Worker safety systems: practices, challenges, and perceptions of safety climate in public school district foodservice programs

Diane K. Schweitzer

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Worker safety systems: Practices, challenges, and perceptions of safety climate in public school district foodservice programs

by

Diane K. Schweitzer

A dissertation submitted to the graduate faculty in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY

Major: Foodservice and Lodging Management

Program of Study Committee:
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Iowa State University
Ames, Iowa
2007
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ABSTRACT

The foodservice industry accounts for third highest in number of reported injuries in service-provided sectors of employment, approximately 4.6 injuries per 100 workers. The working foodservice environment may contribute to worker injury. School foodservice is the largest noncommercial foodservice market behind business and industry, thus large numbers of school foodservice workers may be at risk for injury.

The purpose of this study was to assess the status of foodservice worker safety in public school district foodservice programs. An electronic questionnaire was sent to 1,400 public school foodservice administrators in a national random stratified sample to determine the status of foodservice worker safety practices, perception of safety climate, and perceived challenges to implementing a worker safety system in public school foodservice programs.

Results from the survey of 209 school foodservice administrators were analyzed. Pearson’s Correlation Coefficient analysis determined safety practices were highly correlated with school foodservice administrator perception of safety climate. Foodservice administrators employed by contract management companies had positive perceptions of safety climate. Perceived challenges to implementing a worker safety system was negatively correlated to safety practices.

In a multiple regression model, safety practices were significant. Perceptions of safety climate, perceived challenges, and contract management explained 48% of the variance in safety practices. Perceptions of safety climate contributed most to the model followed by management. Perceived challenges to implementing a foodservice worker safety system did not significantly contribute to the model. In an independent sample \( t \) test, management companies scored significantly higher than self-operated programs in relation to safety
practices. Regarding perceptions of safety climate, management companies indicated stronger perceptions of safety climate than respondents from self-operated programs did. Regarding perceived challenges, management companies perceived significantly fewer challenges to safety than respondents did from self-operated programs. Individuals with the SNS credential from the School Nutrition Association perceived more challenges to implementing a safety system than respondents without the credential. One-way ANOVA was used to compare safety practices, perceptions of safety climate, and perceived challenges to implementing a safety system with foodservice education level. Foodservice directors with some college education scored higher on safety practices than foodservice directors with a high school education only. ANOVA analyzed safety practices, perceptions of safety climate, and challenges toward safety with school district size (enrollment). No significant differences were found.

Strategies for achieving successful worker safety systems found in business and industry may be adapted for use in school district foodservice programs. This study lends itself to further research to explore multiple variables that might positively affect worker safety practices to reduce incidence of injury in school foodservice programs.
CHAPTER I. INTRODUCTION

Business and industry frequently use formal safety systems for teaching and training workplace safety, performing facility safety inspections, communicating workplace safety, involving employees in safety committee meetings, and devoting resources to minimizing or eliminating workplace hazards. Models of safety systems from business may be adapted for use in school district foodservice programs to reduce exposure to worker injury and preserve funds for use in school foodservice programs. This chapter consists of background of the study, significance of study, purpose of the study, assumptions, and definition of terms.

Background of Study

Employee safety is a major concern to employers because loss incidents result in service disruption, lost workdays, and loss of profitability. Safety incidents cost about $54 billion per year in lost productivity (Liberty Mutual Insurance, 2005). Foodservice injuries rank third in numbers of reported injuries and fifth in highest number of days away from work in service provided sectors (U.S. Department of Labor, Bureau of Labor Statistics [BLS], 2003).

Environmental conditions in foodservice operations may predispose workers to injuries due to performing repetitive and monotonous work, heavy lifting, twisting and turning, bending, working on floor surfaces that are slippery, or work surfaces that are too high or too low, using hand and power tools, and horizontally reaching long distances. Employees work with hot ovens, ranges, and dangerous production equipment and they are required to stand in place for long periods with high noise levels (NFSMI, 2002). Most frequent job hazards among this sector include slips, falls, and burns (U.S. Department of
Labor, BLS, 2003). Thus, hazards could result in injuries and affect a large number of foodservice employees.

In addition to working conditions, school foodservice administrators face a number of challenges. These include the requirement to operate at a break-even level or generate profit, feed a large number of children in a timely fashion, gain labor efficiency, and reduce costs despite lack of funding due to local and state budget reductions (NFSMI, 2002). Additional challenges that may affect worker safety include lack of time for training, improperly designed or inadequate facilities, unsafe equipment, the potentially unsafe nature of the foodservice environment, improper or inadequate engineering, and lack of management commitment to safety.

Many school districts may not have available resources to develop and execute comprehensive safety systems including educating and training personnel, purchasing or replacing unsafe equipment, and/or performing and reviewing safety inspections in response to injury reports (Haynes & Beck, 2005). Other potential challenges may include school foodservice administrators not having the knowledge or skills to initiate written safety policies, practices, or plans and not realizing the cost benefit of developing and implementing a comprehensive safety system.

Business and industry offer models of comprehensive safety systems that have resulted in thousands of dollars in cost savings due to worker-injury reduction (Dorman, 2000). Modeling safety practices in the workplace has a positive impact on the workplace environment, represents good management, increases productivity, reduces costs, improves quality, reinforces employee retention, cultivates well-trained employees, and helps provide a safe, secure workplace (Andreoni, 1986). NIOSH (2004a), the Ohio Bureau of Workers’
Compensation (BWC, 2005), and the U.S. Department of Labor Occupational Safety and Health Administration (2001) offer best practice safety models to guide employers in keeping workers safe from injury. A comprehensive safety system that confirms management’s commitment to a safe workplace assures employee involvement, pinpoints and eliminates potential hazards, and requires training employees and managers to prevent potential harm to workers (NIOSH, 2001).

Injuries in school foodservice could be reduced by using business and industry models to develop an effective safety system. School districts across the country focus on safety programs related to student safety and security, but little evidence exists that safety programs take into account the physical safety of school employees, specifically school foodservice workers. The development and implementation of a safety system could assist school districts in curtailing injuries and promote cost savings to the school district budget (Ceniceros, 2004).

**Significance of Study**

Data indicate frequent occupational injuries are very costly to employers and employees, including the school foodservice segment (Lumina Training Associates, 1999). Injuries can diminish in number or be avoided if management implements health and safety systems, provides information and training to employees, initiates and enforces safety measures in the workplace, provides incentives for compliance with safety goals, and secures safety as part of the workplace culture (Marsh et al., 1998). Occupational injuries have a social and financial impact on injured workers as well as family members (Leigh, Fahs, & Landrigan, 2000).
A business, such as a school foodservice program, may incur legal costs; employee
demoralization; and productivity, quality, and financial losses because of injuries in the
workplace (Bird, Germain, & Clark, 2003; Heinrich, 1941; Roughton & Mercurio, 2002).
Although NIOSH (2004a), Ohio BWC (2005), and OSHA (2001) offer guidance for reducing
injuries in the business sector, there has been little investigation into prevention, intervention,
surveillance, and training regarding occupational injuries in the restaurant/foodservice
industry (Filiaggi & Courtney, 2003). Inferences can be made from research in medical
practice, industrial engineering, and industrial psychology disciplines that could help bridge
this knowledge and experience gap in school foodservice.

Results of this study could be useful to school administrators who seek to reduce
direct and indirect expenses related to on-the-job injuries. Results may benefit insurance
company officers who are interested in school districts implementing safety systems to
reduce injury claim losses (Ohio BWC, 2005). Solutions to manage exposure to risk create
mutually satisfying opportunities for maintaining revenues and profitability, and can occur
when insurance companies and their clients use a teamwork approach for reducing risk of
injury (Hereth, 1996).

**Purpose of the Study**

The purpose of this research was to assess the status of worker safety in public school
district foodservice programs. The study explored challenges to implementing safety systems
in public school district foodservice programs in order to strengthen foodservice safety
practices; to reduce injury rates, impairments, or hazards that contribute to occupational
injuries.
The cost of providing medical care insurance to workers has increased by as much as 10.5 percent in the past several years, and these costs are passed on to the employer by insurance companies through increased insurance premiums that are established by general and industry specific information (Lundberg & Tylczak, 1997; National Coalition on Health Care, 2007). Costs saved in workers’ compensation premiums may be reinvested into school district general funds or school foodservice programs.

Models for improving safety in the workplace used in business and industry (NIOSH, 2004a; Ohio BWC, 2005; U.S. Department of Labor (OSHA, 2001), may be adapted for use in school foodservice programs. Characteristics of best practice models for reducing occupational injuries in the workplace formed the foundation for a questionnaire to survey public school foodservice administrators to assess the status of worker safety in public school foodservice programs.

Specific objectives of the study were to:

1. Survey school foodservice administrators to assess the degree to which safety is practiced in public school foodservice programs
2. Assess relationship between perception of safety climate and safety practices in public school foodservice programs
3. Identify perceived challenges that impede implementation of a safety system in public school foodservice programs
4. Compare foodservice safety practices, perception of safety climate, and perceived challenges to implementing a safety system with demographic variables such as school district enrollment, foodservice director education level, and management (contract or self-operated) of foodservice programs.
Assumptions

This research was conducted under the following assumptions:

1. The person most involved with responsibility for the school foodservice program participated in the survey.

2. Foodservice administrators accurately identified safety practices, perceptions of safety climate, and perceived challenges to worker safety in their respective school district foodservice programs.

3. Foodservice administrators responded to all statements truthfully.

4. The questionnaire measured study constructs accurately.

Definitions of Terms

**Accident:** An undesired event that results in harm to people, damage to property, or loss to process. An accident is usually the result of contact with a substance or a source of energy (chemical, thermal, acoustical, mechanical, electrical, etc.) above the threshold limit of the body or structure (Bird et al., 2003).

**Best practice:** Innovative ways to use personnel, resources, or technology in order to achieve better results. A “best practice” is the process that most effectively eliminates a hazard or helps control a risk. Best practices range from single actions and procedures to complex programs (United States Navy, 2006).

**Direct costs:** Expenses associated with compensation payments, lost work time of injured employees, first aid, medical and surgical expenses, legal fees, and overhead costs of restoring a worker to wellness (Heinrich, Petersen, & Roos, 1980).
**Hazard:** A condition or practice with the potential for accidental loss (Bird et al., 2003). A condition or combination of conditions that, if left uncorrected may lead to an accident, illness, or property damage (Goetsch, 2005).

**Incident:** An event that could or does result in unintended harm or damage (Bird et al, 2003).

**Indirect costs:** Include cost of time lost by employees who stop work out of curiosity, sympathy, or to assist the injured employee and cost of administrators’ time to assist the injured employee. Other costs include accident investigation, arrangement of staffing to replace injured employee, overtime pay due to loss of employee, production downtime, errors in production, fines, cost due to damage of machinery or product, and reduction of quality (Heinrich et al., 1980).

**Occupational injury:** A wound or damage to an individual resulting from unintentional or intentional acute exposure to energy (such as movement or force) or from the acute absence of essential elements caused by a specific event, incident, or series of events within a single workday or shift (Barling & Frone, 2004).

**Perception of safety climate:** The extent to which individuals believe that safety is valued in the workplace (Barling & Frone, 2004).

**Safety:** Freedom from incidents or the condition of being safe from pain, injury, loss or unacceptable risk (Bird et al., 2003).

**Safety system:** An established arrangement of components that work together to attain a certain objective, in this case to prevent injuries and illness in the workplace. Within a system, all parts are interconnected and affect each other. No part of this system exists independently. An effective and functioning program is the sum of all the parts (U.S. Department of Labor, OSHA, 1989).
School food authority: The governing body that is responsible for the administration of one or more schools and which has the legal authority to operate a lunch program in those schools (United States Department of Agriculture, 2006).

School foodservice administrator: The person most responsible for oversight of the school foodservice program.

Surveillance: Public health surveillance is the ongoing systematic collection, analysis, and interpretation of health data for purposes of improving health and safety. Occupational health surveillance is tracking of occupational injuries, illnesses, hazards, and exposures. Occupational health surveillance data are used to guide efforts to improve worker safety and health, and to monitor trends and progress over time (NIOSH, n.d.).

Organization of Dissertation

This dissertation, using the traditional format, consists of an introduction to the research, a review of literature, methodology used for data collection and analyses, results of research findings and discussion, summary and recommendations, future research suggestions, references, and appendices. Appendices contain materials relevant to the research project including Human Subjects Review approval, the questionnaire instrument, and correspondence.
CHAPTER II. LITERATURE REVIEW

This review of literature comprises four parts. A discussion of the prevalence and cost of injuries in foodservice is presented in the first part. The second part describes worker safety in business, industry, and school districts. Challenges in designing and implementing a best practice safety system are identified in the third part. The last part presents a discussion on benefits of implementing a best practice safety system.

Prevalence and Cost of Injuries in Foodservice

Almost 51% of restaurant and foodservice workers’ insurance claims were due to same-level slips, trips, falls, and cuts or puncture wounds according to The Restaurant Insurance Corporation in Colorado (“Restaurants Slipping,” 2004). Predominant injuries in foodservice operations also include manual material handling, being struck by or against objects, and repetitive motions (Liberty Mutual Insurance, 2005), and overexertion and contact with hot surfaces or objects (Filiaggi & Courtney, 2003). Over 582,000 musculoskeletal disorders accounted for more than one of three injuries in restaurants (U.S. Department of Labor, BLS, 1999), and there were 4.6 cases of occupational injuries for every 100 workers in the restaurant industry in 2002 (Haynes & Beck, 2005). Restaurants ranked third in the total number (304,200) of service sector injury and illness cases reported to the Bureau of Labor Statistics in 1999 (Filiaggi & Courtney). Nonfatal occupational injuries in the restaurant industry were delineated into frequency of occurrence by Filiaggi and Courtney (2003) as sprains, strains, and tears (34%); cuts and punctures (18%); bruises (10%); heat burns (10%); fractures (7%); and all others (21%).

Safety incidents cost about $54 billion per year in lost productivity (Liberty Mutual Insurance, 2005) including forfeited workdays, profitability loss, service disruptions, and
insurance premium increases. The U.S. Department of Labor, BLS, (2003) reported that food preparation and service occupation employees had the fifth highest number of days away from work due to injuries in 2003. Families absorb about 44% of the overall cost of an injury, including reduced pay while receiving workers’ compensation, travel costs to receive rehabilitative medical care, and nonreimbursed costs while recuperating (Leigh et al., 2000).

Bird et al. (2003) depicted the value allocation of an injury in an iceberg model (Figure 1). Actual costs depicted by the portion of the iceberg underwater are uninsured and unforeseen, beyond the apparent face value (tip of the iceberg). For every $1 in insured costs, uninsured costs may escalate up to $50.

Frank E. Bird, while employed at the Insurance Company of North America in 1969, estimated the direct cost of an injury at 20% and indirect cost at 80% of total cost (Heinrich et al., 1980). However, Leigh et al. (2000) estimated that of total costs incurred with an injury, direct payment for injuries comprise 29% and indirect costs comprise 71%.

**Figure 1.** Frank E. Bird’s iceberg model, cost of a work-related accidents (adapted from Bird et al., 2003, p. 8).
Direct costs for occupational injuries include immediate medical treatment, medication and prescriptions, surgery, hospitalization, X-ray or scans, follow-up physician visits, rehabilitation, and lost wages. Indirect costs entail recruiting and hiring replacement labor, training new employees, administrative expenses for accident investigation, reporting, and work disruption. Furthermore, additional payments may include fines, escalating insurance prices due to harm, loss of quality of life for the employee and family, and loss of material cost (Leigh et al., 2000). Capital expenditures to improve the workplace reduce direct and indirect costs of injuries, improve product quality, reduce waste, and enhance worker health and well-being (Dorman, 2000).

Studies indicate workers who remain off work for an extended period are less likely to return to work (Leigh et al., 2000). Young (2004) indicated many large companies that sustain a high level of worker injuries have return-to-work programs in place. A return to work program is a system of returning an injured employee to work as quickly as possible, often with limited duty until the employee has fully recovered from injuries. It is important to ensure employees do not falsely inform their physician of job requirements that are too strenuous with restricted duty not permissible. Consequently, employees may remain off work for longer than necessary (Taylor, 1992). Costs are reduced when the employer finds a different position that meets the employee’s job restriction if the worker is not able to return to his former position (Hwang & Kleiner, 2002).

Reducing costs through accident prevention is a major goal of workers’ compensation, which is governed by each state’s department of workers’ compensation, and administered through private parties (insurance companies). Employers who provide a
Worker safety system avoid accidents that help reduce insurance premiums and avoid costly safety code violations (Hwang & Kleiner, 2002).

**Worker Safety in Business, Industry, and School Districts**

The Occupational Safety and Health Act of 1970 mandated that each employer furnish workplace environments free of recognized hazards likely to cause serious physical harm or even death (U.S. Department of Labor, 2003). The U.S. Department of Labor, OSHA (1989), proposed a safety and health program for small businesses that contains four basic program elements constituting best practices in injury reduction: management leadership and employee involvement, worksite analysis, hazard prevention and control, and training (Figure 2). The historical model formed the basis for subsequent safety models.

NIOSH (2004a) presented a safety model (Figure 3) for eliminating and reducing injuries in the workplace. The components assure management commitment; assure employee and student involvement; identify and prioritize potential hazards; eliminate hazards; and train employees, management, and students (Table 1).

Kolak (2007), an electrical engineer and President of Praxis Corporation, proposed a seven-element model (Table 2) for organizing an effective electrical safety plan (ESP) for electrical industries. Within each element, several contributory factors describe characteristics of safety system elements. Strategies for assessing a safety system include evaluating each factor with written task-specific activities quantitatively measured using a numerical scoring system. The elements are weighted and ranked in order of importance.
Figure 2. OSHA health and safety program elements (1989).

Figure 3. How to establish an effective occupational safety and health and environmental safety program (adapted from NIOSH, (2004a).
Table 1. NIOSH (2004a) Safety Plan for Eliminating and Reducing Injuries

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Assure management commitment</td>
<td>Involve top administration</td>
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<td></td>
<td>Write health and safety plan</td>
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<td></td>
<td>Provide adequate personnel resources</td>
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<td></td>
<td>Provide adequate financial resources</td>
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<td></td>
<td>Evaluate performance regularly</td>
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<tr>
<td>Assure employee and student involvement</td>
<td>Establish a hazard prevention committee</td>
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<td></td>
<td>Communicate regularly</td>
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<td></td>
<td>Develop a hazard-reporting procedure</td>
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<tr>
<td>Identify and prioritize potential hazards</td>
<td>Complete checklists in the Safety Checklist Program manual</td>
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<td></td>
<td>Conduct walkthrough inspections</td>
</tr>
<tr>
<td></td>
<td>Update and maintain a chemical inventory</td>
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<tr>
<td></td>
<td>Update and maintain an equipment inventory</td>
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<tr>
<td></td>
<td>Establish a procedure for purchasing goods and services and leasing new space</td>
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<td></td>
<td>Investigate incidents, spills, and releases</td>
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<td></td>
<td>Review injury and illness records</td>
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<td></td>
<td>Review environmental records</td>
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<td></td>
<td>Order and review environmental, personal, and biological monitoring data</td>
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<td></td>
<td>Arrange for medical screening</td>
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<tr>
<td>Eliminate hazards</td>
<td>Develop written procedures and programs</td>
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<td></td>
<td>Develop emergency response plans and procedures</td>
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<td></td>
<td>Provide regular equipment maintenance, repair, and replacement</td>
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<td></td>
<td>Perform routine housekeeping</td>
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<td></td>
<td>Install engineering controls</td>
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<td>Provide personal protective equipment (PPE)</td>
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<td></td>
<td>Install eyewash facilities and showers</td>
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<td></td>
<td>Work cooperatively with inspectors from regulating agencies</td>
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<td></td>
<td>Seek expert advice</td>
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<tr>
<td>Train employees, students,</td>
<td>Train all new employees and students</td>
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<tr>
<td>and managers</td>
<td>Provide mandated training programs to employees and students</td>
</tr>
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<td></td>
<td>Train safety representatives and hazard prevention committees</td>
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<tr>
<td></td>
<td>Obtain training help from the regulating agencies</td>
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</table>

*Note.* Adapted from NIOSH, 2004a.
A Safety Analysis Risk Assessment (SARA) instrument proposed by Haynes and Beck (2005) is a proactive model to reduce incidents of injuries in foodservice operations, one of the largest segments of employment in the U.S. economy. The instrument assesses safety of facility conditions, workplace procedures, security provisions, and safety activities conducted in the foodservice department. SARA addresses responsibilities of managers and employees to ensure the safety of customers and fellow workers from unsafe conditions, unsafe practices, workplace violence, and terrorism. SARA requires a foodservice director to use checklists to perform a safety analysis when inspecting facilities, equipment, and procedures. These checklists are used for analysis of inspection data and past work injury reports to determine existing safety hazards. Procedures to implement a SARA safety plan

Table 2. Elements of an Effective Electrical Safety Plan (Kolak, 2007).

