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Understanding Playground Behaviors And Injury Potential To Elementary Children

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UNDERSTANDING PLAYGROUND BEHAVIORS AND INJURY POTENTIAL TO
ELEMENTARY CHILDREN

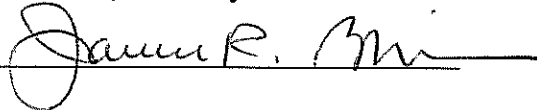
By

Ronald G Dotson

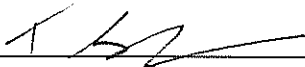
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UNDERSTANDING PLAYGROUND BEHAVIORS AND INJURY POTENTIAL TO
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DEDICATION

To Victoria and Alexis
as example to the importance of education, commitment to
higher cause, and faith in God.

To Lora
for faith and belief in my ability to provide and lead in
times of celebration and hardship.

To My Inspirational Educators
for the education, motivation, patience, and mentoring
along the years of development.

ACKNOWLEDGEMENTS

Above all, is my humble thanks to God for my ability and opportunity to contribute to my fellow educators and their school safety efforts.

My wife Lora, daughters Victoria and Alexis, Steven Trimble and Candace Trimble served as constant reminders of commitment to finish.

My fellow faculty and staff members at Eastern Kentucky University in the Occupational Safety and Health Program, mentored, motivated, and supported me in the process. Specifically, I extend my gratitude to: Dr. Michael Land for helping conduct this study; Dr. Thomas Schneid; Dr. Michael Schumann, Dr. Larry Collins, Beth McCoy, Christy Templeton, Kim Chitwood, and Stella Chenault for her constant kindness and friendship which kept me sane.

The faculty that taught and guided me through the coursework and dissertation process truly impacted me as a person and as an educator. I can only offer a level of dedication in my field as reimbursement for their talents and skills. My gratitude goes to: Dr. Roger Cleveland, for teaching me that education is equality; Dr. Robert Biggin, for his school leadership contribution; Dr. Jessica Hearn, for her brilliance in teaching leadership; Dr. Teresa Wallace, for her humble wisdom and partnership in school safety; Dr. James Bliss, for his brilliant experience and interest that played such a crucial role in the methodology of this study; Dr. Tara Shepperson, for her time and effort in leading the pilot project, her skills as a qualitative researcher, and her tremendous writing talents that influenced me; and Dr. Charles Hausman, for his brilliant guidance through the dissertation process, and lifelong lessons on leadership, teaching pedagogy, and research.

Abstract

UNDERSTANDING PLAYGROUND BEHAVIORS AND INJURY POTENTIAL TO ELEMENTARY CHILDREN

Injuries on school playgrounds have increased in recent times despite widespread adoption of playground equipment standards published by the Consumer Product Safety Commission. The cost of increased insurance premiums and a moral obligation to protect children on a playground while at recess increase liability exposures for a school district. This study explored the behaviors exhibited by elementary school children and playground monitors and the subsequent occurrence of increased or decreased risk potential. The project utilized analytic induction and unobtrusive observations to observe critical incidents that occurred during recess. The behaviors of the children and the monitors were targeted to produce procedures for monitoring playground safety. The study concluded that a four prong playground safety initiative be implemented for proper management of playground behaviors. The recommended behavior based approach consists of pre-usage inspections for general maintenance and hazards, playground monitor training for hazard recognition, playground behavior evaluations, and assignment of monitor duties to include one “play leader.”

Keywords: school playgrounds, playground equipment standards, playground behaviors, analytic induction, unobtrusive observations, recess, behavior based, hazard recognition, playground behavior evaluations, play leader.

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CHAPTER 1

INTRODUCTION

On August 19th, 2010, 9 year old Alyssa Alvarez made national news. It was not the news story that any parent or educator wanted to hear. Alyssa died on her school playground in Oklahoma. It reminded educators and safety professionals that playtime and playgrounds could not be overlooked for safety management practices. While playing at recess at Wyandotte Elementary School in Ottawa County Oklahoma, Alyssa fell off of a see-saw type piece of playground equipment called an X-wave. An X-wave is a multiple person seesaw that can seat up to 20 school aged children. When she went to stand up the see-saw struck her on the head causing severe head trauma. She was transported to a Miami Oklahoma hospital in cardiac arrest and pronounced dead. The autopsy confirmed the death as being caused by severe concussion (Stogsdill, 2011).

Every educator and parent places the utmost of importance on the protection of children while at school. The duty to protect the welfare of the student is not in question. The moral sense of motivation for safety is well established in education. The moral duty as an educator to protect a child is evident in the legal principle of “in loco parentis” or in place of the parent. This long established common law includes situations where student privacy is placed aside in order to maintain discipline and student safety, such as in the Doe v. Renfrow (1981) case where a warrantless search of all students with K-9 officers was upheld due to “in loco parentis”. The principle reflects the moral duty to protect the child as a parent would. Courts then examine or use this principle to establish ruling on “negligent” supervision or activity of individual educational employees and districts

themselves. In the New York case *Merson v. Syosset Central School District*, the court ruled that failing to train or educate a child on the use of playground equipment violated that duty (2001). Playground safety is an increasing area of concern for keeping students safe and efficient management of school resources.

Background

Each year approximately 200,000 children are treated in emergency rooms for injuries that occur on playgrounds (US CPSC, 2010). The majority of these occur while at school (Safe Kids Worldwide, 2011). Playgrounds are the area in schools that statistically are the scene of most student injuries (Frost, 1992). The threat of lawsuit and other liability expenses associated with student injury place financial pressures on school administrators to keep their playgrounds safe. School districts often react in drastic fashion to severe playground injuries and enact policies such as removing swing sets or spending large amounts of money on new equipment (Chambers, 2010). These knee jerk reactions may not make the playground safer (Heseltine, 1986). The policies also may harm the cognitive development of the student impacting adult safety behaviors in the future (Tierney, 2011).

The equipment itself may not be the immediate cause of such incidents. Root cause analysis may reveal that it is unsafe acts of the children or monitors and the oversight of management practice that align to allow the incidents to occur. Removal of equipment that allows children to explore risk, when the equipment meets applicable standards, reduces the educational experience of recess.

Playgrounds might be one of the most overlooked venues for injury and death. Many people think of playground areas as venues of happiness and adventure. Tragedies

do occur on playgrounds, and statistics on playground injuries show an increasing trend. Deaths have been studied and made available for ten year periods from Safe Kids Worldwide. Safe Kids Worldwide is an organization that promotes the safety of all children in many venues such as on playgrounds and in schools. They reported 147 deaths on playgrounds in the US from 1990 until 2000. Seventy percent of these occurred on playgrounds at home. This leaves approximately 43 deaths occurring on public playgrounds such as daycares, city parks, and schools. Every year approximately 200,000 children under the age of 14 are injured on playgrounds. Approximately 45% of these children experience severe injuries such as concussions, broken bones, internal injury, and even amputation. One alarming fact is that playground injuries to children 5 and under have more than doubled since 1980, and the leading age group in terms of number of injuries is children between the ages of 5 and 9 (Safe Kids Worldwide, 2007). Many schools today have pre-school programs with children that fall within this age group.

Countermeasures center on equipment and layout. The major concentration of the American Society for Testing Materials' standards originate from engineering control and practices for countermeasures such as mulch below swings to a depth that matches the maximum fall height. Fifteen states have passed laws requiring school and daycare playgrounds to meet ASTM standards. Safe Kids Worldwide further reports that a study of North Carolina daycares in 2007 revealed a 22% percent reduction in playground injuries 3 years after the upgrading to ASTM requirements (Safe Kids Worldwide, 2007). Upgrading equipment and maintaining impact absorbing grounds, which are large parts of the standards, can be expensive, and if a 22% reduction is all that has been

accomplished, the answer may be hiding in changing child behavior and implementing education and training efforts to the children and those performing monitoring duties.

Root Cause Analysis has been used in the management of workplace safety since Frank Bird Junior suggested that management systems can contribute to incident causation in the 1950's. The most direct causes to an incident termed immediate causes, can be divided into unsafe acts and unsafe conditions. Conditions relate to equipment that does not meet standard (Bird, Jr., Germain, & Clark, 2003). Unsafe acts relate to the human behaviors and their interaction. Application of the root cause analysis concept simply stated is that improper use of standard compliant equipment can still create unnecessary potential for an unintended event. Training and the establishment of basic rules are practiced today to some degree as an attempt to curb the unsafe acts that a child might commit. Typically, rules are taught to children and monitors observe for compliance to the rules. This study produced training guidelines for playground monitors on ending recess without increasing the risk potential to children.

Modern play theory suggests that children must be allowed to explore risks on playgrounds in order to avert adult phobias (Sandseter & Kinear, 2011). Despite playground equipment standards, injury statistics suggest that playground related injuries at school continue to be a management issue. Modern practices in workplace safety management require observation of human behavior. Behavior observations allow safety managers to identify effective upstream controls, predict incident frequency, target training, and concentrate on correcting undesired behaviors (Bird, Jr. et al., 2003).

The identification of potentially injurious behaviors exhibited by children on outdoor elementary school playgrounds is foundational to playground safety. Training

and educational efforts should focus on managing undesired behaviors and rewarding desired behaviors. Playground monitors also enact behaviors that can influence potentially injurious situations. A pilot project in the fall of 2011 at Eastern Kentucky University found that the behaviors of adult monitors compound the potentially injurious behaviors of children (Dotson & Shepperson, 2011).

Incidents that produce injury usually have more than one level of cause (Bird, Jr. et al, 2003). Behaviors and conditions align to allow the critical event of the occurrence to happen. This foundational philosophy to accident causation was utilized in the same pilot project conducted through Eastern Kentucky University in the fall of 2011. The pilot project set out to identify the potentially injurious behaviors exhibited by children on an outdoor elementary playground. It confirmed four categories of risky play that Dr. Sandseter and Kinnear (2011) found in their study in Norway. These four categories were: experiencing speed, experiencing height, wondering alone, and rough and tumble play (Sandseter & Kinnear, 2011). The pilot project found that defiance of authority and close proximity were other risky behaviors that children exhibited on elementary playgrounds.

The pilot project produced some unexpected findings that point to the usefulness of safety management practices and behavioral observations. Primarily, monitor behaviors were pivotal in the occurrences of potentially injurious incidents. The blowing of a whistle to end recess produced a panic type effect that allowed for the children to forget their jackets and “hoodies” on the playground, thus resulting in a management issue with lost and found items. The panic effect also aligned with child behaviors to allow for incidents that produced injury or had potential for producing injury. The

children overwhelmingly forgot about what they were actually doing and with haste ran to line up. The end of recess had a much higher potential risk of injury. When compared to the beginning of recess, a time at which children are excited and run onto and toward the equipment or area of interest, the end still exhibited many more collisions, falls, and near misses. It seemed that the children's attention was on play to the point that the time period of recess and the anticipation of its ending were not high risk. On the contrary, the ending came as a surprise and startled children to immediately begin hurriedly running toward a line. The actions and behaviors of playground monitors impact this potential risk as well. An example is after blowing the whistle, a monitor can yell to hurry or wave their arms to encourage a fast ending (Dotson & Shepperson, 2011).

The panic effect observed at the end of recess was the central theme behind a lawsuit with judgment against a school district in Arizona. The blowing of a whistle to end recess was argued as the primary cause agent for a young girl jumping hastily from a 3 foot masonry wall on which she had been walking. The jump was so close to the wall due to her panic that she shattered her elbow. The case resulted in the insurance carrier paying out over \$87,000 dollars for the incident (Briseno, 2012).

Purpose of the Study

This study was a cross-sectional description of potentially injurious behaviors on playgrounds for students in kindergarten to 5th grade elementary schools. The project explored the interaction of playground monitor behaviors and the behaviors of children in grades kindergarten through five on an outdoor playground. Specific to observable acts on a playground, the study explored the two research questions:

1. What occurs in the lives of students and monitors during recess?

2. What safety practices can be developed from the observation of the events and conditions present during recess?

The purpose of the study was to identify potentially injurious behaviors and underlying conditions that can be targeted for comprehensive management of playground safety. Understanding child behaviors, playground monitor behaviors, and the underlying conditions that align are important pieces of proper safety management. Educators must first understand what behaviors exhibited by children are potentially injurious. Playground safety management has the potential to save school districts and school employees money from the liability exposure of injuries that occur on playgrounds. The management of workforce safety has been deemed to be cost effective since the Investigational Era between 1915 and 1930. Insurance premiums are a budgeting concern for school districts. The prevention of student injuries is a moral duty of school leadership. Playgrounds are involved in most student injuries of school aged children (Frost, 1992) and therefore must be a focus for safety management.

Overview of Study Methods

The study was accomplished by direct observation of playground monitor and child behaviors using a modified Flander's technique of observation. A team of two researchers observed monitor behaviors and child behaviors by watching each for a short period of time and noting the observed behaviors. When either an event that produced an increased risk of injury potential to a child or children or an event that decreased the injury potential to a child or the children occurred, researchers made notes of the sequence of events and behaviors. Each critical event was recorded in a conceptual map referred to as a Bowtie Model.

The researchers then utilized basic coding and en-vivo coding to analyze critical incidents for patterns. The study discovered how playground monitor and child behaviors aligned to produce potentially injurious incidents.

Qualitative observation was selected as the method for this project for several reasons. Several of these reasons emerged from findings from the pilot project. Reasons include:

1. Schools do not practice uniform recordkeeping procedures,
2. School personnel do not have a consistent definition of “injury” as it relates to documentation;
3. Training and education about recess monitoring are inconsistent;
4. School-age children may not be reliable to interview about incident causation;
5. School personnel do not have experience and education in accident causation;
6. Quantitative measures may not uncover necessary behavior changes; and
7. Quantitative measures may miss incidents that do not produce injury.

This study utilized the observation of children and playground monitors in a naturalistic setting and preserve laboratory conditions. It also allowed for the researcher to incorporate his experience with accident causation and investigation in a manner that was objective. These important aspects are fitting to qualitative designs according to Marshall and Rossman (2011) in their book “Designing Qualitative Research.”

Significance of the Study

The results of the study were used to design best management practices conducting playground monitoring. The goal of recess is to allow for physical and social development to include the exploration of risk and the overcoming of fear. Recess is an

important part of educational development. The procedures developed from the study will prevent unnecessary risk exposure and limit the liability and expenditure to schools by providing a thorough basis for the development of procedures for monitoring recess.

This study lays a foundation for future research. Once procedures are developed for monitoring recess, a comparison of modeled procedures can be made. The study produced a model for user friendly behavior based safety application for school personnel to utilize for managing playground safety. Future study of the effectiveness of such application is possible.

CHAPTER 2

LITERATURE REVIEW

Introduction

On August 19th, 2010, nine year old Alyssa Avila died from a concussion that she received while at school. Alyssa was playing on a new piece of equipment called an X-wave that had been recently purchased by her school (Bahe 2011). Alyssa's death is a reminder to educators and safety professionals that recess and playgrounds are not to be overlooked for safety management practices. Alyssa fell from a see-saw like piece of equipment that can seat up to 20 children. When she went to stand up from the fall, the X-wave struck her on the head causing severe trauma. She was pronounced dead at a Miami Oklahoma hospital (Stogsdill, 2011). Suit has been filed against the equipment manufacturer, retail seller, and school district. The incident prompted several other Oklahoma school districts to remove the equipment from their grounds (Bahe, 2011).

In the New York case of Merson versus Syosset School District (2001), the New York Court of Appeals ruled that failure to train a child on the proper use of playground equipment was negligent. A seven year old second grade student was crossing between two sections of equipment pod on a chain walk, an elevated walkway made of chains with cross boards designed for children to walk across to learn balance and risk mitigation. The child's foot became entangled resulting in a fall and broken wrist.

A suit was filed against the school district and the playground equipment manufacturer alleging that the design of the equipment did not meet standards of the Consumer Product Safety Commission and that the school failed to supervise the child by

lack of training on proper use of the equipment. The trial court issued a summary judgment for the school district and playground equipment manufacturer. The decision was reversed on appeal. The New York Court of Appeals held that school districts owed a duty to its students in regard to exercising the same degree of care as a parent in similar circumstances. The playground manufacturer was resolved of liability as the court ruled that playground standards are voluntary and many standards exist besides the Consumer Product Safety Commission recommendations (730 N.Y.S. 2d 132).

The threat of liability to a district and individual school employees has prompted districts to take unprecedented action in regards to playground safety. Cabell County Schools in West Virginia decided to remove all swings from elementary school playgrounds during the fall of 2010. The Herald Dispatch, a local newspaper in Huntington, reported the reason for the decision was from a recent history of injury claims and lawsuit defenses. The district had experienced two swing set injury claims totaling \$1513. Further expenditures emerged from lawsuits centering on the swing related injuries. One had been recently settled for \$20,000, and another was currently being litigated (Chambers, 2010).

“Children have the right to play” (Jacobs, 1999, p). Furthermore, play is an important part of education due to its developmental influences (Frost, 1992; Sandseter & Kinnear, 2011). Jacobs asserts that the answer to effective recess related education is play leadership (Jacobs, 1999). It is the support of play that is mandated by the child’s right to play. He establishes four roles of the teacher as a play leader. The first role is to observe. Observing according to Jacobs is to take notes on themes and difficulties to include safety. The second role of a play leader is to facilitate play in non-intrusive ways. Play

leaders also must plan for effective play. Finally, play leaders must be accessible and participate by blending into the theme. A play leader must incorporate safety into the duties (Jacobs, 1999). Safety then becomes a principle of leadership on the playground.

