day, and that in turn may lead to cynicism about the intentions of those who have organized the walking program.

Participatory approaches to WHP

The importance of psychosocial strain at work as a risk factor for unhealthy behaviors means that primary prevention should directly address work organization. Workplaces that improve the psychosocial environment are ones that provide opportunities for workers to participate in decision-making and to learn and use new skills; reward good work appropriately; train and motivate supervisors to be respectful of workers; and support good communication, constructive feedback and positive interpersonal relationships (Michie & Williams, 2003).

To be consistent with this goal, WHP programs should also empower participant decision-making; health promotion activities in the workplace should involve workers setting their own goals, for their working conditions as well as for their personal behaviors. Effective participatory programs in the workplace teach, model, and facilitate constructive decision-making and problem-solving and thus support individual empowerment (Sorensen et al., 2005). The very act of participating in a team working towards a common goal has been shown to improve psychosocial aspects of the work environment [Park et al., 2004; Watts et al., 2001]. The program itself begins to transform the work environment by increasing participants' decision latitude and social support, reducing psychosocial strain and its negative health consequences (Vezina et al., 2004).

Self-efficacy, or belief in one's own capacity to improve one's situation, is not a fixed attribute but can change over time in relation to negative or positive experiences of attempting to make changes (Clark & Nothwehr, 1999; Koelen & Lindstrom, 2005). People in low decision latitude jobs may develop a lower sense of self-efficacy, becoming more passive in relation to their life circumstances (Karasek & Theorell, 1990). Health self-efficacy (HSE) is affected positively by successful experiences of improving one's own health and removal of barriers to healthy behaviors. Intervention strategies that promote empowerment could be expected to have multiple health benefits, since increased HSE would support a range of healthy behaviors. Further, because of workers' own knowledge about job characteristics, their input is critical to designing interventions with feasibility and broad scope.

In addition, of course, workers themselves are best able to evaluate the extent to which the workplace conditions meet their social, psychosocial, and material needs and serve as barriers or opportunities to health-promoting decisions (Punnett et al. 2009; Henning et al. 2009). Thus a participatory structure increases the likelihood of the WHP program addressing the environmental features that workers experience as most relevant as either supports or obstacles to healthy behaviors. See case study 1 for an example of a participatory WHP in nursing homes.

Case Study 1 : Nursing Home Participatory Intervention

An intervention project is underway in a group of nursing homes in which workers have been invited to name and prioritize their health needs across a broad spectrum of issues, ranging from weight loss to heavy lifting (resident handling) to perceived lack of respect from center managers and nurses toward aides. Participatory teams, facilitated and supported by the investigators, have been encouraged to identify obstacles to employee health and strategize solutions. Each team began with relatively easier issues, such as improving the quality of food in the vending machines and organizing ergonomics training sessions to complement the company's Safe Resident Handling Program. In the service of increasing decision latitude and self-efficacy, the investigators have taught a number of skills to support effective team meetings, problem solving, planning medium term intervention efforts, and improving interdepartmental communication. The team members now generally feel more confident speaking with managers, not only to describe their activities but also to express concerns and suggest new programs. For example, in one facility, the staff wanted to be able to purchase salads and other healthy food options from the center kitchen at a reasonable price. An initial obstacle was that the kitchen staff was too

busy to discuss the idea, but with planning, the team was able to communicate with kitchen staff, work with different departments and reach an agreement for a solution that has been implemented successfully.

Another example illustrates the impact that job insecurity / fear of job loss can have on employee health programs, by interfering with employee participation. At one center, the team decided to mount a suggestion box; the explicit rationale was to encourage employee communication, relieve stress, and promote healthier work environment by raising health related and organizational issues. The suggestion box was first put in a site under video supervision. Not surprisingly, staff members were afraid that they might be fired for writing suggestions and being recognized by supervisors. Although the team requested the administrator to change the placement of the suggestion box, to improve employee participation, it took intervention by one of the research team to achieve this.

Thus worker self-efficacy can be undercut by unsupportive administrators or by objective conditions that inhibit participation in the program. In many centers, turnout for team meetings is regularly hindered by employees' workloads and busy schedules. Staffing is usually at the minimum required level, with no backup available for workers who wish to attend meetings on work time. Many supervisors have shown support by releasing their staff to participate in team meetings and in team sponsored activities such as walking and weight loss programs, ergonomic training, etc. However, resident care naturally must always be given priority, and the reimbursement structure for nursing home services does not incorporate any support for either administrators or workers to seek to improve working conditions.

IV. Venue 2: Community Health Centers

Health care providers play central roles both in the diagnosis and management as well as in the prevention of disease. For low-income workers with limited health literacy and no access to workplace health promotion programs, health care providers and their health systems may be the only source of information on prevention of chronic disease or work-related injury and disease (Azaroff, Levenstein & Wegman 2002). On the intrapersonal level, advice from a primary care provider is effective in influencing positive changes in health behaviors, such as when physicians provide advice regarding smoking cessation (Stead, Bergson & Lancaster, 2008). The health systems in which they practice also provide opportunities to intervene at the intrapersonal,

organizational and community level through peer education programs, consultation with industrial hygienists (Harber et al. 1994) and referrals to legal and social services.

The current debate over health insurance reform in the United States has highlighted disparities in access to health care services, especially for the working poor who are disproportionately un- or under-insured. In 2010, among lower income working age adults (18–64 year olds with an income between 100-200% of the poverty level) 43.0% were uninsured. (Cohen, Ward, & Schiller 2011). Many workers also face added barriers to access to health services for work-related injuries and illnesses (Leigh, 2004). Not only are many providers ill equipped to address occupational health problems, obstacles to using workers' compensation have been widely documented (Dembe, 2001). A 2007 survey in 10 states found the median proportion of those injured at work whose medical treatment was paid for by workers compensation was only 61% (Bonauto et al., 2010). Lack of health care access causes delays in early diagnosis and treatment contributing to health disparities (Smedley et al., 2003).

