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Q1 Foundational workplace safety and health competencies for the emerging workforce[☆]

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A B S T R A C T

Introduction: Young workers (aged 15–24) suffer disproportionately from workplace injuries, with a nonfatal injury rate estimated to be two times higher than among workers age 25 or over. These workers make up approximately 9% of the U.S. workforce and studies have shown that nearly 80% of high school students work at some point during high school. Although young worker injuries are a pressing public health problem, the critical knowledge and skills needed to prepare youth for safe and healthy work are missing from most frameworks used to prepare the emerging U.S. workforce. *Methods:* A framework of foundational workplace safety and health knowledge and skills (the NIOSH 8 Core Competencies) was developed. The framework was aligned with the Health Belief Model (HBM) and the Core Competencies were mapped to the individual HBM constructs. *Results:* The proposed NIOSH Core Competencies utilize the HBM to provide a framework for foundational workplace safety and health knowledge and skills. An examination of how these competencies and the HBM apply to actions that workers take to protect themselves is provided. The social and physical environments that influence these actions are also discussed. *Conclusions:* The NIOSH 8 Core Competencies, aligned with one of the most widely used conceptual frameworks in health behavior practice, fill a critical gap in preparing the emerging U.S. workforce to be cognizant of workplace risks and to participate in, and benefit from, safe and healthy work. *Practical applications:* Integration of the NIOSH 8 Core Competencies into school curricula is one way to ensure that every young person, before he or she enters the workforce, has the foundational workplace safety and health knowledge and skills to be cognizant of risks on the job and to participate in, and benefit from, safe and healthy work.

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41 1. Introduction

42 In the United States, the Occupational Safety and Health (OSH) Act of 1970 requires employers to provide employees with a safe and healthy workplace, free of recognized hazards (“Occupational Safety and Health Act”, 1970). Despite vast improvements in occupational safety and health since the enactment of the OSH Act, work-related injuries, illness, and fatalities remain a persistent and pressing public health problem (Smith & DeJoy, 2012). Every day in the United States, more than 12 workers die on the job (US Bureau of Labor Statistics [BLS], 2015). Furthermore, according to estimates from the Survey of Occupational Injuries and Illnesses (SOII) conducted by the BLS, employers reported more than 3 million nonfatal injuries and illnesses to workers in private

industry and 746,000 in state and local government in 2013 (BLS, 2014a). Workplace incidents cause significant physical, financial, and emotional hardship for businesses, workers, their families, and communities (Adams et al., 2002; Boden, Biddle, & Spieler, 2001; Brown, Shannon, Mustard, & McDonough, 2007; Dembe, 2001; Safe Work Australia, 2012). Based on 2007 U.S. data, the estimated direct medical costs (\$67 billion) and indirect costs (\$183 billion) of occupational injuries and illnesses were found to be at least as large as the cost of cancer (Leigh, 2011).

For numerous developmental and environmental reasons, younger workers (aged 15–24 years³) suffer disproportionately from workplace injuries (Centers for Disease Control and Prevention [CDC], 2010). Approximately 21.3 million individuals under 25 years of age were in the workforce in 2014, representing 8.6% of the total U.S. workforce (BLS, 2014b). Studies have shown that nearly 80% of high school students in the U.S. work at some point while still in school (BLS, 2005; Castillo &

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³ In the United States, federal and state child labor laws, which regulate the employment of minors, are tied to the Fair Labor Standards Act (FLSA) of 1938 (“Fair Labor Standards Act”, 1938). The FLSA limits the types of jobs youths aged 14 to 17 years are allowed to perform, the number of hours they may work, and the timing of these hours. However, national injury and fatality data usually do not include youth under age 15.

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Lewko, 2013; Runyan, Schulman, & Scholl, 2012). During the 10-year period 1998–2007, an estimated 7.9 million nonfatal injuries to young workers were treated in U.S. hospital emergency departments (EDs) (CDC, 2010). The nonfatal injury rate was 5.0 ED-treated injuries per 100 full-time equivalent (FTE) workers, approximately two times higher than among workers age 25 or over (CDC, 2010). One study estimated that work-related injuries for youth up to age 19 accounted for an annual, total cost of \$5 billion, or 3.9% of all workplace injury costs in the United States (Miller & Waehrer, 1998).

Given the high burden of workplace injuries and illnesses suffered by young workers, occupational safety education and training for this vulnerable population is imperative (Chin et al., 2010). Most of the current frameworks to teach work-readiness skills to the emerging workforce do not include the knowledge of and abilities for safe and healthy work. The nature and organization of work is evolving and young workers can expect to change jobs and employers many times during their working lives. These shifts will result in an increased likelihood of encountering new or different hazards or risk scenarios, suggesting the importance of an ongoing application of foundational occupational safety and health knowledge (Schulte, Stephenson, Okun, Palassis, & Biddle, 2005).

The intention of this article is to introduce a framework of core competencies for workplace safety and health. This theoretical framework—grounded in the Health Belief Model—provides young workers with foundational workplace safety and health knowledge and skills that will serve as the basis for subsequent workplace safety and health learning. A brief review of the literature is provided for selected factors contributing to the higher rates of work-related injuries among young workers (when compared to their adult peers). Next, a framework is introduced for providing young workers with foundational workplace safety and health knowledge and skills. Finally, avenues for future research and intervention are discussed, including the integration of the foundational workplace safety and health competencies into school curricula to prepare youth to participate in, and benefit from, safe, healthy, and productive workplaces.