Student safety is a management concern for educators at all levels of a district. Playground safety is an increasing area of concern for keeping students safe and efficient management of school resources. Purchasing equipment that meets manufacturing standards and maintaining its condition along with understanding behavior on the playground are foundational for proper safety management. Aligning the behaviors of children, monitors, and contributing or underlying conditions allows the administrator to adapt practices and policy in order to manage playground injuries and limit liability.

Playgrounds are complex educational settings that contribute a great deal to a child's physical, social, and cognitive development (Frost, 1992; Sandseter & Kinnear, 2011). The need to allow for explorative and risky play while limiting injury potential provides a unique challenge to safety management.

The mere mention of playground safety begs the notion that keeping children safe from injury while on a playground is an obvious goal. The moral duty to protect children at school is not in doubt and is firmly entrenched in social expectations and in case law as "in loco parenti" or in place of the child. School personnel must take the place of the parent in the care and supervision of a child while at school or attending school sponsored functions. Child injuries naturally call for critical evaluation of school policy and actions. Schools must continue to provide playgrounds for the educational benefit of the student but limit injury potential. Understanding child behaviors, playground monitor behaviors, and the underlying conditions that align are important elements for proper

safety management. Educators must first understand what behaviors exhibited by children are potentially injurious. A complete understanding of potentially injurious behavior requires an examination of injuries that occur on playgrounds, the definition of a playground, types of play, comprehensive safety management programs, and accident causation.

Understanding the Problem

Playground Injuries

The U. S. Consumer Product Safety Commission reported that about 200,000 children are treated annually in emergency rooms or urgent treatment centers for injuries involving playground equipment (US CPSC, 2007). A majority of the injuries for children ages 5 to 14, or school aged, occur on the playground at school (Safe Kids Worldwide, 2007). Of the injuries that occur to children while at school, between 30% and 70% occur on the playground. Between 6 and 7% of school age children experience a playground related injury during their elementary education (Posner, 2000). During 2010, the injury rate for U.S. workers in all of manufacturing is only half of that figure according to the Bureau of Labor Statistics (Bureau of Labor Statistics, 2012).

“Playgrounds are the most dangerous place in an elementary school,” says Posner (2000, p.97).

Playground related injuries also range from minor incidents of pain to severe permanent injuries and even death. Almost half or 45% of playground injuries are categorized as severe. They can include amputations, internal injuries, concussions, and broken bones. From 1990 until 2000 147 deaths were reported as involving playground equipment. Seventy percent of these deaths occurred at home playgrounds and involved

falls from swings, strangulations from entanglement, and catching loose strings on the child's clothing (Safe Kids Worldwide, 2007).

A further examination of injury trends reveals that female children are more likely to be injured than their male counterparts. Injuries to the face occur more often to children under the age of 5, while injuries to the hands and arms are more prevalent in school-aged children ranging from age 5 to age 14 (Safe Kids Worldwide, 2007).

The National Electronic Injury Surveillance System (NEISS) was initiated in 1972 by the CPSC. Initially, it began with 119 hospital emergency rooms reporting on injuries treated that involved a consumer product such as playground equipment. The sample allows the CPSC to estimate the number of playground related injuries across the nation. This reporting system indicates an increase in playground equipment related injuries since 1972. Since 1984, the number has been around 200,000 injuries per year (Frost, 1992; Safe Kids Worldwide, 2007). This is despite the widespread establishment of playground equipment standards published by the CPSC in 1991 (Posner, 2000; Frost, 1992).

The Arizona Department of Health and Services has an ongoing study that includes all serious school related injuries. The Arizona School Injury Surveillance Program (ASISP) collected data from 13 of its 15 counties. Schools varied widely in terms of size and location. School personnel reported on serious injuries. The study defined serious as requiring professional medical treatment, sending of the student home, restricted activity, or missing at least half a day of school (Posner, 2000). The Arizona initiative revealed that an elementary with 425 students can expect 11 serious injuries per year. Boys were at double the risk of girls and children in kindergarten through 4th grade

were 4 times more likely to receive a serious injury than students in grades 5 through 7. Head injuries accounted for 30% of all serious injuries (Posner, 2000).

The study also showed some trends that point to causation. Over 50% of the injuries involved lack of adult supervision. Only 15% of the injured students were taken to the emergency room by school personnel, but 58% were taken to the hospital by their parents (Posner, 2000). Based upon the author's own experience in researching playground safety and interviewing school nurses, teachers, playground monitors, and administrators, these figures could be an indicator of oversight in regard to playground safety management. It is common for school personnel to call parents in order for the parent to transport the child to the hospital; serious injuries demand prompt attention. However, many of the parent transports may be in response to a perceived need for treatment by the parent that was overlooked by school personnel. Head injuries can be easily overlooked or misdiagnosed or assessed by non-medical personnel. Take for instance an incident reported by the Scholastic Safety Corporation in a 1992 report on playground injuries. The incident involved a sixth grade boy that had been hit in the head with a ball bat while at recess. Twenty minutes after recess he was found unconscious at his desk and later died of his injury (Posner, 2000).

In the fall of 1992, the Pennsylvania Parent Teacher Association asked school nurses to report on injuries that involved emergency room treatment or missed school days. The study included 102 schools in 75 districts. Findings were consistent with the Arizona Department of Health and Services Study and numbers reported by the CPSC and Safe Kids Worldwide (Posner, 2000). Pennsylvania findings revealed that 3 pieces of equipment accounted for most of the equipment related injuries. Climbing equipment

such monkey bars were involved 50% of the time. Swings were involved 16% of the time and slides 11% of the time. Approximately two thirds of the injuries involved falling from the equipment, 16% from collisions with the equipment, 19% from swing to child contact, and 7% from other collisions between children and equipment. In this study head injuries occurred more than 33% of the time (Posner, 2000).

Based upon the experience of the author in researching and studying playground safety in the pilot project conducted at ECU in the fall of 2011, one very large problem exists with current efforts to study playground injury statistics. The studies have looked at only serious injuries. The National Electronic Injury Surveillance System numbers include only incidents that require treatment in an emergency room. The Arizona and Pennsylvania projects, while expanding the inclusion for serious injuries, did not account for minor injuries. During observations conducted in the pilot study, one 20 minute recess period experienced 8 injuries that would not be reported in those studies. In some cases, the monitor was not aware or did not respond to the incidents. The study of serious injuries reveals important trends that can be used to prevent future injuries. Many are unreported and based upon ratios developed over the years in the management of occupational injuries; many more injuries are occurring than these studies reveal. Schools are not accurately gathering data on injuries and incidents that occur on the playground. In 1931, Heinrich theorized that many more minor injuries occur in relation to a major injury in an industrial setting. His ratio of 29 minor injuries to every major injury has been questioned and studied over the decades. Some other numbers are higher estimates (Heinrich, Peterson, & Roos, 1980). The problem may be far worse on school playgrounds than the present picture reveals.

The documentation and tracking of minor incidents and even incidents that do not result in injury can be important in identifying trends and counteracting the problem before an injury or major injury occurs (Heinrich, et al, 1980). This oversight may allow for an increase in the liability of schools. The lack of personal experience in playground related injuries by school personnel as indicated by the statistical numbers may increase the acceptance of substandard conditions and substandard management practices in regard to playgrounds.

Legal Liability

Children are supposed to experience risk on a playground according to the Sandseter and Kinnear (2011) study out of Norway. It is reasonable to believe that injuries with playing children will occur. The goal then is to limit the severity of those that are supposed to occur and prevent the unnecessary injuries. Liability is a factor in the necessity to manage playground safety due to its potential impact on school monies.

Frost and Sweeney (1995) published a study of lawsuits involving 187 playground related injuries and 13 fatalities from 1981 through 1995. The study presented data in the context of geographic location, nature of injuries, cause, equipment type, location of injury, age, gender, and specific safety violations. In jury statistics were consistent with national data. The authors presented a picture of a lack of management concern for playground safety. Texas was provided as an example of a state where ASTM standards for playground equipment were not mandated and public institutions also enjoyed “sovereign immunity” or protection from lawsuit, except under special circumstances. The lack of perceived need for playground safety concern was increased by the lack of need for legal liability protection (Frost & Sweeney, 1995).

The study of lawsuits by Frost and Sweeney identified one direct factor that might influence a person to file lawsuit against a school. The study found that with few exceptions, the injuries involved in the suits resulted in permanent effects. The study also concluded that lawsuits were sharply rising in frequency (Frost & Sweeney, 1995).

The threat of lawsuits against a school influences managerial decisions that sometimes impact educational experience. As one example, consider the announcement by Cabell County Schools in West Virginia to remove all swings from elementary school playgrounds during the fall of 2010. The Herald Dispatch, a local newspaper in Huntington, reported that the decision was based on recent history of injury claims and lawsuit defenses. The district had experienced two swing set injury claims totaling \$1513. Further expenditures were required from lawsuits centering on the swing related injuries. One had been recently settled for \$20,000, and another was currently being litigated (Chambers, 2010).

Like Frost and Sweeney report about Texas, sovereign immunity protects school districts and individual employees from suit in Kentucky. This immunity applies only if the school or employee exercises judgment in good faith and within the scope of their employment. In the Kentucky case, *Deck versus Noble* (2011) (S.W. 3d 2011 WL 2935667), the Kentucky Court of Appeals for the eastern half of the state ruled that a teacher, Valesa Deck, could not be sued by the guardian of a minor student, Makayla Noble, when the minor was hurt while on a playground. Deck had rewarded her class with an unscheduled recess on the school playground for exceptional performance on a test. While playing on the playground at Emmalena School in Knott County, Makayla fell, resulting in a broken arm. Sovereign immunity prevented the suit from going further

because the unscheduled recess was reasonably within the scope of the teacher's work (Noble v. Deck, 2011). If a school employee is negligent in the exercise of their job they can be sued regardless of sovereign immunity. Suit was filed against Deck on the grounds of negligent supervision since the recess was not scheduled in accordance with school policy. The court ruled in favor of Deck based on the reasonableness of using an extra recess as incentive for good grades (Noble v. Deck, 2011).

In Kentucky, a public officer can be subject to liability within employment if their actions are negligent or purposeful in causing damage (Carr v. Wright, 1968) (423 SW 2d 521). Kentucky case law is best understood by examining two cases, Lawson v. City of Beattyville and Huddleston v. Hughes, that involve injury on a playground and "recreational use" statutes. Recreational use statutes protect a landowner from suit when a person is using the land for recreational purposes. It is covered in state law under KRS 411.190. These laws encourage owners to allow use of their property by the public. Paragraph three of KRS 411.190 states that a landowner does not have a "duty of care to keep the premises safe for entry or use by others for recreational purposes, or to give warning of a dangerous condition, use, structure, or activity on the premises to person entering for such purposes" (KRS 411.190 (7)(b), 2002).

In the Lawson case, a young boy was on a field trip with his school when he tripped on a parking stop that was in ill repair and a piece of protruding re-bar punctured his leg. The Lawson's argued that the City of Beattyville, who owned the park, was negligent in that the failure to maintain the condition of the parking stops and allowance of the rebar to protrude was willful. The "recreational use" statute barred suit unless the actions were willful. The court ruled that since there were no previous injuries and that

the City of Beattyville had repaired the parking stops immediately after the incident, that the negligence was “passive.” It went on to explain that passive negligence occurs when “harm is allegedly caused by what the defendant did not do, but should have done” rather than an act that causes harm (Lawson v. City of Beattyville, 2011).

The Huddleston case was heard by the Kentucky Court of Appeals in 1992. The incident occurred in June of 1988 on the playground of Covington Latin School, a Roman Catholic preparatory school. The lot was a parking lot with two basketball goals and was frequented by the public for play. The goals were not cemented to the ground but were portable in nature and large pieces of concrete were used as counterweights to prevent tipping. Steven Huddleston and his two friends removed the counter-weights from the goal in order to dunk. Steven was standing under the goal while his friends shot balls, and the goal tipped striking him and breaking his back. Suit was filed, and the trial court ruled that the “recreational use” statute protected the school. Huddleston appealed arguing that the actions were willful. The court used the definition of “knowing” to extend the actions to willful. The goal had a known history of tipping and users of the lot would generally remove the counter-weights creating a dangerous environment. Although there was no intention to do harm, knowingly failing to address unsafe conditions was negligent and warranted a trial by jury to decide on personal negligence of the Covington Latin School’s administrator, Reverend William A. Hughes.

The Lawson and Huddleston cases in Kentucky shed light on negligence in regard to knowingly disregarding previous occurrences and conditions for administrators. A New York court in the case, Merson v. Syosset Central School District, found that failure to train a student on the correct use of a piece of playground equipment is “negligent

supervision” (Merson v. Syosset, 2001). A 7 year old child was crossing a chain walk on an equipment pod when her foot became entangled and resulted in a fall. Suit was brought against the manufacturer because the walk did not meet mandatory CPSC standards of manufacture and against the school for negligent supervision. The manufacturer, Kompman Northeast, Inc. argued that other standards were followed in the equipment’s manufacture. The court dismissed the suit against Kompman. It relied on “in loco parentis” to rule that failure to educate and train on the proper use of the equipment was negligent (Merson v. Syosset, 2001). The case clearly demonstrates that the duty to a student rather than a person of the public while at school and under closer supervision to the extent of a parent is required of a teacher.

In January of 2012, a Westlaw news release announced a story from the Albuquerque Journal about a playground related injury where the Rio Rancho district’s insurance carrier was ordered to pay \$87,500 in damages. The case came right after the pilot project for this study discovered an increased risk potential at the end of recess when a whistle was used. A Shining Stars Preschool student, 4 year old Megan Wiezer, was walking on top of a 3 foot masonry wall when a whistle was blown to end recess. She immediately jumped from the wall and struck her elbow on the wall causing a shattered elbow and broken upper arm (WLNR 1948591, 2012). The case hinges on supervision and the facts that the girl was allowed to walk on the wall and the contribution of the whistle in influencing her to forget about personal risk and react in a hurry.

California is one of 15 that states currently requires playgrounds to meet manufacturing standards issued by the American Society for Testing and Materials

(ASTM) (Tierney, 2011). In California, school liability is handled as any other tort case is handled. Sovereign immunity is not a protection for the schools. A tort is a civil wrong, and 4 elements must be proven in a suit. In regards to playground safety, the plaintiff or person bringing the suit, would have to prove that the school had a duty to protect, the duty was breached, the breaching of the duty caused the harm, and the harm produced damages (Larson & Larson, 2000). This handling of school suits in civil court as a tort extends to suits against individual school personnel.

The threat of suit is not an effective motivator for making playground safety a priority. Injury statistics show that the playground is the most likely venue at school for an injury to a student (Posner, 2000). Proving that the school or school employee caused the injury is difficult. Frost and Sweeney concluded in their study of playground related lawsuits that the main motivator was a permanent injury or condition. They also pointed out that sovereign immunity is an established defense that helps diminish the importance of playground safety for a school (Frost & Sweeney, 1995).

The cost associated with the defense of a suit is a considerable liability for a school district where funds can be better utilized. In many aspects monies spent on preventing playground injuries is more cost effective than defending a suit. An additional cost to defend a suit is the increase in premium for liability insurance coverage. When losses mount, the resulting premium will usually increase from that point forward. Schools often spend money in a reactionary mode to injuries. In one situation that this author has dealt with, the school purchased new age appropriate equipment for pre-school age children only after a serious physical injury occurred when a 3 year old boy jumped from a slide at a height of 4 feet. The maximum height of a slide for pre-school children

is 3 feet (U.S. Consumer Product Safety Commission, 2010). The school then built a masonry wall to separate the pre-school playground in addition to the equipment. Spending the time and money upfront to prevent injuries is much cheaper than reacting to incidents that have already occurred, and the expense is definite.

The lack of exposure to risk management training for school principals also may be an issue that contributes to increased liability. In an interview with a school principal during the pilot study conducted in the fall of 2011 at Eastern Kentucky University, the author was made aware of the lack of education and training in regard to playground standards and safety management concerns. The veteran and highly successful principal believed that this contributed to principals relying on equipment representatives for advice on meeting standards. She relayed the story of a recent slide purchase that met code according to the salesman only to find out from another source that the equipment was not age appropriate due to height (Dotson & Shepperson, 2011).

Liability exists with school playgrounds. The principle of “in loco parentis” places an increased level of supervisory duty on school personnel. “Sovereign immunity” and “recreational use” provide some protection to districts and personnel. Suits are on the rise (Frost & Sweeney, 1995) and increased insurance premiums can influence managerial decisions that affect educational settings.

Behavior Based Safety Management

Insuring that equipment, surfacing, and layout meet recommendations published by the CPSC is a first step in managing playground safety. This is not always easy. In the pilot project the author learned districts do not always budget for playground equipment and improvement. Allowing for the maintenance of the surface may be common, but

many districts rely on the individual school to budget for equipment purchases (Dotson & Shepperson, 2011).