Community and Migrant Health Centers (C/MHCs) are community-based organizations, supported in part by the Health Resources and Services Administration (HRSA), Department of Health and Human Services. They operate in more than 8,000 locations and serve 23 million patients throughout the US (<http://bphc.hrsa.gov/about/index.html>). They are patient-directed organizations that serve the poor (including the working poor), the uninsured, the homeless, immigrants and refugees, and migrant and seasonal farmworkers, among others. They are an important healthcare safety net for the medically indigent, including workers who are likely to seek care for health problems that are caused or compounded by their work exposures. (Earle-Richardson et al., 2008),

C/MHCs are often the first point of access for low-income workers whether seeking care for work-related or non work-related health concerns. Even for workers who have access to occupational health services within their workplaces, job insecurity and fears of retaliation (such as being labeled a “careless” employee) may mean that many low-income workers are seen in community health clinics for work-related problems (Azaroff et al. 2004). In many cases

uninsured workers are not aware that they are entitled to medical care for work-related health problems through workers compensation insurance. In 5 C/MHCs in Massachusetts over 1400 working (or recently employed) patients completed a short, anonymous survey about their occupational health experience. Twenty-one percent reported experiencing a work-related injury, illness, or health problem during the previous year, yet 39% of them had never heard of Workers' Compensation and 63% had never heard of OSHA. (MDPH,2007).

Although the need for occupational health services is evident, providers in C/MHCs, like other providers, generally do not bring an occupational and /environmental health perspective to their work and report they frequently do not have the knowledge or skills to address these needs. As a followup to the survey of community health center patients, Massachusetts Department of Public health conducted a survey of C/MHC clinicians and found that only one-third reported they had adequate training to help patients with injuries or illnesses caused by their jobs, and only 10% thought they had adequate educational or resource materials to offer patients who might be exposed to hazards on the job (Letitia Davis, personal communication). Research shows that primary care physicians, overall, report or demonstrate a similar skill deficit. For example, a study that reviewed chart notes for COPD patients found that while 90% of the time the provider documented the individual's occupation, and most patients reported a history of occupational exposures to respirable hazards, a recommendation for exposure avoidance was made in only 10% of the cases. A similar chart review among patients with newly diagnosed asthma found that job title was documented in 75% of cases, but exposure data were collected less frequently and clinical action to address occupational asthma was taken in only 1 case (Kuschner et al., 2009; Shofer et al., 2006).

When PCPs are more comfortable and competent asking their patients about work-related factors, overall patient care can improve (Won & Dembe, 2006). Workers spend a significant proportion of their waking hours at work and work-related factors can significantly impact medical management of many chronic diseases, whether or not they are work-related. For example, work-related stress can contribute to high blood pressure making hypertension more

difficult to control (Landsbergis 2003). Low income populations have a higher prevalence of diabetes (Kanjilal et al.,2006) and recognizing when a patient has long working hours or works a swing shift may be essential to helping a patient successfully manage their disease. Several model programs have been developed to assist PCP in providing more comprehensive care by better integrating risk factors related to the work environment. These successful programs use two main approaches: 1) using occupational health specialist consultation services, and 2) providing easy access to information through toll free hotlines. Some specific examples of these programs are included in table 4.

There are clearly challenges in designing a model in which primary care providers in community health centers can provide more integrated care. CHCs need a process to evaluate management of occupational diseases, the same way they would evaluate management of other chronic conditions. Development of quality of care measures for CHCs around occupational health would require providers to take concrete steps to address occupational health issues in their patient populations. Quality measures are widely used for other clinical indications. C/MHCs use common clinical performance measures that are required by HRSA and based on a metric and definitions used by other tools including Health Plan Employer Data and Information Set (HEDIS). HEDIS is one of the oldest and best-known public reporting systems. It measures a growing number of technical processes of care, collected from both administrative data and medical record review (Harman et al. 2010). Examples that could incorporate occupational health include: using the electronic health records to determine: Did the provider ask working-age patients with asthma about potential triggers at their workplace? For what percentage of house painters were blood lead tests were ordered? Was employer name or industry collected for at least 50% of working age adults?

Greater collaboration between occupational health practitioners and PCPs improves the patient care that both provides and begins to incorporate the SEF framework into health promotion. Practitioners in C/MHCs are passionate about serving their constituencies and bring valuable experience such as with issues of linguistic and cultural competency, and an

understanding of the role of social factors in determining an individual's health. Occupational health practitioners can share their knowledge and skills in diagnosis and treatment of work-related health problems and provide an increased understanding of the reality of people's work lives.

Improving Integration through Community Health Workers

Community Health Workers (CHWs) are increasingly being used throughout the US to narrow the gap of health inequities between low and high resourced populations. The CHWs' role is to assist people in receiving the care they need, give counseling and guidance on health behaviors, advocate for individual and community health needs, and provide some direct services such as first aid and blood pressure screening (Viswanathan et al., 2009). CHWs are frequently recruited from the community and thus bring to the job an inherent understanding of the multiple and interacting factors that give rise to health inequities. The CHW model is another application of the SEF: as peer mentors, community health workers provide community outreach to workers and their families to provide information that influences both intrapersonal and interpersonal factors but also work with community organization addressing larger economic and policy issues such as living wage legislation and environmental hazard remediation. The CHW model has been used to communicate safety and health information to low wage workers most commonly to farmworkers (see case study 2) but also among North Carolina poultry processing workers (Grzywacz et al., 2009) and construction workers (Williams et al., 2010). Many of these programs were created in collaboration with Worker Centers (Fine, 2006) which provide assistance with a wide range of employment issues to low wage and marginalized workers especially immigrant workers (see case study 3). While workers may initially come to a workers center for assistance with other labor issues (like wage theft) they are then introduced to health and safety prevention programs. For example workers centers in New Jersey and Chicago teamed up with local occupational health experts to establish peer-led training on construction health and safety (Williams et al., 2010). The peer-trainers have subsequently demanded a larger and sustained role in carrying health and safety training and advocacy to their peers on street corners and at work sites.

