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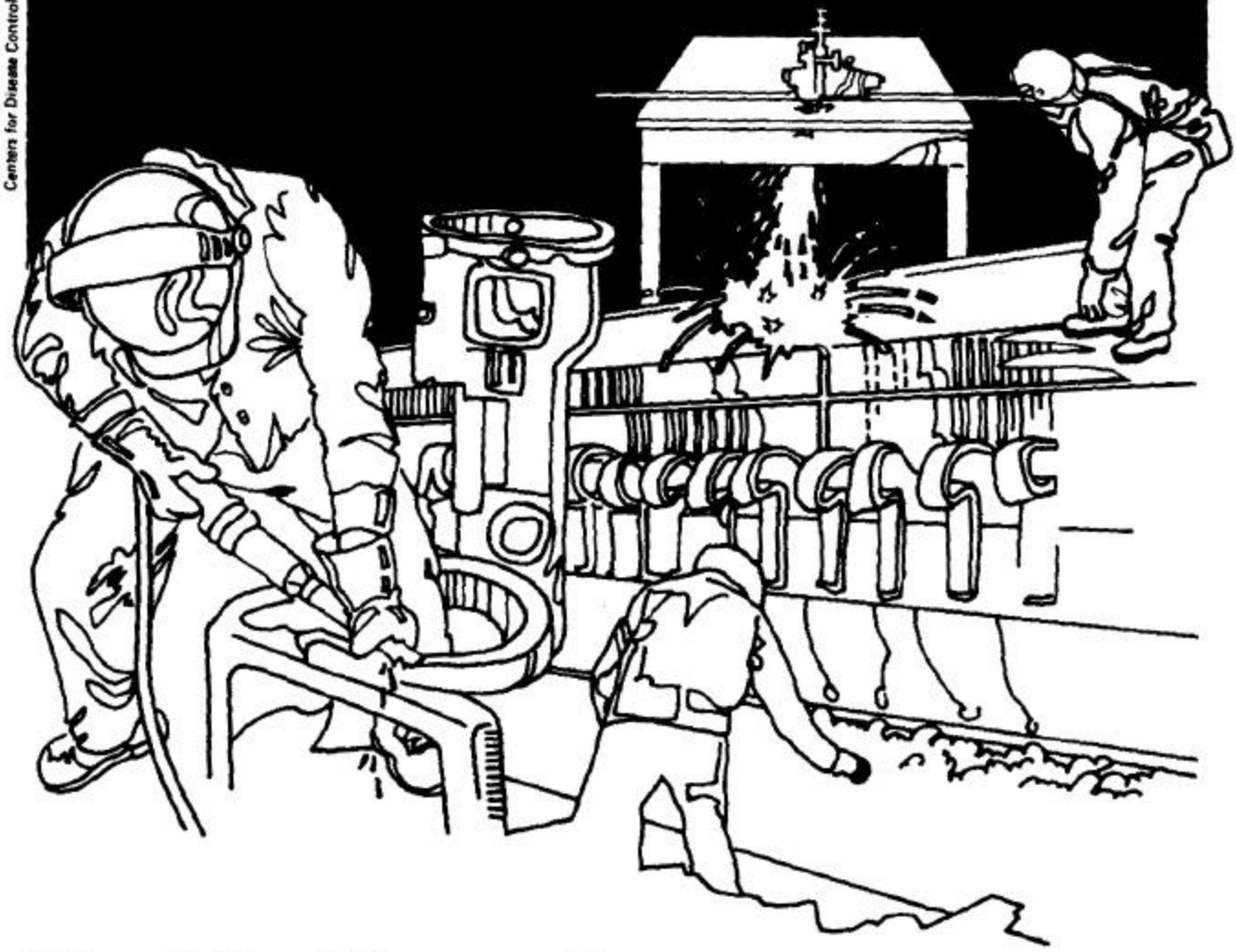

Health Hazard Evaluation Report

HETA 89-250-2046
NEWSDAY, INC.
MELVILLE, NEW YORK

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

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NEWSDAY, INC.
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I. SUMMARY

In May 1989, the National Institute for Occupational Safety and Health (NIOSH) received a joint request from the Graphics Communication International Union and the management of Newsday, Inc. to evaluate cumulative trauma disorders (CTDs) among reporters and other employees. It was suspected that these musculoskeletal and nerve disorders (of the neck, shoulders, arms, and hands) were associated with typing on computer keyboards. In response to this request, NIOSH investigators conducted a health hazard evaluation. At the request of the management and union, we collaborated with University of Michigan researchers who had special expertise and experience in ergonomics. The main objectives were to estimate the prevalence of cumulative trauma disorder symptoms among Newsday employees (overall and by job), and to determine whether these disorders were associated with typing on computer keyboards.

A questionnaire survey was conducted at four office buildings in New York City and on Long Island, New York on August 21-25, 1989, and on September 15, 1989.

Three hundred and thirty-one (40%) of the 834 participating employees reported symptoms consistent with upper extremity cumulative trauma disorders during the past year. Hand/wrist symptoms were the most prevalent (23%), followed by symptoms in the neck (17%), elbow/forearm (13%), and shoulder (11%).

Logistic regression was used to analyze suspected risk factors for symptoms in each of the four body locations separately. Percent of time typing or typing speed was significantly associated with symptoms in each of the four upper extremity joint areas. Working as a reporter was significantly associated with hand/wrist, elbow/forearm, and neck symptoms. Women were at higher risk than men for neck symptoms, but not for symptoms in other locations.

There were several limitations of this study. Self-reported measures of exposures and symptoms may have resulted in misclassification. Prevalence rates based on symptoms are expected to be higher than those based also on physical examinations. Therefore, comparisons to other studies should be limited to those using similar case definitions. The potential for selection bias exists because of the cross-sectional study design. This may have eliminated a disproportionate number of employees with cumulative trauma disorders. We were unable to include employees who were absent due to illness or disability because of low response rates to mailed questionnaires. In any cross-sectional study, temporal relationships are unclear. For example, when an association is seen between job dissatisfaction and symptoms, it is not possible to determine which occurred first.

Recall bias is possible. Those with symptoms may have been more alert to job-related risk factors and may have reported them more readily than those without symptoms. If this occurred, associations between predictor variables and symptoms could be exaggerated.

Recommendations included establishing a joint labor-management committee to oversee ergonomic control measures, early recognition of symptoms, and evaluation of the effectiveness of interventions.

On the basis of this investigation, NIOSH investigators concluded that a hazard for upper extremity cumulative trauma disorders exists at Newsday, Inc.'s offices in New York City and on Long Island, New York. Recommendations to prevent and control cumulative trauma disorders are provided in Section IX.

KEYWORDS: SIC 2711 (Newspapers, Printing and Publishing), reporters, video display terminals, office automation, cumulative trauma disorder, carpal tunnel syndrome, tendinitis.

II. INTRODUCTION

In May 1989, the National Institute for Occupational Safety and Health (NIOSH) received a joint request from the Graphics Communication International Union and the management of Newsday, Inc. to evaluate cumulative trauma disorders (CTDs) among reporters and other employees. It was suspected that these disorders (of the neck, shoulders, arms, and hands) were associated with typing on computer keyboards.

Work-related musculoskeletal and peripheral nerve disorders have been associated with highly repetitive and/or highly forceful activity in other occupational groups. Several terms have been used in the scientific and occupational health literature to describe these disorders, including repetitive motion injury, repetitive strain injury, and cumulative trauma disorder. The term cumulative trauma disorder has been criticized by some because it assumes that the etiology of these disorders has been identified. Despite these limitations, the term CTD is used here because of its current common usage.