Meeting published CPSC guidelines is not a guarantee that playground injuries will be reduced. According to Ball, professor of risk management at Middlesex University in London England, it is a matter of well-established behavioral phenomena. He offers a study conducted in England after the introduction of softened playground surfacing where the number of broken arm incidents increased. He posits that people will take more of a risk when they perceive the environment to be safer (Tierney, 2011).

Behavioral based safety management is a strategy in which human behavior is taken into account in the management of safety. Behavior based safety relies on the premise that many more substandard behaviors will occur in ratio to near misses or loss events (Bird, Jr. et al. 2003). Along with government regulation, national consensus standards produced by private organizations, and production standards, behavior observations provide a more complete picture for the risk manager to comprehensively reduce risk potential (Bird, Jr. et al. 2003). Playground equipment can be manufactured to a high standard, but failure to understand how the equipment will be used by the human subject rather than how it was designed to be used can increase the risk potential.

The first step in managing behaviors is to identify critical behaviors. Critical behaviors are either safe or substandard (Bird, Jr. et al, 2003). On a playground, two categories of human behavior must be considered. The students at play must be considered, and it is typical to establish basic rules of conduct. The playground monitor is another source of human behavior that must be considered. The manner and result as to

how these sources of human behavior interact and effect events can shed additional light on the subject of playground safety.

Playground safety management relies on understanding equipment standards and behaviors at the immediate level of incident causation (Bird, Jr et al, 2003). Behaviors contribute a great deal to incident causation. Exploring the history of standards, the types of playground, and theories of play are basic fundamentals for behavior based safety management in a playground setting.

History of Playgrounds and Play Theories

Defining Playground

A playground can be defined as simply an area with “specific” design for children to play there. This sounds simplistic but is more complex than may first appear. The term specific design really hints that the environment and equipment contained in the area have both psychological and physical aspects to its placement and design. Playgrounds first appeared in Germany and had more purpose than to serve as an area for the release of energy. Early German playgrounds facilitated more creative play and appeared as large sand areas where building and sand design facilitated more creative play (Frost, 1992). The area served as a classroom of sorts meant to teach children how to play properly.

Playgrounds serve a larger purpose than energy release. In most elementary schools, children spend as much time on the playground as they spend in instructional groups such as reading. Between 35 and 45 minutes per day are spent on playgrounds or in recess settings (Hart, 1993). During most of a school day, a child experiences limited interaction with their peers on predetermined topics and settings. On the playground, a

child gets to choose with whom to interact and around a topic of their choice (Peligrini, 1993). Playgrounds are educational settings for social development and peer relationships. Children experience conflict, loneliness, friendship and social cognition. The playground is an extension of other developmental environments such as the family and the traditional classroom (Hartle & Johnson, 1993). It is arguable that the playground is an educational setting in the same way the traditional classroom is an educational setting with the goals centered on social development and peer relationships.

Sandseter contends that playgrounds are venues for social and psychological development in that they are for exploring risk. Her studies point to categories of play that are meant for exploring and conquering risk in order to avert adult phobias. The challenge for proper management of playgrounds is to allow for the social development of the child in overcoming their fears in an environment that does not allow an unacceptable risk of serious injury. Sandseter's studies show that there are categories of risky play that have benefit in preventing phobias (Tierney, 2011).

Theories of Play and Playground Design

Play has developed from being viewed as a meaningless energy release to being seen as an important medium in learning and development (Hart, 1993). Hartle and Johnson (1993) describe play as a "multivariate construct with numerous interacting antecedent determinants and behavioral and developmental consequences" (p14). Early psychologists attempted to explain why humans play. Later, contemporary theorists began studying how humans play longitudinally, and how a child's play was important for growth and development cognitively, socially, physically, and emotionally (Hartle &

Johnson, 1993). The development of playgrounds has followed the changing views of play (Hart, 1993; Frost, 1992).

Early theory viewed play as activity that used up the excess energy after life supporting activities were completed or as activity that stemmed from the need for relaxation. Play was thought to rejuvenate after mentally stressful work. Play had no real cognitive value itself. The real learning took place in the classroom. Playgrounds resembled open areas or places where children could release energy (Hartle & Johnson, 1993).

Groos in 1901 published a theory on play that viewed play as adaptive. Skills were practiced that would be needed as adults, such as cooking and hunting. Children used props as the tools to be used as adults. G.S. Hall in his 1920 work “Youth” theorized play as a method for children to simulate evolutionary development. The link from animal to man was played out. He saw swinging, climbing, and rough and tumble play as mimicking activity of early primates. Playgrounds began to include ladders, swing sets, and monkey bars. Playground also had heavy influence from the German emphasis on physical fitness and development. Gymnastic style apparatus began to appear outdoors at the end of the 19th century (Hartle & Johnson, 1993).

Some contemporary pioneers had influence on a minor scale. In 1886, Dr. Maria Zakerzewska placed piles of sand in the playground at the Boston Children’s Mission. Dr. Friedrich Froebel expanded on Zakerzewska’s contribution. Froebel saw play as a medium for cognitive and social development. Playgrounds referred to as kindergartens, included areas for plant and animal care, sand, water, swings, slides, seesaws, and building materials such as wood blocks, boards, hammers, and nails. The inclusion of

such areas and materials for creative exploration were not the norm of playgrounds in the early 20th century (Hartle & Johnson, 1993).

The advent of public schools and city playgrounds created the demand for manufacturers to produce commercial playground equipment. The equipment needed to be sturdy and have a low demand for maintenance. Mass production of swings, slides, and seesaws from iron and steel became the norm. Equipment was placed over brick or concrete in order to provide a sturdy ground surface requiring little maintenance. This time period in playground equipment is referred to as the “Manufactured Appliance Era” (Hartle & Johnson, 1993; Frost, 1992).

Contemporary play theory began influencing playground equipment later in the 20th century. Play was accepted as a necessary part of childhood. Freud saw play as a venue for acting out socially unacceptable behavior or pretending to be persons or heroes of admiration. Piaget theorized progressive categories of play that paralleled cognitive development. Categories progressed from functional to dramatic to structured games or constructive play (Hartle & Johnson, 1993). It was evident that traditional playground equipment needed to be enhanced to consider cognitive and social needs rather than physical development and energy release.

In 1968, Smilansky advanced Piaget’s theory by studying constructive play and distinguishing between functional and pretense. Outdoors environments facilitated functional and constructive play with swings, slides, and grounds for tag or courts for basketball. Indoor environments tended to facilitate constructive games and pretense play. Playgrounds began to progressively include more creative designs that would stimulate the child. The use of landscapers and artists culminated in new materials for

equipment, and some equipment were based on themes. Theme playgrounds had equipment that centered on ideas by area. Trains or zoos were popular themes. Equipment appeared as exotic zoo animals or as trains, for example (Hartle & Johnson, 1993).

In the mid 1980's from Scandinavian influence, the adventure playground appeared. Adventure playgrounds incorporated creative building materials and tools for children to use and experiment with structured around trained play leaders who would guide and teach the children correct use of tools or design techniques (Hartle & Johnson, 1993).

Types of Playgrounds

In recent times, manufacturing standards and safety management practices pushed by insurance companies have added value to playgrounds. Equipment influence from play theorists continues as well. Research generally falls into one of two areas: comparisons of play environments to determine resulting play potential or comparisons of children's play while they use various equipment pieces and specific features. Modern studies have formed four categories of playgrounds: traditional, contemporary, adventure and creative (Hartle & Johnson, 1993).

Traditional playgrounds have standard equipment such as swings, monkey bars, and slides. The traditional playground experiences the least amount of play time by children (Frost, 1992). Swings are the most used piece of equipment. Campbell and Frost (1985), observed 77.9% of play on traditional playgrounds as functional play. Only 2% was considered dramatic. The traditional playground inspires much less creative cognitive play.

Contemporary playgrounds may utilize several if not all of the types of equipment found on traditional playgrounds but are usually arranged much differently. They have high aesthetic appeal for adults. Pods or clusters of equipment provide a central point for selecting one of many thrills. Children may climb a rock wall or rope net in order to access the slide, a slide pole, or landing that also has wheels or other attractions for their use. Landings may even be connected by chain walk bridges or crawl tunnels. This type of equipment arrangement is important because it assumes that the child has several choices of risk or fear to overcome in order to access the thrill such as the slide.

Contemporary playgrounds may also utilize themed equipment pods. A popular example of this is a wooden pirate ship that incorporates the usual thrill features such as a slide, slide pole, tunnels, or swings (Frost, 1992; Hartle & Johnson, 1993).

Adventure playgrounds center on themes to spark more creative play and combine pretense play with thrills and the exploration of risk. Themes such as ships, trains, or even gold mines and ancient ruins provide interesting playscapes. Adventure themes that have been mixed with traditional equipment that targets functional play have not met with success from a safety perspective. Swings that had animal design seats exposed children to additional hazards. The noses or features of the animal seats added protruding edges as impact hazards when children collided with the seats while running or after falling from the swing (Frost, 1992; Hartle & Johnson, 1993).

Creative playgrounds are meant to increase the occurrence of pretense play and cooperation among children. Creative playgrounds may include building materials and encourage constructive play as well. Stages and props such as soft swords are common

and encourage the child to engage in pretending to be a character or hero. Often times, the child must rely on other children to expand the play (Hartle & Johnson, 1993).

The History of Playgrounds and Equipment Standards

Playground equipment standards formed by the American Society of Testing and Materials (ASTM) and published in the CPSC's Playground Safety Handbook are the first line strategy for playground safety. Fifteen states have enacted legislation requiring schools and public organizations to install playground equipment in compliance with ASTM standards. These 15 states are: North Carolina, California, Arkansas, Florida, New Jersey, Illinois, Michigan, Oklahoma, Oregon, Rhode Island, Tennessee, Texas, Utah, Virginia, and Wyoming. North Carolina has reported a 20% reduction in playground related injuries since adopting the standards as law (Safe Kids Worldwide, 2007). Kentucky, the site of this study has not adopted such legislation.

The State of California has a comprehensive three tiered approach for playground safety consisting of standard implementation, inspections, and educational initiatives. All school playgrounds must be inspected by a trained playground inspection official for meeting ASTM Standards (Tierney, 2011). The National Parks and Recreation Association (NPRA) conducts certification for playground inspectors. Standards concentrate on equipment and surfaces, covering layout and design, types of equipment, installation and maintenance of equipment, surface materials for fall mitigation, safety zones, audit forms, age appropriateness, and testing for entrapment hazards (Posner, 2000).

The approach of using standards began early but has progressed slowly. E.B. Mero began suggesting types of equipment for ages of children in his book, "American

Playgrounds: Their Construction, Equipment, Maintenance, and Utility” published in 1908 (Frost, 1992). Specifically, Mero suggested that appropriate equipment for children less than 6 years of age included items such as sand boxes covered with sun shades or roofed play boxes. Equipment suggested for children between ages 6 and 12 included swings, horizontal ladders, and giant striders (Frost, 1992).

In 1917, Curtis published “The Play Movement and It’s Significance” criticizing the unserviceable conditions of public playgrounds. He estimated that only half of America’s playgrounds were in usable condition. His efforts concentrated on ground conditions (Frost, 1992).

It was not until 1931 that the first formal effort to produce standards occurred. The National Recreation Association (NRA) formed the Committee on Standards in Playground Apparatus with 17 executives from equipment companies. They concentrated their efforts on suggestions for communities to follow in the selection of playground equipment and its placement (Frost, 1992). Shortly thereafter, the NRA then formed an 11 member committee to examine playground surfacing. In 1932, a report was published recommending criteria for playground surfaces. The recommendations for a quality surface included resiliency, drainage, durability, cleanliness, smoothness, firmness, prettiness, nonabrasive, freedom from dust, and reasonably priced. Throughout the 1940’s and 1950’s, the concentration for playground safety centered on surfacing. Many schools and cities experimented with different types of soil and mixtures of soil to achieve these recommendations. The problem of ground maintenance clouded the issue of safety. The maintenance of ground proved to be a strain on the resources of schools and cities. The unserviceable conditions that resulted contributed to the increase in

injuries. Hard surfacing gained in popularity because of its appearance and easy maintenance (Frost 1992).

Using Consumer Product Safety Commission guidelines to construct new playgrounds, guide equipment purchases, or modify existing playgrounds is the starting point for managing playground safety. Spending the time upfront to select age appropriate pieces, building the right surfaces, and ensuring equipment meets manufacturing standards are the most cost effective methods of playground management. Other management aspects affect safety in the long run. The maintenance cost and requirements of surface materials must be considered. “Safety mulch,” or rubberized chips, is much more expensive to maintain rather than untreated wood mulch. Surfacing wears and erodes quickly, and maintaining the correct depth of energy absorbing material is critical to limiting injury potential. Treated wood can contain cancer causing agents. Untreated mulch and industrial plastics limit exposure to school personnel and children.

Playground equipment is subjected to rough play and weather. A frequent inspection schedule is required. Daily inspections should occur that look for general concerns and concentrate on finding items that can be thrown onto or left on the playground over the course of the evening or night. Visitors or saboteurs can leave dangerous items such as knives, pistols, or even syringes on or near the grounds. Weekly and monthly inspections enable looking closer at grounds, energy absorbing material depth, and equipment maintenance status. A yearly inspection can include all of the above, as well as a detailed assessment of program effectiveness and equipment layout. In California, playground inspections from certified inspectors are mandated on a yearly basis (Tierney, 2011).

Zoning playgrounds according to age and matching equipment to the ages keeps age appropriateness issues at check. Slides, for example, designed for toddlers have a suggested width of 12 inches in order to aid in preventing the child from falling off the slide (Consumer Product Safety Commission, 2010). Trends show that children differ in play from 4th grade to subsequent grades (Frost, 1992). Some playground equipment is designed for certain age children and is not appropriate for other ages. Designing age based equipment is also a good strategy to limit the number of children that a playground monitor will have to supervise.

Supervision has been shown to be an effective strategy for injury management (Posner, 2000). A supplemental strategy that facilitates supervision is to layout playgrounds in zones. Zones for age groups, safe zones or buffers around moving equipment, especially around swings, help stop children distracted with active play and limit numbers and actions in areas where playground supervision is challenged from the amount of activity or children (Frost, 1992; Posner, 2000).

Accident Prevention versus Injury Prevention Strategies

Injury prevention developed as an engineering approach to safety management in the 1960's. Dr. Haddon formulated his theory of injury causation rather than looking at preventing an occurrence that had potential for an injury to occur while researching ways to protect soldiers in armored vehicles. The Energy Exchange Theory premised that injuries occurred in two circumstances. One was when the whole body function was interrupted by an exchange of energy to the body. His example was drowning or suffocation. The second manner was when the body received a local exchange of energy that violated the threshold that it could endure (Bird, Jr. et al, 2003).

Dr. Haddon's strategy was to limit or prevent the energy exchange. He developed 10 strategies that guided this engineering approach:

1. Prevent the creation of the hazard in the first place;
2. To reduce the amount of the hazard brought into being;
3. To prevent the release of the hazard that already exists;
4. To modify the rate of special distribution of release of the hazard from its source;
5. To separate in time and space the hazard and that which is to be protected;
6. To separate the hazard and that which is to be protected by interposition of a material barrier;
7. To modify relevant basic qualities of the hazard;
8. To make that to be protected more resistant to the hazard;
9. To begin to counter the damage already done by the environmental hazard; and
10. To stabilize, repair, and rehabilitate the object of the damage.

(Bird, et al, 2003, pp. xi-xii).

CPSC guidelines are excellent examples of injury prevention strategies.

The first half of the 20th century saw the development of accident prevention as a viable strategy. It was a critical supplement to the engineering approach that Dr. Haddon proved so effective after becoming nominated by President Lyndon Johnson to head the National Highway Safety Bureau, now the National Highway Traffic Safety Administration. Unprecedented mandates such as the inclusion of seatbelts saved an estimated 50,000 lives between 1966 and 1979 (Bird, Jr. et al, 2003).

The investigational era of industrial safety occurred between 1915 and 1930. Brought on by the advent of worker's compensation, industrial accidents were investigated to prevent future occurrence. Early accident causation thought placed blame on the worker. The psychological approach made education the key to prevention. Efforts centered on keeping worker attention, hiring qualified workers for the position, and attempting to identify "accident prone" characteristics in workers (Bird, Jr. et al, 2003).

The psychological approach was not highly effective alone. This era did identify a common component for behavior based safety practices. Playground safety management involves the management of human behavior as well as meeting equipment recommendations. Twenty one percent of playground related injuries involve punching, shoving, pinching or other horseplay incidents, and inattention. Proper supervision includes managing children's behaviors and establishing basic play rules (Frost, 1992). This type of abatement strategy fits the psychological approach or accident prevention strategy common to behavior based safety management.

The behaviors that must be managed on a playground also include the behaviors of monitors or play leaders. It is relevant for play leaders to understand basic play theory, how to facilitate play, and what practices facilitate safety (Jacobs, 1999). Knowing what risky behaviors children exhibit, common behaviors that contradict design and create undue danger, and what monitor behaviors facilitate safety or create unacceptable risk comprise the knowledge in the safety behaviors category for play leaders.