Case Study 2: Creating Public Health Interventions for Farmworkers through *Promotores*

Among Hispanic communities CHWs are often referred to as *promotores de salud* or health promoters. Developing out of migrant clinics *promotores* have served migrant and seasonal farm workers providing general health promotion services around substance abuse pregnancy, and chronic diseases; providing personal protective equipment; training on health and safety practices in the work place and providing first aid. For example Community Health Partnership of Illinois (chpofil.org) has five health clinics that serve migrant and seasonal farmworkers and their families. They operate a nurse-managed health program for farmworkers that stresses outreach, health promotion and case management. This program provides stipends, training and ongoing support to 16 farmworker men and women each year who serve as CHWs bringing farmworkers in for primary and oral health care and providing information on cancer and HIV prevention, reproductive health, and also on agricultural health and safety. There are many other similar successful programs around the country (mcn.org). For example one Florida based program trained 427 farm workers over two growing seasons distributed 705 pairs of safety glasses and provided first aid to 227 farm workers. Observations of workers harvesting fruit showed that eyewear use increased from virtually 0% before the intervention to 34% after the intervention (Forst et al. 2004).

Another example is a program developed by Farmerworker Justice (FJ), a national farmworker advocacy organization, with support from the Occupational Safety and Health Administration, called *Institutionalizing Capacity to Improve Occupational Safety and Health of Farmworker Communities Nationwide*. In the spring of 2011, FJ worked closely with its partners to train 10 community leaders at each site to serve as volunteer *promotores*. The trainings, conducted in Spanish, were highly interactive and used popular education techniques to honor the knowledge and experience of adult learners. *Promotores* were given tools such as flip charts and educational brochures to guide their discussions with their peers, and introduced to local advocates and service agencies to refer community members for more information and assistance.

Over the following six-month period, *promotores* provided occupational safety information to thousands of their peers. *Promotores* in Florida are all women who have worked or currently work in the nearby ‘ferneries,’ where decorative ferns are produced. Fernery workers experience many challenges in their daily work. They spend much of the day hunched close to the ground, inserting their hands into the thick greenery to cut the ferns as closely as they can. Fernery workers receive a “piece-rate pay” which results typically in earning less than

the hourly minimum wage. Spending long hours in cramped, uncomfortable positions contributes to a high rate of back injuries and elevated exposure to pesticide residues as they are breathing primarily close to the ground where the pesticide residues collect. Although this outreach project focuses on occupational health and safety, *promotores* report that farmworkers, especially women, have all kinds of questions that they seek advice on, including diabetes, breast cancer, urinary tract infections, and domestic violence. This project aims to create stronger connections between farmworkers, community-based organizations and local service agencies, including public health clinics and health departments, in order to improve the general health of farmworkers.

V. Public Health Intervention Venue 3: State and Local Health Departments

State and local health departments can be important allies in developing integrated approaches to improving the health of low-income workers. The public health system has traditionally focused on those most in need, and achieving health equity for all groups is an overarching goal in *Healthy People 2020*, which serves as a guide for public health agency efforts. Public health agencies are in positions to intervene at multiple levels of the SEF—by shaping policy and promoting systems change at the workplace and in the community, as well as offering individually focused education and preventive services and assuring access to care. (Davis & Souza, 2009)

Illness and injury surveillance is a core public health function, and thus a fundamental role of state public health agencies is generating data documenting health disparities (Souza, Steege & Baron 2010). State agencies have the legal authority to require disease reporting, collect health data, and thus play an essential role in documenting occupational health needs of those worker groups that are not adequately captured in the traditional employer-based occupational health surveillance systems. Occupational lead registry data collected from clinical laboratories documenting high risk of lead poisoning among Hispanics adults are just one such example (Tak et al., 2008). As described above, Massachusetts has identified community health centers (CHCs), which are licensed and partly funded by the state health department, as key partners in reaching underserved worker groups to reduce occupational health disparities. The Massachusetts CHC patient survey described above provided new information about the

occupational health needs of CHC patients that provided the basis for further efforts to improve CHC capacity to identify and address occupational health problems of the patients they serve.

Public health agencies also play significant roles in prevention at the state and local levels, either directly through provision of information and prevention programs, or through collaboration with and support for community organizations and other partners. While many public health prevention efforts are focused on individual-level health education programs, there is renewed recognition of the need for systematic institutional or organizational changes to improve health (Frieden, 2010). Many of these prevention programs directly target special populations such as low income women, adolescents, immigrants, minorities and people with disabilities.

The public health infrastructure can provide many points of access for reaching underserved worker groups to disseminate information about health and safety risks, prevention strategies, occupational health services and legal rights. Public health agencies have, for example, disseminated information about health risks in cosmetology through local public health sanitarians responsible for inspecting beauty salons, and about preventing burn injuries through food safety inspectors. In addition, Massachusetts regularly disseminates information about young worker health and safety and child labor laws through the school health network. More recently health department use social media to publicize health and safety risks, such as public health podcasts in Portuguese and Spanish on safety risks in residential construction. Important targets for these outreach efforts are specific cultural outlets including media (Calles-Escandón 2009) who can in turn disseminate the information to their constituents. US public health agencies could replicate a Canadian program that has disseminated basic information about health and safety rights and resources to newcomers through public health programs incorporated into refugee resettlement programs (IWH, 2011).

Using the public health infrastructure to address occupational health needs is a critical step forward and has generated opportunities for innovative public health collaborations where health concerns of workers and the public-at-large clearly intersect. For example, many health hazards such as indoor air in schools, latex exposures in health care settings, and lead exposures

in home renovation can threaten the health of workers and the general public. These shared hazards demand policy and practice solutions that protect all those at risk. In Massachusetts, recognition of homeowners' as well as workers' risks associated with use of highly flammable floor finishing products prompted a state law banning sale and use a hazardous lacquer sealer. (Azaroff, 2011). These collaborations between occupational health and other public health disciplines bring together their distinct but complementary community networks—thus leading not just to shared knowledge but also an expanded advocacy base needed to promote prevention efforts. Simple initial collaborations can build the foundation of mutual respect and learning that can lead to more extensive and integrative health protection and promotion programs.

While preventing shared worker and community hazardous exposures is an important step, the creation of truly integrative programs are those that recognize and address the complex interplay between exposures at work, in the community and at home. Perhaps the best opportunities for truly integrative collaborations occur through a public health focus on health outcomes, such as reducing asthma, cardiovascular disease and violence related injuries, for which occupational risks are among the multiple contributing factors. In Massachusetts, workplace violence is now recognized as one of the issues to be addressed on the state's agenda to reduce youth violence; therefore health and safety training has been integrated into a number of youth violence prevention programs. Likewise workplace stress is one of a number of priorities on the statewide strategic plan to address cardiovascular disease, which resulted in several initiatives to develop integrative approaches to worksite wellness that address both personal and well as occupational risk factors (Davis & Souza, 2009). The Massachusetts Worksite Health Improvement Survey (www.mass.gov/dph/massinmotion) includes questions about workplace health protection (i.e. occupational hazards) as well as health promotion programs and policies, The ongoing occupational health initiative to expand collaboration with CHCs in Massachusetts has involved incorporation of information about the patient's occupation in electronic health records, information that may not only improve recognition and diagnosis of work-related health problems but also inform management of care for patients regardless of occupational etiology.