NIOSH and University of Michigan researchers conducted initial site visits on June 9, 1989 and on July 21, 1989. During the week of August 21-25, and on September 15, 1989, a questionnaire survey was conducted at four Newsday offices in and around New York City. The objectives of the survey were to:

1. Estimate the prevalence of cumulative trauma disorder (CTD) symptoms among Newsday employees.

2. Determine whether CTD symptoms occur more often in particular jobs or departments.

3. Determine whether there is an association between the use of computer keyboards or other job-related factors and CTD symptoms in this group of workers.

NIOSH and University of Michigan investigators returned to Newsday on January 22, 1990 to present preliminary findings and recommendations to union and management representatives.

III. BACKGROUND

A. Workforce

Newsday, Inc. publishes a daily newspaper and employs approximately 4,600 people at several offices on Long Island, New York and in New York City, and also in editorial bureaus in other selected locations. This company has recently undergone a period of rapid expansion. One-third of all employees have been hired within the past five years. Most of the expansion has been in the Editorial Department.

B. Work Process

In the Editorial Department, reporters research facts and write articles for the paper, using computer terminals for researching via the electronic library and the computerized wire service, taking notes, writing, and communicating with other staff members via electronic messaging. Editors review, verify, and correct articles, and write headlines, using computer terminals, and supervise reporters. Artists and photographers create illustrations and photographs to supplement written material (copy). Computers are used to create, enhance, and transmit images.

The Editorial Systems Group lays out pages of copy by computer. The Advertising Department handles classified advertising, retail advertising, and national advertising. Classified Sales Representatives take incoming calls, give advice for advertisement content and layout, and type advertisements on computer terminals.

Editorial and Advertising copy is transferred electronically to a phototypesetting machine. The resulting film is developed, and elements of pages (copy, artwork, illustrations, photos, etc.) are cut and pasted onto boards. These boards (called mechanicals) are then photographed. The resulting images are burned onto metal plates which are attached to the press cylinder of an offset printing press.

IV. STUDY METHODS

A. Pilot Survey

Twenty-five employees from several departments participated in a pilot survey to field-test the questionnaire. Suggestions for rewording questions were incorporated into the final survey questionnaire.

B. Selection Criteria

On July 11-12, 1989 a walkthrough tour was conducted to select jobs for study. Jobs were selected to represent a wide range of computer keyboard use. All employees in the Editorial Department were included, as well as employees in selected jobs in the Advertising, Circulation, Data Processing, and Finance Departments. Employees in jobs involving little or no use of computer keyboards were included to compare to those in keyboard-intensive jobs. All employees in selected jobs in the Manhattan, Rego Park, and Melville, New York offices, who were present during the week of the survey, were asked to participate. Questionnaires were mailed to those who were absent from work due to illness or disability. Because of concern that other employees might have been on vacation during the week of the survey (the last week in August), a make-up day was scheduled to accommodate vacationers.

C. Questionnaire

The questionnaire (Appendix A) elicited information on demographics, job tasks, prior medical conditions, and symptoms.

Other questions addressed percent of time spent typing, hours worked, workload, type of keyboard used, number of years on the job, etc. The remainder of the questionnaire addressed type, frequency, and duration of symptoms in the neck, shoulder, elbow/forearm, and hand/wrist experienced within the past year. Since some studies have suggested a relationship between work-related psychosocial factors and symptoms, questions addressing these issues were also included. The psychosocial factors addressed were control over various aspects of the job, and overall job satisfaction.

D. Hand/Wrist Diagrams

Diagrams of the hands and wrists were included on the questionnaire. Study participants were asked to record the location of their symptoms on these diagrams.

E. Case Definition

A cumulative trauma disorder was defined as one or more symptoms (pain, aching, stiffness, burning, numbness or tingling) in one of the four upper extremity joint areas (neck, shoulder, elbow/forearm, or hand/wrist) which lasted more than one week or occurred at least once a month within the past year. Cases also had to meet the following criteria:

1. No previous accident or acute injury to the joint; and

2. Symptoms began on current job.

F. Period Prevalence rates

Period prevalence rates for the 12 months prior to the survey were calculated by dividing the number of employees who met each case definition by the number of participants. Period prevalence rates were calculated for departments and jobs.

G. Statistical Analysis

Preliminary analyses included univariate comparisons between cases and non-cases of work-related variables such as percent of work time spent typing, typing speed, type of keyboard used, average number of hours worked per week, workload, and number of years worked. Potential risk factors not related to work, such as age, sex, prior medical conditions were also compared between cases and non-cases.

Statistical analyses included chi-square tests for categorical variables and the student's t-test for continuous variables.[1]

Logistic regression analyses (SAS) were performed to estimate associations between CTDs and various work-related risk factors, while controlling for potential confounding and effect modification. These associations are expressed as odds ratios (OR) with 95% confidence intervals (CI). The OR is an estimate of disease risk, under certain conditions.[2] When the overall prevalence is below about twenty percent, the odds ratio closely approximates the relative risk. When prevalence rates are higher, odds ratios overestimate relative risk.

Models were developed considering not only statistical significance (at the significance level of $p <= .05$), but also the effect on existing variables of adding new variables to the model. All two-way interactions with exposure variables were evaluated. Continuous variables were tested for non-linearity on the log scale.

H. Job Sampling

University of Michigan researchers conducted a pilot study of job tasks of Newsday employees. This study is presented in a report entitled "Upper Limb Ergonomic Stressors in Selected Newspaper Jobs: A Pilot Study."[3]

V. RESULTS

A. Participation Rates and Exclusions

Seven hundred fifty-one employees completed the questionnaire during the week of the survey. Seventy additional questionnaires were completed on the make-up day by those who were on vacation during the week of the first survey. Fifteen pilot questionnaires were used at the request of the participants because they were unable to complete the final questionnaire during the week of the survey. Only 28 (30%) of the 94 mailed questionnaires were returned. Prevalence rates were higher in this group, suggesting that those with cumulative trauma disorders were more likely to respond. Therefore, these questionnaires were eliminated from analyses to avoid biasing results. The final participation rate was 836 of 1037 eligible employees (81%).

Two individuals with a rare systemic disease (lupus erythematosis) were excluded from final analyses. Those with more common systemic diseases, such as arthritis, were included and the condition was analyzed as an independent variable.

B. Demographics

The mean age of the study participants was 40 years (ranging from 20 years to 72 years). Fifty-five percent were female. The mean length of employment was 5.6 years (standard deviation [sd]=6.8 years).

Demographic information for selected departments and jobs is presented in Table 1.

C. Prevalence Rates (PR)

Three hundred and thirty-one (40%) of the 834 participating employees reported symptoms meeting the case definition of any cumulative trauma disorder during the past year. Hand/wrist symptoms, as determined by questionnaire, were the most prevalent (188, 23%), followed by neck (145, PR 17%), elbow/forearm (104, 13%), and shoulder (91, 11%).

D. Univariate Results by Location of Symptoms

1. Hand/Wrist CTD Symptoms

Symptoms meeting the case definition were significantly associated with percent of work time spent typing on computer keyboards, and typing speed.(Table 2). The odds ratios for reporters was 2.8 (95% CI 2.0-4.1) compared to non-reporters. Cases reported getting up from their workstation fewer times per day (mean=11.3, sd=12.5) than non-cases (mean=14.5, sd=17.1) on heavy workload days (p=.01). (It should be noted that 156 participants did not respond to this question, so this finding is based on a smaller sample size.) There was no significant difference in hand/wrist case prevalence between males and females (OR=1.2, 95% CI 0.9-1.7). No association was seen with keyboard use outside of work, or percent of time when there was a heavy workload. There was a 23% case prevalence rate among those who used keyboards outside of work, compared to 22% among those who did not (chi-square=0.1, p=.74). Cases reported that they had a heavy workload 67% of the time, compared to 69% for non-cases (p=.28).

