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The Relationship Between Age and Work-Related Injuries

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THE RELATIONSHIP BETWEEN AGE AND WORK-RELATED INJURIES

by

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This Independent Study, submitted by Nancy Lacina in partial fulfillment of the requirements for the Degree of Master of Physical Therapy from the University of North Dakota, has been read by the Faculty Preceptor, Advisor, and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.

(Faculty Preceptor)

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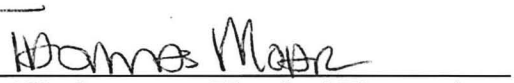

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Signature Nancy Lacina

Date 12-17-98

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I would like to thank Tom for his patience and John Halvorson at the North Dakota Workers' Compensation Bureau for providing data to complete my project.

ABSTRACT

Direct and indirect corporate health and safety costs related to worker illness and injury total billions of dollars annually. The impact of these costs have not only affected industry's viability but also health care in the form of managed care. Before corporate health and safety costs can be reduced, factors contributing to work injury and health costs need to be determined. For nearly a century, researchers have attempted to determine the relationship that exists between age and work injury. The age of the worker may be a significant factor which would be cause for concern due to the aging work force and higher health care expenditures for the older person.

The purpose of this project is to investigate previous studies that have examined the relationship between age and work injury, provide additional research on a statewide level, and determine if interventions can be implemented to reduce the number of injuries in the work place. The procedure being used to complete this project will be a literature review in addition to a data analysis of North Dakota Workers' Compensation figures related to age and work injury. This information may assist employers in implementing preventative measures to reduce the number of work injuries and thereby reduce corporate health care costs.

CHAPTER I

INTRODUCTION

"The tremendous economic impact of work force health care costs underscores the importance of defining total health care costs so that targeted interventions can be designed and implemented."[1(p228)] A literature review defining corporate health and safety costs estimated that in 1994 total work force health care costs may have exceeded $1.2 trillion. This figure is based on a total of direct and indirect costs related to employee illness or injury and may be considered conservative. Direct health care costs incurred by the employer include medical care, rehabilitation, workers' compensation payments, and other benefits that can be defined and measured more easily than indirect costs. Indirect health care costs may take into account reduced productivity, impacts on competitiveness, costs for organizational health and safety programs, and other costs related to health and safety activities. Indirect costs are more difficult to define, hard to measure, differ between work settings, and have been estimated by some investigators to be up to ten times the amount of direct health and safety costs.[1,2]

In addition to work force health care costs reaching unprecedented figures, the age of the work force is increasing as well.[3] The aging work force is a reflection of aging members of the Baby Boom generation born in the United

States between 1946 and 1964 after World War II. The Bureau of Labor Statistics projects that by the year 2005 the labor force in the United States is expected to reach approximately 151 million workers over the age of 16 with the greatest rate of increase in the number of workers aged 45 to 64.

Unfortunately for the aging worker, health care expenditures have shown that people over the age of 65 typically require more medical attention at a greater expense than those aged 19 to 64.[4] Unpublished data reported them to be hospitalized 2.5 times more often and their average length of stay nearly twice as long. Even though this age group (over 65) represents approximately 12% of trauma patients, their hospital costs are grossly underestimated by the current reimbursement system.[5,6]

Since the work force is experiencing an increase in the number of older workers who may require more medical attention when injured, a closer look should be taken to determine whether the older employee is more susceptible to injury on the job than his or her younger counterpart. If it is discovered the older employee is more prone to injuries while at work, preventative measures can be implemented by the employer to reduce the number of injuries and thereby reduce the amount of health care costs. A number of studies have investigated the relationship between age and work injury; the results of those studies will be reviewed in the following chapter.

The purpose of this project is to review existing studies that have researched the relationship between age and work injury, provide additional information on a statewide level, and determine if interventions can be

implemented to reduce the number of injuries in the workplace. The project is significant because it will take a closer look at an existing work force phenomenon that may be contributing to corporate health care costs. The need to contain health care costs has not only affected industry but medicine as well, which can be seen in the form of managed care.[7] Managed care goals are to cut costs while improving medical care as well as requiring proof of effectiveness from health care professionals.