Sandseter and Kinnear identified 6 categories of risky play that children perform. They contend that children play in order to overcome fear at their own pace. They cite a

study in which children who are exposed to a fall before the age of 9 are less likely to be afraid of heights as an adult compared to those children who do not experience a traumatic fall before the age of nine. They have shown that the categories of risky play correspond to typical adult phobias. The categories of risky play have been identified as experiencing height, experiencing speed, rough and tumble play, wondering alone, experiencing dangerous elements, and experiencing dangerous tools (Sandseter & Kinnear, 2011).

The Sandseter and Kinnear study indicates that exploring risk is a necessary consequence to human development. It also suggests that experiencing minor injuries is a part of overcoming fear and the consequences of risk. The children who experienced a traumatic fall before the age of nine experienced and overcame injury. From this perspective, the playground becomes an arena where risk taking and surmounting obstacles of fear in a controlled environment allow for a more emotionally developed person later in life. The lack of risky challenge may leave adults with fears and anxieties that lead to a less productive future. Progressive exposure and conquering of dangers mirrors a technique used by psychologists to help adults get over phobias (Tierney, 2011).

Supervision

Frost is among the leading experts on playground safety in the United States. In his 1992 book, "Play and Playscapes," much importance is given to supervision. He justifies this from the perspective that far more injuries occur from maintenance oversight than equipment design. He also presents evidence from a 1974 survey by Butwinick, a

leading advocate for manufacturing standards, which attributed 21% of playground related injuries to fighting, pushing, inattention, blind running, and foreseeable misuse.

Long before the Sandseter and Kinnear study (2011) identified the categories of risky play, Frost asserted that risk was an “essential ingredient” of creative play (1992, p. 241). He wrote, “misuse of equipment is related to the natural tendencies of children to extend themselves, to be daring, to show off, to engage in rough housing” (1992, p. 241).

Frost contends that a “good” playground is one that promotes “free, unregulated play” (1992, p. 243). Rules often are substituted for poor design and maintenance. Using injury prevention strategies that limit hazards promotes free play. Rather than mandating the proper height to swing and attempting to enforce such a rule, energy absorbing materials should be on the surface that are adequately deep and effective for the possible height of the swing. Standards help promote free play rather than reliance on rules and enforcement by having controls built into the equipment, ground surfaces, and layout.

Frost (1992) arrived at four tasks that playground supervision must include: proper selection and installation of equipment, community involvement, appropriate direct supervision, and proper maintenance. Direct supervision is a major concern for school injury reduction expert, Marc Posner. Based upon statistics from the Arizona School Injury Surveillance Program, half of playground related injuries occur while under direct adult supervision. Playground monitors and school administrators must take recess duty as seriously as any other duty associated with an educational setting. Among the many aspects of being a play leader, monitors must be trained to recognize injury risks in children’s play (Posner, 2000).

A playground monitor becomes a play leader by virtue of their position of supervision. Research on playground safety reveals that a play leader has many tasks and responsibilities. These include having familiarity with play theory and types, possessing general knowledge of equipment standards and maintenance concerns, recognizing and intervening with social issues such as aggressive behavior and other forms of harassment, recognizing hazards, response to injuries, and monitoring practices such as not having obstructed views (Posner, 2000).

Accident Causation

Causation theories that are relevant to the field of safety begin with the Domino Theory published by Herbert Heinrich. It was born of the investigational era in the early 20th century and reflected the thought of blaming the victim that was prevalent in the day. The theory surmised that injuries resulted from some accidents; accidents resulted from unsafe human acts that originated from learned traits and attitudes that were influenced by inherited human characteristics. Heinrich also believed that for efficiency purposes, the investigation stopped at the closest point to the accident. A countermeasure plan therefore only addressed the immediate unsafe act (Heinrich, et al, 1980). The Domino Theory exemplifies accident prevention as strategy for safety management. It is a vastly different concept than injury prevention strategies that arose from the Energy Exchange Theory that guided Dr. Haddon's engineering approach.

Frank Bird Jr. theorized root causes of accidents. He recognized that incidents had complex conditions and factors that contributed to causation. Looking at Bird's Root Cause Theory deductively, it began with harm or damage that resulted from an event or series of events. Events had influence from a three tiered set of causes. The first tier and

most direct was termed immediate causes and included substandard acts and substandard conditions. The second tier or level of cause was termed basic causes and included personal factors and job factors. The third tier or level included management factors that had not been considered prior to the 1950's (Heinrich et al, 1980).

Immediate causes consisted of substandard acts and conditions that most directly allowed the event to occur. Basic causes included personal factors and job factors that contributed to the immediate cause. Management control factors were the duties that management performed or should have performed that underlined or failed to recognize and counter the basic causes and facilitated the immediate cause (Bird, Jr. et al, 2003). An application of this model to a playground can be exemplified in a situation where a pre-school aged child jumps from the top of a slide resulting in a broken arm. The immediate cause and a typical stopping point for novice investigators identifies is the purposeful act of jumping or violation of established playground rule. If the slide was not age appropriate for pre-school children, it would be too tall for the child's development. This would be an immediate cause called a substandard condition. A basic cause would be a personal factor of the child's mental and physical development. The management factor causal consideration would be the failure to purchase age appropriate equipment, establish age appropriate zoning, and possibly the lack of knowledge of equipment standards in planning the playground. An important aspect of root cause analysis is that management duties are considered in determining a countermeasure to future occurrence (Bird, Jr. et al., 2003).

Recognizing hazards is a skill that begins with realizing that categories of hazards exist. Based upon personal experience and Occupational Safety and Health

Administration published material, categories of hazard can be listed as impact, penetration, compression, chemical, temperature, dust, lighting or visibility, radiation, working/walking surface, electrical, atmospheric, and physical exertion (US Dept. of Labor, 2002). Many of these categories should not be present on a playground. Electrical hazards for example should be eliminated or non-existent. Playground hazards can be listed as height, impact, penetration, compression, temperature, chemical, dust, lighting, radiation, and surfacing categories. Existing statistics on injuries and manufacturing standards point to these hazard categories (Frost, 1992; Safe Kids Worldwide 2007; Posner, 2000).

Concept Mapping

Concept mapping is an effective technique for placing a visual component to an incident. The Bowtie map first began to be used in 1979 at The University of Queensland in Australia. It allows the user to apply a visual component to risk assessment, incident investigation, and hazard analysis. The concept map utilizes deduction and induction to show an event tree and fault tree in the same diagram. It can be used in many different applications. In regard to incident investigation and reconstruction, it reflects events and conditions that align in order to arrive at critical event in the center. Subsequent events that occurred after the critical event can be documented, and possible outcomes also can be viewed. This approach to visual mapping of an incident allows for a more thorough countermeasure production when root cause analysis is considered for each event and condition. It further serves as a check to ensure that the countermeasure has covered each event and condition. It is especially useful in safety applications where quantification is not practical (Bowtiepro.com, 2012).

Assessment of Playground Safety in This Study

Peter Heseltine, from the Association for Children's Play and Recreation located in Birmingham England, cites the four main factors of playground safety to be layout, equipment design, maintenance, and behavior (Heseltine, 1993). Supervision at both the play leader level and the administrator level include addressing these areas in ways that allow for psychological development that includes the exploration of risk, while limiting injury potential to acceptable levels.

The American National Standards Institute (ANSI), defines acceptable levels of risk as when additional countermeasures do not produce a reduction in risk based upon frequency rate, exposure, and criticality (American National Standards Institute, B11.TR3, 2000). Applying this principle of risk management to playground safety certainly includes consideration of Haddon's Injury Prevention Strategies to playground equipment design and manufacture. In the industrial type settings to which acceptable risk is usually applied, experiencing risk is not a goal of the equipment. It does have application despite this difference. Playground safety supervision must include efforts to eliminate unnecessary playground related injuries.

Unnecessary injuries are those that occur outside of the child experiencing risk using the playground equipment in reasonable ways. Those injuries include insect bites and stings; exposure to animals; exposure to those that mean to do to harm to children; injuries arising from inattention; injuries arising from panic; injuries from defective equipment and grounds; exposure to dangerous elements such as blood or body fluid; sun, and heat; and exposure to dangerous tools. While the use of tools and exploration of

elements may be categories of risky play or experience, they must be closely supervised at a level much more controlled than a playground setting.

If supervisory behaviors and behaviors of children combine at the end of recess to create an increased injury potential, then the resulting injuries or exposure to potential injury is unnecessary. Existing statistics do not indicate the times of recess at which injury potential increases. This is due to the lack of recordkeeping practices that can be used to identify trends in individual schools. The pilot project discussed earlier in this manuscript identified the end of recess as having an increased potential for injury. This study explored the behaviors and conditions present during incidents that produce injury or near injury incidents during the end of recess. The project utilized the Bowtie concept mapping technique for analyzing observed behaviors during an event. The study produced best practice guidelines for play leaders to utilize in supervising recess periods.

Conclusion

Playground safety efforts have centered on the passing of playground equipment manufacturing standards throughout most of the 20th century. Despite widespread acceptance of the standards and publication by the Consumer Product Safety Commission, playground injuries have continued to increase (Frost, 1992; Posner, 2000; Safe Kids Worldwide, 2007). Legal suits are on the rise as well (Frost & Sweeney, 1995). The decision to file a suit rests with the permanency of the injury. Free play of children is desired because children explore fears in play (Sandseter & Kinnear, 2012; Frost, 1992). The challenge to playground management is to limit injury potential while allowing as unrestricted play as practical.

Dotson and Shepperson (2011) found in a pilot study that the ending of recess was critical in limiting unnecessary injury potential. The blowing of a whistle and the emphasis of hurried discipline combined to produce an unacceptable level of injury potential. The root cause model of accident causation identifies substandard conditions and unsafe acts as the two factors of immediate cause (Bird, et al., 2003). Playground equipment standards target the substandard conditions factor. The pilot project suggests that unsafe acts play a large role in the management of playground safety.

CHAPTER 3

METHODOLOGY

Playground areas are the scene of most student injuries in a school (Frost, 1995). Lawsuits involving playground related injuries are increasing (Frost & Sweeney, 1995). The right for children to play is accepted (Jacobs, 1999). Play is an important piece of education influencing human development (Frost, 1995; Sandseter & Kinnear, 2011). The educational benefit and need for outdoor playground activity despite the threat to school funds creates a need for managing playground safety. Sandseter and Kinnear (2011) assert that risky play as a child is necessary to avert adult phobias. The challenge is to allow for risky play while limiting injury potential.

Utilizing root cause analysis for determining causation to playground related injuries reveals that at the immediate level conditions and acts must be targeted for countermeasure in order to allow for risky play while limiting injury potential (Bird Jr. et al, 2003). A pilot project conducted by the author of this study in the fall of 2011 confirmed Sandseter's and Kinnear's categories of risky play and produced some important findings that led to this project. Sandseter's and Kinnear's categories of risky play are; experiencing height, experiencing speed, rough and tumble play, wandering alone, experiencing dangerous tools, and experiencing dangerous elements (Sandseter & Kinnear, 2011). The pilot project observed children playing on an outdoor elementary school playground. It confirmed the categories of experiencing speed, experiencing height, rough and tumble play, wandering alone, and experiencing elements. The pilot project also revealed an increase in injury potential at the ending of recess. The behavior

of the adult monitor ending recess had a profound effect on the risk potential for injury. The blowing of a whistle to end recess increased the injury potential to students compared to ending recess verbally and in sections. All but one recess period ended with a sharp whistle. The students immediately ended their activity and without regard for their safety ran to line up. The combination of engaging in risky play, enthralled play, and a sharp interruption that signaled a hurried ending combined to allow for numerous trips, falls, and collisions. The recess period that ended with each adult monitor verbally telling students to line up did not produce trips, falls, and collisions. The recess ended with less potential for student injury (Dotson & Shepperson, 2011).

This study explored the behavior aspect of injury reduction efforts during recess. It utilized qualitative observation and a modified Flander's Interaction Analysis method for observation. Observations were unobtrusive. The goal was to observe the behaviors of the playground monitors and of school-aged children in an elementary setting of outdoor recess. The occurrence of the behaviors exhibited by the children and the adult monitors were examined in order to identify the particular behaviors that contributed to increased injury risk of the child.

A team of two researchers observed the behaviors displayed by the playground monitor and children on a short rotational basis. Researchers noted monitor behavior and then note observed child behavior. Data sets reflected behaviors occurring as close as possible to one another. Observers noted the category of risky events that occur within the observed behavior data sets. Risky events that had potential for producing injury or pain were noted in relation to monitor and child behaviors. The researchers then arranged behaviors and events into a visual model reflecting conditions, behaviors, and events that

recorded observed facts in a timed manner. This model is the Bowtie model which utilizes root cause analysis. En vivo or color coding for patterns was completed on all Bowtie models of critical events.

Root cause analysis has its foundation with determining “immediate cause” to an incident that has potential for any type of loss. Loss can include human injury, downtime, or even property damage. This project was concerned with human injury. Immediate causes are considered to be substandard conditions and unsafe acts.

This study focused on the behavioral aspects of playground safety management. Sandseter and Kinnear (2011) established that children play in order to overcome fears at their own pace. Rules governing unsafe child acts may not be effective alone because of the fact that children are exploring fears. Policy and procedure governing adult monitors may be more effective. This study produced guidelines associated with playground safety practices for playground monitors. The study also produced value to commonly taught playground monitor practices.

The pilot study played an important role in the development of this doctoral study. It validated the use of observations to suggest proper injury prevention strategies. The project showed that comprehensive safety management practices are not practiced in many elementary school settings. Accurate causal analysis is not performed, and the data are not consistent enough to justify quantitative analysis. The pilot project made the connection of interaction between child and monitor behaviors at the end of recess to conclude that the concurrent behaviors of whistle blowing and risky play allowed for an increased risk potential. This study builds upon the pilot project’s finding that behaviors are critical to limiting injury potential.

Dr. Sandseter's study identified 6 categories of risky play that can be expected to be observed. Existing statistics on playground related injuries suggest child behaviors that can be expected to be present during the observations. These include using playground equipment in non-traditional ways, inattention, blind running, and aggressive social behaviors (Frost, 1992; Frost, 1995; Safe Kids Worldwide, 2007).

Certain playground monitor behaviors can also be expected during the observation period. Playground monitors may end recess in one of several ways. They might blow a whistle, verbally gather the students, or rely on a bell. Other behaviors might include encouraging the children to line up quickly, yelling, or ignoring situations or cues.

Content Analysis

Behaviors of the children and adult monitors were observed and referenced to a critical event of increased injury potential. Analytic induction was utilized to examine causation conditions and behaviors recorded by the researcher. Analytic induction was introduced for producing cause for criminal cases in the 1960's and involves identifying critical events in order to focus on contributing factors (Berg, 1995).

Each researcher observed a different section of the playground in order to collect more data. Researchers observed the behaviors of the playground monitor and the children on a short rotational basis utilizing a modified version of the Flanders's Interaction Technique. Each researcher observed for an event that increased injury potential to a child or reduced the injury potential to a child. An example of an increased injury potential critical event would be a child running between moving swings. Observation of subsequent behaviors and events were noted. An example of a reduced

injury potential event would be a child properly allowing a swing to stop moving and then walking to the proper playground exit area without a collision, getting too close to a moving piece of equipment, or colliding with another student.

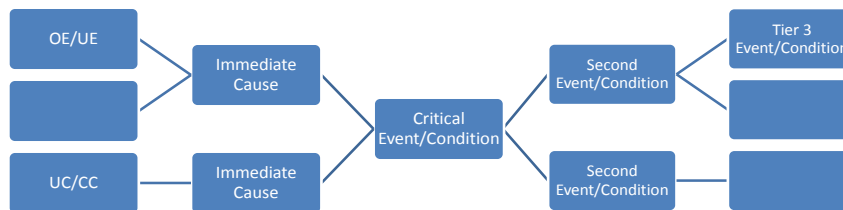
A form of open coding was used to identify frequent monitor and child behaviors that aligned to allow a critical event to occur. Observer notes were arranged in a Bowtie model to present a visual map of the incidents observed. En vivo coding then identified patterns of common behaviors.

The study produced hypotheses from qualitative description of a group of focus. The group was the human subjects primarily involved in outdoor playground activities in a K through 5th grade elementary school setting. In order to verify the applicability of any hypothesis generated from the observations, interrogative hypothesis testing was conducted. Both observers collected opposing data sets from the same setting and comparing opposing events allows validation by examining contradictory evidence (Berg, 1995).

The Bowtie Model

Incidents that resulted in injury or near injury were conceptually mapped utilizing the Bowtie approach to incident causation. The Bowtie Model of Causation was utilized as a model for root cause analysis of the observed behaviors and events while concurrently performing deductive and inductive analysis in a time-lined manner (Bowtiepro.com, 2012). This type of analysis is commonly used in system safety analyses of processes and complex incidents such as disasters. The theory behind the model is that incidents usually have a complex alignment of events and conditions that result in a critical event which may also lead to secondary events and conditions. The

model for this behavioral analysis replaced events and conditions with developmental needs and behaviors to identify the types of critical incident and the resulting types of injury. The model is represented in Figure 3.1.