2. Elbow/Forearm CTD Symptoms

Prevalence of elbow/forearm cases was significantly associated with both percent of time typing and typing speed (Table 3). Reporters had an odds ratio of 2.2 (95% CI 1.4-3.5) compared to non-reporters. Cases reported getting up from their workstations fewer times per day (mean=11.3, sd=10.6) than non-cases (mean=14.2, sd=16.8) during heavy workload days (p=.03). There was no significant difference in elbow/forearm

case prevalence between males (11%) and females (14%) (chi-square=1.3, p=.26). No association was seen with keyboard use outside of work, or percent of time when there was a heavy workload. Fourteen percent of those who used keyboards outside of work were elbow/forearm cases, compared to 12% of those who did not (chi-square=1, p=.32). Elbow/forearm cases reported a heavy workload 71% of the time, compared to 68% for non-cases (p=.30).

3. Shoulder CTD Symptoms

Although the mean percent of time spent typing was significantly higher among shoulder cases than non-shoulder cases (50% compared to 42%, p=.01), no significant association was found with percent of time typing as a categorical variable (Table 4). Shoulder cases were significantly associated with typing speed (Table 4). Cases reported getting up from their workstations fewer times per day (mean=11.1, sd=11.5) than non-cases (mean=14.1, sd=11.5) during heavy workload days (p=.05). The odds ratio for those with a history of arthritis was 2.1 (95% CI 1.0-4.1). There were no significant differences in prevalence rates between females (12%) and males (9%, p=.15) or between reporters (14%) and non-reporters (10%, p=.08). No association was seen with keyboard use outside of work, or percent of time when there was a heavy workload. Thirteen percent of those who used keyboards outside of work were shoulder cases, compared to 10% of those who did not (chi-square=2.3, p=.13). Shoulder cases reported having a heavy workload 71% of the time, compared to 68% of the time for non-cases (p=.28).

4. Neck CTD Symptoms

Neck cases were significantly associated with percent of time typing and typing speed (Table 5). Females had a significantly higher prevalence rate (21%) for neck symptoms than males (13%) (OR=1.8, 95% CI 1.3-2.7). Reporters had an odds ratio of 1.8 (95% CI 1.2-2.6) compared to non-reporters. Cases reported getting up from their workstations fewer times per day (mean=11.3, sd=12.6) than non-cases (mean=14.3, sd=16.8) during heavy workload days (p=.02). No association was seen with keyboard use outside of work, or percent of time when there was a heavy workload. Fifteen percent of those who used keyboards outside of work were neck cases compared to 19% of those who did not (chi-square=1.4, p=2.3). Neck cases reported a heavy workload 70% of the time, compared to 68% for non-cases.

E. Logistic Regression Results

The following variables were considered in logistic regression analysis: percent of time spent typing, typing speed, overtime work, years on the job, percent of heavy workload time, working as a reporter, age, gender, prior medical history of diabetes, gout, thyroid disorders, ruptured disc in the neck, arthritis, control over work, and job satisfaction. Average number of times per day getting up from the workstation was not evaluated in logistic regression analyses, since 156 participants did not answer this question. Including this variable would have limited the power of the analyses to detect associations with other variables.

1. Hand/Wrist CTD Symptoms

The model which best predicted hand/wrist CTD symptoms included typing speed and working as a reporter. (Table 6) The odds ratios for slow, moderate and fast typers were 0.9 (95% CI 0.3-2.3), 1.3 (95% CI 0.6-3.1), and 2.5 (95% CI 1.0-5.6) respectively, compared to non-typers. Reporters had an odds ratio of 2.4 (95% CI 1.6-3.4), compared to non-reporters, controlling for typing speed.

2. Elbow/Forearm CTD Symptoms

The model which best predicted elbow/forearm CTDs included percent of time spent typing and working as a reporter. (Table 7) Those who spent 80% to 100% of their time typing had an odds ratio of 2.8 (95% CI 1.4-5.7) compared to those who spent 0% to 19% of their time typing. Reporters had an odds ratio of 2.5 (95% CI 1.5-4.0), controlling for typing speed.

3. Shoulder CTD Symptoms

The model which best predicted shoulder CTD symptoms included typing speed, reporting a history of arthritis, and job dissatisfaction. (Table 8) The odds ratio for fast typers was 4.1 (95% CI 1.8-9.4) compared to non-typers and slow typers combined. (It was necessary to combine the non-typers with the slow typers, since there were no shoulder cases among the non-typers, a situation which makes statistical comparison impossible.) The odds ratio for those with a history of arthritis was 2.3 (95% CI 1.2-4.4). The odds ratio for those who were dissatisfied with their job was 2.3 (95% CI 1.2-4.3).

4. Neck CTD Symptoms

The model which best predicted neck CTDs included percent of time spent typing, number of years on the job, female gender, working as a reporter, and job dissatisfaction. (Table 9) The odds ratio for those who spent 80-100% of their time typing was 2.8 (95% CI 1.4-5.4) compared to those who spent 0-19% of their time typing. The odds ratio for females was 2.3 (95% CI 1.5-3.5) compared to males. There was a significant interaction between job duration and working as a reporter. For non-reporters, there was a significant trend of increasing odds (approximately 10% per year) with increasing number of years on the job. Reporters had higher odds ratios than non-reporters in the 1-4 year and 5-9 year duration of employment categories, but reporters and non-reporters had similar odds ratios in the 10 year and greater duration of employment category.

F. Type of Keyboard Used

There were predominantly four types of keyboards in use at the time of the survey. (Other types of keyboards were in use, but the number of employees using them was so small that comparison would not be meaningful). Only "primary" keyboards were used in comparisons. (Participants were asked to rank keyboards in order of frequency of use if they used more than one keyboard. The keyboard they ranked first was their primary keyboard.) Current primary keyboard and previous primary keyboard were both used to determine whether an individual had ever (since working at Newsday) used a particular keyboard as his or her primary keyboard.

The type of keyboard used differed by department and job. For example, 70% of IBMs were used in the non-Editorial Departments, 99% of Xetas were used in the Editorial Department, 86% of Thin Atexes were used in the Editorial Department, and 80% of Thick Atexes were used in the Editorial Department. Therefore, the only comparisons which could be attempted were among the three keyboards used in the Editorial Department.

To determine whether any particular type of keyboard was associated with symptoms, those who reported either currently or previously using a particular keyboard as their primary keyboard were compared to those who had never used that keyboard. There were no associations seen between any particular type of keyboard and symptoms in any of the four body locations.

G. Types of hand/wrist CTD Symptoms from Coding Diagrams

One hundred eighty-eight participants met the criteria for hand/wrist cases. Of these, 173 completed hand/wrist diagrams. The sensitivity and specificity of similar diagrams has been evaluated for carpal tunnel syndrome[4], but not for other clinical syndromes of the hand and wrist. Twenty-one hand/wrist diagrams described numbness and/or tingling in the median nerve distribution, involving at least two fingers. These symptoms are consistent with carpal tunnel syndrome.

VI. DISCUSSION

Symptoms consistent with upper extremity cumulative trauma disorders were associated with typing on computer keyboards. Hand/wrist symptoms were most prevalent in this study group (23%), followed by neck (17%), elbow/forearm (13%) and shoulder (11%). These symptoms were more common among reporters (except for shoulder symptoms) compared to other employees.

Study Limitations

Self-reported symptoms

The prevalence rates presented in this study were determined solely by self-reported symptoms from questionnaires, and therefore probably overestimate objectively documentable disease. Other studies have shown that prevalence rates based on questionnaire and physical examination combined tend to be approximately 40-60% of rates based on questionnaire alone.[5] One explanation for this difference is that case definitions based on positive physical examination findings require that symptoms be present at the time of the examination, while our questionnaire-based case definition required only that symptoms occurred within the past year.

It should be noted that there are no universally accepted definitive criteria for determining the presence or absence of cumulative trauma disorders. For carpal tunnel syndrome, sensory nerve conduction studies are generally accepted as a more definitive criterion.