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<tbody>
<tr>
<td>Design</td>
<td>Technical training</td>
<td>Safety rules</td>
<td>General maintenance</td>
<td>Awareness and self-discipline</td>
<td>Management leadership &amp; commitment</td>
<td>Accident investigation</td>
</tr>
<tr>
<td>Hazard analysis</td>
<td>Safety training</td>
<td>Standard operating procedures</td>
<td>Electrical maintenance</td>
<td>Tracking corrective measures</td>
<td></td>
<td>Emergency investigation</td>
</tr>
<tr>
<td>Hazard controls</td>
<td>Proficiency training</td>
<td>Emergency planning</td>
<td>Personal protective equipment</td>
<td>Contractor safety</td>
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<td>Emergency response</td>
</tr>
<tr>
<td>Planning</td>
<td>Testing and evaluation</td>
<td>Equipment-specific procedures</td>
<td>Tool maintenance</td>
<td>Inspections</td>
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<td></td>
<td>Safety meetings</td>
<td>Auditing procedures</td>
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<td>Hazard reporting</td>
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<td></td>
<td>Emergency response training</td>
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<td></td>
<td>Awareness/orientation training</td>
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A Safety Analysis Risk Assessment (SARA) instrument proposed by Haynes and Beck (2005) is a proactive model to reduce incidents of injuries in foodservice operations, one of the largest segments of employment in the U.S. economy. The instrument assesses safety of facility conditions, workplace procedures, security provisions, and safety activities conducted in the foodservice department. SARA addresses responsibilities of managers and employees to ensure the safety of customers and fellow workers from unsafe conditions, unsafe practices, workplace violence, and terrorism. SARA requires a foodservice director to use checklists to perform a safety analysis when inspecting facilities, equipment, and procedures. These checklists are used for analysis of inspection data and past work injury reports to determine existing safety hazards. Procedures to implement a SARA safety plan
include: develop a plan that minimizes or eliminates safety hazards; require compliance of the safety plan by all employees; create contingency plans that focus on the organization’s response to incidents and injuries; involve employees in workplace safety through training, education, committees, work teams, and incentive programs; and evaluate performance and effectiveness of the safety plan and modify as necessary.

Tyson Foods, a leading processor of poultry products, invests up to $20 million per year in safety systems. The company employs a corporate safety director along with corporate safety officers and nurses at each production facility. Company leaders believe a safe workplace is a shared responsibility between workers and managers. Each worker is provided a 1½-day orientation to the workplace safety system and personal protective equipment including (but not limited to) hand guards, hard hats, safety glasses, earplugs, safety face shields, and cut-resistant gloves. Workers are members of a safety committee that also includes supervisors. Tyson Foods’ safety record is reportedly twice as good as the poultry processing industry overall (Tyson Foods, 2000).

Filiaggi and Courtney (2003) suggested integration of specific interventions to reduce injuries as part of an overall safety program in restaurants. They indicated a safety system should consist of a set of strategies, procedures, and standards that collectively help control hazards and prevent injuries. Elements of the restaurant safety system include top management support, safety training, and incident investigation. Factors that influence success of the program include local restaurant management buy-in, safety modeling, integrated safety training, accountability, and worker involvement.

Yum! Brands, Inc; the parent company of Kentucky Fried Chicken, Pizza Hut, Taco Bell, Long John Silver, and A&W; employs a vice president of global assets protection to
ensure safety of restaurant workers (Lee, 2006). Vice President Emil Monda believes the best way to reduce incidents is to offer safety training and education to workers. A corporate safety leader develops safety-training programs for loss prevention managers, who are responsible for training restaurant operation workers. The corporation provides safety equipment, monthly lesson plans, posters on new safety topics, and extensive worker training coupled with evaluation of work processes. The delivery approach is to use positive reinforcement and coaching to workers. Effective training results in reduction of losses with a major focus on loss prevention. Area and regional coaches monitor loss reports, and loss prevention managers are present in restaurants almost daily.

Max & Erma’s Restaurants and Liberty Mutual Insurance Company investigated possible ways to decrease workers’ compensation insurance premiums. A “Performance Benchmark Analysis” showed that slip and fall injuries were reduced by using floor mats and exemplary housekeeping procedures. Cuts were reduced by using wire mesh gloves, and burns reduced by using oven mitts more frequently. The injury frequency rate decreased from 5.8% in 2001 to 3.52% in 2003. Intervention protocol included improved incident reporting efficiency and improved claims investigation. Max & Erma’s management initiated an internal claims tracking system and created action plans for loss prevention (Liberty Mutual Insurance, 2004).

Other foodservice restaurants, like Long John Silver and Friendly’s, have entered into a cost-sharing program with workers for purchasing slip-resistant shoes. Friendly’s has reported a 30% reduction in slips and falls during the first year of the program. In 1995, the company reported a savings of over $750,000 directly attributable to the reduction of slips and falls in their restaurants (Hedden, 1997).
Stuart Anderson’s Restaurants instituted a pre-work warm-up routine and reported a 30% reduction in sprains and strains between January 1998 and January 1999. Restaurant managers and corporate leaders believed workers’ compensation claims fell, equating to savings of $100,000 (Apfel, 2001).

Filiaggi and Courtney (2003) suggested specific interventions to reduce injuries as part of an overall safety process in restaurants. They indicated a safety system should consist of a set of strategies, procedures, and standards that collectively help control hazards and prevent injuries. Elements of the restaurant safety system include top management support, safety training, and incident investigation. Factors that influence the success of the program include local restaurant management buy-in, safety modeling, integrated safety training, accountability, and worker involvement.

Although the foodservice industry is one of the largest commercial employment segments contributing to the U.S. economy (U.S. Department of Labor, 2003), primary and secondary schools are the largest noncommercial foodservice market behind business and industry, and vending (American School Foodservice Association, 2003). Few examples of a best practice injury-reducing system exist in schools, and there are no apparent best practice models for injury reduction in school foodservice programs.

The concept of best practices has roots in scientific management from studies nearly 100 years ago by Frederick Taylor and Frank Gilbreth. In addition, Louis Brandeis, a railroad executive, stated, “Every operation is to be performed according to a predetermined schedule under definite instructions; and the execution under the plan is inspected and supervised at every point; Errors are prevented instead of being corrected” (Gilbreth, 1914, p. 3).
Sodexho USA commits to worker safety by requiring managers to appoint a “safety leader” at each client school. The safety leader is a worker, not a manager, responsible for scheduling and conducting weekly and monthly safety meetings, completing a 24-point safety inspection checklist, and identifying and addressing directly any employee who is not following safety protocol. Sodexho USA believes employee involvement at the local level is instrumental in reducing incidence of potential injury (Atkinson, 2002).

Between 1995 and 1999, the Ohio BWC (2005) asked Ohio school administrators to participate in a best practice study to reduce occupational injuries in Ohio schools. The major focus of the study was identifying strategies for overcoming challenges and obstacles in managing employee safety (Figure 4).

Strategies and practices achieved successful employee safety, health, and workers’ compensation management. Positive results included a 78% reduction in claims between 1997 and 1999, and a 34.6% decrease in insurance premiums between 1995 and 1999. All schools reported a reduction in injury frequency and severity. One school that had been assessed a 45% penalty in 1996 reported a 54% reduction in insurance premiums between 1995 and 1999, a $151,000 reduction in the premium in 1999 compared to 1995, and a 70% reduction in claims in 1999 compared to 1997. All administrative participants reported improvement in communication throughout the school district, heightened awareness of safety issues both on and off the job, and a positive impact on employee perceptions of safety climate and morale.

The Ohio BWC (2005) strategies included management commitment, employee involvement, communication, education and training, injury reporting and treatment, procedures for returning to work, safety audits, and inspections, and safety systems (Table 3).
Figure 4. Strategies for overcoming challenges and obstacles in managing employee safety (adapted from the Ohio BWC, 2005, Best Practices for Public Schools).
Table 3. Characteristics of a Best Practice School Safety System

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics of best practice</th>
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| Management commitment     | Promote an organizational culture of safe practices  
Superintendent and school board commits to safety  
Have one individual responsible for safety and worker’s compensation  
Accountability, responsibility, and authority within each facility and within each department  
Include safety measurements in performance review; set safety goals, communicate expectations, establish performance measures (safety audits, safety meetings, training, accident reports, safety suggestions), hold people accountable (reduction in injuries, claims-management issues, reduction in worker’s compensation costs, impact on total budget, return to work)  
Develop and issue a safety policy statement that clearly communicates administration’s commitment to employee safety and health  
Address student and employee safety in a comprehensive approach |
| Employee involvement      | Conduct regular meetings  
Post meeting minutes  
Conduct safety inspections  
Monitor safety issues; hold people accountable for corrective action  
Implement and monitor safety suggestion plan  
Publish safety newsletter  
Form safety project team  
Communicate safety issues to administrators; establish accountability and ensure timely completion of action items  
Include school board member on the safety committee  
Form executive safety steering committee (school board member, superintendent, business manager, treasurer, principals, and safety team facilitator) |
| Communication             | Communicate safety policy statement  
Communicate safety responsibilities, performance measures, accountability systems  
Conduct safety meetings, post minutes  
Operate safety suggestion program; provide feedback and status reports  
Sponsor labor/management forums  
Publish safety newsletters  
Hold monthly or quarterly employee forums with the superintendent  
Address safety issues by the quickest methods and at the lowest level possible; communicate the issue to the committee and discuss how addressed  
Conduct a safety perception survey |

*Note.* Adapted from the Ohio BWC (2005) *Best Practices for Public Schools.*
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<th>Category</th>
<th>Characteristics of best practice</th>
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<tr>
<td>Education and training</td>
<td>Set meeting with third party administrator (TPA) to review workers’ compensation history and claims management issue&lt;br&gt;Provide training opportunities in cooperation with local education associations, TPA’s, other sources&lt;br&gt;Implement new employee orientation process&lt;br&gt;Conduct employee in-service training&lt;br&gt;Provide job-specific training to all employees</td>
</tr>
<tr>
<td>Injury reporting and treatment</td>
<td>Establish network of preferred medical providers&lt;br&gt;Visit providers and discuss treatment protocol and communication procedures&lt;br&gt;Invite providers to tour facilities to familiarize them with operations&lt;br&gt;Develop written job descriptions that include physical demands, provide job descriptions to medical provider to assist with return-to-work orders&lt;br&gt;Identify who will complete the First Report of Injury form&lt;br&gt;Form accident review team to review (accident reports for timely and accurate details), causal factor analysis (accident cause identified), corrective action specified, assigned and completed, coordinate communication between accident analysis process and worker compensation process, provide accident analysis kit for each facility</td>
</tr>
<tr>
<td>Return to work (transitional work practices)</td>
<td>Return employee to work as quickly as possible to retain full pay and benefits&lt;br&gt;Have agreement with labor contracts to assign employee to ANY work that meets medical restrictions</td>
</tr>
<tr>
<td>Safety audits and inspections</td>
<td>Inspect facilities (quarterly or annually)&lt;br&gt;Perform custodian daily inspection checklist&lt;br&gt;Perform classroom and office checklist via self-audit&lt;br&gt;Inspect playgrounds (monthly)&lt;br&gt;Perform bus driver daily safety inspection checklist&lt;br&gt;Perform school bus monthly inspection and maintenance form&lt;br&gt;Perform school security checklist (after alarm conditions)&lt;br&gt;Perform maintenance work orders</td>
</tr>
<tr>
<td>Safety programs</td>
<td>Comply with safety mandates (local, state, federal)&lt;br&gt;Write grant applications for programs to assist safety initiatives</td>
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The School District of Pittsburgh (2003) employee manual contains an Accident and Illness Prevention Program Plan. The plan includes a safety committee with representation from all employee groups; provides a safety training program; reviews injury reports; and makes recommendations for appropriate procedures, changes, and improvements for accident prevention. The accident and illness prevention program includes 28 guiding policies for staff and student safety. However, there are no specific guidelines for individual departments, including the foodservice department.

*Working Safe: Accident Prevention in Child Nutrition Programs* developed by Lumina Training Associates (1999) for the National Foodservice Management Institute is a safety plan designed specifically for child nutrition programs. The training manual for school foodservice directors includes a four-step SAFE process (Figure 5) for reducing accidents in school kitchens. The four steps include: SELECT areas where accidents could occur, ASSESS potential causes, FIND ways to make changes for safety, and EXPECT safety. The manual includes several checklists for assessing potential hazards in school kitchens.

![Figure 5. 4-Step SAFE process for reducing accidents in school kitchens](from Lumina Training Associates, 1999, *Working Safe: Accident Prevention in Child Nutrition Programs*).
Challenges in Designing and Implementing a Best Practice Safety System

Models and characteristics of safety best practices in business and industry serve as a guide to identify potential challenges for school foodservice directors in designing and implementing a best practice safety system in public school district foodservice programs. Potential challenges include management commitment, management safety systems, human resources, education and training, facilities and equipment, environment and engineering, and funding issues. Elements of a safety system may be independent of one another, but it is the interconnected components, working together, that create a successful system for reducing on-the-job injuries (NIOSH, 2004a; Ohio BWC, 2005; U.S. Department of Labor, OSHA, 1989).

Management Commitment

Schools may struggle with competing educational priorities due to a lack of agreement among school board members, public taxpayers, and school administrators. Competing educational priorities reduce attention given to worker safety. Time and funding resources for worker safety might not capture the same attention as many other educational priorities (Ohio BWC, 2005). School districts are empowered to provide a safe learning environment free of crime and violence for students and staff. National media attention has directed awareness toward the need for student safety since acts of violence occurred in Columbine, CO; Jonesboro, AR; and Nickel Mines, PA (Neubert, 2003).

A challenge for reducing injuries to zero occurs when managers set goals that allow for injuries, acknowledging that a certain number of injuries will occur. The subtle message that injuries are permissible up to a certain number becomes a powerful enemy of a successful safety system (Nelson, 1998). Managers must serve as role models to their
workers by modeling and promoting safe practices in the department through safety training, communication, and audits; showing concern when an employee becomes injured; investigating accidents quickly; and insisting on changes in the workplace that create a safer work environment (NIOSH, 2004a).

Management commitment to injury reduction diminishes when managers and workers are not involved in an injury-reduction system that includes identifying performance expectations, aiding safety performance opportunities, monitoring and measuring safety performance, providing performance feedback, and practicing safety performance coaching (Bird et al., 2003). Injury rates decrease when managers commit to reviewing injury data with stakeholders and discuss causes, effects, and treatment of hazardous conditions (Ohio BWC, 2005). The Hamilton Standard Division of United Technology Corporation charges each department budget for the actual cost of workers’ compensation attributable to that department; and as a result, managers realize the relationships between accident cost, safety, and department budgets (Elsberry, 2006).

Management Safety Systems

Management safety systems are inconsistent when managers do not agree on what to do about safety in organizations where an accident cycle repeats itself. In some organizations safety effort is reactive rather than proactive, training is sporadic, disciplinary action is inconsistent, accident investigations are adversarial, and there is no effort toward continuous improvement. An accident cycle causes a rise in incident rates that trigger attention to safety until incident rates decrease then attention to safety diminishes and the cycle repeats itself (Krause, 1994).
Absence of a safety system increases insurance premiums, may expose an employer to safety code violations, contributes to cost of accidents, and may reject humanitarian interests (Hwang & Kleiner, 2002). A management safety system is an established arrangement of components that work together to attain a certain objective, in this case to prevent injuries in the workplace (Ohio BWC, 2005). Accident prevention is a major goal of workers’ compensation, therefore, part of a management safety system must include developing safety standard operating procedures, inspecting facilities for safety concerns, initiating a safety hazard reporting system, holding employees accountable for safe actions, and providing tools and training to encourage employees to perform work more safely.

Poor safety performance occurs in faulty organizations with weak leadership, unclear vision, poor human relationships, weak values, inadequate communications, inaccurate safety measurement, and lack of consequences for actions (Hansen, 2007). Performance measures should focus on activities such as analyzing work duties for physical limitations, conducting safety audits of the workplace, measuring safety activities, monitoring safety data, and communicating need for safety awareness as part of a safe workplace culture. Periodic audits of safety practices and injury history must be completed to provide data for evaluation of success toward reaching measurable goals (Pollitt, 2006). Benchmarking assists in determining current occupational injury history and provides data for short- and long-term injury reduction planning.

Ariss (2003) suggested employers have not lived up to ethical responsibilities in helping employees decrease work-related accidents. The reporting system currently used by the Bureau of Labor Statistics is fragmentary, unreliable, and inconsistent. Reasons for fragmentary data include underreporting injury data for fear of reprisal, loss of reputation,
employee job loss, need for insurance-provider healthcare, and lack of management reception to prior complaints. Under Section 29 CFR Part 1960 of the Department of Labor, OSHA (2005), an injury recording system provides information to employers about hazards in their workplaces and injury data to implement health and safety systems. Additionally, safety data tracks progress toward reducing incidents of health and safety (U.S. Department of Labor, OSHA, 2005).

Hylton and Trump (1997) reported that image-conscious school board members and administrators might be reluctant to report data that might otherwise tarnish a pristine image to the community. Incentives for injury reduction might dissuade employees from reporting injuries when potential rewards are based on the actions of fellow workers (Flanders & Lawrence, 1999). On the other hand, some companies believe records of no-loss workdays provide motivation for safety performance, although others report incentive plans may prove disingenuous for unreported actual injuries enrich those rewarded for unharmed records (Pransky & Snyder, 1999).

**Human Resources**

Funding does not often exist for full time school safety officers (Hylton & Trump, 1997) to oversee the worker safety system given great numbers of educational priorities. Frequently, school security, not to mention school safety positions, are ancillary duties handled by anyone with free time, not by someone in a position devoted to safety matters. Such positions frequently are assigned to poorly paid employees with few skills, little education, and little training. The position of school safety and/or security may involve many people with shared work responsibilities. Human resources must require collaborative
administrative meetings with safety personnel clearly focused on reducing injuries in the workplace.

Labor shortages and unsafe conditions in foodservice can reduce the pool of available workers and lower the morale of the entire foodservice staff. Foodservice directors felt the strain of a shrinking labor force (NFSMI, 2002) as veteran foodservice workers began retiring in the late 1980s. In the 1990s, employee turnover rates peaked at 123% per year in fast food operations and 87% in fine dining.

Human resource issues include not only a shrinking labor force, but also diverse ethnic, language, and cultural backgrounds (Haynes & Beck, 2005). OSHA is committed to Hispanic and Latino workers by translating many documents, including workplace posters, into Spanish (U.S. Department of Labor, OSHA, 2002). OSHA has established a Hispanic Workers Task Force to pursue creative solutions to improve OSHA’s outreach program and provide Spanish-speaking telephone operators on the toll-free OSHA phone number.

OSHA reported supervisor-identified obstacles to making safety changes in the workplace (Roughton & Mercurio, 2002). Supervisors stated that there seems to be no funding for needed changes, risk in spending money for safety, fear of responsibility, and competing priorities with production. The authors stated supervisors were overwhelmed with workload, high employee turnover, double standards for productivity and safety, problems with lack of communication, and perceived lack of trust in the organization. When asked about making safety changes in the workplace, workers’ comments included fear and lack of trust of management, communication difficulties, competing priorities with production, problems with responsibility, lack of consistency, lack of follow-through, and a feeling of “them versus us.”
School district administrators may be reluctant to discipline employees, who are often taxpayers in the district, for ignoring safe workplace policies and procedures (Hess, 2005). Hylton and Trump (1997) reported that, in order to avoid public embarrassment, school district administrators frequently allow employees to resign or retire rather than face disciplinary action. Safety is only important after an incident in some “reactive” organizations (Roughton & Mercurio, 2002). In other organizations, safety may be so important that managers are overzealous in policy enforcement by imposing harsh punishment for minor infractions. Safety policy and procedures require attention by workers and enforcement by supervisors (Roughton & Mercurio, 2002).