*Figure 3.1:
The Bowtie Model*

In the evaluation of behaviors and conditions, events were considered to include observed behaviors and each behavior had underlying or current conditions that contributed to a type of incident. Examination of current playground injury statistics revealed several anticipated events for which the researchers observed. These events included falls, collisions, trips, exposure to heated surfaces, exposure to sharp edges, exposure to insects, exposure to plants, exposure to solar radiation, exposure to animals, and exposure to body fluid from another child’s injury.

The Bowtie Model is an inductive and deductive evaluation tool. It is especially useful in risk assessment where quantitative measure is not practical (Bowtiepro.com, 2012). The typical application in response to a critical event such as a disaster requires

working backward from the event to piece together the events and conditions that aligned to contribute to the cause. In this study the observed behaviors were examined from inductive and deductive perspectives. Some observations of behavior led to a critical event. Secondary events and conditions may have resulted from one critical event or could be anticipated from known occurrences that have been well documented from statistical evaluation and experiences. This was considered as observers identified critical events for analysis.

Both researchers utilized the Bowtie Model for visual mapping of the critical events. The visual modeling aided researchers in coding for patterns of behavior interaction. Examination of opposite events allowed contradictory evidence to be examined in the analyses and hypotheses to be produced.

Sampling

Three elementary schools from the service region of Eastern Kentucky University were selected. Schools were selected based upon willingness of the principal to participate. The schools serviced approximately 400 rural students in grades kindergarten through 5th grade.

This study produced risk to the district, principals, and educators involved. The safety of elementary school children has become a topic of interest from recent occurrences of violence. The nature of the study created potential for career threatening repercussions on the districts, principals, and educators involved, if negligent supervision was uncovered and identified with the school. Several principals and administrators refused participation in the study. Of the initial 7 schools selected based upon the service region to Eastern Kentucky University, only 2 responded positively.

An informal interview with the participating school's principal was conducted in order to gather basic background information that may be relevant to playground procedures. The informal interviews gathered only basic information for the elementary school and district. The interviews did not gather identifying information or personal information of the principal, staff, or students. The informal interview was an efficient method for gathering basic information that was considered in the analyses of the results to produce hypotheses.

The questions asked during the interviews with the principals were:

1. How many students are enrolled at your elementary school?
2. How many faculty and staff are employed at your school?
3. Does your district employ a risk manager or assign an administrator the primary job of risk management?
4. Does your school utilize a safety committee?
5. What classification of employee performs recess monitoring?
Teaching assistants/aides Certified Teachers Staff
Volunteers Other
6. Have you had training on playground safety management?
7. Do your playground monitors receive training on playground safety?
8. Do your playground monitors receive training on injury response and first aid?
9. Please rate your level of knowledge regarding playground safety management on a progressive scale of 1 to 5. Rating 1 indicates; (I rely on others for advice); 2 indicates little technical knowledge; 3 indicates that you have had some training on basic safety management; 4 indicates that you have had advanced

training and practice strict management; and 5 indicates that you have had training on playground inspection and practice auditing, tracking, investigation, and observations to manage playground safety.

One reasonable expectation of the observations involved observable differences in playground safety management in the form of procedures. It was reasonable to expect that school administrators that had a higher level of training and awareness of playground safety would implement procedures differently than administrators with little safety training or awareness. Data gathered in the interview questions aided in analysis and helped produce valuable hypotheses.

Protection of Participants

Playground monitors were not interviewed, and personal information was not gathered. Researchers only answered questions from monitors when approached to confirm identification. Unobtrusive observation was maintained in order to minimize observer influence.

The observation of the children at play on school grounds was observation in a normal educational setting. Children were not interviewed, and personal information was not gathered. Observations were not filmed or photographed.

A letter for participating school permission was sent via email to the selected elementary school principal. Contact was then made to confirm the date and time of observation. The letter included the purpose of the study, benefits to the participants, the conditions of strict confidentiality, the right of the participant to withdraw from the project without negative consequences, and the known risks that are minimal to the participant. This letter is attached as Appendix C of this manuscript.

Observations of the children and the playground monitors were completed without revealing to them the purpose of study in order to preserve the validity of conclusions. The benefits of the project outweighed any risks to the participants. The observation of the children and adult monitors is publicly displayed as it can be witnessed from a location near the school and publicly accessed. Participants were subject to interaction with the researchers only from being visible during the observations. Permission from the school principal served as an alternate form of protection to the children and in place of child assent.

The project met the three elements of ethical research outlined in the Belmont Report. Respect for persons was contained in voluntary consent of adult participants to be interviewed and consent from the principal of the school to observe the normal recess activities. Beneficence was achieved by not introducing any risks to any participant. Participants benefitted more from research outcomes than any exposure to risk. Observations occurred in the natural setting without intended interaction.

Data Collection and Analysis

The behaviors that are exhibited on a playground are too numerous to attempt to document or track every occurrence. This is in part due to the propensity of a child to experience risk and use playground equipment in risky manners that are not included in the intended use. This study countered this limitation by looking for incidents that produced injury, an occurrence of pain, or a near miss incident, and by collecting contradictory evidence from opposing critical events.

A near miss was defined as an occurrence of unintended result or use of equipment that is outside of designed use that had a reasonable potential to produce

injury or pain. Relevant examples of unintended results were collisions, trips, and passing within the moving radius of items in motion. Examples of improper equipment use were jumping from swings while in motion, jumping from the slide landing, climbing up the slide portion, or walking on top of chin-up bars.

The project documented the incidents observed and the conditions and behaviors of the child and monitor that were observed at the time of the incident. The incident was then subjected to root cause analysis and reconstructed using the Bowtie approach of concept mapping in order to identify patterns of conditions and behaviors that contributed to an increase in injury potential.

En vivo coding was utilized to identify patterns of playground monitor and child behaviors that aligned to produce critical events. Patterns of behavior were analyzed in relation to a critical event categorized as increasing risk potential or decreasing risk potential.

Frost (1992) noted behaviors in his analysis of current statistics that also apply to child behaviors for which observation occurred. They included aggressive behavior, inattention, and distraction. He provided the example of blind running as inattention.

The pilot project contributed some reasonable behaviors for which observation also occurred. These included avoidance of monitor and exploration of defiance. Some children also were observed attempting to have intimate contact such as hugging or touching that induced distraction and caused the receiver to back away and in some cases expose themselves to a hazard.

The specific behaviors were coded from observation notes and analyzed for contributing factors to observed incidents of injury, pain, or a near miss. An injury was

defined as a bout of pain that results in first aid level treatment or more advanced medical treatment. A pain incident was defined as an occurrence that results in pain to the child but is less than first aid. A near miss incident was defined as an occurrence that had a reasonable chance of resulting in injury from an unintended sequence of events or purposeful misuse of equipment. Misuse was “use” of the equipment for which it was not originally designed.

Critical events were conceptually mapped using the Bowtie approach to accident analysis. The Bowtie approach served as a check and balance for countermeasure production. Between each event and corresponding behavior, actions to prevent or reduce the occurrence were explored. This produced hypotheses for the management of playground safety. Best management practices for managing playground safety from a monitor’s viewpoint were produced.

Training of the Researchers

The study was designed to be conducted by two researchers observing child and monitor behaviors while targeting opposing critical events. The use of a second observer allowed for a division of assigned playground area thus increasing data. Construct validity was ensured through training and practical application prior to study observations.

Classroom training covered the history of the problem, categories of risky play, and categories of monitor behaviors, the modified Flander’s observation technique, and the use of the observation instrument. Researchers practiced this observation once just prior to beginning study observations. This practical application portion of the training occurred at an elementary school playground typical of the playgrounds used in the study.

The researchers used in this study had investigational expertise. The relevant skills necessary for such observational analysis includes hazard recognition, risk assessment, causal analysis, knowledge of playground equipment and layout standards, general playground monitoring duties, and knowledge of play theory. Each investigator has several years of experience investigating criminal, traffic, security, and workplace incidents.

Limitations

The study relied on researcher experience in regards to recognizing near miss events, risk events, and level of potential. The filming of elementary age children in Kentucky would have placed an insurmountable obstacle on the researcher by requiring permission from every parent or guardian of all the children on the playground. Protection of the child is the primary concern over being able to replicate the study from researcher to researcher. Researchers attempting to replicate new observations should have experience and skills of the original researchers, covered previously in this manuscript.

The Bowtie approach to incident mapping negates minor differences in regard to the identification of the critical event by preserving the timeline of events and conditions and serving as a check for producing a countermeasure to the observed events. This technique enables other researchers to analyze the critical events and produce hypotheses similar to the results of this study.

CHAPTER 4

FINDINGS

Unsafe acts and substandard conditions comprise the immediate level of incident causation (Bird, et al, 2003). This project documented the observed behaviors of playground monitors and of the children in grades K through 5 during recess. A total of 3 elementary schools participated in the study. All recess periods were observed for one day. A total of 1201 students and 48 playground monitors were observed in 20 minute periods of recess. Observation notes documented playground monitor behavior and child behaviors observed in close proximity of time. The team of two researchers identified and documented two types of critical events. One critical event was an occurrence that increased the potential for injury to a child or the children in general. The second type of critical event resulted in the decreased potential for injury to a child or the children. The goal was to provide best management practices that limited injury potential while allowing children to explore risky play.

Risky play has been described by Sandseter and Kinnear (2011) as a necessary part of human development that limits phobia potential as adults. The categories of risky play are: exploring height, experiencing speed, rough and tumble play, wandering alone, experiencing dangerous tools, and experiencing dangerous elements.

Exploring height on an elementary playground can be exemplified by climbing to the top of monkey bars, climbing to maximum potential on equipment pods and slides, or swinging to maximum height on a swing set. Experiencing speed can be exemplified by sprinting, running on equipment pods, pushing a merry go round faster and faster,

swinging fast, or using a fast pace on any piece of playground equipment. Rough and tumble play can be wrestling, shoving, dodge ball and many other forms of play where rough contact is exhibited. Wandering alone is exhibited by children staying at the properties edge, hiding from the view of the playground monitor, loitering at the top of a slide, or even loitering in a small group at the top of an equipment pod. Experiencing dangerous elements on a playground may not be practical like in other play settings. Allowing a child to play with fire for example would be considered negligent by the school and playground monitor. Children do explore elements though. They may play in water that is puddled; play in dirt, sand, or mulch. They may even throw these items or play in mud, and occasionally may touch a hot surface purposefully in order to quickly feel the sensation. Experiencing dangerous tools is also a category that does not apply on an elementary playground as it would in other play settings. It would be negligent to allow a child to play with a tool such as a saw or screwdriver without closer supervision than a recess environment allows. If props are provided then children may explore their use. Many equipment pods have turn wheels, pull pins, or other tool like items that are attached for satisfying this curiosity. Children will even utilize makeshift items such as sticks or stones for tools used in digging or hammering.

Risky play is natural for children on a playground (Sandseter & Kinnear, 2012). Playground safety management must then involve the management of behaviors. The challenge is to allow for risky play while limiting injury potential.

Critical Event Analysis

The study identified 52 critical events that were conceptually mapped utilizing the Bowtie method of incident analysis (Bowtie Pro.com, 2012). The Bowtie method was

practical for this research for its chronological order of events and its pinpointing of one critical event that developed from other events and conditions and subsequently allowed additional events and conditions to occur. The concept maps were then examined and coded for monitor behaviors and child behaviors.

The study identified 14 Classifications of Playground Monitor Behavior exhibited in the critical events. The classifications of playground monitor behaviors were: attentive, inattentive, distracted, properly positioned, improperly positioned, recognizing a hazard, failing to recognize a hazard, correcting child behavior, instructing a child, speaking to a child, getting a child's attention, verbally ending recess, using a device to end recess, and encouraging improper conduct. All classifications also were categorized in 4 conditions of playground supervision. These categories are attention, positioning, hazard recognition, and active engagement.

The category of attention includes attentive, inattentive, and distracted. Positioning includes proper positioning and poor positioning. Hazard recognition revealed itself as a unique playground supervision skill. Actively engaging students included correcting child behavior, instructing a child, speaking to a child, getting a child's attention, verbally ending recess, using a device to end recess, and encouraging improper conduct. Table 4.1 summarizes the categories of playground monitor behavior.

The study identified 8 Classifications of Children's Playground Behaviors. The classifications of child behaviors were reporting an issue, not reporting an issue, student approach to monitor, proper conduct, improper conduct, risky play, and improper use of equipment. The classifications were further categorized as engaging monitor, conduct, and play. The categories of children's playground behaviors are presented in Table 4.2.

*Table 4.1:
Playground Monitor Behaviors*

Playground Monitor Behaviors							
Attention		Positioning	Hazard	Actively			
			Recognition	Engaging Child			
Attentive		Proper	Recognizing	Speaking to			
Observation		Positioning	Hazard				
Inattention		Improper	Non	Correcting			
		Positioning	Recognition				
Distraction			of Hazard	Getting			
				Attention			
				Instructing			
				Encourage			
				Hurrying			
				or			
				Improper			
				Conduct			
				Instructing			
				Verbal End			
				to recess			
				Instructing			
				Device			
				Ending to			
				Recess			

The children reported hazards, unsafe acts, and injuries. At times, children approached a playground monitor for unknown reasons or interactions. Conduct included proper conduct observed as following common rules and engaging in safer conduct such as slowing down. Improper conduct included a violation of common playground rules and general activity that the researcher believed increased potential for injury. The category of play included Sandseter’s and Kinnear’s (2011) categories of exploring risk through play and other types of play such as creative play with musical instruments as

observed at elementary 1. Researchers identified improper use of equipment as a separate classification of play because of the increased hazard presented to the user and other bystanders. If exploring risk is natural to children as suggested by Sandseter and Kinnear (2011), children will use playground equipment in ways not intended in the original design. Rules designed to limit or prevent improper use of equipment are then rules that limit or impact play itself differently than impeding improper conduct in a general sense, such as prohibiting running until the child is on the playground.

*Table 4.2:
Child Playground Behaviors*

Child Behaviors									
Engaging Monitor			General Conduct				Play		
Reporting an Issue			Proper Conduct			Risky Play			
Not Reporting an Issue			Improper Conduct			Other Play			
Approach to Monitor						Improper Use of Equipment			

Causal Influence classified critical events based upon an increase or decrease of injury potential to the children or a single child. Analysis of the critical events identified a significant pattern of causal influence from playground monitor behavior and child behavior. Playground monitor behavior was identified as being the most influential in occurrence of both increased injury potential and decreased injury potential.

Monitor behaviors were causal to 24 of 28 total increased injury potential events. Three events were driven more by student behaviors. These events included two injuries to a child and the following of unsafe instructions by the playground monitor. A single event was considered equally influenced. It involved a child injury.

Monitor behaviors were most influential in 21 of 24 critical events rated as decreasing injury potential to the children or a single child. Three of the decreased

potential events included children not engaged in risky play, and two incidents involved a child reporting a hazard or unsafe act. Table 4.3 summarizes causal influence.

*Table 4.3:
Causal Influence of Critical Events*

Critical Event Analysis									
Increased Injury Potential Event Causal Influence									
Monitor	24								
Child	3								
Neutral	1								
Decreased Injury Potential Event Causal Influence									
Monitor	21								
Child	3								
Neutral	0								

Behavior Patterns

Analysis of increased injury potential events identified key patterns of behavior interaction. Improper positioning, encouraging hurrying and improper conduct, and inattention of the playground monitor was associated with improper conduct, non-reporting of injury, and reduced approach by children. Table 4.4 summarizes the behavior patterns of increased injury potential.

*Table 4.4:
Behavior Patterns of Increased Injury Potential Events*

Behavior Patterns of Increased Injury Potential Events									
Monitor Behavior					Child Behaviors				
Improper Positioning					Improper Conduct				
					Reduced Approach				
Encouraging Hurrying/Improper Conduct					Improper Conduct				
Inattention					Reduced Approach				
					Non reporting of Injury				

Increased injury events were categorized as an injury event, near miss event, pain event, or hindered supervision. The researchers observed 3 injury events, 13 near miss events, 4 pain events, and 8 events of hindered supervision. Injury events were characterized at least first aid for the child. A near miss was an event that had a reasonable expectation of pain or injury from improper use of equipment or improper conduct. Hindered supervision was observed as improper positioning, inattention, distraction, or failure to recognize a hazard that increased injury potential of the children or of a single child due to a lack of correction.

Analysis of decreased injury potential events identified proper positioning, attentive observation, and actively engaging children with verbal correction, instruction, and general aid or conversation as promoting proper conduct, reporting of issues by children, and general approaching of the monitor by the children. Table 4.5 summarizes the behavior patterns of the decreased injury potential events.

*Table 4.5:
Behavior Patterns of Decreased Injury Potential Events*

Behavior Patterns of Decreased Injury Potential Events									
Monitor Behavior					Child Behaviors				
Proper Positioning					Proper Conduct				
Attentive Observation					Reporting of Issues				
Actively Engaging Children					Proper Conduct				
					Reporting of Issues				
					General Approach				

Analysis of the decreased injury potential events identified two classifications. One classification was an event that resulted in safe or proper conduct increase. The other classification resulted in a child or children reporting an issue or increased approach to the monitor. Correction of improper conduct produced a decreased injury event by increasing proper conduct. Active engagement as correction, instruction, general aid, or conversation also increased the approach by children to the monitor. This included children that were not directly involved in the active engagement.