However, abnormal nerve conduction velocity may only be present in more advanced cases. (One recent study suggested that self-reported symptoms on hand/wrist diagrams similar to those used in this study, and one physical examination maneuver [Tinel's test] were the two single best predictors of carpal tunnel syndrome cases confirmed by positive nerve conduction tests.[4])

While there are no universally accepted criteria for many cumulative trauma disorders, the use of a standardized case definition allows comparisons between groups. In a comprehensive study of cumulative trauma disorders in industrial settings, it was demonstrated that questionnaire data alone could be useful in identifying higher risk jobs.[5]

The case definition required that symptoms began since working at the current job. Without this criterion, 77 additional participants would have met the case definition. It is possible that some of these people may have had work-related symptoms that began on a prior job, but they were not counted as cases. Another potential problem is that all non-cases were compared to cases in statistical analyses. If those who would have been cases except for the current job criterion had current jobs which were associated with symptoms, then including them in the comparison group would tend to mask an association between current job-related risk factors and symptoms.

Recall bias

If those with symptoms were more alert to job-related risk factors, they may have reported these more readily than those without symptoms. If this occurred, associations between predictor variables and symptoms could be exaggerated.

Cross-sectional study design

Cross-sectional studies miss those who have left jobs because of health problems, and this may result in an underestimate of associations between risk factors and health problems. Risk factors and health problems are measured at the same time in cross-sectional studies, therefore it is not possible to determine which occurred first. For example, a significant association was seen between neck symptoms and job dissatisfaction, but it is not possible to determine which occurred first.

Pre-existing medical conditions

Another methodological issue to consider is whether those participants with preexisting medical conditions which can result in symptoms similar to those of cumulative trauma disorders should have been included in the analysis. The approach taken here was to exclude those with rare diseases (lupus erythematosis) from analysis, but to include those with more common diseases (such as arthritis), and control for confounding by including these medical conditions as independent variables in analyses. The rationale for including those with systemic diseases is that preexisting conditions can be exacerbated by work, and therefore work-related.[6] Eighty-three percent of the study participants had no preexisting medical conditions.

Also, unless preexisting conditions are more common among those in jobs where there are more risk factors for cumulative trauma disorders, associations between symptoms and job-related risk factors will not be exaggerated by including those with preexisting conditions.

We found that only shoulder symptoms were significantly predicted by a preexisting condition, arthritis (OR=2.3, 95% CI 1.2-4.4). However, arthritis did not significantly confound the association between typing speed and shoulder symptoms. (When those with arthritis were excluded from the analysis, the odds ratios for moderate and fast typing speed were 2.5 (95% CI 1.0-6.0), and 3.9 (95% CI 1.6-9.5) compared to 2.6 (95% CI 1.1-5.9) and 4.1 (95% CI 1.8-9.4) when those with arthritis were included.)

Interpretation of Odds Ratios

In this study, logistic regression was used for multivariate analyses. This technique calculates the odds ratio as a measure of association between predictor variables and outcome variables. The odds ratio is an estimate of disease risk, under certain conditions.[2] When the overall prevalence is below about twenty percent, the odds ratio closely approximates the relative risk.[2] When prevalence rates are higher, odds ratios overestimate relative risk.

Comparison with Other Study Groups

Studies of cumulative trauma disorders have been conducted in several types of industries. It is difficult to make meaningful comparisons across these studies because of differences in worker populations, study designs, case definitions, etc. However, it may be useful to compare observations made in this study group to findings from other studies of cumulative trauma disorders where similar case definitions were used. In general, the CTD symptom prevalence rates in this study group are much lower than those reported in a study of meatpackers[7], lower than those found in high force, high repetition jobs in a large study of several manufacturing facilities, and higher than low force, low repetition manufacturing jobs[5].

Reporters

The a priori hypothesis that reporters were experiencing more cumulative trauma disorders than those in other jobs was supported by the data for hand/wrist, elbow/forearm, and neck symptoms, but not shoulder symptoms. This suggested increased risk for most CTD symptoms among reporters is not explained solely by the percent of time typing on computer keyboards or typing speed. Possible explanations include the following:

1. Reporters stay on the job longer (mean job duration = 6.5 years) than other workers who type a lot (mean job duration for classified sales representatives = 3.9 years). Since classified sales representatives change jobs more often than reporters, it may be that this cross-sectional study missed more classified sales representatives who had CTD symptoms and subsequently left their jobs than reporters who had CTD symptoms and subsequently left their jobs.

2. Reporters may work under greater job pressure than others, and this may lead to more symptoms. Some studies have reported associations between musculoskeletal symptoms and psychosocial risk factors. Work-related psychosocial factors are undesirable job characteristics such as unrealistic workload demands or inappropriate work design and organizational problems that can lead to a lack of control over the job by the worker, or job dissatisfaction.[8] In this study, reporters rated their control over work and job satisfaction higher than other employees. Despite this, reporters appeared to be at higher risk for cumulative trauma disorder symptoms.

   One study demonstrated increased muscle tension (measured by electromyography) in the trapezius muscles when subjects were instructed to type faster, and decreased muscle tension when subjects were instructed to type more slowly.[9] A hypothesis for further investigation is that reporters may be under greater work pressure, and that this may result in increased muscle tension and fatigue, leading to symptoms. This study did not directly address the issue of work pressure.

   A related issue is whether there is any difference in risk for CTD symptoms with different kinds of deadlines. The data showed a significantly lower percent of stories with daily deadlines among reporters with neck and shoulder symptoms, and a significantly higher percent of stories with weekly deadlines among reporters with neck and shoulder symptoms.

   During preliminary meetings with employees prior to the survey, it was noted that many reporters experienced symptoms following prolonged intensive work periods. Frequency of deadlines may relate to the issue of recovery time. It has been suggested in the scientific literature that insufficient recovery time, or resting time in between intensive periods of muscle activity, is a risk factor for cumulative trauma disorders.[10]

3. Results from job sampling suggested that reporters worked the longest, had the highest work pace, and also shared a broader range of risk factors. It was observed that reporters got up from their workstations less than classified sales representatives, and worked in constrained postures more than copy editors.[3]

Association with typing

Symptoms of the hand/wrist, elbow/forearm, shoulder, and neck were all associated with typing on computer keyboards. Percent of work time spent typing and typing speed were used as estimates of amount and intensity of keyboard use. As percent of time typing or typing speed increased, the likelihood of symptoms meeting the case definition increased.

To assess the validity of self-reported percent of time typing, comparisons were made with observed percent of time typing during job sampling by the University of Michigan. Investigators reported a significant correlation between self-reported average percent of time typing (from the questionnaire) and observed percent of time typing

during the day of job sampling. (correlation coefficient r=.75, p<.001). Typing speed was not directly measured or observed during job sampling. Work pace was observed, but work pace could describe job tasks other than typing, and work pace was not coded in the same manner as typing speed was on the questionnaire. There was poor correlation between observed work pace and self-reported typing speed.

Self-reported typing speed may not be a valid measure of actual typing speed. One study found that when subjects were instructed to type faster, muscle tension increased (as measured by electromyogram readings of trapezius muscle activity), even when typing speed did not.[9] It is possible that self-reported typing speed may be related to effort to type faster and increased muscle tension.

Ergonomic risk factors

Previous studies have identified several general risk factors for work-related cumulative trauma disorders. These include repetition, force, awkward postures, direct pressure, prolonged static postures, and insufficient recovery time. Typing on computer keyboards requires repetitive motions, prolonged static postures and awkward postures. Holding the arms in position over a keyboard for a prolonged period can result in fatigue of the muscles of the neck and shoulder area. Prolonged awkward positions such as holding a telephone receiver between the ear and shoulder while typing or flexing and turning the neck to read documents on a desk can also result in muscle fatigue and symptoms. When typing on a keyboard, the wrists must be held in an awkward position -- ulnar deviation and wrist extension (Figure 1). Direct pressure on the wrists can occur if they are rested on the edge of a table or other hard surface.