A continued increase in corporate health and safety costs may potentially affect industry's viability by decreasing productivity and competitiveness. By reducing the amount of money a corporation spends on health care, a corporation may experience increases in productivity, profitability, competitiveness, and may be inclined to pass these savings along to their workers in the form of increased benefits.[1]

CHAPTER II

LITERATURE REVIEW OF WORK INJURY

At the close of the 19th century, industrial accidents and related injuries were viewed and accepted as a part of the job by workers and employers.[8] This frame of mind did little to encourage employers to seek the causes of accidents, promote their prevention, or consider their short- and long-term effects on employees and production. Not until compensation was given to the injured worker did industry begin to collect data regarding industrial accidents and realize the magnitude of the monetary and personal expense incurred by industry and its employees. European countries were among the first to begin reporting the investigations of accidents, while the United States waited nearly ten years to generate one of its earliest reports on accidents around 1910.[8]

In the search for variables that might contribute to the number of injuries in the workplace, researchers have considered the age of the worker to be significant.[9,10] Contrasting views in the workplace regarding age and work injury have led to discriminatory hiring practices due to preconceived beliefs that older workers are more susceptible to industrial accidents.[11] These discriminatory practices, in addition to an attempt by industry to recognize causes of work injury, have encouraged researchers to examine the relationship between age and work-related injuries for nearly a century. Researchers began their

investigations in the workplace obtaining employee information from company records, workers' compensation files, employee observation, and eventually state and national records as data became available.

Most studies have relied on frequency distribution as their statistical technique when interpreting data. This technique is simply to divide employees into different age groups and calculate the mean number of accidents for each age group during a specified time frame. Other studies have chosen different statistical techniques, primarily in an attempt to account for variables that may be contributing factors in the relationship between age and accident frequency. The age of the younger versus the older worker has not been consistent between studies; however, most of the older subjects were 45 years and older, while the younger subjects have typically been 25 years old or younger.

The studies that have examined the relationship between age and work-related injuries have exhibited diverse results. The most consistent result has been a decrease in the number of accidents for the older worker. It has been observed that older workers are injured less frequently than younger workers and have better employee safety records.[11,12] Two studies reviewed reported minor and major accidents by workers within factory settings and discovered the highest accident rates occurred among workers under the age of 20.[8,13] This accident rate was often twice as high, if not higher, than other age groups and had a tendency to decline steadily with increasing age. On the national level, relative comparisons were made from over a million workers' compensation records and work injury rates were found to be highest among workers age 20 to

24 and lowest for those age 65 and over.[14] It was noted these results do not hold true for industry divisions of finance, insurance, real estate, some services and occupational groups of transport operatives, nonfarm laborers, farm laborers and foremen, and service workers. Lastly, job experience was included to compare age and accident frequency between two samples due to the high correlation between age and experience.[9] The younger sample with a mean age of 29 years and the older sample with a mean of 41 years had the same job experience of three years, but the younger group appeared to have a significantly higher accident rate.

In contrast, other studies have observed an increase in the number of industrial accidents for the older worker. The accident records of utility drivers aged 25 to 64 were obtained for a five-year period.[15] When the driver's age was correlated with accidents, the results showed the younger drivers were involved in fewer accidents. Supplemental testing of the subjects also found the younger drivers were more effective with information processing tasks and had faster reaction times. Likewise, data from the National Health Survey on accidental industrial injuries discovered the annual frequency of disabling industrial injuries that lasted between seven days and one year was 7.7 days per 1000 employees for workers age 16 to 24 and increased to 12.3 days for workers age 65 years and older. In industrial injuries which took over 12 months to recover, the estimated annual frequency rate rose from .53 per 1000 employees for workers age 16 to 24 to 2.6 for workers 65 years and older.