Observations

The observations at all participating elementary schools showed that monitors looked for enforcing typical rules that originate from equipment manufacturers or from general behavior codes of the school. Examples included not climbing up the outside of tube covered slides or not climbing up the friction board of the slides. Behavior code enforcement was observed when children shoved or argued. Common to all schools observed where playground monitors that failed to recognize or address obvious hazards. At elementary 2 for example a playground monitor corrected two children in a recess

period and punished with a short time out from play for climbing on the top of a tunnel slide. The action presented the child with only a 3 foot height of fall hazard over approximately 4 inches of mulch. Other children sliding down the tube were not presented with the hazard of colliding with the child since they were both on top of the tunnel. The same monitor spoke to and condoned by not correcting a little girl who sat on top of a hand over hand walk. She was exploring height by using the equipment improperly as well, but was exposed to a height hazard of between 5 and 6 feet. The depth of the mulch beneath the hand over hand walk was 4 inches and less due to a lapse in maintenance for erosion and wear. The playground monitor definitely exhibited a lack of hazard recognition skill.

Playground monitors at all schools overwhelmingly exhibited social interaction with peers, use of social media devices, lack of group control techniques, and a lack of area surveillance highlighted the behaviors that seemed to allow or promote for a child's increased potential for injury. Children exhibited all categories of risky play, lack of rule compliance, and a lack of reporting injury and direct speaking with a playground monitor when the monitors were exhibiting use of social media devices, talking in monitor groups, or not able to view the child.

Risk of injury potential central to all observations dropped when the playground monitor loudly corrected a child or group of children and when the monitor participated in play, taught correct play techniques and use of equipment, or actively walked around and spoke to random children.

Elementary One

Background of Elementary One

Elementary one is described as a new elementary with all construction coming under final completion and inspection during May of 2013 at the time of this observation. The school had opened its playground only 10 days prior to the observations. The previous year experienced the children playing outdoors on a rear parking/bus loop lot controlled for any traffic. The school had 430 students in grades kindergarten through 5th grade. The school is located in a small Kentucky town on the outlying areas of the Appalachian Mountain Range and although located within city limits, serves a rural based population as the majority of its students and student families.

The Principal is a veteran educator with two master's degrees, several years teaching experience, experience working for the Kentucky Department of Education, and had been the principal at the school for a year and one half at the time of the observations. The Principal reported that they had not received any training on playground safety and relied on others for advice. The Principal does not utilize a safety committee at the school and playground monitors receive no playground safety training except for first aid. Playground monitors are certified teachers.

The district utilizes an Assistant Superintendent for grounds and maintenance duties as well as overall risk management duties.

The Playground

The playground was new and the Principal had said that members of the community would often ask in anticipation about the opening of the playground for their children at the school.

The playground had been designed around a theme of nature. It had paved walkways that wound around playground equipment, around a stage, into a courtyard arena surrounded by planted trees for identification, a recessed sitting bench courtyard, and around large musical instruments.

The playground had two slides built on a hill that was placed over two large culverts that served as tunnels. The slides utilized an earthen ramp for access and did not present the hazard of height due to the slide lying on the ground and traversing down an earthen embankment. The landing area provided a soft energy absorbent mat surround by 4 inches of mulch.

The playground had traditional swings that also utilized an energy absorbent mat under the swing in order to negate erosion and a height hazard at access. The playground also utilized a swing that was designed for multiple students to sit on at once.

The most popular piece of playground equipment was a large climbing structure made of climbing rope woven beneath an outer steel structure. It presented a hazard of height and entanglement in the event of a fall. The ground was covered with 4 inches of mulch for a height hazard of around 9 feet. The minimum depth of energy absorbent and loose material is 6 inches. This piece should have at least 8 inches of energy absorbing loose material.

The playground was constructed on an embankment that presented uneven terrain. The walkways seemed to negate much of this hazard and encouraged the children to walk on the paved surfacing. The playground was fenced with a low chain link fence. It was close to natural vegetation and wood lines which presented the hazard of poisonous plants like poison ivy and poison oak, which were visible and accessible to the children.

Additionally, the proximity to the natural woods presented the possibility of encountering dangerous vermin like poisonous snakes. Copperheads and timber rattlers are common snakes to this county.

Safety management of the playground did not involve a pre-recess inspection and a formal inspection process was not established. Maintenance issues were little due to the new condition of the playground and equipment.

Observations

Recess occurred in over lapping sequences of classes by grades. Grades 1 through 3 and grades 4 through 5 played together. Approximately 100 children shared the playground with 4 and 5 playground monitors present.

The weather was warm at about 72 degree Fahrenheit and the natural vegetation provided shade. Children and playground monitors were generally excited and active.

Observers watched behaviors of children and of playground monitors switching back and forth between children and monitors noting their respective behaviors. When one of two critical incidents occurred, the observer made note of the event as critical and began focusing on switching between monitor and the child or children involved by taking notes of events and occurring conditions in a manner that lent itself to be visualized in the Bowtie model after recess.

Critical events that either reduced the risk of injury or increased the risk of injury to the children were analyzed. More incidents that increased the risk of injury to the child were observed in comparison to reducing the risk to the children.

Modern play theory asserts that children engage in risky play as normal human behavior in order to overcome natural fears (Sandseter & Kinnear, 2011). Playground

monitors seemed to enforce popular playground rules suggested by manufacturers rather than concentrate on hazard recognition and risk assessment skill. Rules such as not climbing up the slide portion of the slides were enforced. All categories of risky play were observed of the children.

Behaviors exhibited by the monitors seemed to influence critical events. It was obvious that when monitors spread out dividing supervisory areas that they uncovered and corrected child behaviors that were outside of using equipment in its designed manner. In one instance a monitor that was making supervisory rounds observed the exploration of a dangerous tool by several boys. The boys had taken a piece of steel from the chain link fence by unraveling it from the fence wire. Monitor behaviors that reduced the risk of child injuries or critical events that created more danger hinged on active supervision.

Playground monitors that increased the risk of injury to a child centered on inattention and procedures that limited supervision. When monitors gathered in groups children were less open to reporting and approaching the monitors with problems. Risky play continued and the breaking of simple rules like climbing up the slide backward continued. In one instance child with an injury would not approach the monitor until the group of teachers had dispersed. The injured girl hid from the monitors gathered in the center of the playground while assessing the degree of pain. Her friends stayed with her. She only reported the incident after the playground monitors dispersed from a group and another boy approached the monitor that the injured girl eventually reported her incident to. This playground monitor was her teacher.

A second playground monitor behavior that increased the risk of child injury centered on supervisory procedure while ending recess. Monitors led their students to the entry of the school from the front of the line. This allowed children to stagger, throw rocks, and un-prop entry doors creating more risk on injury.

The Principal advised that the access door to the playground would lock and playground monitors did not have the ability to unlock it. This was planned to be corrected over the summer. This condition combined leading a line of children created a condition that increased the risk to an injured child.

A playground monitor led her children into the school losing sight of the end of the line. When the back of the line began to enter a boy kicked the rock used to prop open the door. The door closed barring access to the school for the remaining playground attendees. A boy reported a small cut to his finger. The responding monitor had to knock loudly on the door to gain the attention of another inside the school. This took several minutes. If the incident had been one of an injury requiring medical treatment, proper care or alert of advanced responders would have been unduly delayed.

The critical incidents that reduced the potential for injury to the child centered on playground monitors actively correcting children. When a playground monitor yelled or verbally corrected a child all children within the playground slowed in pace and reduced the noise level for a short time afterward. Children engaged in experiencing speed, slowed, children breaking simple rules ceased, and children approached the monitor shortly after the correction.

Elementary 1 had large musical instruments, a stage, a nature walking trail, and a recessed courtyard that encouraged creative play. Playground monitors did not correct

any children engaged in such activity and little running was observed in those areas. Children in the themed areas ran only when encouraged by monitors to come quickly at the end of recess. Children here exhibited creative play, group discussion, and wandering alone.

The observations at elementary one produced three themes. The first theme was that positioning at the beginning and end of recess was critical in limiting unnecessary injury potential to the children. The second theme was that children were discouraged from reporting incidents to a playground monitor when the monitor was positioned and interacting in close proximity with other playground monitors. The third theme was that verbal correction of children breaking playground rules reduced the potential for injury to the children due to other children in the area slowing their activity.

The first theme developed from critical events that occurred at the beginning and end of recess when playground monitors were not positioned well enough to observe and correct continued displays of risky play. One critical event that occurred at the beginning of recess involved a playground monitor that was well behind the line of children entering the playground. The children were able to sprint in a chaotic manner and jump on equipment to use it improperly. The sprinting and exploration of speed created an environment of unnecessary risk when children ran too close to moving equipment. Critical events occurred at the end of recess when playground monitors were in front of the line and led their children into the school. Children at the end of the line engaged in rough and tumble play by pushing and shoving and throwing rocks. One incident detailed the kicking away of a rock used to prop open the access door. A subsequent event of an

injured child and an alignment of two conditions; a locked access door and playground monitors without a key combined to make this an incident of priority.

The second theme from the observations at elementary one developed from the playground monitors gathering in a group at different times during recess. Children did not approach playground monitors during the times that they were grouped together. This phenomenon was highlighted by a young girl who hurt her ankle severely enough to cry and stop play and to delay talking to her teacher the playground monitor until after the playground monitors had separated from a group.

The final theme developed from playground monitors correcting child behaviors. When this was done other uninvolved children in the area slowed their pace of activity. The slowing of pace lasted for a short time afterward.

15 critical incidents were observed during 80 minutes of recess time. 430 students and 17 playground monitors were present at different times. 11 of the critical events increased the risk of injury to a child.

Elementary Two

Background of Elementary Two

Elementary two is a newer elementary with 370 students enrolled in grades K through 5. It is located inside the limits of a small Kentucky town and serves a rural population.

The Principal is veteran educator and long serving principal of the school. She has a Rank 1 certificate and principal certification. She reported that she had not received training on playground safety management. She rates her knowledge of playground safety

management at a 3. The school does form safety committees using faculty and staff on a topic by topic basis as needed.

Certified teachers are used as playground monitors. Playground monitors receive first aid and blood-borne pathogens training annually.

The district uses a Maintenance and Grounds Manager in central office to oversee school safety management.

The Playground

The school had three separate playgrounds; pre-school, public access, and an enclosed contemporary playground. The pre-school playground was exemplary in safety measures. The public access playground presented many issues and was not well maintained. The private contemporary playground presented safety issues one of which was of high concern.

The pre-school playground was not utilized in this study but was initially audited for safety. It was fenced and all equipment met standard for the age group. The playground utilized safety mulch or rubber chips for energy absorbent material around the equipment. It was contained by rounded pvc pipe to prevent eroded areas and not present a sharp edge to children. This playground was not utilized for observations. The exemplary condition of the playground is evidence of proper safety management.

The public access playground was not used by students the day of observations. An administrative assistant did advise that the playground is occasionally used for 4th and 5th grade students only. The playground consisted of traditional playground equipment, open grounds, and cookout grills. The equipment was older and in disrepair. Grills had rusted out areas that presented sharp edges, concrete walkways had uneven

surfaces, trash debris was present on the playground, and the mulch did not maintain a six inch depth minimum.

The primary playground was a private school use playground with a large contemporary equipment pod. It also utilized open grass areas between the playground and school. The equipment was surrounded by a plastic containment system and wood mulch utilized as shock absorbing material. The playground did not maintain a minimum depth of 6 inches of mulch under equipment. The high priority discrepancy was an exposed piece of rebar that stuck up from the ground several inches in a high traffic entranceway of the playground. The rebar presented a reasonable hazard of impalement.

Observations

The theme for elementary two was hazard recognition. Recess began with students sprinting out from the school building and running to the playground equipment with large suckers in their mouths. Recess was conducted just after the annual awards ceremony. Later classes joined the playground as initial classes ended recess and returned to the school building. Some of the children in later recess periods were observed with large loose necklaces around their necks and some had candy vampire teeth in their mouths while running and playing on the equipment and grounds. The presence of a choking hazard was observed.

Playground monitors were observed enforcing the rule of not climbing up backward on an equipment slide and keeping children within the playground itself. The choking hazard presented by the suckers, candy teeth, and loose necklaces was not addressed. In one critical event noted by both researchers, a playground monitor corrected a child on the back of a tunnel slide from crawling up backwards and then

spoke to a child sitting on top of the hand over hand walk. The child sitting on the hand over hand walk was actually experiencing height by improper use of equipment. The height of 5 to 6 feet presented a greater hazard than the 3 foot hazard observed of the student climbing up the back of the slide. Children who used the hand over hand walk properly would have a much lower height hazard and not have the length of exposure of a child that was sitting on top of the equipment.

The playground monitors were enforcing common equipment rules rather than utilizing hazard recognition skills to recognize and prioritize conduct enforcement.

Several incidents of playground monitor inattention by use of social media device were observed. Children avoided reporting and approaching monitors that were using cell phones or other social media devices.

One playground monitor at elementary two displayed “play leader” ability. The monitor went from area to area actively engaging children by instructing some on how to use equipment, rules of games they were playing, and actively participating in kick ball. In one instance the playground monitor instructed a child who was sitting alone on how to use a zip line type piece of playground equipment. After the child began using the equipment others began joining him. Children responded by engaging the monitor with conversation, one report of a minor occurrence of pain from a fall, and one reported water on the equipment pod.

Recess observations at elementary two confirmed observation findings at elementary one in supervisory control issues at the beginning and end of recess and the non-reporting and approach of students to monitors that were grouped together talking or using cell phones and other devices. Observations at elementary two uncovered issues in

hazard recognition and showed that active engagement from a playground monitor can reduce injury potential to a child from increased reporting.

Elementary Three

Background of Elementary Three

Elementary three is an older building that has been renovated and built upon over decades. It has an established history in the community obvious from pictures and wards from its day as a high school for the rural mountain town. The enrollment for kindergarten through 5th grade is currently at 401. It employs 46 faculty and staff.

The principal is a veteran principal at the school. The school utilizes a positive school committee that takes a look at safety issues as needed. The principal was unsure as to the district's use of a risk manager or assignment of those duties. The principal has not had any training on playground related safety. Self-rated playground safety knowledge is at a "3" on a scale of 1 to 5 with 5 being expertise.

Playground monitors are certified teachers. The principal indicated that the monitors were not trained in playground safety management, first aid delivery, or blood-borne pathogens protection.

The principal also informed the research team of a serious injury that had occurred on the playground the previous week. A young boy fell and received a broken arm. The principal relayed that the boy's mother was very angry and critical of the school for not having adequate mulch on the ground. The school immediately placed new mulch on the playground beneath the equipment pod where the boy had fallen.

Playground

The playground had a contemporary equipment pod and traditional swings surrounded by 6 inches of newly placed mulch. It also had a paved basketball full court area surrounded by grass field. The equipment pod area was near and partially shaded by older trees.

Initial inspection uncovered evidence of an absence of inspection. Numerous cigar wrapping paper containers were observed on the newly laid mulch. Closer inspection of the equipment pod revealed a cigarette lighter and a stem of marijuana plant that had been left behind. The lighter and stem of marijuana plant were confiscated and discarded prior to children coming onto the playground. Chains on the swings and on the chain walk of the equipment pod had various stages of wear that warranted replacement. On a nearby pre-school playground hornets were observed around nearby trees, a dead branch partially overhung the swing set, and a garbage can was overflowing with garbage and attracting bees.

These conditions were reported to the principal. The pre-school playground was not used on this day. It is not a focus of the study but was inspected and conditions reported from an ethical duty of the researchers.

Observations

The overall theme of the day was chairs. All but three playground monitors utilized a chair for sitting in a group during recess. The chairs were carried by a student to and from the playground. Alarmed as an observer the day produced many practices that decreased the injury potential to the children. Surprisingly, the day produced many more decreased injury potential events than observed at the first two elementary schools or

from the pilot project. The critical events were evenly divided at 11 between incidents that increased injury potential to the children or a single child and incidents that decreased injury potential.

Recess grouped three classes together sharing the playground for a 20 minute period. Certified teachers also filled the role of playground monitor. The monitors exhibited a mix of good practices and poor practices. The lack of uniform procedures was clearly explained from the principal's report of not conducting playground safety training at the school.

The key playground monitor behaviors that contributed to increased injury potential were common to the other observed incidents at the first two schools. Positioning at the beginning and end of recess as well as during recess, exacerbated by the use of chairs that limited view and grouping of the chairs in close proximity was the main contributor to hindered supervision.

Certain playground monitors exhibited outstanding positioning on an inconsistent basis. In one instance the playground monitors practiced outstanding team positioning and supervision while leading the children back into the school after recess. The same monitors did not exhibit this level of supervision at the beginning of recess nor during recess. When recess was called to end verbally, each playground monitor stood at the location where their respective class was to line up. The monitors stood facing the playground. One monitor encouraged the children to hurry, which did increase injury potential. After the children were lined up respective to their monitor, the playground monitors converged the classes into one line. A playground monitor was positioned at the front of the line, in the middle of the line, and at the end of the line. This produced a

critical event of decreased injury potential. Children did not straggle behind, push, shove, or throw items. Children slowly walked and talked with each other. This practice is an outstanding practice not observed at any other school and more importantly at the end of any other recess at elementary 3. Playground safety training could foster a sharing of practices and procedures that would decrease injury potential and standardize supervisory practices.