Guidelines for workstation design to minimize ergonomic risk factors[11,12] should be consulted for specific recommendations. Considerations include desk and keyboard height, height and angle of the computer terminal, adjustability of chairs to avoid awkward positions and to provide support, the use of document holders, wrist rests, foot rests, sufficient space for knees under the desk, and holders for telephone receivers or headsets. Guidelines for keyboard design address layout, spacing, and travel of keys, force required to depress keys, keyboard slope, and tactile or auditory feedback to signal that the key has been actuated.

These guidelines do not specifically address the issue of awkward wrist postures required to type on standard keyboards. Experimental keyboard designs have been described in the literature.[13,14] Experimental features include split keyboards with space between the left and right halves to allow the hands to be held farther apart while keying (to avoid ulnar deviation), and tilted keyboards to avoid rotating the forearms from the neutral position. It has been suggested that the standard (qwerty) key layout results in an uneven distribution of

workload to the fingers, with the small fingers performing more work than the larger, stronger fingers.[15] Alternative key layouts have been proposed. There is insufficient scientific evidence on which to judge these experimental keyboards. There is also concern that new key layouts might require extensive retraining to use and that radically different keyboard designs might not be accepted.

There is no single cause of cumulative trauma disorders. Epidemiologic studies attempt to identify risk factors which contribute to the probability that a disease will occur.[16] Repetitive movements, awkward, static and constrained postures have been identified as ergonomic risk factors of computer workstations. The term CTD includes some specific diagnoses such as carpal tunnel syndrome and many less well-defined problems such as hand pain. Even when considering a single disorder, there are many factors which are thought to contribute to the disorder. For example, age, chronic medical conditions, gender, highly repetitive work, and awkward postures may all contribute to the risk of developing carpal tunnel syndrome.

VII. CONCLUSIONS

In this study, symptoms of the hand/wrist, elbow/forearm, shoulder, and neck were associated with typing on computer keyboards. Percent of work time spent typing and typing speed were used as estimates of amount and intensity of keyboard use. As percent of time typing or typing speed increased, the likelihood of symptoms meeting the case definition increased.

Reporters appeared to be at higher risk for symptoms of the hand/wrist, elbow/forearm, and neck when compared to other study participants. Factors considered in this survey cannot adequately explain this finding. It is possible that perceived work pressure may be a factor. A proposed mechanism is that work pressure may lead to increased muscle tension which may, in turn, lead to increased muscle fatigue and symptoms.

Eliminating ergonomic risk will likely result in a decreased prevalence of cumulative trauma disorders. However, very rarely has a scientific investigation been performed to accurately assess the contribution of specific changes in working conditions and the subsequent change in the prevalence of CTDs. Our recommendations are based on the available scientific studies and our practical experience with the redesign of workplaces to reduce CTDs.

VIII. RECOMMENDATIONS

1. Establish a joint labor-management ergonomics committee, with representation from all affected departments. The responsibility of the committee would include making decisions on appropriate interventions, such as the purchase and use of new equipment and changes in work organization, and to evaluate the effectiveness of

interventions in reducing the prevalence of CTD symptoms. Examples of work organization changes to be considered include breaks away from the workstation for reporters and editors, and changing work methods to avoid working at a computer terminal for long, uninterrupted periods.

2. Provide specific training for the ergonomics committee in health and ergonomic hazard surveillance, workstation and job evaluation techniques.

3. Provide a variety of adjustable chairs, supports, and equipment for employees based on their anthropometry (height, weight, etc.), work methods and personal preferences.

4. Provide training to employees on how to use adjustable workstations, chairs, and equipment to optimum ergonomic advantage. Evaluate how equipment is being used, and feedback on advantages and disadvantages of equipment.

5. Consider repeating a symptom survey in one year to estimate the change in prevalence, and incidence of new cases compared to the initial survey.

6. Provide for appropriate medical management of employees with potential or diagnosed cumulative trauma disorders. A draft OSHA document on proposed guidelines for the meatpacking industry includes medical management suggestions which may be helpful. (Appendix B)

7. In addition to the recommendations listed here, we have reviewed the recommendations from the University of Michigan entitled "Upper Limb Ergonomic Stressors in Selected Newspaper Jobs", and we also support the recommendations included in that report[3].

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XI. DISTRIBUTION AND AVAILABILITY

Copies of this report are temporarily available upon request from NIOSH, Hazard Evaluations and Technical Assistance Branch, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through: the National Technical Information Service (NTIS), 5285 Port Royal, Springfield, Virginia 22161. Copies of this report have been sent to:

1. Newsday, Inc., Melville, New York
2. Graphics Communication International Union - Local #406
3. OSHA

For the purpose of informing affected employees, the report should be posted by Newsday, Inc. in prominent places that are accessible to employees, for a period of 30 calendar days.

TABLE 1

Demographics

NEWSDAY, INC.
MELVILLE, NEW YORK
HETA 89-250

	%Female	Mean Age Yrs. (range)	Mean Years on Job (sd)
Editorial Dept.	46%	40 (20-72)	5.9 (7.0)
Non-Edit. Dept.	73%	40 (20-69)	5.1 (6.2)
Reporters	38%	40 (23-72)	6.6 (7.7)
Other Editorial Dept. Jobs	60%	40 (20-70)	6.3 (6.4)
Classified Sales Representatives	96%	40 (21-68)	3.9 (4.0)

TABLE 2

Univariate Results - Hand/Wrist Cases

NEWSDAY, INC.
MELVILLE, NEW YORK
HETA 89-250

Variable	Prevalence Rate
Percent of Time Typing	
0-19%	13%
20-39%	23%
40-59%	27%
60-79%	30%
80-100%	24%
(chi-square, 4df = 15.5, p<.01)	
Typing Speed	
Slow	11%
Moderate	20%
Fast	33%
(chi-square, 2df = 26.4, p<.001)	

TABLE 3

Univariate Results - Elbow/Forearm Cases

Variable	Prevalence Rate
Percent of Time Typing	
0-19%	7%
20-39%	11%
40-59%	15%
60-79%	15%
80-100%	17%
(chi-square, 4df = 10.4, p=.03)	
Typing Speed	
Slow	7%
Moderate	11%
Fast	13%
(chi-square, 2df = 8.4, p=.02)	

TABLE 4

Univariate Results - Shoulder Cases

Variable	Prevalence Rate
Percent of Time Typing	
0-19%	6%
20-39%	10%
40-59%	13%
60-79%	11%
80-100%	15%
(chi-square, 4df = 7.8, p=.10)	
Typing Speed	
Slow	6%
Moderate	11%
Fast	15%
(chi-square, 2df = 6.3, p=.04)	

TABLE 5

Univariate Results - Neck Cases

NEWSDAY, INC.
MELVILLE, NEW YORK
HETA 89-250

Variable	Prevalence Rate
Percent of Time Typing	
0-19%	10%
20-39%	17%
40-59%	22%
60-79%	16%
80-100%	20%
(chi-square, 4df = 12.4, p=.02)	
Typing Speed	
Slow	10%
Moderate	14%
Fast	25%
(chi-square, 2df = 19.2, p<.001)	

TABLE 6

Logistic Regression Results

Hand/Wrist CTD Symptoms

NEWSDAY, INC.
MELVILLE, NEW YORK
HETA 89-250

Variable	OR (95% CI)
Typing speed	
Slow:	0.9 (0.3-2.3)
Moderate:	1.3 (0.6-3.1)
Fast:	2.5 (1.0-5.6)
Reporter/Writer:	2.4 (1.6-3.4)