School nurses who provide emergency on-site injury care, perform medical assessments, and prepare first report of injury forms are frequent victims of downsizing and budget shortfalls. Workers with injuries that can be treated onsite are transported to a hospital by ambulance, a cost to the school district, perhaps because of a nurse downsizing decision (Genovese, 2005). Persons professionally trained to provide emergency care (i.e., nurses), rather than school personnel who are not trained or have limited medical training, best handle emergency treatment of injuries (American Federation of Teachers, 2003).

**Education and Training**

Lack of safety education and training can result in high-risk workplace injury and illness, which can include pain, suffering, and even death (Robotham, 2001). Inexperience and lack of training are risk factors for occupational accidents (NIOSH, 2004b). An employee may make an error due to cognitive, memory, or attention failure. Martin (1983) described a cognitive-based error as one that occurs during task performance that the person normally executes successfully, and cognitive failure as lapses in attention, memory, and/or
motor function. Memory failure, according to Martin, can interfere with the individual’s ability to retrieve relevant job-related information. Attention failure may cause individuals to become unfocused on tasks, and retraining may reinforce worker cognition. Therefore, according to NIOSH (2004b), workers may need retraining three to four times over the course of their careers.

The workforce has become diverse in cultural backgrounds, language skills, and literacy, thus, educating the workforce in a way that is meaningful to the worker becomes a challenge. Education needs to focus on diversity including age differences, cultural differences, and motivation. This is especially true for temporary and young workers, those with less education and job experience, and workers new to the job (NIOSH, 2004b).

Many managers either do not know how to train or do not know how to use training materials (Conrade, Woods, & Ninemeier, 1994). In a survey of 371 personnel trainers, Swanson and Falkman (1997) found these trainers perceived 12 major problems with training delivery. Respondents identified fear, lack of confidence, and feeling anxious during instruction delivery as major problems. Other problems were perceived lack of credibility as subject matter experts, inability to convey personal experiences with the subject matter, and not knowing how to deal with difficult learners. Training issues included encouraging participation, pacing instruction, adjusting training to trainees, and responding to difficult questions. Finally, trainers indicated they were unable to “read” trainees in order to make adjustments and use formative evaluations effectively.

Facilities and Equipment

In a study of school foodservice equipment by Meyer, Conklin, and Nettles (1998), the researchers determined school kitchens were not equipped to meet the new dietary
guidelines that included menus containing more whole grains and foods with fewer calories from fat. School kitchens and equipment were functional, but obsolete, and needed upgrading. School foodservice administrators are hesitant to replace or recommend replacement of working equipment merely because the equipment is outdated. They also found foodservice facility design errors can cause significant difficulties for the owner long after the architect and consultants have left the job site. Changing a design after the fact means great expense or prohibitive cost or may even be impossible to correct. The cost of introducing retrofits to an existing workplace may not be in the budget, may interrupt production, and may be difficult to justify after the completion of the initial project (Grossmith & Chambers, 1998). Many kitchens were designed based on military influence of the 1940’s using a fixed institutional model of single-use cooking equipment with few options for flexibility and change (Frable, 1995).

When functions are not considered in kitchen design, workers are susceptible to injury (Filiaggi & Courtney, 2003; Haynes & Beck, 2005). The design of a foodservice facility is important in planning a safe workspace that meets the needs of the business, customers, and employees. The basic principles of design include modularity, flexibility, simplicity, efficiency, ease of sanitation, ease of supervision of employees, and efficiency of space. Effective design includes good product flow and collaboration with science, engineering, and business with consideration for human engineering and worker safety (Bean, 2004).

Environment and Engineering

Cash-starved institutions such as schools are vulnerable to temptations that allow a large log of deferred maintenance to accumulate (Haynes & Beck, 2005). School
administrators might allocate funds for improving environmental conditions in aging buildings to maintain health and safety of their students (National Center for Education Statistics, 2003). Environmental conditions include bad indoor air quality and impure drinking water from aging plumbing (Minnesota Department of Health, 2006).

Individuals who inhale unhealthy air are prone to illness (U.S. Environmental Protection Agency, 2000). Airborne virus transmission causes colds, influenza, and other communicable diseases that contribute to days lost from work. Indoor air quality requires an even balance between temperature, humidity, and exchanges of fresh air. With high densities of foodservice workers who wear fragrances, deodorant, cosmetics, powders, and use scented soaps and shampoos, a need for fresh air arises.

Factors involved in human engineering include consideration for lighting, temperature, humidity, working height, sufficient amount of space, and noise control (Bean, 2004). Foodservice environments can be noisy with loud motors; dishwashers; ventilation systems; and sounds of mixers, grinders, disposers, and objects making contact with stainless steel surfaces. Noise contributes to hearing loss, tensed muscles, and increased heart rate and blood pressure due to the release of adrenalin and norepinephrine. These problems may affect feelings of helplessness and decrease concentration and the ability to apply learned tasks (Camp Dresser & McKee, 2001). Chronic exposure to noise may reduce coping skills, directly affect the cardiovascular system, and indirectly affect the immune system (Evans, Hygge, & Bullinger, 1998).

**Funding Issues**

Many school districts have aging schools and limited capital for upgrades, improvements, and routine maintenance, including replacing foodservice equipment that is
not as safe to operate as newer equipment. Lack of school funds often does not allow for upgrade of the physical plant or facilities to improve safety of working conditions.

Competing priorities for school operating budgets require careful planning from all stakeholders, including school board members, superintendents, business managers, department administrators, and the community (Ohio BWC, 2005). Filiaggi and Courtney (2003) identified benefits of using cost-benefit models; however, Dolan (2006) found school administrators do not see the value of using these models for capital expenditures. Administrators may view the cost of safety initiatives as an expense that competes with other educational needs and may not recognize that the benefit of implementing a safety program may far outweigh capital cost (Reinsch, 2003).

School district budgets yield to federal mandates that are funded locally rather than federally. These mandates include No Child Left Behind, school wellness and food safety policies, school security, and accessibility for physically challenged students under the American with Disabilities Act (ADA). Districts also respond to the need to accommodate technology that includes computers, Internet service, satellite, and cable television (Pennsylvania School Boards Association, 2006). The capital expense appropriated for educational mandates competes with financial resources for buying foodservice equipment or providing safety education to service staff.

Only 51% of corporations have worker training as a line item expense in their budgets. Labor costs are frequently a line item on which managers are evaluated (Conrade et al., 1994). Service employees are the least trained American workers, and the hospitality industry as a whole is slower than other industries in recognizing the value of training and associated costs. The American Society of Training Development recommends companies
spend 4% of payroll on training, yet American businesses spend about 1%. The majority of
training is devoted to white-collar and technical workers, while service workers and
production workers receive less training (Conrade et al., 1994). Funding issues for safety
training and safety system implementation could diminish if school foodservice directors
collaborated with other foodservice directors in sharing financial and training resources (New
Jersey School, 2006).

**Benefits of Implementing a Best Practice Safety System**

On July 25, 2005 the American National Standards Institute (ANSI), issued a best
practice safety system called Z10, modeled after the Shewhart (later known as Deming)
Cycle, and also called the Plan-Do-Check-Act process. The Z10 model contains provisions
that pertain to risk assessment and prioritization; apply a prescribed hierarchy of controls to
achieve acceptable risk levels; design reviews; management of change systems; use of safety
specifications in procurement systems; and use of safety audits (Manuele, 2006). A safety
management system to reduce opportunities for occupational injury results in a best practice
safety system.

Injury incidents decrease and safety attitudes become more positive, employee
participation in safety increases, and companies move from reactive to proactive when
management is committed to safety (Roughton & Mercurio, 2002). Yankee Gas Company
accident rates were reduced by 76% over a 5-year period and were reduced 55% in medical
treatment when management changed their approach to reducing injuries from reactive to
proactive (Elsberry, 2006).

A safety system supports initiatives such as the development of a safety team under
the direction of a designated safety officer, whereby safety policies are developed and
enforced and resources are devoted to time for education and training of workers. Time resources allow for safety inspections and injury report analyses. Funding support allows resources for improving safety in the workplace whether by means of staffing, materials, personal protective equipment, or replacement of foodservice equipment (NIOSH, 2004a).

A safety system encourages a culture that places a high priority on worker safety and supports injury prevention initiatives. Employees’ perceptions of a stable climate relate significantly to safety knowledge and secure work behavior (Griffin & Neal, 2000). A safety system encourages safety as a responsibility of all employees, allows stakeholders to assess risk of injury, applies an intervention to decrease risk of injury, and evaluates documentary evidence related to injury incidence. A safety system provides surveillance to monitor the effectiveness of intervention with the purpose of reducing or eliminating exposure to future injuries.

Liberty Mutual Insurance (2005) surveyed chief financial officers to determine the most frequently mentioned benefits of implementing a workplace safety system. These benefits included improved productivity, reduced costs, employee retention, and increased employee morale. Findings indicated that a safety plan facilitates worker training, improvements in equipment and workspace, greater safety management, and a safer environment for workers.

Management commitment is evident when top administration supports initiatives that result in decreasing incidence of injuries in the workplace, such as developing safe workplace policies, supporting a culture of workplace safety, and hiring qualified safety staff (NIOSH, 2004a). Workers seek information on proper behavior from their environment, and workers
develop requisite technical skills when organizational goals align with policies and practices (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002; Smith-Crowe, Burke & Landis, 2003).

Pre-employment testing, also known as physical capabilities evaluation (PCE), is a practice that should identify workers who can perform the designated job safely and enhance self-confidence by validating the workers’ ability to perform physically demanding work safely (Rosenblum, 2003). An “Estimated Functional Capabilities Form” specifies how long an employee can sit, stand, and walk; how many pounds can be lifted or carried; and frequency of bending, squatting, crawling, climbing, and reaching above shoulder level on scales of never, occasionally, frequently, or continuously (Hwang & Kleiner, 2002).

Screening for occupational injuries eliminates medically compromised workers, a decision that can possibly occur after the employer has provided a conditional job offer. OSHA guidelines indicate job screening before hiring should be safe, administered through tests, reliable, job-related, practical, and risk predictive (Huber, 2005).

The Los Angeles Unified School District hired a risk manager from business when it became apparent school district personnel did not have requisite skill levels to contain workers’ compensation costs. More than half of all workers’ compensation cases required litigation as injured employees frequently contacted personal attorneys or union representatives prior to contacting the school district insurance department for case resolution. The school district provides workers’ compensation information via district website and insurance department staff to contact injured workers with an attitude of caring customer service (Los Angeles Unified School District, 2006). Results from safety initiatives were very positive and were expected to continue to reduce the number of lost days from work claims (Ceniceros, 2004).
Newly hired workers benefit from an orientation program that encompasses safety knowledge. Workers require reminders about performing tasks more safely, and this information communicates through safety signage, posters, and in-service meetings. Safety education learned in the classroom complements hands-on experiences in the workplace when workers participate in workplace safety audits (Ohio BWC, 2005). Conrade et al. (1994) and Eaglen, Lashley, and Thomas (2000) identified a number of benefits of training workers (Table 4).

Safety training integrated into operational training ensures employers provide job-specific training and emphasizes management commitment to safety (Filiaggi & Courtney, 2003). Modeling Bloom’s Taxonomy of Learning (1956), education incorporates various instructional methods to reinforce information of safety knowledge, synthesis, and application. Training may help reduce or eliminate opportunity for injury (Roughton & Mercurio, 2002). Training may be delivered in a variety of formats including video or DVD; with trainers from organizations such as the American Red Cross and American Heart Association; as safety meetings; and formally or informally, classroom style (Elsberry, 2006). When managers train workers, one outcome may be skills development in areas other

Table 4. Benefits of Training

| • Improves worker productivity       | • Increases job satisfaction   |
| • Improves work quality             | • Attracts new employees      |
| • Improves customers’ overall perception of an organization | • Improves employees’ attitudes |
| • Increases profit levels            | • Reduced labor turnover     |
| • Increases on-the-job skills        | • Reduces costs               |
| • Increases level of self-awareness  | • Promotes teamwork          |

*Note.* From Conrad et al., 1994, p. 17.
than health and safety. Pollitt (2006) found an unexpected outcome of safety training is emphasis on worker health through awareness, health surveillance, pre-employment screening, and periodic health checks once employed.

Safety training is more successful if the trainer designs and uses focused lesson plans, delivers up-to-date relevant safety information, develops appropriate learning assessment tools, and documents training processes. Three criteria measure effective training: whether workers learned course content, whether workers applied training on the job, and whether or not training made a difference in reducing injuries (Robotham, 2001).

**Summary**

Data indicate worker injuries in the foodservice industry rank among highest of all service sector occupations. Working conditions in foodservice may contribute to injuries. Workers and their families incur great cost for rehabilitative care, loss of wages, and unreimbursed medical expenses related to injuries incurred in the workplace. Safety incidents are costly to employers in lost worker productivity and increased insurance premiums.

Foodservice administrators might consider the relationship between prevention of occupational injuries in school district foodservice programs and development of worker safety systems.

NIOSH (2004a) and the U.S. Department of Labor, OSHA (2001) recommend a safety plan for reducing injuries in the business sector. The Ohio BWC (2005) introduced a best practice safety study to reduce injuries in Ohio schools with remarkable success. Few school districts appear to dedicate resources for worker safety systems; therefore, prototypes are not available readily, especially for school foodservice programs. Often the lack of a safety system is due primarily to challenges that impede its development.
The purpose of this study was to assess the status of worker safety in public school district foodservice programs. Objectives of the study were to survey public school foodservice administrators to assess the degree to which safety is practiced in public school foodservice programs; assess relationship between perception of safety climate and safety practices in public school foodservice programs; identify perceived challenges that impede a best practice safety system in public school foodservice programs; compare foodservice safety practices, perceptions of safety climate, and perceived challenges to implementing a safety system with demographic variables such as school district enrollment, foodservice director education level, and management (contract or self-operated) of foodservice programs.

Models in this study from NIOSH, the Ohio BWC, and OSHA provide components for a worker safety system used in business and industry, but no model currently exists for public school district foodservice programs. These models provide opportunity for taking school foodservice worker safety in a new direction, for developing a new safety instrument unique to public school district foodservice programs.
CHAPTER III. METHODOLOGY

Few research studies regarding worker safety in foodservice appear in the literature, yet OSHA (2003) data indicate there is a need to study the problem of preventing worker injuries and offer solutions for safety improvement in foodservice. The purpose of this study was to assess the status of worker safety in public school district foodservice programs. Specific objectives of the study were to survey school foodservice administrators to assess the degree to which safety is practiced in public school foodservice programs; assess relationship between perception of safety climate and safety practices in public school foodservice programs; identify perceived challenges that impede implementation of a safety system in public school foodservice programs; and compare foodservice safety practices, perception of safety climate, and perceived challenges to implementing a safety system with demographic variables such as school district enrollment, foodservice director education level, and management (contract or self-operated) of foodservice programs.

This chapter includes questionnaire development, study sample, pilot test, data collection, and data analysis. The Iowa State University Committee on the Use of Human Subjects, Office of Research Assurances, approved the protocol and questionnaire for this study prior to data collection (Appendix A). The survey instrument sought to answer the following questions:

1. What safety practices exist in foodservice programs?

2. What are foodservice administrators’ perceptions of safety climate in school foodservice programs?

3. What are perceived challenges to implementing a safety system in public school foodservice programs?
4. What is the relationship among actual safety practices, perceptions of safety climate, and perceived challenges to implementing a worker safety system, and demographic variables (certification or credentialed from the School Nutrition Association, professional designation of Registered Dietitian, foodservice directors’ education level, school district enrollment, and type of foodservice management) in school district foodservice programs?

**Questionnaire Development**

A five-part questionnaire was developed by the researcher to determine school foodservice safety practices, perceptions of safety climate, perceived challenges toward implementing a worker safety system, and demographic information (Appendix B). Safety concepts from NIOSH (2004a), the Ohio BWC (2005), and the U.S. Department of Labor, OSHA (2001) models guided development of this five-part questionnaire. There appeared to be no standardized, tested, reliable instrument available for this study. Seemingly, this is the first study of its kind.

Part one of the questionnaire included 39 statements related to safety practices in school district foodservice programs to which participants responded with a yes or no. For each question in this section, a “No” answer was given 0 points and each “Yes” answer was given 1 point. For each participant, a safety practice mean rating was computed to a score representing the variable “safety practices.”

The second part, perceptions of safety climate, included 26 statements to which participants responded using a 5-point Likert-type scale to determine perception of safe work environment in the school foodservice program (1 = *Strongly disagree* to 5 = *Strongly agree*).
Part three included four statements that requested specific safety information about the school district and school foodservice program using a multiple-choice format. In part four, perceived challenges to implementing a safety system in foodservice, 16 statements solicited information using a 5-point Likert-type scale with the option of “no issue” (1 = Strongly disagree to 5 = Strongly agree; No issue = 0). Part five used five statements to request demographic information about the school district foodservice program and respondent using a multiple choice response format. Missing data, if any, were excluded in computation of ratings in the parts.

Study Sample

A stratified proportional sample of the population was selected from each of the seven USDA Food & Nutrition Service regions to ensure all school districts across the country were represented (Creswell, 2005). The population for this study included all public school districts in the U.S. in an attempt to gather an accurate representation of approximately 10,450 school foodservice programs. Each USDA region had a proportional percentage to the total population of foodservice administrators selected for the study (Table 5).

A random numbers table was used to select the sample. Internal validity was controlled in this national study as responses could be made immediately thus there were no issues with threats to internal validity including history, maturation, or mortality. The survey instrument did not change during the course of the survey and selection bias was controlled through simple random sampling (Creswell, 2005). A table for calculating a sample size for a 28% response rate (T.J. Cline, personal communication, November 1, 2007) with a ±5% sampling error was used (Dillman, 2000). Therefore, a sample size of approximately 1,346 rounded up to 1,400 for an expected yield of 370 to 377 responses.
Table 5. Regions Selected for the Study

<table>
<thead>
<tr>
<th>USDA region</th>
<th>Schools in population $N$</th>
<th>% of population</th>
<th>Surveys sent $n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Atlantic Region</td>
<td>1,254</td>
<td>12</td>
<td>168</td>
</tr>
<tr>
<td>(PA, WV, MD, DC, NJ, DE, VA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountain Plains Region</td>
<td>2,090</td>
<td>20</td>
<td>280</td>
</tr>
<tr>
<td>(MT, ND, SD, IA, MO, NB, KS, WY, CO, UT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southeast Region</td>
<td>1,045</td>
<td>10</td>
<td>140</td>
</tr>
<tr>
<td>(KY, TN, NC, SC, GA, FL, AL, MS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Region</td>
<td>1,567</td>
<td>15</td>
<td>210</td>
</tr>
<tr>
<td>(AK, WA, ID, OR, NV, CA, AZ, HI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Region</td>
<td>1,254</td>
<td>12</td>
<td>168</td>
</tr>
<tr>
<td>(NM, TX, OK, AR, LA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest Region</td>
<td>2,404</td>
<td>23</td>
<td>322</td>
</tr>
<tr>
<td>(MN, WI, MI, IL, IN, OH)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast Region</td>
<td>836</td>
<td>8</td>
<td>112</td>
</tr>
<tr>
<td>(NY, ME, NH, VT, MA, RI, CT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10,450</td>
<td>100</td>
<td>1,400</td>
</tr>
</tbody>
</table>

A database of school districts for all 50 states was compiled in March 2007 primarily from state directors of child nutrition programs and secondarily from food manufacturers and state school nutrition associations. Database requests were made by e-mail or direct contact by phone when requests by email were not successful. E-mail addresses for school foodservice administrators from each of the 50 states were obtained, and email addresses were placed in the appropriate corresponding USDA region. Every attempt was made to collect foodservice director e-mail addresses primarily; however, databases obtained from the states’ department of education contained e-mail addresses of the “local food authority” which may have included email addresses of school superintendents.
Pilot Test

Statements for the pilot test were developed by the researcher, placed in an Excel spreadsheet, and sent to participants for pilot testing in April 2007. Participants filled out the questionnaire on the Excel spreadsheet and returned to the researcher via e-mail. Participants included 2 school superintendents, 15 school foodservice directors, 5 school foodservice directors from the Iowa State University CNP Academy, 3 individuals from business and industry, 4 school foodservice managers, and 5 university professors. Participants were asked about the appropriateness of questionnaire length, time to complete the survey, clarity of statements, and content validity. Participants were requested to address questions or concerns regarding operational definitions of terms used in the questionnaire. The questionnaire was modified as needed, and modifications were incorporated into the final questionnaire. Participants chosen for the pilot test were excluded from the final study, another means to control threats to internal validity for selection bias. A safety engineer and statistician from a university ensured content validity of the questionnaire before and after pilot testing.