Additional studies have not discovered a distinct positive or negative correlation between age and the number of work-related injuries.[10,16,17] The compensation accidents incurred by coal miners were observed during two 2-year periods and the accident rate decrease was considerable for those workers over the age of 20 until the ages of 30 to 39 when the rate increased rapidly with age.[17] Another study using workers' compensation files showed no significant difference in temporary disabilities among prime age workers and older workers but noted workers aged 65 and older were more likely to suffer permanent disabilities and fatalities while on the job.[10]

Although the results of studies that examined the relationship between age and work injury have not been similar, there have been consistent findings among several studies. One finding is that the new worker, who tends to be younger, is more prone to accidents.[8,14] It was determined the higher accident rates of new workers existed for approximately five months before they leveled off, although Van Zelst[9] concluded this time frame could be reduced approximately two months by incorporating worker training prior to job assignment and performance.

Two studies provided results regarding the cause and nature of accidents incurred by the younger and older worker.[14,18] Both studies agreed that for the older worker, falls from heights or falls from the same level were the greatest cause of accidents. The nature of the injury for this same age group differed slightly between the studies. The studies agreed contusions were a frequent nature of injury; however, one study discovered fractures, hernias, and heart

attacks more common for the older worker. The cause of injury for the younger worker was to be caught in, under, or between things or struck by something, while the nature of the injury for the younger worker was a sprain, strain, cut, or laceration.

Once injured, the older worker is also more likely to suffer a permanent disability or fatality.[10,11,14,17,18] Data used from the National Traumatic Occupational Fatalities (NTOF) surveillance system found the work-related injury death rate for workers aged 65 and over to be over 2.5 times that of the worker aged 16 to 64.[19] The leading causes of death for the older worker were machinery related incidents, motor-vehicle related incidents, homicide, and falls, with the highest number of fatalities having occurred in the industry divisions of agriculture, forestry, and fishing.

The next chapter will briefly discuss the history and purpose of workers' compensation. It will also examine North Dakota Workers' Compensation data to provide regional information regarding the relationship between age and work-related injuries.

CHAPTER III

DATA ANALYSIS OF NORTH DAKOTA WORKERS' COMPENSATION

The basic premise behind workers' compensation is to provide no-fault medical, disability, rehabilitation, and death benefits to the injured worker regardless of negligence. These benefits provided to the injured worker in turn forfeit the right of the worker to sue the employer for compensatory damages. Even though this is the objective of workers' compensation, it should be realized each state is unique in its specific provisions of the law.[20]

Prior to workers' compensation, the workers only recourse was to sue the employer for failing to meet common law obligations. This was difficult for most injured workers who did not have the necessary resources to prove employer negligence. Although judicial and legislative bodies in the United States tried to improve the plight of the injured worker, it was not until England enacted a workers' compensation law in 1897 that the United States found a guideline to follow.[20]

Most states must obtain workers' compensation insurance from a private insurer, although some states have insurance available from a state fund as well as private insurance companies. North Dakota is one of several states where workers' compensation insurance is only available through a state fund. In addition, North Dakota does not allow qualified employers to self-insure workers'

compensation rather than purchase workers' compensation insurance. North Dakota Workers' Compensation Bureau has been known to accept a higher percentage of claims filed than the workers' compensation industry. During the 1996 fiscal year, North Dakota Workers' Compensation Bureau accepted 93% of all claims filed in comparison to the industry's 85% to 88% of accepted claims.[20,22]

The data reviewed in this chapter have been obtained from the North Dakota Workers' Compensation Bureau. It includes workers' compensation claims reported during the fiscal years of 1995-1998 divided into categories of nature of injury, cause of injury, body part injured, and fatalities. The categories are presented in seven different age groups representing workers under the age of 18 to those over the age of 65. The following tables represent the highest percentage of workers' compensation claims reported by each age group in each category for a four-year period.

Workers over the age of 60 consistently reported the lowest percentage of workers' compensation claims over the four-year period (see Table 1). When the claims were separated into medical only and wage-loss for each age group, the medical only claims decreased with increasing age compared to the wage-loss claims which increased with increasing age (see Table 2). Wage-loss claims involve more than five days off work and generally represent more severe injuries. A wage-loss claim in North Dakota averages around $28 000 compared to $400 for medical only benefits.