A second example of limiting injury potential was observed at the last recess period of the afternoon. The researchers had stepped into the school building to observe the entrance of a class onto the playground. The playground monitor stopped her class at the door and reminded her children of proper playground conduct. She went over not running down the hill to the playground, to follow rules of using the equipment, and not to be rough with each other. This very short stopping and safety reminder produced an event of decreased injury potential. The children did not run downhill in a chaotic manner as witnessed during the day at elementary 3 and at the other schools.

Conclusion

Playground monitor behaviors influence playground safety more than child behaviors. Positioning, attention, hazard recognition skill, and active engagement of the children were the categories of playground monitor behavior identified with causal influence in events of increased injury potential to the children or a single child. The specific behaviors identified were; attentive, inattentive, distracted, properly positioned, poorly positioned, failing to recognize a hazard, correcting child behavior, instructing a child, speaking to a child, getting a child's attention, verbally ending recess, using a device to end recess, and encouraging improper conduct.

The study identified 7 specific child behaviors from the analysis of all critical events. The specific child behaviors were reporting an issue, not reporting an issue, student approach to monitor, proper conduct, improper conduct, risky play, and improper use of equipment. These specific behaviors were categorized as engaging monitor, conduct, and play.

Child behaviors that were of causal influence in events of decreased injury potential were categorized as proper conduct and reporting or approaching the playground monitor.

Decreasing injury potential to children in grades k through 5 in an elementary school setting depends on managing the categories of playground monitor behaviors of positioning, attention, hazard recognition skill, and active engagement. Child behaviors that must be managed are proper conduct outside of risky play and reporting and approaching playground monitors.

CHAPTER 5

CONCLUSION

The pilot project conducted prior to this study concluded that child and playground monitors' behaviors are a management concern for safety (Dotson & Shepperson, 2011). The history of playground safety was dominated by the push for equipment manufacturing standards. Despite the widespread acceptance of manufacturing standards in the 90's, injuries have continued to increase (Frost, 1992). The increase in injury is evidence that the immediate level of causation requires focus on playground behaviors.

Sandseter and Kinnear (2011) posit that children's play must include risky behavior in order to overcome adult phobias. This new evidence explaining a child's play, considered with the increasing exposure to liability (Frost & Sweeney, 1995), and the fact that playgrounds are the most frequent school venue for child injury (Frost, 1992), present a unique management challenge to a school district. The challenge of allowing unrestrictive play, while controlling for unnecessary increases in injury potential to the child, calls for a management effort of behaviors exhibited by the playground monitor and the child while on the playground.

This study examined what behaviors were exhibited by playground monitors and children during recess and examined the occurrence of those behaviors with incidents that increased potential injury to the children or a single child and also to incidents that reduced the potential injury to the children or single child.

The study observed 16 recess periods at 3 elementary schools from different districts in Central Kentucky. Recess periods lasted approximately 20 minutes each. 1201 children in grades K through 5 and 48 playground monitors participated in the observed events. All playground monitors were certified teachers.

This study identified 52 critical events that either increased the potential of child injury or decreased the potential for child injury. Observations of observable behaviors and conditions were documented and arranged in a chronological order utilizing the Bowtie method of incident mapping for each of the critical events.

Playground monitor behaviors were identified as having causal influence in 45 of the critical events. 24 of 28 of the events that increased injury potential to a child or the children in general had causal influence by the playground monitor. Only 3 were identified as having causal influence from student behaviors. A single event had neutral influence.

Playground monitor behaviors were identified as having causal influence in 21 of 24 events that decreased injury potential to a child or the children in general. Student behaviors were identified as having causal influence in 3 decreased injury potential events. Table 5.1 reflects causal influence.

Playground safety based upon the root cause model of accident causation relies upon unsafe conditions and unsafe acts (Bird et al, 2003). Unsafe conditions are largely met with meeting and inspecting for playground equipment standards published by the Consumer Product Safety Commission. This study has found that limiting unsafe acts or behaviors on an elementary playground, relies more on the management of playground monitors rather than targeting children's behaviors on a playground.

*Table 5.1:
Causal Influence of Critical Events 2*

Critical Event Analysis									
Increased Injury Potential Event Causal Influence									
Monitor	24								
Child	3								
Neutral	1								
Decreased Injury Potential Event Causal Influence									
Monitor	21								
Child	3								
Neutral	0								

The study found that playground monitor behaviors of causal influence in regard to safety management could be categorized as attention, positioning, hazard recognition, and active engagement. Specific playground monitors' behaviors that were identified as being a causal factor in decreasing injury potential for a child or the children in general were inattention, improper positioning, and encouraging hurrying and improper conduct. The behavior patterns of the playground monitors and of the children identified with increased injury potential events are depicted in table 5.2.

*Table 5.2:
Behavior Patterns of Increased Injury Potential Events 2*

Behavior Patterns of Increased Injury Potential Events									
Monitor Behavior					Child Behaviors				
Improper Positioning					Improper Conduct				
					Reduced Approach				
Encouraging Hurrying/Improper Conduct					Improper Conduct				
Inattention					Reduced Approach				
					Non reporting of Injury				

The playground monitors’ behaviors that were associated with decreased injury potential events included attentive observation, proper positioning, active engagement by correcting improper conduct, speaking with, and instruction. These playground monitor behaviors encouraged children to exercise proper conduct, report hazards, and approach the monitor in general. Children exercising proper conduct by properly using equipment and slowing their pace and the reporting of hazards and injuries were associated with decreasing injury potential to the children or a single child. Table 5.3 reflects the behavior patterns of the playground monitors and the children identified with decreased injury potential events.

Behavior Application

Findings of the study are a significant find in the development of training and evaluation programs for playground monitors. Categories of desired playground monitor behaviors can now be targeted by administrative observation and evaluation of proper playground supervision. Training for playground monitors on proper safety supervision can now add value propositions to proper supervisory practices.

*Table 5.3:
Behavior Patterns of Decreased Injury Potential Events 2*

Behavior Patterns of Decreased Injury Potential Events									
Monitor Behavior					Child Behaviors				
Proper Positioning					Proper Conduct				
Attentive Observation					Reporting of Issues				
Actively Engaging Children					Proper Conduct				
					Reporting of Issues				
					General Approach				

The informal interview with the principal from elementary one found that guidelines instructed to teachers in regard to playground supervision included not grouping together for unnecessary conversation or for use of cell phones or other social media devices. The observation team felt that it is likely that playground monitors viewed recess as an opportunity for their own break as well as an important educational setting. This feeling was developed from the common observation of playground monitors remaining grouped together in long conversations, use of chairs grouped together for interaction, use of cell phones or other social media devices. A simple policy or guideline from a principal may be expected by the playground monitor. The study now adds valuable reasoning that may appeal to playground monitors. The study identified a propensity of children to not report hazards or injuries or approach the playground monitor in general when they were grouped or using social media devices.

The pilot project included in-depth interviews with a school nurse and a long serving elementary principal. Reactions, informal interviews, and preparations associated with this study reveal an overwhelming attitude with educators toward playground

injuries. The saying that children are going to get hurt seems to be an acceptance and ideal that precludes proper playground safety management.

Behavior based safety is a concept of managing human habits and observable acts that produce undesired safety results (Roughton & Mercurio, 2002). This study identified the undesired results as critical events that increased the injury potential to children on a playground. Observable acts were then identified that were associated with the undesired results. Value propositions are important as well because behaviors are influenced by personal values (Roughton & Mercurio, 2002). Motivating playground monitors to attentively observe, practice established procedures, properly place themselves on the playground for maximized observation, and actively engage the children relies in part on moral appeal (Wagner & Simpson, 2009). Playground monitors that have the knowledge of poor supervisory habits discouraging a child's approach to them may be a motivator for changing the habit.

The psychological basis for behavior based safety is to move personnel toward desired behaviors by encouraging acts. Evaluation and feedback on observed behaviors and reward for desired behaviors leads personnel toward realizing their contribution toward positive safety (Roughton & Mercurio, 2002). In this case it is the increased safety and educational experience of children on a playground.

Assessment is about the analysis of observable events (Wagner & Simpson, 2009). This study assessed critical events to produce specific behaviors that can be valued toward playground safety. Establishing a system of evaluation adds true emphasis to playground safety. It adds playground safety to the moral architecture of a school. Moral architecture involves commitments as well as ethics, virtues, goals, policies, personal

relations, attitudes, habits, and communication for “human betterment” for the school (Wagner & Simpson, 2009).

Evaluations are such a tool for educational practice in the classroom. Evaluations based upon the findings of this study can be used as a basis for evaluating playground monitors. Use of such evaluations can provide awareness, focus, force responsibility, and result in action and positive behaviors necessary for establishing safety culture among playground monitors (Roughton & Mercurio, 2002). Hazard recognition training has been identified as a need for playground monitors by this study. It is the remaining link of the chain for positive behaviors (Roughton & Mercurio, 2002).

Evaluators may use a behavior observation card for recording observation results. Modifications of the suggested card are encouraged for individual school application, scoring and tracking results in desired methods, or ease of use. Figure 5.1 depicts an example of a playground behavior evaluation card.

The challenge of allowing children free play while limiting injury potential is answered by injury prevention strategies and behavior management. Injury prevention involves the adherence to playground layout and equipment standards. This study found that playground and child behaviors do interact in a way that can decrease injury potential to the child. Behavior management must include the adherence by playground monitors to procedures that allow for child development through free play and concurrently decrease injury potential to the child.

Preserving the educational experience of the child at play is of primary importance (Frost, 1992). Promoting playground monitor behavior that encourages a child to interact with the playground monitor and playground monitor behavior that

openly enforces established rules were shown to decrease injury potential to a child or the children in general.

Playground Behavior Evaluation							
Monitor Behaviors				Child Behaviors			
Desired		Undesired		Desired		Undesired	
1 to 5		1 to 5		1 to 5		1 to 5	
Attentive		Unattentive		Approach		Fails to	
				Monitor		Approach	
Properly		Poorly					
Positioned		Positioned		Reports		Fails to	
				Issues		Report	
Recognizes		Fails to					
Hazard		Recognize		Proper		Improper	
		Hazard		Conduct		Conduct	
Instructs		Encourages		Risky Play		Improper	
Child		Hurrying				Use of	
						Equipment	
Corrects		Fails to					
Improper		Follow					
Conduct		School					
		Procedures					
Speaks to							
Child							
Follows							
School							
Procedures							
Number of First Aid or Medical Treatment Injuries observed:							
Number of pain incidents observed:							
Number of near misses observed:							
Notes on major occurrences:							

Figure 5.1:
Playground Behavior Evaluation Card

The observations produced one overall theme that involved playground monitor positioning. Playground monitors in the beginning of recess need to lead their assigned group of children to the playground in order to maintain safe travel speeds and paths to

the playground itself. Playground monitors need to remain near the back of the line when taking the children from the playground to the school building and classroom. This allows them to maintain visual observation of children. Two playground monitors could team up to maintain order while moving children in groups to and from recess.

Observations conducted at elementary 3 identified a best management practice for one playground monitor taking students from a building to a playground to begin recess. The playground monitor paused at the door in order to instruct the children of general playground conduct. None of those students were observed sprinting downhill from the building before gaining access to the playground.

The moving of children in groups at all elementary schools involved one monitor at the rear of the line while traveling to the playground and leading the line away from the playground. Several incidents that increase injury potential to students occurred. It is established practice for military unit leaders to guide group formations from a point that is to the rear and side of the members. When the leader is positioned at a point allowing a frontal view of at least 75 percent of the personnel with a peripheral view and within sensory presence of the remaining personnel supervision can be accomplished.

Observations conducted at elementary 3 witnessed a team of 3 playground monitors arrange 3 class lines of students into one line with a playground monitor stationed in the front, middle and end of line in order to establish and maintain supervisory control.

A recurring theme that involved positioning and inattention was observed when playground monitors were grouped together and talking. Children did not approach the playground monitor or report injuries. Children did approach the playground monitors

when the broke away from a huddled group or engaged the children with instruction for play, greetings, or shows of interest in general. The study found that playground monitors that engage children first get more feedback and interaction from the children. This finding reinforces the reasoning behind training playground monitors for best practices that limit injury potential to children rather than attempting to control an elementary student's play.

Best practices for playground monitors involves dividing the playground into sections for active observation of the children, not grouping together, and engaging children with play ideas, themes, examples, demonstrations, or general displays of interest such as talking to about child interests or simple greetings. Paul Jacobs referred to these as duties of a play leader (Jacobs, 1999).

The playground is an important environment for child development and learning (Frost, 1992). A best practice for educational and safety concerns would be to assign at least one playground monitor per recess period to be the play leader. This playground monitor would teach children proper use of equipment, rules to games, complex activities, facilitate proper recess termination procedures, and even participate to some degree. Other playground monitors would be tasked with observation of different sections of the playground, ending recess, enforcing established rules of conduct, controlling access and egress, summoning and responding to incidents of an emergency nature, and other duties associated with general supervision.

Playground monitors seem to view recess as their break time as well. This presumption is based on observed behaviors of grouping to talk among their peers, use of cell phones to speak with another party, use of electronic devices to text, game, or

otherwise communicate or entertain. Several observations of events that increased injury potential to the child involved playground monitor distraction based upon use of electronic communication devices.

Emergency response while on playground seems to be a topic that is overlooked in planning. Playgrounds observed in this study did not have first aid kits, body fluid protection and clean-up kits, Automated External Defibrillators, or utilize a call box or radio communications for sounding alarms to summon aid. All schools relied upon physical access through a door for access to first aid kits, medical devices, or to summon aid. Elementary one had an access door that would lock behind playground monitors and had to be propped open by a rock. Observations included the rock being purposefully kicked by a child as he entered the building unobserved by the playground monitor due to leading the line of students.

Observations at elementary two produced a separate theme that is foundational for proper safety supervision. Playground monitors were relying on common rules of proper equipment use rather than exercising the ability to recognize and prioritize hazards. Common rules for playground safety center on the child. Examples include sitting evenly and grasping a swing's supports with both hands, using the ladder to access a slide, and not pushing or shoving on equipment another child (Boelts, 1998; Knowlton, 2009; Pancella, 2005). Analysis of some critical events showed a discrepancy between the corrections of child behaviors based upon risk potential.

Recess observations conducted at elementary three produce an equal number of critical events that increased injury potential or decreased injury potential to the children

or a single child. Positioning and unsafe conditions from lack of pre-use inspections became the individual theme for elementary three.

Elementary 3 occurrences also tied together an unexpected finding involving the use of a whistle and the ending of recess. The pilot project had identified the end of recess as a time of increased injury potential and showed that the use of whistle to end recess was not as safe as verbal endings. Observation of a playground monitor at elementary 3 using a whistle to get the attention of children in order to receive verbal instruction tied together observations of different practices for ending recess.

The study observed several different specific ways to end recess. Many monitors ended recess with a verbal command, others ended with a non-verbal cue such as raising their hand, and some signaled the end with a device. Devices included a horn and a whistle. The active engagement of children by the monitor waiving or otherwise encouraging them to hurry increased the injury potential to a child. Children in response would begin sprinting on loose surfacing, around swings, or in close proximity to others running blindly.

The pilot project observed the same increased injury potential scenarios when a whistle was blown to end recess. The last recess period of the pilot project witnessed a verbal gathering of students to end recess which did not produce an increase injury potential. The horn was used at elementary one with only a few students running to the playground monitor. At elementary 3 one playground monitor blew a whistle to signal for the children to stop activity and look to her. This was the suggested practice for the elementary school involved in the pilot project. The observations at all elementary schools and the observed use of a whistle to gain child attention at elementary 3 revealed

that the use of a device to end recess is not the deciding factor for increased or decreased injury potential. This study has found that the playground monitor must establish meaning to a procedure.

Whistles may be used to gain attention and then verbally signal an end to recess without increasing injury potential. Playground monitors should refrain from common body language or verbal commands that encourage unnecessary hurrying.

Pre-recess Inspection

The research team conducted pre-recess inspections at each elementary prior to recess beginning in order to understand the conditions present. The schools were not conducting pre-recess inspections. Elementary 1 had a new playground completed only days prior to observations. Only possible concerns were uncovered from hazard recognition skills. Pre-observation inspections at elementary 2 and elementary 3 showed a definite need for pre-recess inspection from the findings of worn chains, protruding rebar, presence of trash build-up in refuse cans, vegetation, falling debris or dead limbs, insects, illegal drugs, and drug paraphernalia.

The Consumer Product Safety Commission has published a basic inspection audit sheet. Minimal training on hazard recognition also allows playground monitors, or other school personnel assigned to daily inspection duties to apply specific knowledge to the inspection criteria. The daily inspection form is contained in Appendix B.

Conclusion

This study had two research questions to explore by unobtrusive qualitative observations of the observable acts of playground monitors and of the elementary

children in grades K through 5 present on an outdoor playground. The study found significant answers to the following questions;

1. What occurs in the lives of students and monitors during recess?
2. What safety practices can be developed from the observation of the events and conditions present during recess? The results of the study have a potential for significantly changing playground safety management in elementary schools in Kentucky.