Public health agencies also affect health promotion through policy, not only by development of public health regulations (such as mandatory reporting of lead poisonings) but also by bringing stakeholders together to address critical public health problems. Integrating occupational health concerns into strategic planning can set the stage for future actions and resources. There are numerous opportunities, many as yet untapped, for integrative approaches – both programs and policies - to improving the health of low-income workers. With an increasing number of state health agencies developing occupational health programs in recent years – 23 states were funded by NIOSH in 2011 to implement fundamental programs – there is a growing platform on which to build collaborative efforts.

(www.cdc.gov/NIOSH/topics/surveillance/ords/StateBasedSurveillance.htm -accessed 8/19/11))

VI. Venue 4: Community-Based Participatory Programs

Community-based participatory health intervention initiatives have expanded substantially over the past few decades and are developing successful new health promotion programs to address a wide range of causes of health inequities including those resulting from environmental and occupational exposures (Wallerstein & Duran, 2010). These approaches are deeply tied to the community, involving them in the determination/identification of problems; and in effectively engaging community participation in programs and in sharing program results. Though projects tend to be organized around addressing specific health issues—often driven by the source of funding—community organizations tend to be multidimensional thus providing a fertile environment for developing integrated programs.

Community-based interventions embrace the SEF framework by looking beyond individual risk factors and health behaviors to examine broader social and community influences on health (Minkler, 2010a). Using a community-based approach is especially useful in reaching workers whose employers are unwilling or unable to address OSH issues (such as small business owners) or for workers who may feel intimidated at the workplace (Minkler et al., 2010b). They are also effective in developing education and outreach programs that overcome the cultural, language, and literacy barriers that limit the effectiveness of some workplace training programs

especially for immigrant workers (Baron et al. 2009). Finally, by building local knowledge and leadership these approaches help to create sustainable programs (Isreal et al., 2010; Minkler et al. 2008). Below we describe examples of how community-based participatory approaches have been applied in both research and training interventions related to occupational and environmental health.

Community-Based Participatory Health Research (CBPR)

Partnerships for Communication is an example of a federally funded community-based CBPR initiative addressing environmental and occupational health (Baron et al. 2009). This program was launched in 1994 by the National Institute of Environmental Health Sciences (NIEHS) to help establish approaches that allow for community members to actively participate in the environmental and occupational health research affecting their community. This program grew and by 2007 NIEHS, together with EPA and NIOSH, had funded a total of 53 projects in communities urban and rural throughout the US. The projects brought together three groups—community organizations, environmental/occupational health researchers, and health care professionals—to effectively address the needs of communities facing disproportionate health and environmental burdens. The program emphasized community engagement with the objective of raising awareness among broad sectors of the target community to both encourage changes in individual behaviors and motivate collective actions to create sustainable programs and improve policies, thus implicitly adopting the SEF. The programs collaborated with community clinics, state and local public health and environmental quality agencies and with interested employers to enhance their effectiveness.

The Partnerships for Communication projects developed a wide variety of community educational programs that raised awareness at the intrapersonal and interpersonal levels through community classes and workshops, educational presentations in community centers and religious institutions and technical information meetings in response to specific community complaints. A common feature of almost all of the projects was the use of “neighbor to neighbor” community outreach, usually by trained community members who used a variety of innovative approaches

such as portable illustrated flip charts, photos for digital storytelling and interactive exercises. They also used a wide range of sometimes traditional and mostly innovative mass media outlets including radio, television and newspapers, educational fact sheets and pamphlets, posters, video/DVDs, audio cassettes, photo exhibits, community theater performances (Baron et al. 2009).

The projects targeted a range of health behaviors including increasing physical activity and promoting healthy eating habits, reducing use of toxic cosmetic products and increasing the use of nontoxic “green” cleaning agents among domestic workers. In addition to providing the community with information to increase knowledge and awareness of environmental and occupational hazards, the projects also influenced community/institutional change. For example projects led to a direct reduction in exposure to hazardous environmental toxins such as reductions in the use of toxic cleaning compounds in a large commercial cleaning worksite, reductions to airborne contaminants in auto body shops, and reductions in the use of toxins by computer manufacturers. In Chicago and Los Angeles the projects contributed to actions of school boards to reduce student access to unhealthy foods. A manufacturer of blueberry harvesting rakes began marketing rakes that were less stressful on workers and an insurance company started encouraging farm company clients to use employee training materials developed by the community. The projects also led to policy changes such as a Houston Mayor’s task force that worked with the petrochemical industry to reduce toxic emissions, a New York City Council law to reduce diesel exhaust from school bus idling, and a Massachusetts State law prohibiting use of highly flammable solvents by floor finishing companies (Baron et al. 2009).

The success of these and other collaborations by occupational/environmental health practitioners and community-based organizations has been replicated in many communities often expanding into broader and more integrated health initiatives (see case study 3).

Community-Based Participatory Training: Combining Education and Economic Development

The Minority Worker Training Program (MWTP) established by NIEHS in September 1995, funds programs to recruit and train under and unemployed individuals who live near hazardous waste sites or other contaminated properties about hazardous waste remediation providing skills so that they can obtain work in the environmental field (NIEHS 2009). The creation of these training programs for hazardous waste workers has empowered low -income residents of environmentally contaminated communities to get involved in the cleanup and redevelopment efforts within their communities while also providing jobs to low income communities. A similar program targeting brownfields sites was developed in 1998 called the Brownfields Minority Worker Training Program.