Table 1.—Percentage of Workers' Compensation Claims Reported by Age and Year

Age of Worker	1995	1996	1997	1998
< 18	4%	4%	4%	4%
19 - 29	33%	31%	31%	32%
30 - 39	29%	30%	29%	27%
40 - 49	20%	21%	21%	22%
50 - 59	10%	10%	11%	11%
60 - 65	2%	2%	3%	2%
65+	1%	1%	1%	1%

(Percentages rounded to nearest whole number.)

Table 2.—Percentage of MO (Medical Only) and WL (Wage-Loss) Claims Reported for Each Age Group

Age of Worker	1995		1996		1997		1998	
	MO	WL	MO	WL	MO	WL	MO	WL
< 18	88%	12%	87%	13%	89%	11%	88%	12%
19 - 29	86%	14%	86%	14%	88%	12%	88%	12%
30 - 39	82%	18%	84%	16%	85%	15%	84%	15%
40 - 49	81%	19%	83%	17%	83%	17%	84%	16%
50 - 59	78%	22%	78%	22%	80%	20%	80%	20%
60 - 65	74%	26%	77%	22%	80%	19%	77%	22%
65+	73%	27%	72%	27%	66%	34%	75%	24%

(Percentages rounded to nearest whole number.)

Lacerations claimed the highest percentage of nature of injury for those workers 18 years and younger. The percentage of lacerations continued to drop until the worker was 60 and older, at which time the rate began to climb again. Strains and uncoded injuries increased until the worker was approximately 40 to

50 years old, then declined steadily with age in contrast to contusions that typically increased with age (see Table 3).

Strain or injury due to a miscellaneous cause was prevalent for nearly every age group each year. The younger workers had some variation with injuries as seen by being caught in or between machinery and injury by a hand tool. It was also noted that being caught in or between a machine was a significant percentage in every age group for 1995 and 1996, but virtually nonexistent in 1997 and 1998. The opposite trend was seen with falls on the same level and strains by lifting (see Table 4). The rationale for the changes cannot be determined by the data provided.

The body parts consistently injured by workers under the age of 30 were the fingers, while the other age groups continued to injure their low backs at work (see Table 5). The most consistent age for fatalities were those workers aged 50 to 59. Workers under the age of 18 had the lowest percentage of fatalities followed closely behind by those 65 and over (see Table 6).

Table 4.—Cause of Injuries to Workers by Age and Year
(Highest percentage of reported workers' compensation claims for each age group.)

Age of Worker	1995					1996					1997					1998				
	Caught in or Between Machine	Strain or Injury by Misc.	Cut, puncture, Scrape Injury by Hand Tool	Fall or Slip Injury on Same Level	Strain or Injury by Lifting	Caught in or Between Machine	Strain or Injury by Misc.	Cut, puncture, Scrape Injury by Hand Tool	Fall or Slip Injury on Same Level	Strain or Injury by Lifting	Caught in or Between Machine	Strain or Injury by Misc.	Cut, puncture, Scrape Injury by Hand Tool	Fall or Slip Injury on Same Level	Strain or Injury by Lifting	Caught in or Between Machine	Strain or Injury by Misc.	Cut, puncture, Scrape Injury by Hand Tool	Fall or Slip Injury on Same Level	Strain or Injury by Lifting
< 18	27%	27%	11%	1%	0%	24%	52%	0%	0%	0%	1%	19%	13%	3%	8%	2%	2%	13%	7%	11%
19 - 29	23%	38%	6%	1%	0%	19%	58%	0%	0%	0%	2%	22%	5%	2%	11%	2%	14%	7%	5%	14%
30 - 39	19%	43%	3%	1%	0%	16%	60%	0%	0%	0%	1%	23%	4%	2%	13%	1%	18%	5%	7%	15%
40 - 49	18%	43%	3%	1%	0%	14%	61%	0%	0%	0%	1%	24%	3%	3%	12%	1%	18%	5%	17%	15%
50 -59	16%	43%	3%	1%	0%	12%	60%	0%	0%	0%	1%	25%	3%	3%	11%	1%	17%	4%	11%	15%
60 - 65	16%	39%	4%	3%	0%	13%	58%	0%	1%	0%	1%	21%	4%	4%	8%	1%	16%	3%	13%	15%
65+	14%	37%	3%	5%	0%	9%	59%	0%	0%	0%	1%	18%	3%	6%	11%	1%	10%	2%	21%	13%