Data Collection

The questionnaire was reformatted from an Excel spreadsheet into SurveyMonkey™, which was used for data collection. Prior to sending the questionnaire, an e-mail message (Appendix C) was sent to selected school foodservice administrators stating the purpose of the study and indicating a questionnaire was forthcoming, if they wished to participate. Messages were sent in 140 batches of 10 email messages (n=1,400) to ensure the recipient e-mail firewall did not detect the message as spam mail. Confidentiality of responses was assured to all participants. Participants were informed of the importance of the research, their participation was requested, and they were thanked in advance for participating.
Survey Monkey, ™ a Web-based survey tool allows the user to create surveys in multiple formats, collect responses, and download data in multiple formats for statistical analysis. The tool is inexpensive and easy to use, and is valuable for speed in which data are collected. Dillman (2000) found that e-mail responses returned more quickly than postal service responses (76% of all responses returned within four days). A potential challenge to using an online survey tool is respondent computer server “time-out.”

A cover letter (Appendix D) with a hyperlink to the electronic survey in SurveyMonkey™ was e-mailed to selected participants. Participants could click on the hyperlink that directed them to the online questionnaire. Within the questionnaire, instructions were provided to ask the person most responsible for the foodservice program to complete the survey. Responses were made by clicking the radio button then submit button after completing the questionnaire. Data were available only to the researcher, thereby protecting the anonymity of the respondent and responses. A copy of results was offered in all correspondence to participants.

A follow-up e-mail letter (Appendix E) was sent 2 weeks after the first letter, and a second follow-up e-mail letter (Appendix F) was sent 2 weeks later (Dillman, 2000). The first 100 respondents’ names were entered into a drawing for two $50 rewards. The electronic mailing yielded an adjusted sample size of 1,166 after removing 234 incorrect or invalid e-mail addresses, and recipients who elected not to participate in the study. Responses were received from 248 participants or a 21% response rate. Challenges to data collection from school foodservice administrators include:
• Time of year questionnaire sent (many school foodservice administrators do not work 12 months); care should be taken to send questionnaires when schools are in session.

• Questionnaire sent electronically to school “food authority” may include the foodservice director or school superintendent.

• If questionnaire reaches someone other than the foodservice director, risk is taken that questionnaire may be deleted before reaching the foodservice director.

• If questionnaire reaches someone in higher authority than the foodservice director, the supervisor may potentially not allow the foodservice director to participate in the survey.

• Bulk-type email may appear as SPAM mail and may be rejected by school district e-mail security systems.

• Firewalls may prevent questionnaire from reaching the respondent.

• Assumption is made that all respondents with e-mail addresses have access to a computer, know how to use the computer sufficiently, and know how to perform an online electronic survey.

Data Analysis

Responses collected from the electronic survey program SurveyMonkey™, were exported to an Excel spreadsheet, and imported into SPSS Version 15 (SPSS, Inc., 2005). Data were checked for completeness and accuracy. Additional 36 responses were purged because of an excessive number of missing responses, and three private school responses were purged resulting in 209 useable responses, a useable response rate of 18%.

Responses to parts of the questionnaire coded in SPSS as follows:
Part 1. Safety Practices in School Foodservice Programs (1 = Yes; 0= No). For each question in this section, a “No” answer was given 0 points and each “Yes” answer was given 1 point. There were no missing data in this section. For each participant, these points summed for all questions in this section and the total score represented the variable “Safety Practices.”

Part 2. Perception of Safety Climate (1 = Strongly Disagree to 5= Strongly Agree). There were no missing data in this section. Participants’ ratings summed for all questions and the total score represented the variable “Perception of Safety Climate.”

Part 4. Perceived Challenges to Implementing a Safety System in Foodservice. (1 = Strongly Disagree to 5= Strongly Agree; No issue = 0). There were no missing data in this section. Participants’ ratings summed for all questions and the total score represented the variable “Perceived Challenges.”

Descriptive statistics were computed to organize and summarize the data. Factor analysis was used to confirm the statements in sections two and four represented factors of perceptions of safety climate, and perceived challenges. Pearson’s Correlation Coefficient identified relationships between variables. Variables that were identified as statistically significant were used as variables in the multiple regression model. Independent sample t tests and one-way analysis of variance (ANOVA) tested differences between groups on the variables of safety practices, perception of safety climate, and perceived challenges.

Multiple regression was used to assess the contribution of each significant independent variable to explain the variance of the dependent variable, safety practices. The multiple regression model used identified significantly correlated variables from the correlation matrix as independent (predictor) variables to determine outcome on the
dependent (criterion) variable, safety practices. When two variables correlate, knowing the score on one variable predicts the score on the other variable. Therefore, the stronger the correlation, the closer the scores will fall to the regression line and therefore the more accurate the prediction. Multiple regression is used when exploring relationships between predictor and criterion variables (Brace, Kemp, & Snelgar, 2006). ANOVA and independent sample $t$ tests were conducted to identify significant differences in safety practices, perception of safety climate, and perceived challenges between groups as defined by demographic variables.
CHAPTER IV. RESULTS AND DISCUSSION

This study assessed the status of worker safety in public school district foodservice programs. Specific objectives of the study were to survey school foodservice administrators to assess the degree to which safety is practiced in public school foodservice programs; assess relationship between perception of safety climate and safety practices in public school foodservice programs; identify perceived challenges that impede implementation of a safety system in public school foodservice programs; and compare foodservice safety practices, perception of safety climate, and perceived challenges to implementing a safety system with demographic variables such as school district enrollment, foodservice director education level, and management (contract or self-operated) of foodservice programs.

An electronic survey software program, SurveyMonkey™, was used to solicit and collect data from school foodservice administrators. E-mail questionnaires were sent to 1,400 school foodservice administrators selected from a population of 10,450 school districts across the country. A total of 248 responses were received for a response rate of 21%; however, 39 responses were purged resulting in a useable response rate of 18%.

Demographic Characteristics and Descriptive Statistics of Study Sample

Demographic characteristics of respondents are described in Table 6. The majority of respondents (69.4%) were responsible for more than one school cafeteria. Approximately 29% of the respondents reported they had School Nutrition Association (SNA) certification, which require 30 hours of continuing education training including Healthy Edge (a program that seeks to reduce fat and calories in school meals), a foodservice sanitation-training program, and 10 hours of elective credits that include marketing, equipment, customer service, or financial management training. The credentialing program (SNS- School Nutrition
Table 6. Demographic Characteristics of Respondents \((N = 209)\)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent is responsible for one school cafeteria</td>
<td>31</td>
<td>14.8</td>
</tr>
<tr>
<td>Respondent is responsible for more than one cafeteria</td>
<td>145</td>
<td>69.4</td>
</tr>
<tr>
<td>Respondent is certified by the School Nutrition Association</td>
<td>61</td>
<td>29.2</td>
</tr>
<tr>
<td>Respondent is credentialed by the School Nutrition Association (SNS)</td>
<td>30</td>
<td>14.2</td>
</tr>
<tr>
<td>School foodservice director is a Registered Dietitian (RD)</td>
<td>29</td>
<td>13.9</td>
</tr>
<tr>
<td><strong>Highest level of education of school foodservice director</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School graduate</td>
<td>29</td>
<td>13.9</td>
</tr>
<tr>
<td>Some college</td>
<td>48</td>
<td>23.1</td>
</tr>
<tr>
<td>2 year Associate degree</td>
<td>21</td>
<td>10.1</td>
</tr>
<tr>
<td>4 year Bachelor’s degree</td>
<td>68</td>
<td>32.7</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>41</td>
<td>19.7</td>
</tr>
<tr>
<td>Doctorate</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Number of students enrolled in school district</strong></td>
<td>209</td>
<td>100.0</td>
</tr>
<tr>
<td>4,999 or less</td>
<td>144</td>
<td>69.2</td>
</tr>
<tr>
<td>5,000 to 9,999</td>
<td>29</td>
<td>13.9</td>
</tr>
<tr>
<td>10,000 to 14,999</td>
<td>6</td>
<td>2.9</td>
</tr>
<tr>
<td>15,000 to 24,999</td>
<td>13</td>
<td>6.3</td>
</tr>
<tr>
<td>25,000 to 49,999</td>
<td>11</td>
<td>5.3</td>
</tr>
<tr>
<td>50,000 or more</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Description of school district</strong></td>
<td>209</td>
<td>100.0</td>
</tr>
<tr>
<td>Public school or public school district</td>
<td>209</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Management of the school foodservice program</strong></td>
<td>208</td>
<td>100.0</td>
</tr>
<tr>
<td>Self-operated by school district</td>
<td>187</td>
<td>89.9</td>
</tr>
<tr>
<td>Operated by contract management company</td>
<td>21</td>
<td>10.1</td>
</tr>
</tbody>
</table>
Specialist designation from the School Nutrition Association) requires the member to possess a college degree, certification credits, and pass a comprehensive written examination with a score of 75% or higher. Over 14% of respondents reported they had School Nutrition Association (SNS) credentials. In addition, 13.9% of the respondents indicated the foodservice director was a Registered Dietitian, which requires a bachelor’s degree from an accredited university plus experience in dietetics, passing a national exam as established by the Commission on Dietetic Registration, and continuing education.

The majority of respondents (32.7%) said foodservice directors were 4-year degree college graduates, 23.1% had some college education, 19.7% had a master’s degree, and 10.1% had an associate’s degree. One respondent reported the foodservice director had a doctoral degree (0.5%). Therefore, 63% of all foodservice directors possessed a college degree. The majority of respondents (69.2%) were from small sized school districts (4,999 or fewer students enrolled), followed by respondents in districts with an enrollment of 5,000 to 9,999 (13.9%). All respondents (100%) were from public school districts. Private schools (n = 3) were excluded from this study. The majority of respondents (89.9%) reported the foodservice program was self-operated by the school district; 10.1% of the respondents said contract management companies operated the foodservice program.

**Safety Practices in Public School Foodservice Programs**

The first 39 statements of the questionnaire explored safety practices in school district foodservice programs. Table 7 shows the response frequency for each question with mean ratings in descending order.
### Table 7. Safety Practices in School District Foodservice Programs

<table>
<thead>
<tr>
<th>Statement description</th>
<th>Total</th>
<th>No</th>
<th>%</th>
<th>Yes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate corrective action is taken when an injury occurs</td>
<td>209</td>
<td>4</td>
<td>1.9</td>
<td>205</td>
<td>98.1</td>
</tr>
<tr>
<td>Appropriate corrective action is taken when a safety incident occurs without serious injury, insurance claim, or insurance payment</td>
<td>209</td>
<td>5</td>
<td>2.4</td>
<td>204</td>
<td>97.6</td>
</tr>
<tr>
<td>There is a maintenance work order system for requesting equipment repairs</td>
<td>207</td>
<td>18</td>
<td>8.7</td>
<td>189</td>
<td>91.3</td>
</tr>
<tr>
<td>Safety policies are enforced</td>
<td>208</td>
<td>18</td>
<td>8.8</td>
<td>187</td>
<td>91.2</td>
</tr>
<tr>
<td>There is an written policy for alcohol and drug free workplace</td>
<td>209</td>
<td>20</td>
<td>9.6</td>
<td>189</td>
<td>90.4</td>
</tr>
<tr>
<td>Material safety data sheets are located with or near chemical storage</td>
<td>205</td>
<td>24</td>
<td>11.7</td>
<td>181</td>
<td>88.3</td>
</tr>
<tr>
<td>Accident reports are analyzed for future incident prevention</td>
<td>207</td>
<td>27</td>
<td>13.0</td>
<td>180</td>
<td>87.0</td>
</tr>
<tr>
<td>Safety initiatives are communicated to workers with signs, newsletters, or posters</td>
<td>207</td>
<td>29</td>
<td>14.0</td>
<td>181</td>
<td>86.0</td>
</tr>
<tr>
<td>Employees are familiar with material safety data sheets and know how to use them in case of emergency</td>
<td>207</td>
<td>29</td>
<td>14.0</td>
<td>181</td>
<td>86.0</td>
</tr>
<tr>
<td>Workers are held accountable for their actions related to safety</td>
<td>204</td>
<td>33</td>
<td>16.2</td>
<td>171</td>
<td>83.8</td>
</tr>
<tr>
<td>Foodservice equipment is evaluated for preventive maintenance or replacement at least once each year</td>
<td>208</td>
<td>33</td>
<td>15.9</td>
<td>175</td>
<td>84.1</td>
</tr>
<tr>
<td>There is a school nurse onsite</td>
<td>209</td>
<td>35</td>
<td>16.7</td>
<td>174</td>
<td>83.3</td>
</tr>
<tr>
<td>Employees may return to work with a physician order for limited duty following an on-the-job injury</td>
<td>208</td>
<td>41</td>
<td>19.7</td>
<td>167</td>
<td>80.3</td>
</tr>
<tr>
<td>Safety training has been presented to employees in the past year</td>
<td>208</td>
<td>46</td>
<td>22.1</td>
<td>162</td>
<td>77.9</td>
</tr>
<tr>
<td>Managers are held accountable for the safety of their workers</td>
<td>202</td>
<td>48</td>
<td>23.8</td>
<td>154</td>
<td>76.2</td>
</tr>
<tr>
<td>Safety is written into foodservice worker job descriptions</td>
<td>208</td>
<td>54</td>
<td>26.0</td>
<td>154</td>
<td>74.0</td>
</tr>
<tr>
<td>Managers’ personnel evaluations (reviews) take into account safety in their respective kitchens</td>
<td>204</td>
<td>75</td>
<td>36.8</td>
<td>129</td>
<td>63.2</td>
</tr>
<tr>
<td>The foodservice department provides written safety policies to workers</td>
<td>206</td>
<td>78</td>
<td>37.9</td>
<td>128</td>
<td>62.1</td>
</tr>
<tr>
<td>New employees are provided an orientation program that includes safety before they are allowed to work in a kitchen</td>
<td>207</td>
<td>80</td>
<td>38.3</td>
<td>127</td>
<td>60.7</td>
</tr>
</tbody>
</table>

*Note. (Yes = 1; No = 0)*
Table 7 (continued)

<table>
<thead>
<tr>
<th>Statement description</th>
<th>Total</th>
<th>No</th>
<th>%</th>
<th>Yes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers are closely matched to the job in terms of physical strength for pushing, pulling, and lifting duties</td>
<td>207</td>
<td>85</td>
<td>41.1</td>
<td>122</td>
<td>58.9</td>
</tr>
<tr>
<td>The foodservice director performs an annual review of department injury frequency rates</td>
<td>208</td>
<td>85</td>
<td>40.9</td>
<td>123</td>
<td>59.1</td>
</tr>
<tr>
<td>Foodservice workers are required to wear protective, heavy-duty footwear</td>
<td>207</td>
<td>88</td>
<td>42.5</td>
<td>119</td>
<td>57.5</td>
</tr>
<tr>
<td>There are safety-trained personnel in the school district to assist with foodservice worker safety</td>
<td>209</td>
<td>97</td>
<td>46.4</td>
<td>112</td>
<td>53.6</td>
</tr>
<tr>
<td>Nurse is available on site full time</td>
<td>208</td>
<td>96</td>
<td>46.2</td>
<td>112</td>
<td>53.8</td>
</tr>
<tr>
<td>Funds are in the budget to upgrade facilities for safety.</td>
<td>206</td>
<td>95</td>
<td>46.1</td>
<td>111</td>
<td>53.9</td>
</tr>
<tr>
<td>Foodservice workers are required to wear goggles and neoprene gloves when cleaning ovens</td>
<td>205</td>
<td>96</td>
<td>46.8</td>
<td>109</td>
<td>53.2</td>
</tr>
<tr>
<td>The insurance company representative acts as a safety consultant to assist the foodservice director in setting safety goals</td>
<td>205</td>
<td>107</td>
<td>52.2</td>
<td>98</td>
<td>47.8</td>
</tr>
<tr>
<td>Safety inspections are performed in the foodservice department at least quarterly</td>
<td>206</td>
<td>108</td>
<td>52.4</td>
<td>98</td>
<td>47.6</td>
</tr>
<tr>
<td>Foodservice director participates on a school district safety committee</td>
<td>206</td>
<td>109</td>
<td>52.9</td>
<td>97</td>
<td>47.1</td>
</tr>
<tr>
<td>Funds are in the budget for safety training</td>
<td>209</td>
<td>115</td>
<td>55.0</td>
<td>94</td>
<td>45.0</td>
</tr>
<tr>
<td>A pre-employment physical exam is required before employment in foodservice</td>
<td>207</td>
<td>127</td>
<td>61.4</td>
<td>80</td>
<td>38.6</td>
</tr>
<tr>
<td>Workers are closely matched to the job in terms of height (employee not too short nor too tall for assigned job)</td>
<td>207</td>
<td>133</td>
<td>64.3</td>
<td>74</td>
<td>35.7</td>
</tr>
<tr>
<td>The foodservice director performs an annual review of department injury costs</td>
<td>208</td>
<td>140</td>
<td>67.3</td>
<td>68</td>
<td>32.7</td>
</tr>
<tr>
<td>Safety meetings with foodservice workers are held at least quarterly</td>
<td>206</td>
<td>138</td>
<td>67.0</td>
<td>68</td>
<td>33.0</td>
</tr>
<tr>
<td>Workers are closely matched to the job for reaching and stretching</td>
<td>207</td>
<td>138</td>
<td>66.7</td>
<td>69</td>
<td>33.3</td>
</tr>
<tr>
<td>Safety signs, newsletters, and/or posters are written in at least two languages</td>
<td>209</td>
<td>158</td>
<td>75.6</td>
<td>51</td>
<td>24.4</td>
</tr>
<tr>
<td>Drug testing (screening) is required before potential workers are hired</td>
<td>208</td>
<td>169</td>
<td>81.3</td>
<td>39</td>
<td>18.7</td>
</tr>
<tr>
<td>There is a line item in the school foodservice budget for safety</td>
<td>206</td>
<td>175</td>
<td>85.0</td>
<td>31</td>
<td>15.0</td>
</tr>
<tr>
<td>Foodservice workers perform warm-up exercises before performing work duties</td>
<td>207</td>
<td>205</td>
<td>99.0</td>
<td>2</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Human Resources

New school foodservice workers were provided an orientation program that included safety information (62.1%) before work in a kitchen. Safety information was in foodservice worker job descriptions (74%), and written safety and safety policies were provided to workers 62.1% of time.

Respondents reported there was a written policy for an alcohol and drug free workplace (90.4%). Neither pre-employment physical exams (38.3%) nor drug tests (18.8%) were required of potential foodservice employees. Most respondents (83.3%) reported there was a school nurse on site, yet only about half (53.8%) indicated the school nurse was available full time. This survey determined school nurses were employed in school districts, but frequently at less than full time. The school nurse may take a leading role, not just in student health, but also in worker health and safety as a means to reduce insurance premiums. The cost savings realized from reduction in injury claims and subsequent insurance premium increases might more than offset the added cost of having a fulltime nurse on staff. The school nurse, rather than the human resources director or district benefits coordinator, could be the on-site local expert on injury prevention. Genovese (2005) indicated school nurses are frequent targets for downsizing. School administrators should consider changing the manner in which the “First Report of Injury” form is completed. The school nurse is the onsite professionally trained medical authority that can correctly assess, treat, and document worker injuries. Research by Hwang and Kleiner (2002) indicated medical screening might eliminate potentially medically compromised workers, thereby reducing the cost of workers’ compensation claims later.
Safety policies for foodservice workers were enforced (91.2%) frequently. In most districts, workers were accountable for their safe actions (83.8%), and managers were held accountable for the safety of their workers (76.2%). Managers’ personnel evaluations required accountability for safety in their respective kitchens in 63.2% of the districts.