TABLE 7

Logistic Regression Results

Elbow/Forearm CTD Symptoms

Variable	OR (95% CI)
Percent of time typing	
20-39%:	1.2 (0.6-2.5)
40-59%:	1.7 (0.8-3.5)
60-79%:	1.9 (0.9-4.3)
80-100%:	2.8 (1.4-5.7)
Reporter/Writer:	2.5 (1.5-4.0)

TABLE 8

Logistic Regression Results

Shoulder CTD Symptoms

NEWSDAY, INC.
MELVILLE, NEW YORK
HETA 89-250

Variable	OR (95% CI)
Typing speed	
Moderate:	2.6 (1.1-5.9)
Fast:	4.1 (1.8-9.4)
Arthritis:	2.3 (1.2-4.4)
Dissatisfied with job:	2.3 (1.2-4.3)

TABLE 9

Logistic Regression Results

Neck CTD Symptoms

NEWSDAY, INC.
MELVILLE, NEW YORK
HETA 89-250

Variable	OR (95% CI)
Percent of time typing	
20-39%:	2.0 (1.0-7.7)
40-59%:	2.6 (1.4-5.0)
60-79%:	2.2 (1.0-4.7)
80-100%:	2.8 (1.4-5.4)
Reporter/Writer by job duration	
<= 12 months:	4.6 (1.3-15.7)
13-59 months:	6.5 (2.6-15.9)
60-119 months:	10.7(3.6-32.5)
>= 120 months:	7.6 (2.4-20.4)
Other job by job duration	
<= 12 months:	1.0 (comparison)
13-59 months:	2.8 (1.3-6.4)
60-119 months:	4.4 (1.8-10.7)
>= 120 months:	7.4 (3.1-17.7)
Female:	2.3 (1.5-3.5)
Dissatisfied with job:	1.9 (1.1-3.4)

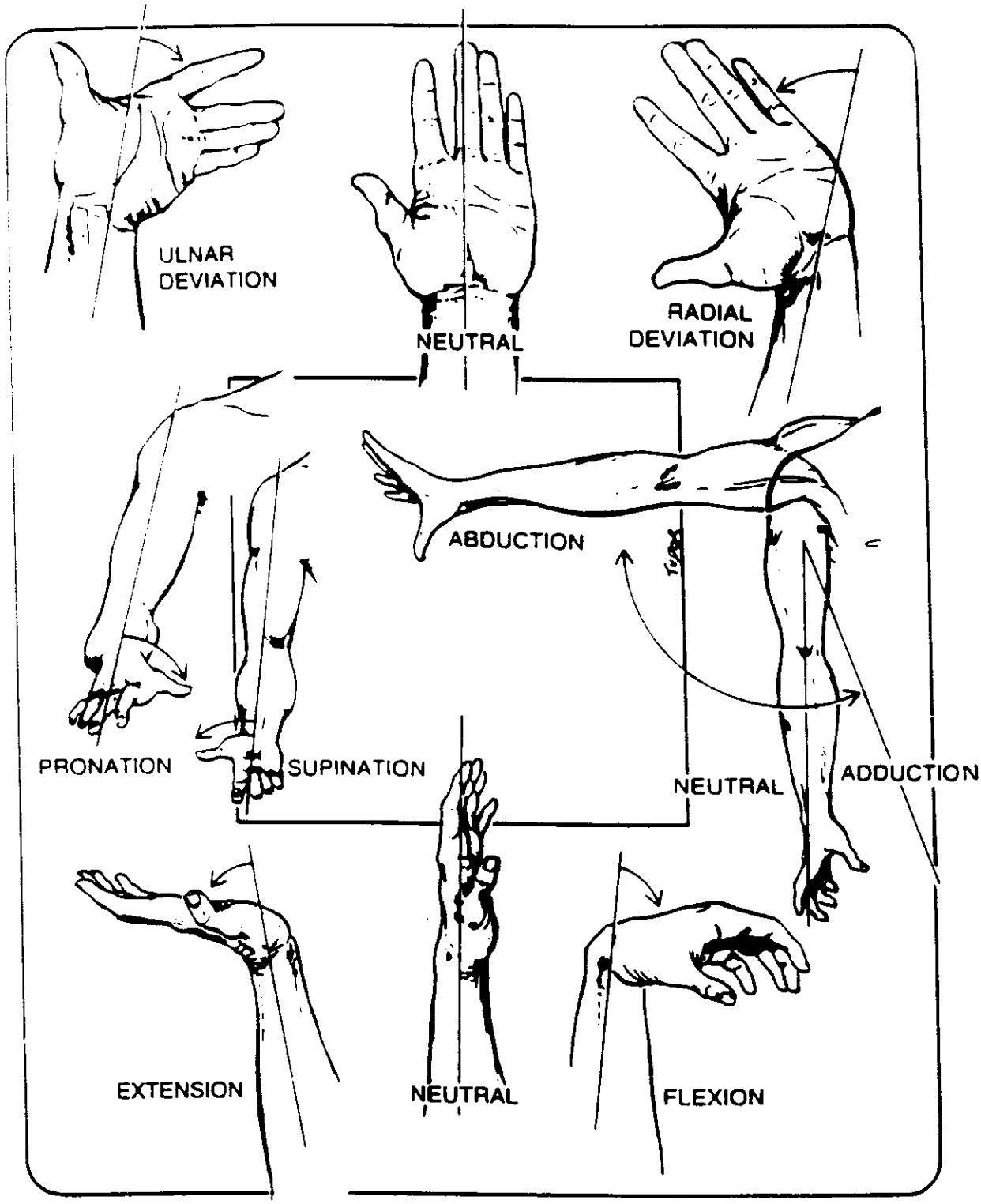

Figure 1. Positions of the hand and arm.

Reprinted from Putz-Anderson, Vern (Editor), Cumulative Trauma Disorders, Taylor & Francis, Philadelphia, 1988.

APPENDIX A

Questionnaire

DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
NEWSDAY
HETA 89-250

AGREEMENT TO PARTICIPATE IN THE QUESTIONNAIRE PORTION OF A MEDICAL STUDY

I, _____, agree to participate in a medical study of
(print name)
employees at NEWSDAY. This study is being conducted by personnel from the National Institute for Occupational Safety and Health (NIOSH) and the University of Michigan in response to a request to evaluate adverse musculoskeletal outcomes among employees at NEWSDAY. I understand that:

This study will consist of a questionnaire in which questions will be asked about demographic information (such as name, birthdate, etc.), working conditions and medical problems. It also will entail inspecting and photographing my workstation where I work and interviewing my supervisors and co-workers.

My participation in this study is voluntary, and I may refuse to participate or may withdraw from the study at any time without penalty. Information provided on the questionnaire will be shared with the University of Michigan for research purposes. Data in the possession of NIOSH will be considered confidential in accordance with the Privacy Act of 1974 (Public Law 93-579). For details of the Privacy Act, see the back of this page. The data collected from this study will be used to determine the rate of adverse musculoskeletal outcomes and identify factors associated with the occurrence of these outcomes. Study results will be reported for groups of employees, and identification of particular individuals will not be possible.

Based on the results of this health survey, the University of Michigan personnel will evaluate selected jobs for potential risk factors for work related musculoskeletal disorders. Data collection by University personnel is strictly confidential and no personal identifiers will be made available to non-research project persons, according to University policy.

All questions concerning my participation in this study have been answered to my satisfaction. Further inquiries may be directed to:

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NIOSH - Robert A. Taft Laboratories
4676 Columbia Pkwy - Mail Stop R-10
Cincinnati, Ohio 45226
(513) 841-4386

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SIGNATURE _____ DATE _____

ADDRESS _____

_____

HOME PHONE _____

The Privacy Act, a federal law, prohibits the release of your records from this study without your written permission. However, there are 12 situations written into this law which do permit releasing your information in identifiable form without your permission. Your records could be released if:

1. They are necessary for PROTECTING THE HEALTH AND SAFETY of other persons.

2. A RESEARCHER uses them only for STATISTICAL RESEARCH.

3. NIOSH OFFICIALS, or groups working with NIOSH, need the records for USES compatible with the purpose for which the information was collected.