1.1. Factors that contribute to young worker injuries

The inverse relationship between age and non-fatal work injuries is a consistent association found in occupational safety and health research (Breslin & Smith, 2013; Laflamme & Menckel, 1995; Salminen, 2004). As new workers, adolescents are likely to be inexperienced and unfamiliar with many of the tasks required of them. Furthermore, adolescents' unique characteristics such as their size, sleep requirements, musculoskeletal and endocrinal development, and cognitive and emotional maturity (National Institute for Occupational Safety and Health, 1997; National Research Council, 1998; Sudhinaraset & Blum, 2010) may predispose them to workplace injuries (Runyan & Zakocs, 2000). Adolescent sensation seeking—the desire to pursue novel and intense experiences and sensations—and adolescent risk taking, especially when in the company of other young people, are commonly observed phenomena among developing youth (Spear, 2000; Steinberg, 2005, 2011). Moreover, when adolescents experience an absence of negative consequences when they engage in risky behavior, feelings of invulnerability may increase (Reyna & Farley, 2006). Adolescents' orientation toward risk may predispose them to job-related injury (Sudhinaraset & Blum, 2010) and their most positive traits—energy, enthusiasm, and a need for increased challenge and responsibility—can increase their likelihood of taking on tasks they are not prepared to do safely.

The literature pertaining to the epidemiology of adolescent work-related injuries is limited when compared to that for adult workers (Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996); nevertheless, a substantial evidence base has been built over the past two decades that identifies both individual factors, including minority status (Mardis & Pratt, 2003; Miller & Waehrer, 1998; New Zealand Department of Labour, 2007), socioeconomic status (Rauscher & Myers, 2008), and

work-based risk factors, such as the fast pace of work (Breslin, Day, et al., 2007; Evensen, Schulman, Runyan, Zakocs, & Dunn, 2000; Frone, 1998; Zakocs, Runyan, Schulman, Dunn, & Evensen, 1998), inadequate supervision and training (Knight, Castillo, & Layne, 1995; Lewko, Runyan, Tremblay, Staley, & Volpe, 2010; Runyan & Zakocs, 2000; Runyan et al., 2007; Zakocs et al., 1998), equipment use (Breslin, Polzer, MacEachen, Morrongiello, & Shannon, 2007; Evensen et al., 2000; Frone, 1998; Knight et al., 1995; Mardis & Pratt, 2003; Parker, Carl, French, & Martin, 1994), working late, and working with cash and customers (Miller & Waehrer, 1998; NIOSH, 2003; Richardson & Windau, 2003; Runyan, Schulman, & Hoffman, 2003), that increase the risk for job-related injuries among adolescents (Breslin, Day, et al., 2007; Laberge & Ledoux, 2011; Rauscher & Runyan, 2013). Lack of job-related knowledge, skills, and training; and lack of job control also contribute to heightened risk among younger workers, who might be less likely to recognize hazards, less likely to speak up regarding safety issues (Breslin, Polzer, et al., 2007; Tucker & Turner, 2013; Zakocs et al., 1998), and less aware of their legal rights as workers (NIOSH, 2003).

1.2. Missing life skills and competencies for life

The terms “21st century skills,” “work-readiness skills,” “job-readiness skills,” and “employability skills,” have become watchwords in education, business, and government. Numerous frameworks articulate the skills, knowledge, and abilities for a skilled worker in the modern economy (Partnership for 21st Century Skills, 2009; The Conference Board, Partnership for 21st Century Skills, Corporate Voices for Working Families, & Society for Human Resource Management, 2006; U.S. Department of Labor, 2008). However, as previously noted, workplace safety and health is currently missing from many, if not most, of the current frameworks to prepare the future American workforce. Young people frequently enter the labor force lacking even the most basic workplace safety and health knowledge and skills needed to be cognizant of the safety and health challenges and hazards they may face. This is despite the fact that the benefits of incorporating foundational workplace health and safety knowledge and skills into education and training frameworks for youth are believed to include increased job/career knowledge, safer work activities, increased competence when dealing with occupational situations, and reduced incidence of job-related injuries and illnesses (Schulte et al., 2005).

In general, foundational skills in and for the context of work are considered the fundamental, portable skills needed for training and workplace success (ACT, 2013). These skills, which include reading for information, applied mathematics, problem solving, critical thinking, managing personal and interpersonal relationships, and communication, are fundamental in that they serve as a basis for supporting more advanced skill development, and they are portable because, rather than being job specific, they can be applied across a wide variety of occupations (ACT, 2013; Lankard, 1990; Partnership for 21st Century Skills, 2009; Saterfiel & McLarty, 1995; Symonds, Schwartz, & Ferguson, 2011; The Conference Board et al., 2006). In short, foundational skills are the fundamental, portable skills necessary for conveying and receiving information critical to training and workplace success (ACT, 2013). Having foundational skills is important as general competency “leavens” subsequent learning and practical experience (Darche & Stam, 2012).

Foundational skills for workplace safety and health are situated within the larger context of “work readiness” skills, which are generally thought of as “life skills” with a strong work focus. Life skills in turn are abilities that allow individuals to adapt to the challenges of everyday life (World Health Organization [WHO], 1997). Life skills are not in themselves behaviors but rather are abilities to behave in certain ways given the motivation, and given the scope to do so within an individual's social, cultural, and environmental constraints (WHO, 1997).

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