**Communication**

Safety initiatives were communicated to workers by way of signs, newsletters, and posters (86%), but information rarely was communicated in two or more languages (24.4%). OSHA provides many safety signs and posters in Spanish as well as English (Roughton & Mercurio, 2002). Communication in multi formats is an effective means of informing workers of pertinent safety information (U.S. Dept. of Labor, OSHA, 2002).

**Education and Training**

Safety training meetings occurred at least once each year in 77.9% of the districts and at least quarterly in a third of the districts (33.0%). Safety-trained personnel were available to assist with foodservice worker safety in half (53.6%) the school districts. Insurance company supervisors acted as a safety consultant to reduce occupational injuries in fewer than half (47.8%) of school districts. Safety training is an integral part of a successful safety program (Lee, 2006; NIOSH, 2004b; School District of Pittsburgh, 2003) and benefits are substantial, yet school foodservice administrators reported lack of time for meetings and training. Benefits of training include greater productivity and quality, worker satisfaction, greater job satisfaction, reduced costs, higher profits, and reduced labor turnover (Conrad et al., 1994).

**Safety Audits and Inspections**

A large percentage of respondents (87%) said accident reports were analyzed for future incident prevention. The analysis included annual review of injury frequency rates by
the foodservice director (59.1%), but annual review of injury costs (32.7%) eluded 67.3% of school foodservice directors. Analysis of injury frequency rates is helpful to reduce hazards, but review of frequency should pair with actual injury costs (Elsberry, 2006) to stress the need for greater safety-diligence.

Corrective action was taken when an injury occurred (98.1%) even if incidents occurred without serious injury, need for insurance claim, or insurance payment to the individual (97.6%). Liberty Mutual Insurance Company, one of the largest workers’ compensation insurance companies in the country, devotes substantial resources to injury prevention and investigation. Liberty Mutual and many other insurance companies collaborate with their insured to reduce injury claims, which influence workers’ compensation insurance rates. Liberty Mutual Insurance (2004) found in working with Max & Erma’s Restaurants that internal injury report tracking created opportunity for developing safety action plans that resulted in substantial reduction in injury frequency and cost.

Funding

Respondents reported funds were available for safety training in fewer than half (45%) the school districts. Funds were available for facility safety upgrades in only just over half (53.9%) the school districts, and only 15% of school foodservice budgets included a line item for safety.

Safety Systems

Workers were matched to a job with consideration for physical strength (pushing, pulling, and lifting) just over half the time (58.9%) and were matched to a job with height (35.7%) and reaching and stretching (33.3%) one third of the time. Only 2 of 207 respondents (1.0%) said workers performed warm-up exercises before work in school district
foodservice programs. Stuart Anderson Restaurants reported a 30% reduction in sprains and strains when muscle warming and stretching exercises preceded the workday (Apfel, 2001).

In this study, the survey determined foodservice workers are matched to the job with consideration for their physical stature or physical limitation (58.9%). Frequency of injuries may be reduced by matching workers with tasks based on physical characteristics in individual workers. Physical considerations for the worker may prevent personal injury (Hwang & Kleiner, 2002; Rosenblum, 2003). The results from this survey indicated foodservice programs could reap additional benefit from the development of an ergonomics program, more commonly employed in industrial settings (Apfel, 2001).

Workers returned to the job with a limited physician orders following an on-the-job injury in 80.3% of school districts. Foodservice workers were required to wear protective heavy-duty footwear (57.5%), and 53.2% were required to wear goggles and neoprene gloves when cleaning ovens. Tyson Foods (2000), Max & Erma’s Restaurants (Liberty Mutual Insurance, 2004), and Long John Silver and Friendly’s (Hedden, 1997), reported the use of personal protective equipment such as slip resistant shoes, steel knit gloves, and frequent use of oven mitts resulted in reduced injury frequency and subsequent reduced medical cost.

School foodservice directors participated on school district safety committees in fewer than half (47.1%) of school districts. Tyson Foods (2000), Sodexho (Atkinson, 2002), and the School District of Pittsburgh (2003) reported substantial benefits when workers participated on safety committees.

Maintenance work orders for equipment repairs occurred frequently (91.3%) and foodservice equipment was evaluated on an annual basis for safety, preventive maintenance, or replacement (84.1%). Foodservice equipment that is maintained very well may account for
results in a study by Meyer et. al (1998) that determined school foodservice equipment is in operating condition, but in need of replacement.

For each question in this section, a “No” answer was given 0 points and each “Yes” answer was given 1 point. There were no missing data for this variable. Mean safety practice ratings were computed to represent the composite score of “safety practices” \( (M = 23.79, \text{SD} = 6.47, n = 209, \text{Range} = 8--39) \).

**Perception of Safety Climate in Public School Foodservice Programs**

Statements 40 through 65 of the questionnaire explored the area of school foodservice administrator perception of safety climate using a 5-point Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). There were no missing data for this variable. A perception of safety climate mean score was computed \( (M = 101.46, \text{SD} = 13.40, n = 212, \text{Range} = 61-130) \). Table 8 shows details of the responses to these statements compiled by mean ratings in descending order.

**Safety Culture**

Respondents indicated (75.5%) worker safety is important \( (M = 4.63, \text{SD} = .84) \) and teaching worker safety is important \( (M = 4.46, \text{SD} = .537) \) and they believe the superintendent and school administrators place a high priority on worker safety \( (M = 4.15, \text{SD} = .913) \); administrators supported a culture of safety awareness and practices \( (M = 4.07, \text{SD} = .847) \). Respondents believed school administrators would support initiatives and efforts to reduce foodservice worker injuries \( (M = 4.19, \text{SD} = .779) \).

**Education and Training**

Respondents indicated teaching worker safety for injury prevention is important \( (M = 4.46, \text{SD} = .537) \), and that an important goal of the foodservice program was to reduce or
<table>
<thead>
<tr>
<th>Statement description</th>
<th>Total n</th>
<th>1 n (%)</th>
<th>2 n (%)</th>
<th>3 n (%)</th>
<th>4 n (%)</th>
<th>5 n (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker safety is important</td>
<td>208</td>
<td>8 (3.8)</td>
<td>0 (0)</td>
<td>1 (0.5)</td>
<td>42 (20.2)</td>
<td>157 (75.5)</td>
<td>4.63</td>
<td>.840</td>
</tr>
<tr>
<td>Teaching worker safety for injury prevention is important</td>
<td>207</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (1.9)</td>
<td>103 (49.8)</td>
<td>100 (48.3)</td>
<td>4.46</td>
<td>.537</td>
</tr>
<tr>
<td>It is important to evaluate equipment for preventive maintenance or replacement at least once each year</td>
<td>207</td>
<td>1 (0.5)</td>
<td>1 (0.5)</td>
<td>7 (3.3)</td>
<td>107 (51.7)</td>
<td>91 (44.0)</td>
<td>4.38</td>
<td>.626</td>
</tr>
<tr>
<td>When safety concerns are brought to the attention of management, corrective action is taken</td>
<td>208</td>
<td>0 (0)</td>
<td>3 (1.4)</td>
<td>13 (6.3)</td>
<td>108 (51.9)</td>
<td>84 (40.4)</td>
<td>4.31</td>
<td>.655</td>
</tr>
<tr>
<td>An important goal of the foodservice program is to reduce or eliminate worker injuries</td>
<td>209</td>
<td>1 (0.5)</td>
<td>1 (0.5)</td>
<td>25 (12.0)</td>
<td>89 (42.5)</td>
<td>93 (44.5)</td>
<td>4.30</td>
<td>.734</td>
</tr>
<tr>
<td>Safety is a high priority for completing repair requests and maintenance work orders</td>
<td>209</td>
<td>1 (0.5)</td>
<td>5 (2.4)</td>
<td>19 (9.1)</td>
<td>99 (47.4)</td>
<td>85 (40.6)</td>
<td>4.25</td>
<td>.758</td>
</tr>
<tr>
<td>School administrators would support initiatives and efforts to reduce foodservice worker injury</td>
<td>208</td>
<td>2 (1.0)</td>
<td>1 (0.5)</td>
<td>32 (15.3)</td>
<td>94 (45.2)</td>
<td>79 (38.0)</td>
<td>4.19</td>
<td>.779</td>
</tr>
<tr>
<td>The superintendent and school administrators place a high priority on worker safety</td>
<td>208</td>
<td>5 (2.4)</td>
<td>3 (1.4)</td>
<td>34 (16.3)</td>
<td>80 (38.6)</td>
<td>86 (41.3)</td>
<td>4.15</td>
<td>.913</td>
</tr>
<tr>
<td>Workers are adequately trained on how to use new equipment safely</td>
<td>206</td>
<td>0 (0)</td>
<td>3 (1.5)</td>
<td>19 (9.2)</td>
<td>128 (62.1)</td>
<td>56 (27.2)</td>
<td>4.15</td>
<td>.634</td>
</tr>
<tr>
<td>School administrators support a culture of safety awareness and practices</td>
<td>207</td>
<td>2 (1.0)</td>
<td>5 (2.4)</td>
<td>40 (19.3)</td>
<td>89 (43.0)</td>
<td>71 (34.3)</td>
<td>4.07</td>
<td>.847</td>
</tr>
<tr>
<td>The facilities management department (maintenance and/or custodial) is a foodservice partner in maintaining a safe workplace</td>
<td>208</td>
<td>6 (2.9)</td>
<td>5 (2.4)</td>
<td>27 (13.0)</td>
<td>101 (48.5)</td>
<td>69 (33.2)</td>
<td>4.07</td>
<td>.904</td>
</tr>
<tr>
<td>The foodservice director has adequate knowledge regarding prevention of worker injuries</td>
<td>209</td>
<td>2 (1.0)</td>
<td>14 (6.7)</td>
<td>27 (12.9)</td>
<td>114 (54.5)</td>
<td>52 (24.9)</td>
<td>3.96</td>
<td>.857</td>
</tr>
</tbody>
</table>

*Note.* 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree.*
Table 8 (continued)

<table>
<thead>
<tr>
<th>Statement description</th>
<th>Total</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers are adequately trained when moved to a different foodservice job</td>
<td>208</td>
<td>0</td>
<td>10</td>
<td>41</td>
<td>122</td>
<td>35</td>
<td>3.88</td>
<td>.738</td>
</tr>
<tr>
<td>Funding requests to purchase safe or safer foodservice equipment are often approved</td>
<td>208</td>
<td>5</td>
<td>9</td>
<td>38</td>
<td>120</td>
<td>36</td>
<td>3.83</td>
<td>.849</td>
</tr>
<tr>
<td>Adequate personal protective equipment that includes masks, goggles, freezer mitts, and steel knit gloves is provided to workers</td>
<td>209</td>
<td>5</td>
<td>22</td>
<td>44</td>
<td>77</td>
<td>61</td>
<td>3.80</td>
<td>1.051</td>
</tr>
<tr>
<td>The school board has an adequately written safety policy that includes all school district employees</td>
<td>206</td>
<td>0</td>
<td>15</td>
<td>64</td>
<td>77</td>
<td>50</td>
<td>3.79</td>
<td>.896</td>
</tr>
<tr>
<td>I believe improving safety could improve foodservice worker morale</td>
<td>208</td>
<td>1</td>
<td>9</td>
<td>68</td>
<td>87</td>
<td>43</td>
<td>3.78</td>
<td>.839</td>
</tr>
<tr>
<td>Workers are adequately trained on how and when to use personal protective equipment</td>
<td>208</td>
<td>1</td>
<td>16</td>
<td>49</td>
<td>105</td>
<td>37</td>
<td>3.77</td>
<td>.847</td>
</tr>
<tr>
<td>Foodservice director provides adequate safety training to workers</td>
<td>209</td>
<td>1</td>
<td>18</td>
<td>46</td>
<td>108</td>
<td>36</td>
<td>3.77</td>
<td>.853</td>
</tr>
<tr>
<td>Noise level of kitchen is appropriate—not too loud</td>
<td>209</td>
<td>5</td>
<td>23</td>
<td>47</td>
<td>108</td>
<td>26</td>
<td>3.61</td>
<td>.925</td>
</tr>
<tr>
<td>Foodservice kitchen(s) have adequate layout to reduce chances for injury</td>
<td>209</td>
<td>6</td>
<td>38</td>
<td>29</td>
<td>100</td>
<td>36</td>
<td>3.58</td>
<td>1.062</td>
</tr>
<tr>
<td>Funding for foodservice worker safety is adequate</td>
<td>209</td>
<td>7</td>
<td>24</td>
<td>67</td>
<td>95</td>
<td>16</td>
<td>3.43</td>
<td>.912</td>
</tr>
<tr>
<td>There are safety-trained personnel in the school district to assist with foodservice worker safety</td>
<td>209</td>
<td>9</td>
<td>45</td>
<td>45</td>
<td>76</td>
<td>34</td>
<td>3.39</td>
<td>1.121</td>
</tr>
<tr>
<td>Funds are in the budget to upgrade facilities for safety</td>
<td>208</td>
<td>10</td>
<td>48</td>
<td>45</td>
<td>80</td>
<td>25</td>
<td>3.30</td>
<td>1.098</td>
</tr>
<tr>
<td>Funds are in the budget for safety training</td>
<td>207</td>
<td>4</td>
<td>60</td>
<td>43</td>
<td>75</td>
<td>25</td>
<td>3.28</td>
<td>1.069</td>
</tr>
<tr>
<td>There is adequate time to teach workers about safety in the kitchen</td>
<td>208</td>
<td>12</td>
<td>54</td>
<td>45</td>
<td>80</td>
<td>17</td>
<td>3.17</td>
<td>1.085</td>
</tr>
</tbody>
</table>
eliminate worker injuries \((M = 4.30, SD = .734)\). Respondents indicated foodservice directors provided adequate safety training to foodservice workers \((M = 3.77, SD = .847)\), workers were adequately trained how to safely use new equipment \((M = 4.15, SD = .634)\), and workers were trained when moved to a different foodservice job \((M = 3.88, SD = .738)\).

Participants responded to statements regarding funds in the budget for safety training \((M = 3.28, SD = 1.069)\), workers were provided adequate personal protective equipment \((M = 3.80, SD = 1.051)\), and workers were adequately trained how and when to use personal protective equipment that has been provided \((M = 3.77, SD = .847)\). Respondents reported there were safety-trained personnel in the school district to assist with foodservice worker safety \((M = 3.39, SD = 1.121)\) and respondents reported the foodservice director had adequate knowledge regarding prevention of worker injuries \((M = 3.96, SD = .857)\). Respondents reported there was adequate time to teach workers about safety in the kitchen \((M = 3.17, SD = 1.085)\).

**Equipment and Engineering**

Respondents indicated it was important to evaluate equipment for preventive maintenance or replacement at least once per year \((M = 4.38, SD = .626)\); and indicated maintenance and/or custodial departments partner with the foodservice department in maintaining a safe workplace \((M = 4.07, SD = .904)\), and safety was a high priority when equipment repair requests were made \((M = 4.25, SD = .758)\).

Foodservice kitchens were adequately designed for safety to reduce chances for injury \((M = 3.58, SD = 1.062)\), and respondents reported kitchen noise level was somewhat appropriate \((M = 3.61, SD = .925)\). Funds were in the budget for upgrading facilities for safety \((M = 3.30, SD = 1.098)\) and funding for foodservice worker safety was adequate \((M =\)
Respondents reported requests for funding to purchase safe or safer foodservice equipment were often approved \( (M = 3.83, SD = .849) \) and safety efforts could improve employee morale \( (M = 3.78, SD = .839) \).

**Safety Information in Public School Districts**

Supplementary demographic information requested in the questionnaire determined extraneous information not captured in other sections. Data are reported in frequency and percentage of total responses. Missing data were excluded and not computed in the analysis.

Table 9 depicts information found in section 3 of the questionnaire.

**Table 9. Safety Program Information**

<table>
<thead>
<tr>
<th>Statement description</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who pays the cost of workers’ compensation injuries for foodservice workers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The foodservice department</td>
<td>106</td>
<td>51.20</td>
</tr>
<tr>
<td>The school district general fund</td>
<td>101</td>
<td>48.80</td>
</tr>
<tr>
<td>Who fills out the “First Report of Injury” accident form when a foodservice worker becomes injured?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foodservice manager</td>
<td>91</td>
<td>43.54</td>
</tr>
<tr>
<td>Foodservice director</td>
<td>48</td>
<td>22.97</td>
</tr>
<tr>
<td>School principal</td>
<td>7</td>
<td>3.35</td>
</tr>
<tr>
<td>School nurse</td>
<td>24</td>
<td>11.48</td>
</tr>
<tr>
<td>Someone other than those mentioned above</td>
<td>39</td>
<td>18.66</td>
</tr>
<tr>
<td>Who primarily maintains injury records for foodservice workers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School nurse</td>
<td>13</td>
<td>6.25</td>
</tr>
<tr>
<td>School district insurance clerk</td>
<td>31</td>
<td>14.90</td>
</tr>
<tr>
<td>School district benefits coordinator</td>
<td>50</td>
<td>24.04</td>
</tr>
<tr>
<td>Human resources/personnel department</td>
<td>54</td>
<td>25.96</td>
</tr>
<tr>
<td>Foodservice director</td>
<td>32</td>
<td>15.38</td>
</tr>
<tr>
<td>School principal</td>
<td>4</td>
<td>1.92</td>
</tr>
<tr>
<td>School district insurance company</td>
<td>3</td>
<td>1.45</td>
</tr>
<tr>
<td>Someone other than those mentioned above</td>
<td>21</td>
<td>10.10</td>
</tr>
<tr>
<td>What percentage of your time do you estimate you spend with safety including training, inspections, preparing incident reports, meeting to discuss injuries, etc.?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5% or less</td>
<td>113</td>
<td>54.07</td>
</tr>
<tr>
<td>6% to 10%</td>
<td>58</td>
<td>27.75</td>
</tr>
<tr>
<td>11% to 20%</td>
<td>32</td>
<td>15.31</td>
</tr>
<tr>
<td>21% or more</td>
<td>6</td>
<td>2.87</td>
</tr>
</tbody>
</table>
About half the respondents said the cost of workers’ compensation for injuries was paid out of the school district general fund (48.3%), and the other half said it was paid out of the school foodservice department budget (50.7%). The school foodservice manager primarily (43.59%) reported injuries on the First Report of Injury form followed by the foodservice director (23.0%), someone other than the foodservice manager (18.7%), the school nurse (11.5%), and the school principal (3.3%). The school district human resources director (26%) or the benefits coordinator (24%) primarily maintains insurance and injury reports rather than the school district nurse (6.3%). The majority of respondents (54.1%) reported less than 5% of their time was spent with safety issues, and only 2.9% said 21% or more of their time was spent with safety training, inspections, preparing incident reports, and meetings to discuss injuries.

**Perceived Challenges to a Foodservice Worker Safety System**

Survey statements 70 to 85 explored perceived challenges school foodservice administrators faced to implement a worker safety system in their district using a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) plus a “no issues with current administration” response. “No issues” coded as “0” (not weighted). There were no missing data for this variable. A perceived challenges mean score was computed ($M = 35.30$, $SD = 20.37$, $n = 209$, $Range = 0--80$).