4. They are needed by AGENCY PERSONNEL, who need the records in performance of their duties.

5. The release is REQUIRED BY LAW.

6. The BUREAU OF CENSUS needs them for census or survey work.

7. The NATIONAL ARCHIVES needs them for historical purposes.

8. Either House of CONGRESS requests your records.

9. The COMPTROLLER GENERAL needs them for the General Accounting Office.

10. A COURT ORDERS them; or

11. A CONSUMER REPORTING AGENCY needs them to assist the Federal government in collecting a claim owed the government; or

12. The records are requested under the terms and conditions of the FREEDOM OF INFORMATION ACT, and their release would not invade your privacy.

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
HEALTH HAZARD EVALUATION 89-250

NEWSDAY SURVEY QUESTIONNAIRE

SUBJECT ID#: 0983 (1-4)

HETA 89-250

TODAY'S DATE: | | | - | | | - 19 |8|9| (5-10)

PERSONAL IDENTIFICATION

1. Name (last): | | | | | | | | | | | | | | | | | | | | (11-28)

(first): | | | | | | | | | | | | | | | | | | | | (29-46)

(middle initial): | | (47)

2. Date of birth: | | | (month) - | | | (day) - 19 | | | (year) (48-53)

3. Sex: Male___1 Female___2 (54)

4. Height: | | (ft) | | | (inches) (55-57)

5. Which hand do you use most at work? Right___1 Left___2 Both equally___3 (58)

CARD |0|1| (79-80)

WORK HISTORY

6. When did you begin working at this newspaper? |__|__| (month) - 19 |__|__| (year) (5-8)

7. Are you currently doing alternative or light work because of an injury or illness? Yes___1 No___2 (9)

|IF "NO" TO QUESTION 7, GO TO QUESTION 8.|

a. How long have you been doing light work? |__|__| (# yrs) |__|__| (# mos) (10-13)

8. Are you currently on medical disability? Yes___1 No___2 (14)

|IF "NO" TO QUESTION 8, GO TO QUESTION 9.|

a. How long have you been on disability? |__|__| (# yrs) |__|__| (# mos) (15-18)

PLEASE NOTE: IF "YES" TO QUESTIONS 7 OR 8, ANSWER QUESTIONS 9-22 FOR THE JOB YOU HAD PRIOR TO YOUR INJURY.

9. In which Newsday office do you work? (IF YOU WORK AT MORE THAN ONE, CHECK ALL THAT APPLY).

Melville, Main Plant___1 (19)
Melville, Quad.....___2 (20)
Manhattan.....___3 (21)
Other_____ ___4 (22)

10. In which department do you work? (CHECK ONLY ONE ANSWER).

Editorial.....___1
Advertising.....___2
Circulation.....___3
Data Processing.....___4
Finance.....___5 (23)
Transportation.....___6
Other_____ ___7

EDITORIAL DEPARTMENT STAFF SHOULD ANSWER QUESTION 11.
ALL OTHER PERSONNEL SHOULD GO TO QUESTION 12.

11. If you work in the Editorial Department, in which SECTION do you work? (CHECK ONLY ONE ANSWER).

Administration	01		Magazine	16 (24-25)
Art	02		National Desk	17
Books	03		New York Copy Desk	18
Business	04		New York Metro Desk.(includes Queens, Bronx, etc.)	19
EMG	05		Part II, Features	20
Entertainment	06		Part II, Copy Desk	21
Food	07		Photo	22
Foreign Desk	08		Science	23
Home/City Living	09		Special Sections	24
Investigations	10		Sports	25
Kidsday	11		State Desk	26
Library	12		Travel	27
Living	13		TV Book	28
Long Island Copy Desk	14		Viewpoints	29
Long Island Desk	15		Other _____	30

12. What is your job title? (CHECK ONLY ONE ANSWER).

Editorial Department

Artist	01
Copy Editor	02
Darkroom Technician	03
Editorial Aide	04
Editorial Assistant	05
EMG Technician	06
Lister	07
News Editor	08
News Editor, Assistant	09
Photographer	10
Reporter/Writer	11
Researcher	12
Secretary	13
Supervising Editors, all other	14
Transcriber	15
Other Editorial job (specify)	16

_____

Non-Editorial Departments

Billing Clerk	17	(26-27)
Classified Sales Rep	18	
Credit Clerk	19	
Customer Service Rep	20	
Programmer/Analyst	21	
Publications Clerk	22	
Tray System Operator	23	
Other Non-editorial job	24	

(specify)_____

13. How long have you worked at this job? | | | (# yrs) | | | (# mos) (28-31)

14. In most jobs, the workload varies from day to day. In your job, what percent of your days are heavy workload days? |__|__|__| % (32-34)

15. Please answer each of the following questions twice, first for an average workload period, and then for a heavy workload period:

	Average Workload	Heavy Workload	
a. What percent of your time do you spend typing (or using a keyboard)?	|__|__|__| %	|__|__|__| %	(35-40)
b. What percent of your time do you spend using an adding machine?	|__|__|__| %	|__|__|__| %	(41-46)
c. How many hours do you work each week?	|__|__| hrs	|__|__| hrs	(47-50)
d. How many days do you work each week?	|__| days	|__| days	(51-52)
e. What percent of your work time do you usually spend on the telephone?	|__|__|__| %	|__|__|__| %	(53-58)
f. How fast do you type?	Slow....__1 Moderate__2 Fast....__3	Slow....__1 Moderate__2 Fast __3	(59-60)
g. Do you usually work in an office all day?	Yes__1 No__2	Yes__1 No__2	(61-62)
(1) IF YES, how many times a day do you get up from your workstation?	|__|__| # times	|__|__| # times	(63-66)

16. In the past year, how many weeks did you work more than 5 days? |__|__| (# weeks) (67-68)

CARD |0|2| (79-80)

17. In the past year, have you typed on a computer keyboard at work? Yes__1 No__2 (5)

|IF "NO" TO QUESTION 17, GO TO QUESTION 18.|

a. Which keyboard do you currently use?

PLEASE NOTE: IF YOU USE MORE THAN ONE KEYBOARD REGULARLY, PLEASE NUMBER THEM IN ORDER OF FREQUENCY OF USE: "1" = MOST FREQUENT USE; "2" = SECOND MOST FREQUENT USE, ETC.

Thick Atex		(6)	Tandy.....		(7)
Thin Atex		(8)	Hazeltine.....		(9)
Xeta.....		(10)	Mac II.....		(11)
IBM.....		(12)	Other_____		(13)

b. How long have you been using your current keyboard? (IF YOU USE MORE THAN ONE KEYBOARD, ANSWER THIS QUESTION FOR THE ONE THAT YOU USE MOST FREQUENTLY). | | | (# yrs) | | | (# mos) (14-17)

c. Have you used a different keyboard in the past? Yes__1 No__2 (18)

|IF "NO" TO QUESTION 17c, GO TO QUESTION 18.|

(1) Why did you change? (CHECK ONLY ONE ANSWER).

Office equipment updated__1
Changed workstations....__2
Requested change*.....__3
Other*.....__4 (19)

(2) *IF YOU REQUESTED A CHANGE OR IF YOU CHANGED KEYBOARDS FOR AN "OTHER" REASON, please specify why:

_____ | | (20)

(3) Which keyboard did you use BEFORE?

PLEASE NOTE: IF YOU USED MORE THAN ONE KEYBOARD REGULARLY, PLEASE NUMBER THEM IN ORDER OF FREQUENCY OF USE: "1" = MOST FREQUENT USE; "2" = SECOND MOST FREQUENT USE, ETC.