These training projects simultaneously influence multiple SEF levels by creating new and safer employment opportunities, reducing community contamination, and improving individual awareness about environmental/occupational hazards. They address the critical components of environmental justice, by both investing in economic development while improving the community's environment and public health. These training programs have served more than 7,800 workers across the country and placed 5,400 workers in jobs in over 30 communities from Boston to Los Angeles (NIEHS 2009). Workers obtained union and non-union jobs in various positions, including laborers, construction workers, environmental technicians, tank cleaners, asbestos workers, and energy conservation and efficiency technicians. They earn wages averaging \$12-18 per hour and reaching more than \$30 per hour for union jobs. An example of the program's impact on one community is provided (Case Study 3 example #2)

Case Study 3: Examples of Community-Based Participatory Research and Training

Example 1: IDEPSCA, the Instituto de Educacion del Sur de California, is one of more than 100 worker centers throughout the country (Fine, 2006). Organized as a coalition in 1983, volunteers taught Spanish literacy and English classes and were committed to responding to the needs of low-wage, immigrant workers and defending their human rights. Based on popular education principles (critical analysis and education for action), the classes led to organizing among day laborers, household workers, tenants, and street vendors. Health emerged early on as a critical issue and IDEPSCA launched a Worker Health Project officially in 2003, targeting

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casual, temporary workers with limited literacy and English skills in high-hazard industries. IDEPSCA established periodic health fairs reaching thousands of people, with local physicians providing health exams and with *promotores* providing health information. They collaborated with a network of clinics to refer patients to low-cost medical resources and provided education about health and workers' rights in clinic waiting rooms.

Now, work-related health and safety is a key component of many IDEPSCA programs. Staff collaborates with the UCLA Labor Occupational Safety and Health program (LOSH) to obtain technical information and training and with a community coalition, SoCalCOSH, to develop outreach programs through the consulates, churches and other community groups. To build organizational capacity, IDEPSCA staff and worker leaders attend UCLA-LOSH leadership courses to become Health and Safety specialists and a core group have become peer trainers. Staff and worker leaders document common job hazards of day laborers, street vendors, household and other workers., develop case studies, a newsletter and other educational materials, train workers at day laborer job centers, on street corners, and in other venues, and support the establishment of worker health and safety committees.

IDEPSCA's holistic and preventive approach to health - addressing the context of workers lives through outreach, education, access to health care, and job creation - also encompasses policy advocacy. Current policy initiatives include advocating for worker protection standards in green chemistry regulations with an emphasis on safer cleaning chemicals, and working in coalition to advocate for a Domestic Workers Bill of Rights.

Example 2- As Hurricane Katrina swept through New Orleans East in 2005, the floodwaters caused massive destruction of homes and property. As the waters retreated, they deposited increased concentrations of heavy metals like arsenic, zinc, barium, and cadmium; contamination from diesel fuels; and other harmful pollutants. These contaminants, mixed into the neighborhood's topsoil and spread across its streets and sidewalks, posed a potentially long-term health risk to those moving back into the area.

To make New Orleans East safe for residents, hundreds of volunteers from community-based organizations, environmental organizations, universities, and churches teamed up to remove contaminated soil and clean up the neighborhood through a project called "A Safe Way Back Home." Funded through grants by NIEHS, the Dillard University Deep South Center for Environmental Justice (Dillard DSCEJ), and the United Steelworkers supplemented by some private funding, the program provided training and equipment to help the diverse community of volunteers unify their efforts and safely remove the contaminants. The volunteers, after health and safety training from Dillard DSCEJ and the United Steelworkers, removed several inches of grass and topsoil from the yards on the neighborhood's Aberdeen Road, where soil tests had revealed high concentrations of pollutants. The sidewalks and streets were pressure washed to remove all sediment, and the lots were re-landscaped with fresh sod and graded river sand (Dillard DSCEJ 2011).

In addition to cleaning up some of the environmental damage from Katrina, the project also

helped to strengthen and unify the communities living in the neighborhood. Many of the survivors of the New Orleans East neighborhoods were low-income, predominately African American residents vulnerable to a variety of health risks. One of the goals of the groups post Katrina work is to facilitate linkages between impacted community residents, health professionals, educators, scientific researchers, small and minority businesses, and government officials to address environmental and health disparities and other issues related to re-entry, re-population, and housing re-construction in New Orleans. The New Orleans East cleanup program has been identified as a model for providing technical assistance and education to other displaced communities; similar community outreach initiatives are being considered for Memphis, Atlanta, Dallas, and Baton Rouge (MDB, Inc. 2010).

VII. Discussion and Recommendations

The examples described above illustrate several complementary venues for integrated public health programs that consider the complex interplay between work-related and non work-related factors, to improve health equity for low-income working population. Working people spend close to half their waking hours at work and, as we have described, hazards in the workplace can impact health directly and working conditions, both physical and organizational, can influence what are commonly defined as personal health choices. Whether at the workplace or in the community, employers, workers, and community advocates, in partnership with public health practitioners, can deliver more comprehensive health prevention programs. However, achieving real integration—programs that address the combined and interacting factors at work, at home and in the community—is difficult to accomplish and few good examples exist.

The SEF offers several advantages for beginning to understand and develop integrated approaches to address disparities in health among low income workers. First, SEF is a helpful conceptual framework to guide intervention planning efforts within each level of influence or preferably across levels of influence, as SEF posits that multi-level interventions are likely to be most effective. Using the SEF to mobilize multiple levels of influence to understand disparities will also facilitate development of new intervention strategies that address the complexity and dynamic interplay of the multiple factors that create health disparities. Traditional health promotion efforts that only address personal motivations, beliefs, or attitudes or that do not

address fundamental changes in the way that work is organized and done, are unlikely to produce lasting change.

The challenges to developing integrated public health programs for low-income workers are many. Public health professionals and their community partners and advocates are often overwhelmed with the problems they have chosen to address. In times of limited resources, they may be unwilling to add new program elements even though they recognize their importance. Also for many working to improve health equity, employment is considered part of the solution rather than part of the problem. Concerns about workplace hazards are hard to acknowledge or address when work is seen as the fundamental way to improve socioeconomic status and health.

Professional “silos” also create distinct languages and orientations that impede collaborations. For example, many in public health articulate their program goals as promoting positive health behaviors; while occupational safety and health practitioners avoid this terminology as it is seen as shifting the blame for injuries and illnesses away from unsafe working conditions and onto workers who “choose” unsafe work practices. Similarly, the distinction between “health” and “safety” or “health promotion” versus “health protection” so readily understood by those working in occupational health are not apparent to those working in other public health fields.