(Percentages are rounded to nearest whole number.)

Table 3.—Nature of Injuries to Workers by Age and Year
(Highest percentage of reported workers' compensation claims for each age group.)

Age of Worker	1995				1996				1997				1998			
	Laceration	Strain	Uncoded	Contusion	Laceration	Strain	Uncoded	Contusion	Laceration	Strain	Uncoded	Contusion	Laceration	Strain	Uncoded	Contusion
<18	37%	7%	10%	11%	31%	13%	6%	11%	31%	12%	6%	11%	31%	7%	14%	12%
19 -29	21%	14%	13%	13%	20%	19%	9%	13%	20%	19%	9%	13%	21%	14%	16%	13%
30 -39	15%	17%	15%	12%	15%	22%	10%	12%	15%	22%	11%	13%	14%	16%	21%	12%
40 -49	13%	17%	16%	14%	12%	22%	11%	14%	12%	23%	11%	14%	13%	15%	23%	13%
50 -59	11%	16%	19%	16%	12%	19%	11%	16%	. 12%	22%	11%	17%	11%	15%	23%	15%
60 -65	14%	13%	15%	16%	13%	19%	13%	19%	14%	19%	13%	19%	13%	15%	21%	18%
65+	15%	13%	13%	26%	16%	14%	8%	20%	16%	17%	11%	17%	14%	9%	22%	20%

(Percentages rounded to nearest whole number.)

Table 5.—Body Part Injuries by Age and Year
(Highest percentage of reported workers' compensation claims for each age group.)

Age of Worker	1995			1996			1997			1998		
	Upper Extremity -Finger(s)	Trunk - Low Back	Lower Extremity -Knee(s)	Upper Extremity -Finger(s)	Trunk - Low Back	Lower Extremity -Knee(s)	Upper Extremity -Finger(s)	Trunk - Low Back	Lower Extremity -Knee(s)	Upper Extremity -Finger(s)	Trunk - Low Back	Lower Extremity - Knee(s)
< 18	21%	8%	4%	20%	10%	4%	20%	7%	5%	21%	7%	5%
19 - 29	14%	15%	5%	14%	14%	5%	13%	13%	5%	14%	13%	5%
30 - 39	10%	20%	5%	10%	17%	5%	10%	17%	5%	10%	16%	5%
40 - 49	10%	19%	5%	9%	19%	6%	8%	17%	6%	10%	16%	6%
50 - 59	8%	20%	7%	7%	17%	8%	8%	18%	7%	10%	16%	8%
60 - 65	8%	20%	7%	7%	17%	9%	10%	17%	7%	6%	18%	7%
65+	9%	15%	4%	12%	14%	7%	7%	15%	4%	9%	8%	10%

(Percentages rounded to nearest whole number.)

Table 6.—Percentage of Fatalities by Age and Year

Age of Worker	1995	1996	1997	1998
<18	0%	4%	0%	0%
19 - 29	6%	12%	8%	5%
30 - 39	31%	23%	8%	15%
40 - 49	6%	12%	15%	30%
50 - 59	50%	35%	31%	35%
60 - 65	0%	12%	38%	10%
65+	6%	4%	0%	5%

(Percentages rounded to nearest whole number.)