Table 10 shows details of the responses to these statements. Larger mean ratings indicate the statement is viewed as a perceived challenge; lower mean ratings indicate the statement is not a perceived challenge. In this category of perceived challenges, there were no items that were rated higher than a mean rating of 3.05, indicating a neutral rating.
Table 10. Perceived Challenges to a Foodservice Worker Safety System

<table>
<thead>
<tr>
<th>Statement description</th>
<th>Total</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N$</td>
<td>1 (%)</td>
<td>2 (%)</td>
<td>3 (%)</td>
<td>4 (%)</td>
<td>5 (%)</td>
</tr>
<tr>
<td>Safety in my school district foodservice program would be better if:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foodservice director had more time to train foodservice workers</td>
<td>208</td>
<td>(1.0)</td>
<td>(6.2)</td>
<td>(13.0)</td>
<td>(43.3)</td>
<td>(15.9)</td>
</tr>
<tr>
<td>Training foodservice workers in safety practices and injury prevention were a continuous ongoing process</td>
<td>207</td>
<td>(1.4)</td>
<td>(2.4)</td>
<td>(11.6)</td>
<td>(50.8)</td>
<td>(8.2)</td>
</tr>
<tr>
<td>The work environment were maintained as comfortable as can be with temperature and humidity</td>
<td>208</td>
<td>(1.4)</td>
<td>(5.8)</td>
<td>(13.9)</td>
<td>(31.8)</td>
<td>(17.8)</td>
</tr>
<tr>
<td>Funding were available for safety initiatives and efforts</td>
<td>209</td>
<td>(1.9)</td>
<td>(4.3)</td>
<td>(21.1)</td>
<td>(34.5)</td>
<td>(8.1)</td>
</tr>
<tr>
<td>Facilities were better designed to promote safe work activities</td>
<td>207</td>
<td>(3.4)</td>
<td>(7.8)</td>
<td>(17.9)</td>
<td>(30.4)</td>
<td>(10.1)</td>
</tr>
<tr>
<td>Foodservice department had more funding to support safety</td>
<td>207</td>
<td>(1.9)</td>
<td>(5.3)</td>
<td>(19.8)</td>
<td>(30.5)</td>
<td>(10.6)</td>
</tr>
<tr>
<td>There was a formal worker safety system in place</td>
<td>209</td>
<td>(1.4)</td>
<td>(7.2)</td>
<td>(13.9)</td>
<td>(36.8)</td>
<td>(7.7)</td>
</tr>
<tr>
<td>Resources were committed to worker safety, e.g., trainers and safety training seminars</td>
<td>209</td>
<td>(1.4)</td>
<td>(8.6)</td>
<td>(17.7)</td>
<td>(34.9)</td>
<td>(6.2)</td>
</tr>
<tr>
<td>Safety consultants or insurance representatives assisted with foodservice safety efforts</td>
<td>207</td>
<td>(1.9)</td>
<td>(8.7)</td>
<td>(19.8)</td>
<td>(32.5)</td>
<td>(6.3)</td>
</tr>
<tr>
<td>Foodservice engineering (maintenance) needs were addressed quickly</td>
<td>209</td>
<td>(1.9)</td>
<td>(7.7)</td>
<td>(14.4)</td>
<td>(22.5)</td>
<td>(12.0)</td>
</tr>
<tr>
<td>Safety policies were enforced</td>
<td>207</td>
<td>(2.4)</td>
<td>(5.3)</td>
<td>(19.3)</td>
<td>(28.0)</td>
<td>(2.9)</td>
</tr>
<tr>
<td>Policies were written to include safety</td>
<td>209</td>
<td>(1.09)</td>
<td>(7.7)</td>
<td>(23.4)</td>
<td>(21.1)</td>
<td>(3.3)</td>
</tr>
<tr>
<td>Foodservice director had greater knowledge of injury prevention</td>
<td>208</td>
<td>(2.9)</td>
<td>(13.5)</td>
<td>(23.1)</td>
<td>(16.8)</td>
<td>(2.4)</td>
</tr>
<tr>
<td>Safe or safer foodservice equipment were available to workers</td>
<td>209</td>
<td>(3.3)</td>
<td>(15.8)</td>
<td>(19.6)</td>
<td>(16.3)</td>
<td>(3.8)</td>
</tr>
<tr>
<td>Administration was committed to safety in the foodservice department</td>
<td>209</td>
<td>(2.4)</td>
<td>(11.5)</td>
<td>(24.9)</td>
<td>(13.9)</td>
<td>(13.9)</td>
</tr>
<tr>
<td>Training and training materials were translated in two languages</td>
<td>209</td>
<td>(7.7)</td>
<td>(17.2)</td>
<td>(13.4)</td>
<td>(8.6)</td>
<td>(2.4)</td>
</tr>
</tbody>
</table>

Note. 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.
Mean ratings of 3.0 indicate “neutral,” and lower mean ratings of 2.0 or 1.0 indicate not a perceived challenge. Time for training had the highest mean rating in perceived challenges ($M = 3.05, SD = 1.744$) followed secondly by need for training on an ongoing basis ($M = 2.85, SD = 1.793$). Respondents indicated perceived challenges related to environmental engineering ($M = 2.71, SD = 1.928$), funding (for safety initiatives, $M = 2.52, SD = 1.814$, and $M = 2.47, SD = 1.861$), and facilities ($M = 2.45, SD = 1.837$).

Respondents reported they had no issues with safety knowledge ($M = 1.78, SD = 1.664$); need for safety resources for safety training ($M = 2.43, SD = 1.796$). Respondents indicated safety consultants or insurance representatives to assist with safety efforts were not a challenge ($M = 2.40, SD = 1.781$). There were no issues with needing safe or safer equipment ($M = 1.78, SD = 1.664$). There were no issues with maintenance department requests being addressed quickly (41.6%), and there were no issues with language barriers in about half the responses (50.74%).

**Factor Analysis**

Factor analysis was used to confirm the underlying structure of statements in parts two and four representing the factors of perceptions of safety climate, and perceived challenges, respectively. Missing values were excluded list wise. Principal component analysis was used to determine the underlying structure of perception of safety climate. Five factors extracted with eigenvalues greater than 1. However, all but the first question, “Worker safety is important,” loaded on the first component, which explained 34.82% of the variance. Therefore, this scale, minus one statement, was treated as a single factor (Table 11).
Table 11. Factor Loading Matrix for Perception of Safety Climate

<table>
<thead>
<tr>
<th>Statement</th>
<th>Perception of safety climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funds are in the budget for safety training.</td>
<td>.698</td>
</tr>
<tr>
<td>When safety concerns are brought to the attention of management, corrective action is taken.</td>
<td>.697</td>
</tr>
<tr>
<td>Foodservice director provides adequate safety training to workers.</td>
<td>.693</td>
</tr>
<tr>
<td>School administrators support a culture of safety awareness and practices.</td>
<td>.679</td>
</tr>
<tr>
<td>There are safety-trained personnel in the school district to assist with foodservice worker safety.</td>
<td>.679</td>
</tr>
<tr>
<td>Funding for foodservice worker safety is adequate.</td>
<td>.662</td>
</tr>
<tr>
<td>The facilities management department is a foodservice partner in maintaining a safe workplace.</td>
<td>.655</td>
</tr>
<tr>
<td>School administrators would support initiatives and efforts to reduce foodservice worker injury.</td>
<td>.646</td>
</tr>
<tr>
<td>Funds are in the budget to upgrade facilities for safety.</td>
<td>.645</td>
</tr>
<tr>
<td>The school board has an adequately written safety policy that includes all school district employees.</td>
<td>.632</td>
</tr>
<tr>
<td>Safety is a high priority for completing repair requests and maintenance work orders.</td>
<td>.628</td>
</tr>
<tr>
<td>Workers are adequately trained on how to use new equipment safely.</td>
<td>.616</td>
</tr>
<tr>
<td>Foodservice director has adequate knowledge regarding prevention of worker injuries.</td>
<td>.611</td>
</tr>
<tr>
<td>Foodservice kitchen(s) have adequate layout to reduce chances for injury.</td>
<td>.573</td>
</tr>
<tr>
<td>Workers are adequately trained when moved to a different foodservice job.</td>
<td>.571</td>
</tr>
<tr>
<td>I believe improving safety could improve foodservice worker morale.</td>
<td>.565</td>
</tr>
<tr>
<td>Workers are adequately trained on how and when to use personal protective equipment.</td>
<td>.563</td>
</tr>
<tr>
<td>An important goal of the foodservice program is to reduce or eliminate worker injuries.</td>
<td>.553</td>
</tr>
<tr>
<td>The superintendent and school administrators place a high priority on worker safety.</td>
<td>.543</td>
</tr>
<tr>
<td>Adequate personal protective equipment that includes masks, goggles, freezer mitts, and stainless steel knit gloves is provided to workers.</td>
<td>.538</td>
</tr>
<tr>
<td>Funding requests to purchase safe or safer foodservice equipment are often approved.</td>
<td>.514</td>
</tr>
<tr>
<td>Noise level of kitchen is appropriate—not too loud.</td>
<td>.499</td>
</tr>
<tr>
<td>Teaching worker safety for injury prevention is important.</td>
<td>.480</td>
</tr>
<tr>
<td>There is adequate time to teach workers about safety in the kitchen.</td>
<td>.476</td>
</tr>
<tr>
<td>It is important to evaluate equipment for preventive maintenance or replacement at least once each year.</td>
<td>.439</td>
</tr>
</tbody>
</table>
For perceived challenges, principal component analysis with a varimax rotation indicated all questions loaded on one factor, which explained 59.54% of the variance. Therefore, this scale was treated as a single factor, perceived challenges (Table 12).

The reliability of these sections was confirmed using Cronbach’s alpha. For perception of safety climate $\alpha = .920$, and for perceived challenges $\alpha = .931$. A Cronbach’s alpha of .70 or higher confirms reliability (UCLA Academic Technology Services, 2007), thus the categories were well above the range for reliability. These factors, perception of safety climate, and perceived challenges, and participants’ mean scores on safety practices, were used in the remaining analyses.

Table 12. Factor Loading Matrix for Perceived Challenges

<table>
<thead>
<tr>
<th>Statement</th>
<th>Perceived challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety in my school district foodservice program would be better if:</td>
<td></td>
</tr>
<tr>
<td>Foodservice department had more funding to support safety.</td>
<td>.836</td>
</tr>
<tr>
<td>Resources were committed to worker safety, e.g., trainers and safety training seminars.</td>
<td>.830</td>
</tr>
<tr>
<td>There was a formal worker safety program in place.</td>
<td>.827</td>
</tr>
<tr>
<td>Funding was available for safety initiatives and efforts.</td>
<td>.810</td>
</tr>
<tr>
<td>Safety policies were enforced.</td>
<td>.795</td>
</tr>
<tr>
<td>Policies were written to include safety.</td>
<td>.789</td>
</tr>
<tr>
<td>Administration was committed to safety in the foodservice department.</td>
<td>.776</td>
</tr>
<tr>
<td>Foodservice engineering (maintenance) needs were addressed quickly.</td>
<td>.770</td>
</tr>
<tr>
<td>Training foodservice workers in safety practices and injury prevention were a continuous, ongoing process.</td>
<td>.763</td>
</tr>
<tr>
<td>Facilities were better designed to promote safe work activities.</td>
<td>.761</td>
</tr>
<tr>
<td>The work environment was maintained as comfortable as can be with temperature and humidity.</td>
<td>.743</td>
</tr>
<tr>
<td>Foodservice director had greater knowledge of injury prevention.</td>
<td>.741</td>
</tr>
<tr>
<td>Safe or safer foodservice equipment were available to workers.</td>
<td>.735</td>
</tr>
<tr>
<td>Foodservice director had more time to train foodservice workers.</td>
<td>.717</td>
</tr>
<tr>
<td>Safety consultants or insurance representatives assisted with foodservice safety efforts.</td>
<td>.705</td>
</tr>
<tr>
<td>Training and training materials were translated in two languages.</td>
<td>.636</td>
</tr>
</tbody>
</table>
Correlations

Pearson’s Correlation Coefficient measures the linear relationship between two variables. Reported in Table 13 is the correlation matrix illustrating Pearson’s Correlation Coefficient \( r \), level of significance \( p \), and number of responses \( N \) for the bivariate relationship between demographic variables (dichotomous variables coded as 1 and 2), factors of perception of safety climate, and perceived challenges, and the mean score of safety practices. Table 14 shows a summary of relationships between variables.

Pearson’s Correlation Coefficient detected several relationships between variables as statistically significant, but the correlations between variables are actually low at < .4. Correlations are not predictive; therefore, caution is urged when interpreting statistically significant data with low correlations (Field, 2005).

Multiple Regression Model

To achieve the most parsimonious model, only variables significantly correlated with the dependent variable of safety practices were used as predictor variables in the multiple regression model. Therefore, factor scores of perception of safety climate, and perceived challenges, and management (coded as 1 = self-operated; 2 = management company) were entered simultaneously as predictor variables. The variable safety practices was entered as the criterion variable.

The multiple regression model for safety practices was significant, \( F(3, 204) = 64.67, p < .001 \), \( R^2 = .487 \), adjusted \( R^2 = .480 \). Perception of safety climate, perceived challenges, and management explained 48% of the variance in safety practices. Beta values indicate the contribution of each predictor variable to the model. Perceptions of safety climate contributed the most to the model \( (\beta = .618, p < .01) \), followed by management \( (\beta = .152, \)
<table>
<thead>
<tr>
<th></th>
<th>SafePractice</th>
<th>Perceptions</th>
<th>Challenges</th>
<th>Education</th>
<th>Enroll</th>
<th>Schools</th>
<th>Management</th>
<th>SNA</th>
<th>SNS</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SafePractices</td>
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<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>Perceptions</td>
<td>Correlation</td>
<td>.682**</td>
<td>—</td>
<td>—</td>
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<td>—</td>
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</tr>
<tr>
<td></td>
<td>Sig. 2-tailed</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
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</tr>
<tr>
<td>Challenges</td>
<td>Correlation</td>
<td>-.369**</td>
<td>-.485**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>.000</td>
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<tr>
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<td>-.075</td>
<td>.116</td>
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<td>.278</td>
<td>.092</td>
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<tr>
<td>Enrollment</td>
<td>Correlation</td>
<td>.108</td>
<td>.081</td>
<td>.120</td>
<td>.320**</td>
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<td>Sig. 2-tailed</td>
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<td>.239</td>
<td>.083</td>
<td>.000</td>
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<td>—</td>
</tr>
<tr>
<td>Schools</td>
<td>Correlation</td>
<td>.041</td>
<td>.118</td>
<td>-.188**</td>
<td>.038</td>
<td>-.064</td>
<td>—</td>
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<td>.085</td>
<td>.006</td>
<td>.584</td>
<td>.352</td>
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</tr>
<tr>
<td>Management</td>
<td>Correlation</td>
<td>.277**</td>
<td>.210**</td>
<td>-.245**</td>
<td>.013</td>
<td>-.095</td>
<td>-.040</td>
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<td>Sig. 2-tailed</td>
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<td>.002</td>
<td>.000</td>
<td>.855</td>
<td>.170</td>
<td>.564</td>
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</tr>
<tr>
<td>SNA</td>
<td>Correlation</td>
<td>.021</td>
<td>-.029</td>
<td>.195**</td>
<td>-.001</td>
<td>.157*</td>
<td>-.076</td>
<td>-.142*</td>
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<td>Sig. 2-tailed</td>
<td>.762</td>
<td>.677</td>
<td>.004</td>
<td>.985</td>
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<td>.270</td>
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</tr>
<tr>
<td>SNS</td>
<td>Correlation</td>
<td>-.056</td>
<td>.028</td>
<td>.154*</td>
<td>.217**</td>
<td>.152*</td>
<td>.066</td>
<td>-.135*</td>
<td>.340**</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Sig. 2-tailed</td>
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<td>.689</td>
<td>.025</td>
<td>.001</td>
<td>.027</td>
<td>.339</td>
<td>.050</td>
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<td>209</td>
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</tr>
<tr>
<td>RD</td>
<td>Correlation</td>
<td>.016</td>
<td>.053</td>
<td>.066</td>
<td>.380**</td>
<td>.275**</td>
<td>-.051</td>
<td>.036</td>
<td>-.064</td>
<td>.131</td>
</tr>
<tr>
<td></td>
<td>Sig. 2-tailed</td>
<td>.818</td>
<td>.446</td>
<td>.340</td>
<td>.000</td>
<td>.000</td>
<td>.464</td>
<td>.603</td>
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<td>209</td>
<td>209</td>
<td>209</td>
</tr>
</tbody>
</table>

*Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed).
Table 14. Summary of Relationships Between Variables, Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th>Variables</th>
<th>$r$</th>
<th>$p$</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety practices and perception of safety climate</td>
<td>.682</td>
<td>&lt; .001</td>
<td>The greater the safety practices, the higher the perception of safety climate.</td>
</tr>
<tr>
<td>Safety practices and perceived safety challenges</td>
<td>-.369</td>
<td>&lt; .001</td>
<td>The greater the safety practices, the less the perceived safety challenges.</td>
</tr>
<tr>
<td>Management and safety practices</td>
<td>.277</td>
<td>&lt; .001</td>
<td>Programs managed by management companies have greater safety practices than self-operated programs.</td>
</tr>
</tbody>
</table>

$p < .001$). Perceived challenges to implementing a worker safety system did not significantly contribute to the model (Table 15).

Demographic variables were not significantly associated with safety practices, perceptions of safety climate, or perceived challenges to implementing a worker safety system. This finding was somewhat surprising when considering resources available in larger school districts and educational level of the foodservice director. One might expect larger school districts could devote more financial resources to worker safety programs. One might also expect a foodservice director with a higher education level might result in effective and successful worker safety programs.

Table 15. Summary of Simultaneous Regression Analysis for Three Variables Predicting Criterion Variable Safety Practices

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>$B$</th>
<th>SE $\beta$</th>
<th>$B$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception of safety climate</td>
<td>.297</td>
<td>.026</td>
<td>.618**</td>
<td>11.543</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Perceived challenges</td>
<td>.030</td>
<td>.019</td>
<td>.083</td>
<td>1.569</td>
<td>.118</td>
</tr>
<tr>
<td>Management</td>
<td>3.244</td>
<td>1.098</td>
<td>.152*</td>
<td>2.954</td>
<td>.004</td>
</tr>
</tbody>
</table>
Registered dietitian, SNS credentialed (a person with an RD or SNS designation must possess a college degree), and SNA certified personnel were associated with school districts with larger enrollments in the correlation matrix. This finding suggests foodservice directors with a college degree or SNS credential were employed in larger school districts, whereas smaller school districts may not attract such certified or credentialed foodservice directors.

**Independent Sample \( t \) test and One-Way Analysis of Variance**

An independent sample \( t \) test was used to test differences between respondents from management companies and self-operated foodservice programs on the variables of safety practices, perception of safety climate, and perceived challenges (Table 16). Regarding safety practices, respondents from management companies scored significantly higher \( (M = 29.19, SD = 5.43) \) than respondents from self-operated programs \( (M = 23.24, SD = 6.30) \), \( t(209) = -4.160, p < .001 \). Regarding perception of safety climate, respondents from management companies indicated significantly stronger perceptions of safety climate \( (M = 109.95, SD = 13.09) \) than respondents from self-operated programs \( (M = 100.59, SD = 13.13) \), \( t(209) = -3.102, p = .002 \). Regarding perceived challenges, respondents from management companies perceived significantly fewer challenges \( (M = 20.29, SD = 20.08) \) than respondents from self-operated programs \( (M = 36.93, SD = 19.82) \), \( t(209) = 3.647, p < .001 \).

Table 16. Independent Sample \( t \) test by Management Type

<table>
<thead>
<tr>
<th>Variables</th>
<th>Self-operated</th>
<th>Management company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( t )</td>
<td>( p )</td>
</tr>
<tr>
<td>Safety practices</td>
<td>-4.160</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Perception of safety climate</td>
<td>-3.102</td>
<td>.002</td>
</tr>
<tr>
<td>Perceived challenges</td>
<td>3.647</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
An independent sample $t$ test was used to test differences between respondents who are certified by the School Nutrition Association and those respondents not certified by the SNA on the variables of safety practices, perception of safety climate, and perceived challenges to safety. A significant difference was reported for perceived challenges to safety between respondents who did not have SNA certification $t(209) = -2.878, p = .004$. Respondents with the SNA certification reported significantly more perceived challenges ($M = 41.52, SD = 18.39$) than those without certification ($M = 32.78, SD = 20.64$).

An independent sample $t$ test was used to test differences between respondents who have the SNS credential and those who do not on the variables of safety practices, perception of safety climate, and perceived challenges to safety. Levene’s test of equality of variances indicated unequal variances ($F = 6.020, p = .015$) for the variable perceived challenges. Assuming unequal variances, significant differences were reported between individuals with SNS credential and without the credential for the variable perceived challenges $t(44.58) = -2.604, p = .012$. Individuals with the SNS credential perceived more challenges ($M = 43.00, SD = 16.91$) than those individuals without the credential ($M = 34.03, SD = 20.65$).