On the policy level, our institutional frameworks and siloed funding streams have created divisions that are often hard to overcome. While federal and state labor departments that enforce labor laws are the lead agencies in protecting workers’ health, state and federal public health agencies have important complementary roles to play in conducting surveillance, and funding research and intervention programs. Effective programs that reduce injury and illness to workers have come about because of community concerns about dust from construction sites or pedestrian injuries from falling scaffolds; local regulations to require dust controls or scaffold inspections improve worker safety as well. Community-based programs that engage stakeholders with differing viewpoints and knowledge, which cross disciplines, are more likely

to find creative ways to address the personal, social and economic factors that affect the health of the low-income workforce whether in or outside of the workplace.

Some broad recommendations for promoting a more integrated approach to improving the health of low-income workers include:

- 1) Data needs: Surveillance experts have warned that “if it is not measured, it does not exist.” Whether in a clinic, as part of a health surveillance system, or within community-based initiatives, collecting data related to individuals’ work environment is likely to result in greater incorporation of work-related factors in public health programs. The recent discussion regarding the inclusion of work-related variables into the electronic health record is just one example of initiatives that will improve data.
- 2) Education and training: Mutual exchange of information and experience between the different disciplines or “silos” of public health programs is a key step in the creation of successful programs. This includes exchanging information between occupational health and primary care practitioners; between different programs within public health agency; between those conducting workplace wellness programs and those responsible for workplace safety and health; between community members and experts; and between workers themselves and all of these components of the public health infrastructure. Integrating and providing more public health/occupational health education and training in medical/nursing school course curricula, ultimately training and educating physicians/nurses at the beginning of their health careers, might be beneficial in creating better communication and more exchange of information
- 3) Worker and community participation: Capacity building is a key step in providing workers and communities with the tools to act as equal partners in implementing intervention programs. As we have described, whether through worksite programs, as *promotores* within community clinics, or as active member of community-based participatory research and training programs, worker participation is essential to build effective and sustainable programs. This also helps create job growth and better promote economic development for low-income communities and community residents.

- 4) Research: The development of truly integrated public health intervention programs for low income workers will require additional research efforts to test new approaches and to evaluate their effectiveness. Support for innovative demonstration projects that are multidisciplinary and community-based will build the scientific basis that will contribute to program sustainability and influence policy development.

Table 1. Characteristics of wage and salary workers in the United States: all low income workers, and all higher income workers. Source: Current Population Survey, 2009-2010.

Variable	All Low Income Wage and Salary Workers ²		All Higher Income Wage and Salary Workers ³	
	Workers	%	Workers	%
Total	38,972,477	100.0	85,308,980	100.0
Age group				
16-19	4,185,513	10.7	322,144	0.4
20-24	7,975,143	20.5	4,422,903	2.2
25-34	8,247,776	21.2	19,967,455	23.4
35-44	6,112,927	15.7	21,598,114	25.3
45-54	6,036,856	15.5	22,920,207	26.9
55-64	4,152,387	10.7	13,746,584	16.1
65+	2,261,875	5.8	2,331,573	2.7
Sex				
Male	15,790,025	40.5	47,744,668	56.0
Female	23,182,452	59.5	37,564,311	44.0
Race				
White	31,056,899	79.7	70,254,401	82.4
Black	5,317,533	13.6	8,843,574	10.4
Native Amer./Alaskan Native	348,808	0.9	543,836	0.6
Asian	1,494,760	3.8	4,378,602	5.1
Hawaiian/Pacific Islander	128,330	0.3	247,237	0.3
Multiple Races	626,147	1.6	1,041,329	1.2
Hispanic Origin				
Hispanic	8,111,482	20.8	10,036,833	11.8
Non-Hispanic	30,860,995	79.2	75,272,146	88.2
Education				
<9th Grade	2,350,425	6.1	135,9675	1.6
9th-12th Grade (No diploma)	5,568,007	14.3	2,849,034	3.3
High School /GED Diploma	13,270,994	34.1	21,830,624	25.6
College (No Degree)	9,527,977	24.5	14,587,694	17.1
Associates Degree or Higher	8,255,074	21.2	44,681,949	52.4
Citizenship				
Native	31,397,081	80.6	73,580,344	86.3
Naturalized	2,256,457	5.8	6,175,498	7.2
Non-Citizen	5,318,938	13.7	5,553,137	6.5