CHAPTER IV

DISCUSSION/CONCLUSION

The relationship between age and work injury is not well defined in the literature. Several researchers have suggested the older worker has a lower accident rate due to experience and maturity that comes with age, while the younger worker may be more susceptible to accidents because of inexperience and carelessness. In contrast, other researchers feel the older worker may be more prone to accidents due to physiological factors that occur with age allowing the young worker in better physical and mental health to have fewer accidents. One explanation for the discrepancy between researchers may be attributed to the nature of the studies.[21] A decrease in accidents for the older worker was typically found for study samples based on numerous data from many industries, while single studies in single plant samples were more likely to reveal mixed results.

One researcher claimed the "inability to collect uniform data about exposure and incidents on any homogeneous group of workers, either by industry or occupation, had been considered the most important reason for the divergence of these views".[14(p30)] Lack of uniform data may have resulted in overstated or understated data in studies and required researchers to combine data sources to compensate for missing or incomplete data.[10,14] Researchers

have also commented on study designs failing to include factors that may have an influence on the relationship between age and work-related injuries.[18] These factors may include experience of the worker outside the research setting, a natural weeding out of high accident workers, selection of workers by employers, and age differences of hazardous occupations.

The data provided by the North Dakota Workers' Compensation Bureau found several similarities with earlier studies. Although workers aged 60 and older had the lowest percentage of reported claims, they had the highest percentage of reported wage-loss claims for any age group. This is consistent with earlier findings that the duration, severity, and cost of disabilities are greater for the older worker. One has to keep in mind that this is indicative of a trend and that workers over the age of 60 do not represent the largest number of workers and work injury costs.

The findings also agree that the nature and cause of injury for the younger worker are more likely to be lacerations, caught in or between machinery, or an injury caused by a hand tool. These injuries may be due to an unfamiliarity of machinery or equipment that will decrease with experience; however, an increase was found in the percentage of lacerations for workers over the age of 60 that may be attributed to physiological aging factors such as a decline in reaction time or the ability to focus on close objects. Strains and uncoded injuries declined for the older worker which again may be due to experience gained on the job, but this does not explain the increased percentage of contusions with increasing age. In contrast to earlier studies, falls were not a

significant cause of injury for the older worker in North Dakota until 1998. Another contrast to earlier research was that the highest percentage of fatalities was not for the workers 65 and older but for workers aged 50 to 59. The specific cause of the fatalities is undetermined at this time.

Even though research did not provide a well-defined relationship between age and work injury, there are some common trends and shortcomings found in the research. These can guide future researchers to better define the relationship between age and work injury and help employers reduce the current cost of work injury. The need for uniform data on work injury cannot be overemphasized. The best source of nationally representative data to date is workers' compensation and, unfortunately, the reporting system varies state from state. Researchers using this system as a data source need to account for these differences in their methodology of research until there is a more standardized form of reporting work injury from state to state. Research on a smaller scale can take a more detailed approach into the variables affecting an employee, such as work experience, worker selection by employers, and job hazards. Reviews of these studies must also realize the research is limited to a specific industry or occupation and should not be generalized without statistical justification. Regardless of the data approach, researchers need to study the workers over an extended period of time and account for variables that may impact the age and work injury relationship to create an accurate picture of the relationship. Certainly, this will not be an easy task, but unless these variables are taken into account over an extended period of time, the results of future

studies will continue to vary and the reliability of the research may be questionable.

A common thread throughout most of the research is that the older worker once injured is more likely to suffer from a serious injury or an injury that will take longer to recover compared to a younger worker. With this in mind, employers need to realize the work place is aging and they need to act now to adapt the work practice and settings to meet the needs of this aging group of workers. The literature supports injury prevention and work injury management programs. This may mean incorporating training programs for new workers and ongoing safety programs to remind workers how to perform their jobs with the lowest risk of injury. Employers can provide protective equipment, regularly maintain machinery, and improve working conditions with better lighting, handrails, guardrails, and non-slip surfaces. Another approach may be to emphasize a healthy lifestyle to workers in the form of health club programs through work or programs that offer to help the worker stop smoking. An employer with insight will realize these actions will not only reduce the injury rate and health care costs for older workers, but also for the new worker who is more prone to accidents.

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