An independent sample $t$ test was used to test differences between respondents who were Registered Dietitians and those who were not with the variables of safety practices, perception of safety climate, and perceived challenges to safety. No significant differences were found.

One-way ANOVA was used to look at safety practices, perception of safety climate, and perceived challenges to safety between demographic groups. Education level compromised five groups—high school graduate, some college, two-year Associate’s degree, four year Bachelor’s degree, and Master’s/Doctorate. Regarding foodservice director
education levels, significant differences for safety practices were reported $F(4,206) = 3.428$, $p = .01$. Post-hoc analysis using the Scheffe test indicated respondents with some college education scored higher on safety practices ($M = 25.98$, $SD = 6.38$) than respondents with high school education, only ($M = 21.10$, $SD = 6.80$). One-way ANOVA was used to examine differences between groups based on enrollment size on the variables of safety practices, perception of safety climate, and perceived challenges to safety. No significant differences were found.
CHAPTER V. SUMMARY AND RECOMMENDATIONS

In this study, a national proportional stratified sample of 209 public school food administrators were surveyed to assess the status of worker safety in public school district foodservice programs. Respondents provided data regarding safety practices, perception of safety climate, and perceived challenges to implementing a worker safety system. Additionally, respondents provided demographic data and specific information about safety in their respective school foodservice programs. A summary of findings, limitations to this study, future research, and recommendations are found in this chapter.

Summary of Findings

The study revealed school foodservice administrators perform safety practices to keep foodservice workers safe from harm, but numerous opportunities exist for improvement in accomplishing a best practice school district foodservice worker safety system. Specific objectives of the study were to survey school foodservice administrators to:

1. Assess the degree to which safety is practiced in public school foodservice programs. Safety practices significantly positively correlated to perception of safety climate (.682) and management (.277) (contract management companies). Safety practices significantly negatively correlated to perceived challenges (-.369) to implementing a worker safety system. There were 39 statements related to safety practices provided to school foodservice administrators. The 9 items below were indicated as practiced by school foodservice administrators at less than 40% of the time:

   • Warm-up exercises before work (1%)
   • Line item in budget for safety (15%)
• Drug testing before hire (18.8%)
• Safety posters & newsletters communicated in two languages (24.4%)
• Workers matched to job for reaching, or stretching (33.3%)
• Annual review of actual injury COSTS (32.7%)
• Safety meetings held at least quarterly (33.0%)
• Workers matched to job for height (35.7%)
• Pre-employment physical exam (38.3%)

2. Assess relationship between perception of safety climate and safety practices in public school foodservice programs. These items were identified on a scale of 1 to 5 where 1= Strongly disagree to 5= Strongly agree. Respondents indicated strong agreement with the following statements:

• Worker safety is important \( (M = 4.63) \)
• Teaching worker safety for injury prevention is important \( (M = 4.46) \)
• Important to evaluate equipment for preventive maintenance at least once each year \( (M = 4.38) \)
• Corrective action is taken when safety concerns are brought to the attention of management \( (M = 4.31) \)
• An important goal of the foodservice program is to reduce or eliminate worker injuries \( (M = 4.30) \)
• Safety is a high priority for completing repair/maintenance work orders \( (M = 4.25) \)
• School administrators would support initiatives and efforts to reduce foodservice worker injury \((M = 4.19)\)

3. Identify perceived challenges that impede implementation of a safety system in public school foodservice programs. These items were identified on a scale of 1 to 5 where 1 = *Strongly Disagree* and 5 = *Strongly Agree*. There were no statements that indicated agreement or strong agreement, school foodservice administrators should give notice to the following statements in the perceived challenges section that included:

• Time to safety train \((M = 3.05)\)
• Time to train on a continuous, ongoing basis \((M = 2.85)\)
• Comfort level of work environment \((M = 2.71)\)
• Funding for safety initiatives \((M = 2.52)\)
• Facility design for safety \((M = 2.47)\)
• Formal worker safety program \((M = 2.43)\)
• Resources devoted to safety \((M = 2.43)\)

The multiple regression model revealed a positive relationship between safety practices and perception of safety climate, and a positive relationship between safety practices and contract management companies. Perceived challenges to implementing a safety system did not significantly contribute to the multiple regression model. These are findings not previously reported in the literature and suggest that initiatives or programs focusing on improving perceptions of safety climate should be a priority for school foodservice directors.
4. Compare foodservice safety practices, perception of safety climate toward safety, and perceived challenges to implementing a safety system with demographic variables such as school district enrollment, foodservice director education level, and management (contract or self-operated) of foodservice programs.

Demographic variables of school district enrollment, school foodservice director education level, certification, credentialing, or Registered Dietitian did not contribute to the multiple regression model. However, an independent sample t test determined SNA certified respondents perceived more challenges to implementing a safety system than non-certified respondents.

An independent sample t test determined SNS credentialed respondents perceived more challenges to implementing a safety system than non-SNS credentialed respondents. An independent sample t test determined there were no differences in safety practices, perception of safety climate, and perceived safety challenges between Registered Dietitians and those who were not Registered Dietitians. One-way ANOVA was used to examine differences between groups based on school enrollment (district size) and safety practices, perception of safety climate, and perceived challenges to implementing a safety system. There were no significant differences found in the analysis of data.

One-way ANOVA with Post-hoc Scheffe test was used to examine differences between groups for foodservice director education level and safety practices, perception of safety climate, and perceived challenges to implementing a worker safety system. Analysis revealed respondents with some college scored higher on safety practices than respondents with high school education, only.
Limitations to the Study

Due to the design of the research, this study has the following limitations:

1. The researcher, based on constructs from NIOSH (2004a), the Ohio BWC (2005), and OSHA (2001), developed the questionnaire. A tested, valid, questionnaire was not available; therefore, construct validity could be limited.

2. A challenge to the data collection for this study was the time of year the questionnaire released (first week in June 2007). A greater response rate might have been possible if the questionnaire had reached respondents during the school year rather than during the summer months.

3. The survey sample was designed as a proportional stratified random sample; however, a question might have been asked in the demographics section of the questionnaire to identify from which region of the country the school district was located for survey return tracking purposes.

4. There was no commercially available database of school foodservice directors available for lease; therefore, the researcher compiled a database of school food administrators that included public school foodservice directors as well as superintendents.

5. Questionnaires intended for school foodservice directors may have reached someone other than the school foodservice director, including the school superintendent. In the questionnaire a request was made to forward the electronic questionnaire to the person most responsible for managing the public school foodservice program. Perhaps the demographic section of the questionnaire might have requested a place to identify the job title of the respondent.
6. Respondents who answered the questionnaire were perhaps most interested in worker safety, a potential selection bias toward “best practices” with worker safety.

7. The respondent may not have answered the statements truthfully; particularly if the school food supervisor did not have adequate safety practices or procedures in place, or if the foodservice department experienced high injury rates.

8. An assumption was made that all selected respondents were knowledgeable about use of computers, and comfortable with responding to an electronic questionnaire.

9. An assumption was made that the respondents’ computer did not “time out” during the online survey session.

10. Independent variables used in the multiple regression model were selected based upon significance in the bivariate correlation matrix. Pearson’s Correlation Coefficient assumes a linear relationship between variables. Correlations are not predictive and SPSS analysis of data may indicate statistically significant relationships with low correlations, perhaps a limitation when data are used in the multiple regression model (Field, 2005). Follow-up statistical analysis was used with One-way analysis of variance and independent sample t tests.

11. Data from the questionnaire were obtained from school food administrators; therefore, results from this study cannot be generalized to other population groups or other foodservice operations including private schools, franchise operations, quick service restaurants, fine dining restaurants, hospital foodservice, or other commercial or noncommercial foodservice establishments.
Future Research

Findings in this study might be helpful to school districts in planning worker safety systems that may result in the reduction of frequency and severity of injuries to school foodservice workers. Business and industry have implemented successful worker safety systems; findings in this study indicate there are opportunities for implementation of safety initiatives in school foodservice programs.

Future studies might include more in-depth research into specific strengths and weaknesses of worker safety systems such as human engineering, education and training, facility design, materials handling practices, management commitment, return to work programs, and cooperative teamwork as it relates to hazard abatement and injury prevention. Ergonomics programs are prevalent in industry, and may be adapted for use in school foodservice programs to aid in reducing repetitive stress and musculoskeletal disorders.

The majority of workers in school foodservice include female workers. Studies might be of interest to determine the implication of age and gender on worker safety in school foodservice. Other studies with regard to worker safety might include ethnicity, physical characteristics such as stature, number of years on the job (foodservice experience), foodservice production methods, and safety studies related to new versus vintage kitchens.

Future research might include strategies for attributing direct and indirect costs to a foodservice worker safety system (Bird et al, 2003; Heinrich et al, 1980), determining cost benefit analysis of facility design or redesign for safety, and costs and benefits of foodservice department human re-engineering. Earlier studies by Henry Heinrich and Frank Bird might be replicated in this venue.
Safety models used for this study included businesses, industries, commercial and non-commercial foodservice operations. This study is a starting place for future studies in worker safety practices, perception of safety climate, and safety challenges in venues including private school districts and other foodservice businesses.

**Recommendations**

The findings from this study demonstrate that safety is an important part of school foodservice programs, and there are many opportunities to expand upon safety initiatives in this setting. Initiatives to improve worker safety include management commitment, employee involvement in safety practices with safety committee meetings and facility inspections (Haynes and Beck, 2005), effective safety communication, education and training opportunities, injury reporting and treatment, successful return to work policies and practices, safety audits (Atkinson, 2002), safety inspections and frequent and ongoing safety programs.

A safety system comprises multiple safety activity components that can be developed and administered in a comprehensive manner. A team approach to implementing a worker safety system includes school board members, superintendents, business managers, school foodservice directors, managers, foodservice workers, school nurses, maintenance and custodial personnel, human resources, insurance company supervisors, and representatives from supporting agencies (Ohio BWC, 2005).

Two expense categories (food and labor) contribute the greatest impact on school foodservice operation expenses. Safety training allocates to labor cost; therefore, the cost of training increases expense to the labor and benefits category. Research indicates expenses associated with safety training have great benefits that outweigh costs (Robotham, 2001). Therefore, creating a line item in the budget for safety training as an “allowable expense”
(e.g., not charged against labor cost) and allowing training expenses for “train the trainer” programs may prove beneficial to reduce injuries. Respondents indicated worker safety was important, yet finding time to safety train workers on an ongoing basis proved challenging.

This study may be used as a guide for developing safety-training curricula in school foodservice programs, creating foodservice facility inspection reports, and developing policies and procedures for writing safety into job descriptions and standard operating procedures for school foodservice programs. Research revealed school foodservice administrators are aware of injury frequency, but frequently not actual cost of injuries. If the actual cost of injuries charges to the foodservice department, foodservice administrators may become more cognizant of the need for injury prevention programs. If school foodservice directors were required to pay from department budgets the actual cost of workers’ compensation insurance or claims, the financial impact would cause notice and may result in a reassessment of safety priorities (Elsberry, 2006). Another finding indicated most school districts have policies for drugs and alcohol, yet drug testing is not frequently required prior to employment. Physical exams prior to employment might be a consideration to eliminate potentially physically compromised employees.

School boards might be educated as to the cost benefit of renovating existing school foodservice facilities with safety in mind. Considerations might include better traffic flow of food from receiving to storage to preparation and service, purchasing newer foodservice production equipment that has safety and automated features (Meyers, et al, 1998), and purchasing material handling equipment to reduce need for heavy lifting.

Results from this study indicate the impact of perception of safety climate and perceived challenges to implementing an effective worker safety system on safety practices.
Using models from NIOSH (2004b), the Ohio BWC (2005), the U.S. Department of Labor, OSHA (2001), and commercial foodservice companies, school foodservice worker safety systems could evolve.

Individual components of a worker safety system should be developed in school district foodservice programs, and integrated into a comprehensive worker safety system that benefit school foodservice workers. This study might provide opportunity for development of a new school foodservice safety system. The researcher offers a school district safety checklist based upon concepts in the Ohio Bureau of Workers’ Compensation model (Appendix G). Components of the safety system would work well in a school district foodservice setting; however, additional components of safety have been added to the checklist.

The safety system includes formal documentation of policies and procedures that address foodservice worker safety, safety awards and incentives, and safety suggestion and hazard reporting initiatives. The safety inspections and audits component were a combined component in the Ohio BWC model; however, the safety inspection process and safety audit processes seemingly are very different and therefore become two separate components in the new checklist. Safety inspections include facility inspections, hazard inspections, equipment inspections, and accident and incident investigation reporting. The safety audit component includes investigation of accidents and incidents, review of accident and incident frequency and cost, comparison of safety data from a historical perspective, audit of safety and incident occurrences by school building and by type of incident. The audit process requires evaluation with school district third party insurance administrators. Safety systems include pre-employment medical and drug testing, implementation of ergonomics, development of
emergency response plans, and development and implementation of employee assistance programs. Functional capabilities testing monitor physical abilities of foodservice workers to ensure they are capable of performing the jobs to which they have been assigned. Safety systems also include providing personal protective equipment and ensuring compliance with use of equipment. An additional component of the new safety checklist includes foodservice worker retraining and continuous, ongoing training. While safety training is frequently included in new employee orientation and at an annual meeting, ongoing training throughout the school year was identified as not occurring frequently in the research study.

School foodservice directors who are proactive rather than reactive with safety, and actively involved with safety training and educating their workers, performing facility inspections, and involving workers in maintaining a safe work environment might promote stronger perceptions of safety climate (Roughton & Mercurio, 2002). One outcome of safety training revealed in the literature is education in other areas (Pollitt, 2006). A focus on worker personal safety might promote interest in worker personal health and wellness, perhaps a motivating factor in promoting positive perceptions of safety climate. The new school district safety checklist provides a framework for a school district foodservice safety system using an integrated and comprehensive approach in an attempt to reduce accidents and incidents in school district foodservice programs.
REFERENCES


APPENDIX A. ISU COMMITTEE ON THE USE OF HUMAN SUBJECTS APPROVAL

The Institutional Review Board (IRB) Chair has reviewed the project, "Worker Safety Systems: Practices, Attitudes, and Challenges in Public School District Foodservice Programs." (IRB ID 07-263) and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b), Exempt Category (2). A description of this exemption category can be found in the list on the next page. Please note that you must submit all research involving human participants for review by the IRB. Only the IRB may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

The IRB determination of exemption means that this project does not need to meet the requirements from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects, unless required by the IRB. We do, however, urge you to protect the rights of your participants in the same ways that you would if the project was required to follow the regulations. This includes providing relevant information about the research to the participants.

Because your project is exempt, you do not need to submit an application for continuing review. However, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent if you have stated in your application that you will do so or if required by the IRB.

Any modification of this research should be submitted to the IRB on a Continuation and/or Modification form, prior to making any changes, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.
APPENDIX B. SURVEY INSTRUMENT

Thank you for agreeing to participate in this survey of foodservice safety practices, perception of safety climate, and perceived challenges to implementing a worker safety system in school foodservice programs.

The person most responsible for foodservice operation (foodservice director) is asked to respond to the questions in this survey. If the person who received this questionnaire is not the foodservice director, may I please ask that you forward this questionnaire to the foodservice director?


Ensuring worker safety is an important part of foodservice management. Please help us understand safety practices you have in place in your school district foodservice program. Please respond to the following statements regarding safety practices in your school kitchens by checking the appropriate response.

1. There is a school nurse onsite.
   No
   Yes

2. There is school nurse onsite full time.
   No
   Yes

3. Accident reports are analyzed for future incident prevention.
   No
   Yes

4. The foodservice director performs an annual review of department injury FREQUENCY RATES.
   No
   Yes

5. The foodservice director performs an annual review of department INJURY COSTS.
   No
   Yes
6. The insurance company representative acts as a safety consultant to assist the foodservice director in setting safety goals.

   No
   Yes

7. Foodservice director participates on a school district safety committee.

   No
   Yes

8. Safety initiatives are communicated to workers with signs, newsletters, or posters.

   No
   Yes

9. Safety signs, newsletters, and/or posters are written in at least two languages.

   No
   Yes
   Not applicable

10. Appropriate corrective action is taken when an injury occurs.

    No
    Yes

11. Appropriate corrective action is taken when a safety incident occurs without serious injury, insurance claim, or insurance payment.

    No
    Yes

12. Safety is written into foodservice worker job descriptions.

    No
    Yes
13. A pre-employment physical exam is required before employment in foodservice.
   No
   Yes

14. Drug testing (screening) is required before potential foodservice workers are hired.
   No
   Yes

15. The foodservice department provides written safety policies to workers.
   No
   Yes

16. There is a written policy for an alcohol and drug free workplace.
   No
   Yes

17. Safety policies are enforced.
   No
   Yes

18. New employees are provided an orientation program that includes safety before they are allowed to work in a kitchen.
   No
   Yes

19. Employees may return to work with a physician order for limited duty following an on-the-job injury.
   No
   Yes

20. Foodservice workers are required to wear protective, heavy-duty footwear.
   No
   Yes
21. Foodservice workers are required to wear goggles and neoprene gloves when cleaning ovens.
   No
   Yes

22. Foodservice workers perform warm-up exercises before performing work duties.
   No
   Yes

23. Material safety data sheets are located with or near chemical storage.
   No
   Yes

24. Employees are familiar with material safety data sheets and know how to use them in case of emergency.
   No
   Yes

25. There is a maintenance work order system for requesting equipment repairs.
   No
   Yes

26. Foodservice equipment is evaluated for preventive maintenance or replacement at least once each year.
   No
   Yes

27. There is a line item in the school foodservice budget for safety.
   No
   Yes

28. Safety meetings with foodservice workers are held at least quarterly.
   No
   Yes
29. Safety training has been presented to employees in the past year.
   No
   Yes

30. Workers are held accountable for their actions related to safety.
   No
   Yes

31. Workers are closely matched to the job in terms of physical strength for pushing, pulling, and lifting duties.
   No
   Yes

32. Workers are closely matched to the job in terms of height (employee not too short or too tall for assigned job).
   No
   Yes

33. Workers are closely matched to the job for reaching or stretching.
   No
   Yes

34. Managers are held accountable for the safety of their workers.
   No
   Yes

35. Managers' personnel evaluations (reviews) take into account safety in their respective kitchens.
   No
   Yes

36. Safety inspections are performed in the foodservice department at least quarterly.
   No
   Yes
37. There are safety-trained personnel in the school district to assist with foodservice worker safety.
   No
   Yes

38. Funds are in the budget for safety training.
   No
   Yes

39. Funds are in the budget to upgrade facilities for safety.
   No
   Yes

Part 2. Perceptions of safety climate in School District Foodservice Programs

We would like to determine to what extent you agree or disagree with the following statements regarding your perception of safety climate in your school district foodservice program. Please check the response that most closely expresses your impression with the following statements.

40. Worker safety is important.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

41. The superintendent and school administrators place a high priority on worker safety.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

42. School administrators support a culture of safety awareness and practices.
   Strongly Disagree
43. School administrators would support initiatives and efforts to reduce foodservice worker injury.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

44. The school board has an adequately written safety policy that includes all school district employees.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

45. Safety is a high priority for completing repair requests and maintenance work orders.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

46. The facilities management department (maintenance and/or custodial) is a foodservice partner

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
47. I believe improving safety could improve foodservice worker morale.
   