1. Wage and salary workers only. Excludes self-employed and unpaid family workers.

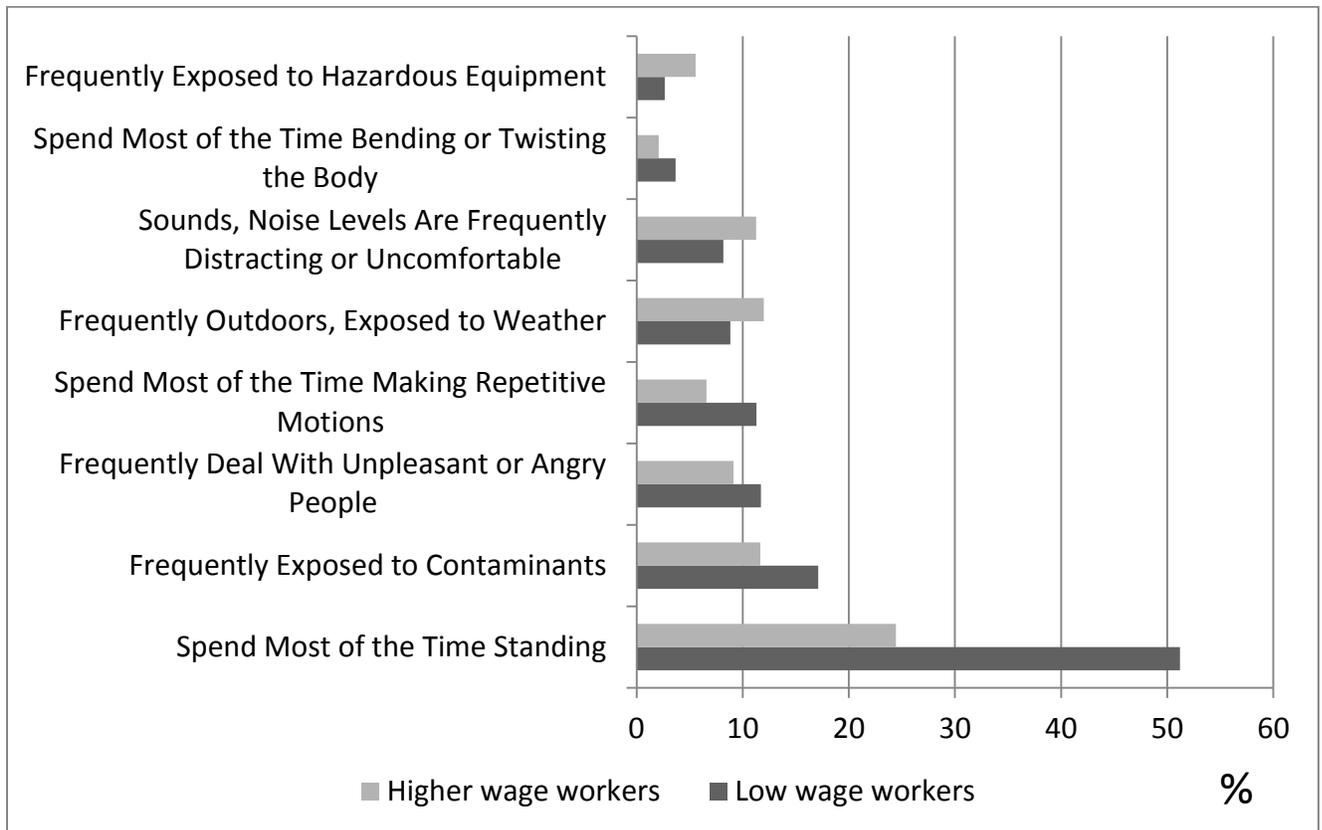
2. Workers with a reported weekly income \leq 1.5 times the gross weekly income for a minimum wage worker working 40 hours a week (\$435). 3. Workers with a reported weekly income $>$ 1.5 times the gross weekly income for a minimum income worker working 40 hours a week (\$435).

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Table 2: Occupations employing >100,000 workers paying <150% of Minimum Wage (\$11.00) Source: OES 2010 (BLS)

Occupation	No. of worker	Hourly wage
Cashiers	3,354,170	9.52
Combined Food Preparation and Serving Workers, Including Fast Food	2,692,170	8.95
Waiters and Waitresses	2,244,480	9.99
Home Health Aides	982,840	10.46
Maids and Housekeeping Cleaners	865,960	10.17
Food Preparation Workers	802,650	9.93
Personal Care Aides	686,030	9.82
Packers and Packagers, Hand	676,870	10.63
Childcare Workers	611,280	10.15
Cooks, Fast Food	525,350	8.91
Dishwashers	505,950	8.98
Bartenders	495,350	10.25
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	446,660	9.27
Dining Room and Cafeteria Attendants and Bartender Helpers	390,920	9.29
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	329,020	9.43
Cleaners of Vehicles and Equipment	288,110	10.74
Amusement and Recreation Attendants	254,630	9.50
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	228,600	9.64
Hotel, Motel, and Resort Desk Clerks	222,540	10.30
Food Servers, Nonrestaurant	205,330	10.40
Laundry and Dry-Cleaning Workers	204,820	10.21
Cooks, Short Order	171,780	10.11
Sewing Machine Operators	147,030	10.88
Nonfarm Animal Caretakers	135,070	10.61
Parking Lot Attendants	124,590	10.21
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	117,540	9.98
Ushers, Lobby Attendants, and Ticket Takers	107,200	9.76

Figure 1: Occupational characteristics associated with wage and salary workers¹ in the United States: all low income workers², and all higher income³ workers. Source: Current Population Survey, 2009-2010 and O*NET⁴



1. Wage and salary workers only. Excludes self-employed and unpaid family workers.
 2. Workers with a reported weekly income ≤ 1.5 times the gross weekly income for a minimum wage worker working 40 hours a week (\$435).
 3. Workers with a reported weekly income > 1.5 times the gross weekly income for a minimum income worker working 40 hours a week (\$435).
 4. The Occupational Information Network (O*NET) is developed under the sponsorship of the US Department of Labor/Employment and Training Administration (USDOL)

Table 3: Examples of Program Activities

Levels of Influence <i>Intervention targets</i>				
	Worksite	Community Clinics	Health Departments	Community-Based
Intrapersonal <i>Individual</i>	<ul style="list-style-type: none"> Disseminate information on smoking risks and cessation programs; and on how smoking may interact with workplace exposures to increase disease risk. Provide healthy food options in cafeteria & vending machines. Illuminate and decorate staircases to encourage their use. 	<ul style="list-style-type: none"> Asking each patient about what they do for work and about hazardous physical activities and exposures in his/her work and home environment Discuss the importance of smoking cessation and physical activity during clinic visits 	<ul style="list-style-type: none"> Disseminate information on asthma prevention and control (including work-related asthma) to patients through health care providers. 	<ul style="list-style-type: none"> Disseminate information through community forums about hazard remediation Disseminate information about workplace exposures and proper use of protective equipment through door to door visits by community outreach workers
Interpersonal <i>Individual/Dyad/ Small Group family/friends, co-workers, supervisors</i>	<ul style="list-style-type: none"> Support peer health coaches to encourage exercise, healthy diet, and smoking cessation. Support peer health coaches to assist nursing home workers in successful use of resident handling devices. 	<ul style="list-style-type: none"> Organize farm worker support groups and using promotores de salud to reach out to employers and workers to provide education about exposures in the work and home environment Collaborate with worker centers or other community based organizations to provide education about exposures in the work and home environment 	<ul style="list-style-type: none"> Provide tools to parents about how to communicate with their teens about workplace safety. Support teen health peer leaders in high schools and community organizations. 	<ul style="list-style-type: none"> Create worker train-the –trainer programs so that workers can educate other workers about identifying hazards in the workplace. Offer group exercise programs or cooking classes as one of the social activities within community centers that provide information about jobs or working conditions
Institution	<ul style="list-style-type: none"> Support worker committees/teams to identify obstacles to healthy behaviors and strategize about solutions, with 	<ul style="list-style-type: none"> Integrating prompts for clinicians to ask about occupational hazards into the Electronic Medical Record, and using the EMR to assess specific goals set 	<ul style="list-style-type: none"> Promote integrated health promotion/health protection programs in workplaces. Incorporate workplace 	<ul style="list-style-type: none"> Create community gardens and farmers markets and arrange hours that accommodate varying work shifts Collaborate with community service