Evaluating playground monitor behaviors and children behaviors utilized in conjunction with playground hazard recognition training may prove useful for allowing free play and reducing injury potential for the children on an elementary playground for grades k through 5. This is because the study concluded that playground monitor behaviors play a bigger role in playground safety critical events than child behaviors. Positioning, attention, hazard recognition, and active engagement of the children were associated with increasing or decreasing injury potential on an elementary playground. Attentive observation, proper positioning for view, recognizing hazards, and active engaging a child by instruction, conversation, or conduct correction were associated with decreased injury potential events. Playground monitor behaviors of not paying attention, improper positioning, failing to recognize hazards, and encouraging hurrying or improper conduct were associated with increased injury potential events.

The study also identified some best management practices that reduced injury potential events. The beginning and ending of recess were times of increased risky play and improper conduct that increased the injury potential to the children or a single child due to supervisory control. Front of the line control was needed in the beginning of recess

while controlling the rear of the line was needed at the end of recess. Monitors should team up to provide supervisory control at both ends during the beginning of recess. The end of recess should at a minimum have control of the line from a rearward position. The best practice would be to have playground monitors in the front, middle, and end of lines when possible.

The act of stopping the children just prior to the exit of the school building for entry to the playground and conducting a safe conduct reminder was found to decrease the injury potential to the children while traveling to the playground.

The use of a whistle was of concern due to the findings of a whistle at the end of recess in the pilot project to have increased injury potential. The study found that the use of any device to end recess impacted safety based upon the established meaning it had to the children. The observed use of the whistle in the study produced a stop in place effect on the children playing at recess. The children would then look to the playground monitor for verbal instruction. It was used as an attention getting device only. The use of the whistle in the pilot project was more of a device that meant hurry up. This is significant because the active engagement of a child in a manner to encourage hurrying, such as waiving of a hand or verbal shout to “hurry,” was found to increase injury potential to the children.

Developing best practice procedures for the beginning and end of recess, training playground monitors on playground hazard recognition, and establishing playground monitor evaluations are recommended for reducing injury potential to children.

Future Study

This study has opened the door for future study by finding a lack of reliance on hazard recognition skills by playground monitors and producing a set of observable behaviors that can be used for evaluation of playground monitors for reducing potential for injury to a single child or to the children in general. Additional study is needed to identify the level of need for hazard recognition skills of playground monitors. The foundation has now been built for testing the effectiveness of such an evaluation system for playground monitoring duty.

A study that asked playground monitors to identify hazard categories as presented on a playground and then to prioritize certain presented hazards based upon potential severity would produce a better understanding of the training needs. This suggested study would assess the need for training to playground monitors that replicates the skills of hazard recognition and assessment possessed by the researchers in this study. The observations conducted at elementary two were conducted just after the annual awards ceremony with the end of the school year looming near. Many questions surface concerning the observed lack of hazard recognition skills. Does the fact that the children are not the siblings of the playground monitor effect the level of supervision? Does the legal protection of sovereign immunity impact playground safety management? Are playground monitors concerned with personal or district liability?

The finding that the playground monitors at elementary two exhibited a lack of hazard recognition skill was based on the observed enforcement of common rules written by equipment manufacturers to prevent improper usage. This is akin to the moral decision making dilemma of legislating ethical behavior or teaching virtue that then transfers to

increased ethical behavior. Will hazard recognition skills taught to playground monitors decrease injury potential on the playground? Furthermore, proper supervision from the district level certainly must include hazard recognition and assessment skills to playground monitors, since they are supervising children that explore risk as suggested by Sandseter and Kinnear (2011), and are responsible for the safety of the children on the playground. The study has also established a reasonable line for accepting the risk of play that preserves uninhibited play. Playground monitors should observe the use of equipment for improper use that creates a hazard not presented by design of the equipment. When a child climbs over the guardrails of an equipment, for example, they are exploring height presented outside the designed intention.

This study has produced a three prong program to manage playground safety. The first prong is pre-recess daily inspection for basic maintenance issues and basic hazards. The second prong suggests training on supervisory protocol and hazard recognition. The third prong involves evaluating playground monitor and elementary children behaviors on a playground for injury potential reduction. The next step is for study of hazard recognition skills. Once hazard recognition training is conducted, a study of program effectiveness could be conducted.

This study has produced a basic method for playground monitor evaluation. Once training has been conducted for supervisory protocol an evaluation program could be implemented and results tracked based upon evaluation. If consistent record keeping practices were developed and implemented for the schools participating in future studies, injury statistics could also be added to the performance measure.

The future study and implementation of behavior centric safety management efforts promise positive impact on playground safety in elementary schools. This study has explored a new methodology in regards to behavioral observations in education settings. It establishes a valid method for observing for events and analyzing critical events for safety based upon behavior. The methodology can be applied in other situations where human behavior is critical to outcome. Relevant examples include evaluation of emergency drills and exercises, security assessments, and crowd control procedures.

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Appendix A

Participation Request and Informal Principal Interview Questionnaire



EASTERN KENTUCKY UNIVERSITY
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College of Justice & Safety – A Program of Distinction
Safety, Security and Emergency Management Department

Ronald G. Dotson
Eastern Kentucky University Assoc. Professor of Occupational Safety and Health
521 Lancaster Ave. Stratton Bldg. 250
Richmond, Ky. 40475
Participant

Re: Playground Safety Study
Principal,

I am requesting your participation in a study about the behaviors of children and adult monitors exhibited at the end of recess on elementary school playgrounds. The purpose is to produce best management practices that reduce the unnecessary increase of injury potential. The information gained will be used to design training and educational efforts for elementary students and playground monitors in order to limit liability associated with playground injuries.

Strict confidentiality will be maintained. The name of the school, the school district, administrators, students, playground monitors, and school nursing staff will not be maintained or referenced in any article, publication, study, or classroom presentation.

I need your help in studying playground safety in order to limit injuries to our children on Kentucky playgrounds and limit liability to our public schools. I am asking for your permission to observe your recess periods for one day. Additionally, I would like to ask you some basic questions that should take no longer than 10 minutes of your time.

As a participant you have the right to withdraw from this project at any time. Known risks to the school, school district, or any participant observed or interviewed is minimal. Observations will be made in an objective and non-participative manner.

As a participant you can expect to gain knowledge of the experiences that are actually occurring and the liability exposure to your school. Practices will be examined in comparison to widely accepted ASTM standards for playgrounds, known psychological behavior studies, and accepted safety management practices from the public and private sectors.

Please respond with permission or denial to participate in one of the following manners:

Office Phone: 859-622-1584

E-mail: ron.dotson@eku.edu

Or you may return this letter to

Address: Ronald G Dotson
521 Lancaster Ave. Stratton BLDG 250
Richmond KY 40475

Yes, I agree to participate

Participant Signature _____

No, I decline to participate at this time

Participant Signature _____

Informal Principal Interview

Please answer the following:

1. How many students are present at your elementary school? _____
2. How many faculty and staff are employed at your school? _____
3. Does your district employ a risk manager or assign an administrator the primary job of risk management? Yes or No
4. Does your school utilize a safety committee? Yes or No
5. What classification of employee performs recess monitoring?
Teaching assistants/aides Certified Teachers Staff Volunteers
Other
6. Have you had training on playground safety management? Yes or No
7. Do your playground monitors receive training on playground safety? Yes or No
8. Do your playground monitors receive training on injury response and first aid?
9. Please rate your level of knowledge regarding playground safety management on a scale of 1 to 5, 5 being high expertise.

1 (I rely on others for advice)
2 (little technical knowledge)
3 (had training and understand basic safety management)
4 (have had advanced training and practice strict management)
5 (have playground inspection certification and practice auditing, tracking, investigation, and observations to manage playground safety)

10. Please indicate your permission for me to observe your students during recess

Yes on No

Appendix B

Tables and Figures

*Table B.1:
Playground Monitor Behaviors 2*

Playground Monitor Behaviors							
Attention		Positioning	Hazard	Actively			
			Recognition	Engaging Child			
Attentive		Proper	Recognizing	Speaking to			
Observation		Positioning	Hazard				
Inattention		Improper	Non	Correcting			
		Positioning	Recognition				
Distraction			of Hazard	Getting			
				Attention			
				Instructing			
				Encourage			
				Hurrying			
				or			
				Improper			
				Conduct			
				Instructing			
				Verbal End			
				to recess			
				Instructing			
				Device			
				Ending to			
				Recess			

*Table B.2:
Child Playground Behaviors 2*

Child Behaviors									
Engaging Monitor				General Conduct			Play		
Reporting an Issue				Proper Conduct			Risky Play		
Not Reporting an Issue				Improper Conduct			Other Play		
Approach to Monitor							Improper Use of Equipment		

*Table B.3:
Causal Influence of Critical Events 3*

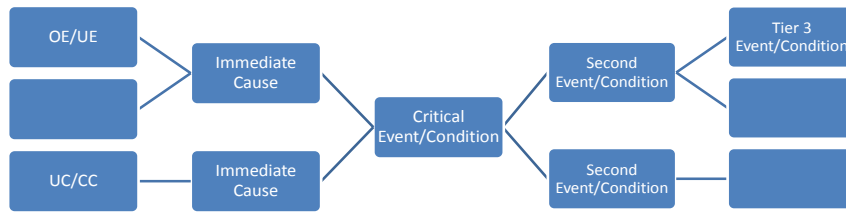
Critical Event Analysis									
Increased Injury Potential Event Causal Influence									
Monitor	24								
Child	3								
Neutral	1								
Decreased Injury Potential Event Causal Influence									
Monitor	21								
Child	3								
Neutral	0								

*Table B.4:
Behavior Patterns of Increased Injury Potential Events 3*

Behavior Patterns of Increased Injury Potential Events									
Monitor Behavior					Child Behaviors				
Improper Positioning					Improper Conduct				
					Reduced Approach				
Encouraging Hurrying/Improper Conduct					Improper Conduct				
Inattention					Reduced Approach				
					Non reporting of Injury				

*Table B.5:
Behavior Patterns of Decreased Injury Potential Events 3*

Behavior Patterns of Decreased Injury Potential Events									
Monitor Behavior					Child Behaviors				
Proper Positioning					Proper Conduct				
Attentive Observation					Reporting of Issues				
Actively Engaging Children					Proper Conduct				
					Reporting of Issues				
					General Approach				



*Figure B.1:
The Bowtie Model 2*

Playground Behavior Evaluation							
Monitor Behaviors				Child Behaviors			
Desired		Undesired		Desired		Undesired	
1 to 5		1 to 5		1 to 5		1 to 5	
Attentive		Unattentive		Approach Monitor		Fails to Approach	
Properly Positioned		Poorly Positioned		Reports Issues		Fails to Report	
Recognizes Hazard		Fails to Recognize Hazard		Proper Conduct		Improper Conduct	
Instructs Child		Encourages Hurrying		Risky Play		Improper Use of Equipment	
Corrects Improper Conduct		Fails to Follow School Procedures					
Speaks to Child							
Follows School Procedures							
Number of First Aid or Medical Treatment Injuries observed:							
Number of pain incidents observed:							
Number of near misses observed:							
Notes on major occurrences:							

Figure B.2:
Playground Behavior Evaluation Card 2

Appendix C
Instrumentation

School:

Date:

Time:

Researcher:

Playground Type: Traditional Contemporary Adventure Creative

Weather: Dry/Sunny Dry/Overcast Dry/Cloudy Temp:

Wet/Sunny Wet/Overcast Wet/Cloudy

Noise:

General playground conditions/equipment condition:

Grades:

#of Students

#of Monitors

**Critical Event
(Increased Injury Potential)**

Examples

Injury incident

First aid by monitor/school employee/nurse
Response by emergency first responders
Requiring notification of parent/guardian

Pain Incident

Child indicates good condition and displays no evidence of impairment

Near Miss

child falls, collides with object or person,
or is struck and does not hesitate or indicate pain
child nearly falls or trips
Child nearly collides with object or person
child penetrates swinging radius of equipment
child uses equipment in unintended manner

Hindered Supervision

Can't view children/playground area
Can't control children

**Opposing Critical Event
(Decreased Injury Potential)**

Examples

Proper safety behavior

Child takes precaution
Child slowly lines
up
Child stops swing or correctly dismounts

Child Behavior

Monitor Behavior

Coinciding Event

Child Behavior

Monitor Behavior

Coinciding Event

Pre-Recess Inspection Instrument

Copied from the Handbook for Public Playground Safety published by the Consumer Product Safety Commission 2010.

APPENDIX A: SUGGESTED GENERAL MAINTENANCE CHECKLISTS

Surfacing (§2.4)

- Adequate protective surfacing under and around the equipment.
 - Install/replace surfacing
- Surfacing materials have not deteriorated.
 - Replace surfacing
 - Other maintenance: _____
- Loose-fill surfacing materials have no foreign objects or debris.
 - Remove trash and debris
- Loose-fill surfacing materials are not compacted.
 - Rake and fluff surfacing
- Loose-fill surfacing materials have not been displaced under heavy use areas such as under swings or at slide exits.
 - Rake and fluff surfacing

Drainage (§2.4)

- The entire play area has satisfactory drainage, especially in heavy use areas such as under swings and at slide exits.
 - Improve drainage
 - Other maintenance: _____

General Hazards

- There are no sharp points, corners or edges on the equipment (§3.4).
- There are no missing or damaged protective caps or plugs (§3.4).
- There are no hazardous protrusions (§3.2 and Appendix B).
- There are no potential clothing entanglement hazards, such as open S-hooks or protruding bolts (§2.5.2, §3.2, §5.3.8.1 and Appendix B).
- There are no crush and shearing points on exposed moving parts (§3.1).
- There are no trip hazards, such as exposed footings or anchoring devices and rocks, roots, or any other obstacles in a use zone (§3.6).

NOTES:

DATE OF INSPECTION:

Security of Hardware (§2.5)

- There are no loose fastening devices or worn connections.
 - Replace fasteners
 - Other maintenance: _____
- Moving parts, such as swing hangers, merry-go-round bearings, and track rides, are not worn.
 - Replace part
 - Other maintenance: _____

Durability of Equipment (§2.5)

- There are no rust, rot, cracks, or splinters on any equipment (check carefully where it comes in contact with the ground).
- There are no broken or missing components on the equipment (e.g., handrails, guardrails, protective barriers, steps, or rungs).
- There are no damaged fences, benches, or signs on the playground.
- All equipment is securely anchored.

Leaded Paint (§2.5.4)

- Paint (especially lead paint) is not peeling, cracking, chipping, or chalking.
- There are no areas of visible leaded paint chips or accumulation of lead dust.
 - Mitigate lead paint hazards

General Upkeep of Playgrounds (§4)

- There are no user modifications to the equipment, such as strings and ropes tied to equipment, swings looped over top rails, etc.
 - Remove string or rope
 - Correct other modification
- The entire playground is free from debris or litter such as tree branches, soda cans, bottles, glass, etc.
 - Clean playground
- There are no missing trash receptacles.
 - Replace trash receptacle
- Trash receptacles are not full.
 - Empty trash

INSPECTION BY:

Routine Inspection and Maintenance Issues

- Broken equipment such as loose bolts, missing end caps, cracks, etc.
- Broken glass & other trash
- Cracks in plastics
- Loose anchoring
- Hazardous or dangerous debris
- Insect damage
- Problems with surfacing
- Displaced loose-fill surfacing (see Section 4.3)
- Holes, flakes, and/or buckling of unitary surfacing
- User modifications (such as ropes tied to parts or equipment rearranged)
- Vandalism
- Worn, loose, damaged, or missing parts
- Wood splitting
- Rusted or corroded metals
- Rot

Ronald G. Dotson

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Ron is currently an associate professor and program coordinator of Occupational Safety and Health at Eastern Kentucky University. He is a Certified Safety and Health Manager with ISHM, a Construction Health and Safety Technologist through BCSP, an active member of the American Society of Safety Engineers, ISHM, and the National Association of Safety Professionals. He has served on the Board of Directors for the Kentucky Safety and Health Network, an OSHA Training Institute Construction Trainer, and operated an excavation business. His current research interests include playground safety and occupational injuries of educational service employees.

His safety background includes a variety of technical skills and management environments to include military construction project operations with the USMC Reserve, several small excavation contractors, and for his personal excavation business. Most recently he has been providing safety training to residential contractors in Kentucky. His career also includes working as an instructor and head football coach for a public school district in Kentucky, various security and personal protection projects, heavy equipment operations training, commercial vehicle driving, diesel mechanics, and law enforcement.

He was a highly decorated officer serving in Ashland, Kentucky earning several awards to include a Medal of Honor. After performing patrol and investigation duties he became an Instructor at the Department of Criminal Justice Training in Richmond, Kentucky. He performed duties as an instructor in Defensive Tactics and Physical Fitness for basic recruits as well as veteran officers and developed training for Homeland Security in chemical awareness and readiness, personal protective equipment, and suspicious packages handling procedures.

While working as a safety manager with KI USA Corporation he led the company to reduce injuries by 46%, become an inaugural member of Kentucky EXCEL, and KI saw its lowest worker's compensation expenditure in its history.

He has served on a curriculum advisory committee for heavy equipment operations for Kentucky Community and Technical College in Maysville, several committees for Eastern Kentucky University, and sat on the Board of Directors for the Kentucky Safety and Health Network, and hopes to continue impacting workplace safety through education and service to the profession.