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

48. There are safety-trained personnel in the school district to assist with foodservice worker safety.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

49. Foodservice director provides adequate safety training to workers.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

50. Teaching worker safety for injury prevention is important.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

51. Workers are adequately trained on how to use new equipment safely.

   Strongly Disagree
   Disagree
   Neutral
52. Workers are adequately trained when moved to a different foodservice job.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

53. An important goal of the foodservice program is to reduce or eliminate worker injuries.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

54. Adequate personal protective equipment that includes masks, goggles, freezer mitts, and stainless steel knit gloves is provided to workers.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

55. Workers are adequately trained on how and when to use personal protective equipment.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree
56. It is important to evaluate equipment for preventive maintenance or replacement at least once each year.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

57. Foodservice kitchen(s) have adequate layout to reduce chances for injury.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

58. Noise level of kitchen is appropriate- not too loud.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

59. When safety concerns are brought to the attention of management, corrective action is taken.

   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

60. Funds are in the budget for safety training.

   Strongly Disagree
   Disagree
   Neutral
   Agree
Strongly Agree

61. Funds are in the budget to upgrade facilities for safety.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

62. Funding requests to purchase safe or safer foodservice equipment are often approved.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

63. Funding for foodservice worker safety is adequate.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

64. There is adequate time to teach workers about safety in the kitchen.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree

65. The foodservice director has adequate knowledge regarding prevention of worker injuries.
   Strongly Disagree
   Disagree
   Neutral
Neutral
Agree
Strongly Agree

**Part 3. Safety System Information**

Please select the one response that most closely answers the following statements regarding safety in your school district foodservice program.

66. Who pays the cost of workers' compensation injuries for foodservice workers?
   a. The foodservice department
   b. The school district general fund

67. Who fills out the "First Report of Injury" accident form when a foodservice worker becomes injured?
   a. Foodservice manager
   b. Foodservice director
   c. School principal
   d. School nurse
   e. Someone other than those mentioned above

68. Who (primarily) maintains injury records for foodservice workers?
   a. School nurse
   b. School district insurance clerk
   c. School district benefits coordinator
   d. Human resources/personnel department
   e. Foodservice director
   f. School principal
   g. School district insurance company
   h. Someone other than those listed above

69. What percentage of your time do you estimate you spend with safety including training?
   a. 0% or less
   b. 60% or more
   c. 11% to 20%
   d. 11% to 20%
   e. 21% or more
Part 4. Perceived Challenges to Implementing a Safety System in Foodservice

There may be reasons why safety practices are not implemented in school foodservice programs. Please indicate to what degree each of the following statements present a problem in implementing safety practices in your school district foodservice program.

70. Safety in my school district foodservice program would be better if:
Administration was committed to safety in the foodservice department.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with administration commitment

71. Safety in my school district foodservice program would be better if:
There was a formal worker safety system in place.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with worker safety system

72. Safety in my school district foodservice program would be better if:
Resources were committed to worker safety e.g. trainers and safety training seminars.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with human resources for worker safety
73. Safety in my school district foodservice program would be better if:
Training foodservice workers in safety practices and injury prevention were a continuous, ongoing process.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with foodservice worker training

74. Safety would be better in my school district foodservice program if:
Training and training materials were translated in two languages.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with language

75. Safety in my school district foodservice program would be better if:
Facilities were better designed to promote safe work activities.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with safety design of foodservice facilities

76. Safety in my school district foodservice program would be better if:
Safe or safer foodservice equipment were available to workers.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with unsafe equipment

77. Safety in my school district foodservice program would be better if:  
The work environment was maintained as comfortable as can be with temperature and humidity.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree
   No issues with work environment

78. Safety in my school district foodservice program would be better if:  
Foodservice engineering (maintenance) needs were addressed quickly.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree
   No issues with maintenance

79. Safety in my school district foodservice program would be better if:  
Funding was available for safety initiatives and efforts.
   Strongly Disagree
   Disagree
   Neutral
   Agree
   Strongly Agree
   No issues with funding for safety

80. Safety in my school district foodservice program would be better if:
   Strongly Disagree
   Disagree
   Neutral
   Agree
Agree  
Strongly Agree  
No issues with foodservice director injury prevention knowledge

81. Safety in my school district foodservice program would be better if: 
Foodservice director had more time to train foodservice workers.

Strongly Disagree  
Disagree  
Neutral  
Agree  
Strongly Agree  
No issues with time for training

82. Safety in my school district foodservice program would be better if: 
Foodservice department had more funding to support safety.

Strongly Disagree  
Disagree  
Neutral  
Agree  
Strongly Agree  
No issues with funding for safety support

83. Safety in my school district foodservice department would be better if: 
Safety consultants or insurance representatives assisted with foodservice safety efforts.

Strongly Disagree  
Disagree  
Neutral  
Agree  
Strongly Agree  
No issues with consultants or insurance administrators assisting with safety efforts

84. Safety in my school district foodservice program would be better if: 

Strongly Disagree  
Disagree  
Neutral  
Agree
Agree
Strongly Agree
No issues with written safety policies

85. Safety in my school district foodservice program would be better if:
Safety policies were enforced.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree
No issues with enforcement of safety policies

**Part 5. Demographic Information**

About the respondent:

a. I am responsible for one school cafeteria

b. I am responsible for more than one cafeteria

c. I am certified by the School Nutrition Association

d. I am credentialed by the School Nutrition Association

e. Foodservice director is a Registered Dietitian

What is the highest level of education of the foodservice director?

a. High school graduate

b. Some college

c. 2-year Associate degree

d. 4-year bachelor degree

e. Master’s degree

f. Doctorate

How many students are enrolled in your school district?

a. 4,999 students or less
b. 5,000 to 9,999 students
c. 10,000 to 14,999 students
d. 15,000 to 24,999 students
e. 25,000 to 49,999 students
f. 50,000 or more students

Which of the following describes your school district?
   a. Public school or public school district
   b. Private school or private school district

Which of the following describes the management of your school foodservice program?
   a. Foodservice program is self-operated by school district
   b. A foodservice management company operates foodservice program
Dear Foodservice Director,

Safety in schools is very important. Although many school districts focus on safety and security for students, few studies address the issue of school foodservice worker safety.

As part of my doctoral studies at Iowa State University, the subject of my research is to identify practices, perception of safety climate, and challenges in public school district foodservice programs. Iowa State University Institutional Review Board has approved my research.

Your school district was randomly selected for participation in this very important research study that will take approximately 10 minutes to complete. Your assistance is very important to this research project. Your participation in this research study is voluntary with responses held in strictest confidence.

If you do not wish to participate, please respond to this e-mail by simply saying, “I cannot participate.”

The first 100 respondents’ names will be entered into a drawing for two $50.00 awards.

Results of the survey and/or a copy of my dissertation will be sent if you provide your e-mail address.

Diane Schweitzer, PhD Candidate
Iowa State University
C/o School City of Hammond
41 Williams Street
Hammond, IN 46320
219-933-2400 x 3056 Office
219-933-2495 Fax
Diane1224@Comcast.net
APPENDIX D. COVER LETTER

Dear Foodservice Director,

Safety in schools is very important to many. Although many school districts focus on safety and security for students, few studies address the issue of school foodservice worker safety. As part of my doctoral studies at Iowa State University, the subject of my research is to identify best practice safety systems and to explore challenges for implementing a best practice safety system in a district school foodservice program. Iowa State University Institutional Review Board, 1138 Pearson Hall, Ames, Iowa 50011-1120 (515-294-4566) has approved my research.

Your school district was randomly selected, and you are asked to participate in a very important research study that will take approximately 10 minutes. Your assistance is very important to the success of this research project. Your participation is voluntary and you may skip any questions you do not wish to answer. Answers are held in strictest confidence and confidentiality of information will be maintained. Questionnaires will remain in a locked cabinet with no access other than me and no names associated with this research will be revealed.

Questionnaires are coded for follow-up purposes. The first 100 respondents’ names will be entered into a drawing for two $50.00 gift cards.

Double click on the URL or you may copy and paste the URL into your web browser for a questionnaire.
http://www.surveymonkey.com/s.aspx?sm=nI5y0Ez7cDmlvnN7qg%2b%2bBg%3d%3d

If you have any questions about this study or have any concerns about participating, please contact my major professor, Dr. Shirley Gilmore, or me. Our contact information is below. Thank you for your participation. Results of the survey and/or a copy of my dissertation will be sent if you provide your e-mail address.

Diane Schweitzer, PhD Candidate
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Dr. Shirley Gilmore
Professor
Iowa State University
31 MacKay Hall
Ames, IA 50011-1120
(515) 294-9740 Office
(515) 294-6364 Fax
sgilmore@iastate.edu
APPENDIX E. FOLLOW-UP LETTER

Dear School Foodservice Director,

Several weeks ago, you were asked to participate in a voluntary study about workplace safety for school foodservice workers. If you have completed the survey, we thank you very much. Your input is extremely important in this study for determining challenges to implementing a safety system.

If you have not completed the survey, we ask you to do so now. The electronic survey is easy to complete and only takes about 10 minutes. I would be happy to provide a copy of the results of the study upon request.

To access the questionnaire, double click on the URL address or cut and paste the address into your web browser.
http://www.surveymonkey.com/s.aspx?sm=nI5y0Ez7cDmlvN7qg%2b%2bBg%3d%3d

Your responses remain confidential. If you have any questions about the study, you may contact me my major professor, Dr. Shirley Gilmore. You may also contact the Iowa State University of Research Assurances, 1138 Pearson Hall, Ames, Iowa. 50011-1120 (515-294-4466).

Thank you again for your valuable input into this study.

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Dr. Shirley Gilmore
Professor
Iowa State University
31 MacKay Hall
Ames, IA 50011-1120
(515) 294-9740 Office
(515) 294-6364 Fax
sgilmore@iastate.edu
Dear School Foodservice Director,

There still is time! Several weeks ago, you were asked to participate in a voluntary study about workplace safety for school foodservice workers. If you have completed the survey, we thank you very much. Your input is extremely important in this study for determining challenges to implementing a safety system.

If you have not taken a few minutes to complete the survey, I ask you to do so. The electronic survey regarding a safety system for school foodservice employees is very easy to complete and I will provide a copy of the results of the study upon request.

To access the questionnaire, simply double click on the URL address or cut and paste the address into your web browser.

http://www.surveymonkey.com/s.aspx?sm=nI5y0Ez7cDmlvN7qg%2b%2bBg%3d%3d

Your responses remain confidential. If you have any questions about the study, you may contact me, or my major professor, Dr. Shirley Gilmore. You may also contact the Iowa State University Office of Research Assurances, 1138 Pearson Hall, Ames, Iowa. 50011-1120 (515-294-4566).

Thank you again for your valuable input into this important study.

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APPENDIX G. SCHOOL FOODSERVICE CHECKLIST OF SAFETY PRACTICES

This checklist may be used monthly or as often as the foodservice administrator deems appropriate. Comments may be made on this form to indicate each item has been completed, not completed, in progress, or planned for implementation at a future date.

<table>
<thead>
<tr>
<th>I. Administration Support</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop a district-wide school board safety policy that affirms management commitment to safety that includes all school district employees</td>
<td></td>
</tr>
<tr>
<td>Provide funding toward safety efforts:</td>
<td></td>
</tr>
<tr>
<td>- Modifications in facilities</td>
<td></td>
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<tr>
<td>- Equipment repair or replacement</td>
<td></td>
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<tr>
<td>- Personal protective equipment</td>
<td></td>
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<tr>
<td>- Safety consultants</td>
<td></td>
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<tr>
<td>- Onsite safety personnel (nurses)</td>
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<tr>
<td>- Time for training</td>
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<tr>
<td>- Time for facility inspections</td>
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<tr>
<td>Support a proactive rather than reactive safety culture</td>
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<tr>
<td>Support efforts toward safety accountability, responsibility, and authority within each school and within each department</td>
<td></td>
</tr>
<tr>
<td>Include safety measurements in manager performance reviews:</td>
<td></td>
</tr>
<tr>
<td>- Reaching established safety goals and expectations (safety inspection audits, safety meetings, training efforts, review of incident reports, incident investigation reports, solicitation of safety suggestions from workers, reduction in injuries, efforts to expedite efficient claims-management, reduce worker’s compensation costs, and cooperation in returning employees to work as quickly as possible)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Safety Plan</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include physical requirements of the job in job description</td>
<td></td>
</tr>
<tr>
<td>Include safety in Policy &amp; Procedure manual</td>
<td></td>
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<tr>
<td>Include personal responsibility for safety in personnel evaluation for employee</td>
<td></td>
</tr>
<tr>
<td>Include responsibility for safety of employees and responsibility for safety in school foodservice department in manager personnel evaluation</td>
<td></td>
</tr>
<tr>
<td>Address foodservice worker safety concerns in a comprehensive approach</td>
<td></td>
</tr>
</tbody>
</table>
Address safety issues by the quickest method and at the lowest level possible

Initiate safety suggestion program:
- Provide feedback to worker(s) who made suggestion
- Provide updated status report on safety suggestions or recommendations

Initiate awards/incentive plans for hazard reporting

Provide reward system to foodservice workers for hazard reporting

III. Safety Team/Employee Involvement

Develop a cooperative safety team that includes the foodservice director, school district risk manager, safety officer, insurance and/or benefits coordinator, superintendent, business manager, facilities manager, insurance company representative, occupational medicine physician, school nurse, foodservice employees, custodians

Conduct regular safety meetings that includes foodservice workers

Work cooperatively with maintenance and custodial departments

Conduct safety inspections with foodservice workers as members of the team

Require timely completion of safety action items

Write work orders for repair of faulty equipment
Remove unsafe equipment from service

Monitor safety issues; hold workers accountable for safe work performance

Implement worker safety suggestion plan

Implement reward system for hazard reporting system

Enforce safety policies

Develop personnel reviews that include efforts toward safety improvements (training, inspections, safety communications, involvement on safety committee)

Match workers to the job- Lifting, reaching, bending, stooping, pushing, pulling
## IV. Communication

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicate school board safety policy statement to all workers in writing</td>
<td></td>
</tr>
<tr>
<td>Communicate safety responsibilities, performance measures, and personal accountability to all workers</td>
<td></td>
</tr>
<tr>
<td>Communicate safety expectations in department policy and procedure manual</td>
<td></td>
</tr>
<tr>
<td>Distribute policy &amp; procedure manual with safety expectations to all workers (require worker to sign for receipt of manual)</td>
<td></td>
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<tr>
<td>Publish and distribute safety newsletters</td>
<td></td>
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<tr>
<td>Conduct monthly or quarterly worker safety forums with the safety committee</td>
<td></td>
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<tr>
<td>Survey workers for safety perception of the foodservice workplace</td>
<td></td>
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<tr>
<td>Place safe operation warning tags on foodservice equipment</td>
<td></td>
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<tr>
<td>Write all safety communication in worker-appropriate second language</td>
<td></td>
</tr>
<tr>
<td>Place safety posters, signs on bulletin boards, and on walls of kitchen and serving areas</td>
<td></td>
</tr>
<tr>
<td>Post safety meeting minutes on worker bulletin board in foodservice area</td>
<td></td>
</tr>
</tbody>
</table>

## V. Education and Training

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide safety training during new employee orientation process</td>
<td></td>
</tr>
<tr>
<td>Conduct employee in-service safety training- Video, Webcast, formal or informal training session</td>
<td></td>
</tr>
<tr>
<td>Provide training opportunities to workers in cooperation with local education associations, third party administrators (TPAs), other sources such as Red Cross, fire department, and physical therapists</td>
<td></td>
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<tr>
<td>Provide job-specific training to all foodservice workers</td>
<td></td>
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<tr>
<td>Provide training on new equipment when assigned to new job</td>
<td></td>
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<tr>
<td>Model safe workplace practices</td>
<td></td>
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<tr>
<td>Provide positive safety coaching to workers</td>
<td></td>
</tr>
<tr>
<td>Provide ergonomics training- Lifting, pushing, pulling, reaching, stooping, bending</td>
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</tr>
<tr>
<td>Provide safety-training opportunities to foodservice director and managers with train the trainer program</td>
<td></td>
</tr>
</tbody>
</table>

### VI. Injury Reporting and Treatment

- Establish network of preferred medical providers
- Meet with medical care providers to discuss injury treatment protocol and how to communicate worker medical progress to employer
- Invite medical care providers to tour foodservice facilities; Familiarize healthcare providers with foodservice operations
- Develop written job descriptions that include physical requirements of each job
- Provide job descriptions to medical provider to assist with return-to-work orders
- Provide onsite first aid or emergency medical care by school nurse
- Complete First Report of Injury form by school nurse
- Take corrective action immediately when an incident occurs

### VII. Return-to-Work (Transitional Work) Programs

- Negotiate labor contracts that allow foodservice director to assign worker to any job that meets medical restrictions
- Communicate job requirements to occupational health physician to encourage return to work with medical restrictions (light duty)
- Return employee to work as quickly as possible to retain full pay and benefits
- Provide work that meets medical job restriction even if job is outside the department
- Contact injured worker to express care and concern for well-being during convalescence and to check on medical progress toward return to work date
- Prepare list of light duty jobs for human resources & occupational medicine physician
- Communicate with occupational physician for return to work
VIII. Safety Inspections

- Inspect facilities monthly (heat, humidity, indoor air quality, noise, housekeeping);
- Include workers, custodians, and maintenance workers on inspection team;
- Perform semi-annual equipment inspection;
- Develop incident investigation report form;
- Perform annual fire protection inspections (fire extinguishers, fire blankets, heat sensors, sprinkler system);
- Remove non-working equipment from service;
- Perform routine, emergency, and preventive equipment maintenance work orders expeditiously;
- Form incident/injury review team to review incident reports;
- Perform incident investigation report after injury and “near-miss” incident occurs.

IX. Safety Audits

- Review each incident and accident as it occurs;
- Review injury cost and frequency reports;
- Compare data with baseline data by school and department, job description;
- Review cost of injury treatment;
- Create historical baseline data;
- Review workers’ compensation insurance premium cost;
- Compare insurance costs to annual incident reports (incident claims history);
- Review direct and indirect cost of incidents;
- Meet with third party administrator (TPA) to review workers’ compensation frequency claims;
- Review incident reports for timely and accurate injury or near miss details, identify incident cause, specify corrective action (assigned and completed), coordinate communication between incident analysis process and worker compensation process.

X. Safety Systems

- Comply with worker safety mandates (local, state, federal)
<table>
<thead>
<tr>
<th>Initiative</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Initiate worker health, safety, and wellness programs (weight loss</td>
<td>program, medical screening, and physical fitness programs); provide baseline medical data</td>
</tr>
<tr>
<td></td>
<td>to worker, monitor annually</td>
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<tr>
<td>Initiate employee assistance programs (smoking cessation, stress</td>
<td>management)</td>
</tr>
<tr>
<td>Develop emergency response plans for fire, flood, bomb, and gas leaks</td>
<td></td>
</tr>
<tr>
<td>Initiate safe housekeeping procedures to clean floors,</td>
<td>cleanup spills, use wet floor signs as needed</td>
</tr>
<tr>
<td>Initiate ergonomics program with safe foodservice equipment, mobile</td>
<td>equipment, carts, equipment on wheels, material handling equipment,</td>
</tr>
<tr>
<td></td>
<td>gas equipment with quick-disconnect gas lines</td>
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<tr>
<td>Require pre-employment drug screening and medical testing</td>
<td></td>
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<tr>
<td>Require Functional Capabilities test if in doubt about worker capability to</td>
<td>perform job</td>
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<tr>
<td>Provide personal protective equipment that includes heavy-duty, slip</td>
<td>resistant shoes, oven mitts, neoprene gloves, goggles, and steel knit slicing gloves</td>
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<tr>
<td>Develop pre-work physical exercise program to warm up muscles</td>
<td></td>
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<tr>
<td>Set safety expectations with reasonable, non-competing production</td>
<td>expectations</td>
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<tr>
<td>Create a line item in foodservice budget for safety initiatives</td>
<td></td>
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<tr>
<td>Seek administrator approval to charge safety initiative costs to school</td>
<td>district general fund rather than foodservice fund</td>
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<td></td>
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<tr>
<td>Allocate workers’ compensation premium cost to each school foodservice</td>
<td>account</td>
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<tr>
<td>Store chemicals safely with MSD sheets in separate location away from</td>
<td>food; train how to use chemicals safely</td>
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<tr>
<td>Initiate reward incentives program for hazard reporting</td>
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<tr>
<td>Write grant applications for safety initiative opportunities</td>
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<tr>
<td>XI. Worker Retraining</td>
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<tr>
<td>Retrain workers based upon findings in safety inspections or safety audits</td>
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<tr>
<td>Conduct retraining safety program continuously and on an ongoing basis</td>
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<tr>
<td>Deliver training that is easily understood by workers</td>
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</tbody>
</table>