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<p><i>Worksite, community</i></p>	<p>sufficient budget & decision authority to implement at least some solutions, and protection against reprisals for team members who identify problems.</p> <ul style="list-style-type: none"> • Change policies and practices that interfere with healthy behaviors (e.g., mandatory overtime, supervisor pressure to work faster rather than safer). • Conduct routine surveillance of working conditions, including physical & chemical exposures as well as psychosocial job features. • Eliminate workplace hazards to health and safety. 	<p>by the community clinic</p> <ul style="list-style-type: none"> • Provide occupational health referral services that include consultation with employers about how to control hazards 	<p>health and safety training in high school curricula and workforce development programs.</p>	<p>centers such as legal aide centers and social service agencies to distribute information about workplace hazards</p>
<p>Community/Society <i>Local, State, Regional, National Government</i></p>	<ul style="list-style-type: none"> • State health dept. surveillance of work-related injuries and illnesses as well as relevant chronic health conditions (e.g., diabetes, metabolic syndrome, ischemic heart disease) by sector and occupational category. 	<ul style="list-style-type: none"> • Developing standard protocols for assessment and management of occupational and environmental hazards across CMHC network 	<ul style="list-style-type: none"> • Incorporating health and safety interventions into the purview and agenda of health departments. 	<ul style="list-style-type: none"> • Apply for community based job training grants and include incentives for employers who comply with safety standards. • Use community development funds for infrastructure projects that promote physical activity (pools, parks etc)

<p>Policy</p> <p><i>Government Laws or Standards</i></p>	<ul style="list-style-type: none"> • Regulation of physical /ergonomic stressors in the workplace (e.g., heat, noise, heavy lifting). • Financial incentives (e.g., tax credits) to employers who support worksite health promotion programming with genuine participatory design. 	<ul style="list-style-type: none"> • Evaluating and documenting best practices at the community clinic level, and using that evidence to support widespread application of those practices • Regulations that require clinicians to report/document work related injuries and exposures 	<ul style="list-style-type: none"> • Support state law banning use of highly flammable floor finishing chemicals – protecting workers and home occupants. • Incorporate requirements to use safe needle devices in hospital licensure regulations – protecting workers and patients. 	<ul style="list-style-type: none"> • Advocate for community ordinances to control hazardous exposures • Advocate for local living wage ordinances • Advocate for zoning changes that create mixed land use and restrict the density of fast food restaurants
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Table 4 Examples of Clinical Programs That Integrate Occupational Health into Clinical Practice

<p><i>Pediatric Environmental Health Specialty Units (PEHSUs)</i> are funded by the US Environmental Protection Agency to provide medical information and advice on environmental factors that can affect children’s health. PEHSUs are academically based, typically at university medical centers, and are located across the United States, Canada and Mexico. These PEHSUs form a network that is capable of responding to requests for information throughout North America and offering advice on prevention, diagnosis, management, and treatment of environmentally related health effects in children. PEHSUs work with health care professionals, parents, schools and community groups, and others to provide information on protecting children from environmental hazards. They also work with Federal, State, and local agencies to address children’s environmental health issues in homes, schools, and communities.</p>
<p><i>New York State Network clinics</i> are a resource for health care providers treating patients with potential work-related illnesses and injuries. The clinic network is available for consultation or referral of patients with occupational diseases or injuries. They have diverse treatment teams of physicians, nurses, industrial hygienists and social workers that assist providers in assessing and managing their patients' work-related conditions and, if necessary, provide worksite and social work interventions. The OHCN's physicians and staff are also experts in dealing with the Workers' Compensation system and assisting patients during the compensation process. The clinic network is funded through the state worker’s compensation fund.</p>
<p><i>The Cambridge Health Alliance</i> is an academic and public healthcare system serving Cambridge, Somerville, and Boston's metro-north communities. The Alliance developed a program to identify house painters and screen them with blood lead levels. The program includes outreach and training and is centered in primary care but does have an occupational specialist as an important resource.</p>
<p><i>Migrant Clinicians Network, Inc. (MCN)</i> offers an environmental and occupational health (EOH) program supported through a cooperative agreement with the US Environmental Protection Agency (EPA), Office of Pesticide Program as part of the EPA National Strategies for Healthcare Providers: Pesticide Initiative. The primary aim of this program is to integrate EOH into primary care in order to assist clinicians in better recognizing and managing pesticide exposures. MCN’s program acknowledges the competing demands and severe time constraints in a primary care setting and recognizes that healthcare providers struggle with ways to incorporate occupational medicine practices into their day to day efforts. MCN focuses on feasible changes in clinical practices to improve the recognition and management of occupational exposures and injuries. This is done through partnerships with C/MHCs and involves on-site clinical training, the provision of resources and technical assistance and peer-to-peer networking between frontline providers and occupational and environmental medicine specialists.</p> <p>Between 2006 and 2011, MCN established 10 model environmental and occupational programs in health centers and clinics across this US. These programs systematically demonstrate: 1) changes in clinical systems including intake, screening, outreach and education; 2) primary care providers’ willingness to acknowledge and address occupational injury and exposure which leads to improved patient care; 3) new linkages between health centers and clinicians and the agricultural workplace; and 4) connections between primary care providers and pesticide experts and OEM specialists.</p>
<p><i>Agricultural Workers’ Access to Health Project (AWAHP)</i> is a California-based medical legal partnership to address the frequent exclusion of farmworkers from the workers’ compensation system. Since 2004, AWAHP has worked to develop and implement a three-part effort in which low-wage immigrant workers are informed of their right to medical treatment and related benefits in the workers’ compensation system and are provided medical and legal services so they can obtain the medical treatment they need. During the last three years AWAHP led Salud Para La Gente, a C/MHC, through planning and implementation allowing it to provide effective treatment and conduct proper coding and billing for work injuries under workers’ compensation, with a focus on sustainable services and proper payment for services rendered.</p>

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