Thick Atex		(21)	Tandy.....		(22)
Thin Atex		(23)	Hazeltine.....		(24)
Xeta.....		(25)	Mac II.....		(26)
IBM.....		(27)	Other_____		(28)

(4) How long did you use this keyboard? (IF YOU USED MORE THAN ONE KEYBOARD, ANSWER THIS QUESTION FOR THE ONE THAT YOU USED MOST FREQUENTLY). | | | (# yrs) | | | (# mos) (29-32)

18. What type of telephone do you use at work? (CHECK ONE ANSWER).

Hand-held receiver.....___1 (33)
Headset*.....___2
Use both*.....___3
Don't use a phone at work___4

a. *IF YOU USE A HEADSET AT WORK, how long have you been using it? | | | (# yrs) | | | (# mos) (34-37)

19. Do you type or use a keyboard outside of your usual job (for example, at home, on another job, or for freelance work)? Yes___1 No___2 (38)

IF "NO" TO QUESTION 19, GO TO QUESTION 20.

a. How many hours a week? | | | hrs (39-40)

b. How many weeks a year do you work this much on a keyboard aside from your regular job at Newsday? | | | wks (41-42)

PLEASE NOTE: REPORTERS/WRITERS SHOULD ANSWER QUESTIONS 20, 21, & 22; ALL OTHERS SHOULD GO TO QUESTION 23.

20. What percent of your stories are:

a. Daily..... | | | | % (43-45)

b. Weekly..... | | | | % (46-48)

c. Short term special projects (>week but <1 month) | | | | % (49-51)

d. Long term special projects (1 month or more).... | | | | % (52-54)

21. How many of these stories do you do in a month?

a. Daily..... | | | (# per month) (55-56)

b. Weekly.... | | | (# per month) (57-58)

c. Short term | | | (# per month) (59-60)

d. Long term | | | (# per year) (61-62)

22. What percent of your notes are taken:

a. By hand | | | | % (63-65)

b. Typed.. | | | | % (66-68)

CARD |0|3| (79-80)

MEDICAL HISTORY

'23. Has a doctor ever told you that you have/had any of the following? If yes, please give the month and year of the diagnosis.

	(If Yes): →		Date Diagnosed (Month) (Year)	
a. Diabetes	Yes 1	No 2	|__|__| - 19 |__|	(5-9)
b. Gout	Yes 1	No 2	|__|__| - 19 |__|	(10-14)
c. Thyroid problems	Yes 1	No 2	|__|__| - 19 |__|	(15-19)
d. Lupus	Yes 1	No 2	|__|__| - 19 |__|	(20-24)
e. Ruptured disc in the neck	Yes 1	No 2	|__|__| - 19 |__|	(25-29)
f. Arthritis	Yes 1	No 2	|__|__| - 19 |__|	(30-34)

24. Have you ever been told by a doctor that you had:

	(If Yes): →		Date Diagnosed (Month) (Year)	
a. Tendonitis	Yes 1	No 2	|__|__| - 19 |__|	(35-39)
b. Tenosynovitis	Yes 1	No 2	|__|__| - 19 |__|	(40-44)
c. Carpal tunnel syndrome	Yes 1	No 2	|__|__| - 19 |__|	(45-49)
d. Thoracic outlet syndrome	Yes 1	No 2	|__|__| - 19 |__|	(50-54)
e. Ulnar nerve compression at ELBOW	Yes 1	No 2	|__|__| - 19 |__|	(55-59)
f. Ulnar nerve compression at WRIST	Yes 1	No 2	|__|__| - 19 |__|	(60-64)
g. Other cumulative trauma disorder (specify below)	Yes 1	No 2	|__|__| - 19 |__|	(65-69)

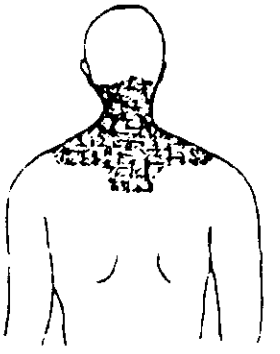
_____

CARD \|0\|4\| (79-80)

NECK

25. In the past year, have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on this diagram more than three times or lasting more than one week?

Yes___1 No___2 (5)



IF "NO" TO QUESTION 25, GO TO QUESTION 26, PAGE 9.

a. How long does each episode of NECK problems usually last?

Less than 1 hour ___1 More than 1 week to 1 month..___4 (6)
1 hour to 24 hours___2 More than 1 month to 6 months___5
25 hours to 1 week___3 More than 6 months.....___6

b. How many separate episodes of this NECK problem have you had in the past year?

Constant...___1 Once a week ___3 Every 2-3 months___5 (7)
Daily.....___2 Once a month___4 Every 6 months..___6

c. Have you had this NECK problem in the past 7 days? Yes___1 No___2 (8)

d. Have you ever had an accident or sudden injury to your NECK such as a whiplash, a fracture, or a sudden slipped disc? Yes___1 No___2 (9)

e. Do specific activities make this NECK problem worse? Yes___1 No___2 (10)

Specify which activities_____ | | (11)

f. When did you first notice this NECK problem? | | | - 19 | | | (12-15)

g. What job did you have when you first noticed this NECK problem? Current job___1 Other job___2 (16)

Specify "other" job_____ | | (17)

h. Have you seen a doctor or other health care provider for this NECK problem? Yes___1 No___2 (18)

IF YES: How many times in the past year? | | | (19-20)

i. Have you missed any WORKDAYS because of this NECK problem? Yes___1 No___2 (21)

IF YES: How many days in the past year? | | | | (22-24)

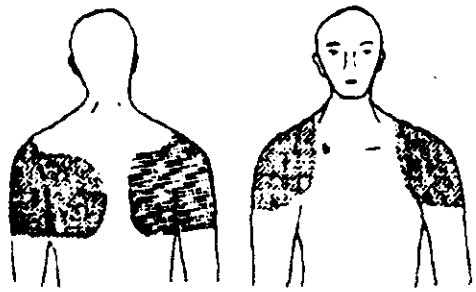
j. Have you spent any days doing light or restricted work because of this NECK problem? Yes___1 No___2 (25)

IF YES: How many days in the past year? | | | | (26-28)

SHOULDER

26. In the past year, have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on this diagram more than three times or lasting more than one week?

Yes___1 No___2



(29)

IF "NO" TO QUESTION 26, GO TO QUESTION 27, PAGE 10.

a. Which side bothers you? Right___1 Left___2 Both___3 (30)

b. How long does each episode of SHOULDER problems usually last? (31)

Less than 1 hour ___1	More than 1 week to 1 month..___4
1 hour to 24 hours___2	More than 1 month to 6 months___5
25 hours to 1 week___3	More than 6 months.....___6

c. How many separate episodes of this SHOULDER problem have you had in the past year? (32)

Constant...___1	Once a week ___3	Every 2-3 months___5
Daily.....___2	Once a month___4	Every 6 months..___6

d. Have you had this SHOULDER problem in the past 7 days? Yes___1 No___2 (33)

e. Have you ever had an accident or sudden injury to your SHOULDER such as a dislocation, fracture, tendon tear? Yes___1 No___2 (34)

f. Do specific activities make this problem worse? Yes___1 No___2 (35)

Specify which activities _____ | | (36)

g. When did you first notice this SHOULDER problem? | | | - 19 | | | (37-40)

h. What job did you have when you first noticed this SHOULDER problem? Current job___1 Other job___2 (41)

Specify "other" job _____ | | (42)

i. Have you seen a doctor or other health care provider for this SHOULDER problem? Yes___1 No___2 (43)

IF YES: How many times in the past year? | | | (44-45)

j. Have you missed any WORKDAYS because of this problem? Yes___1 No___2 (46)

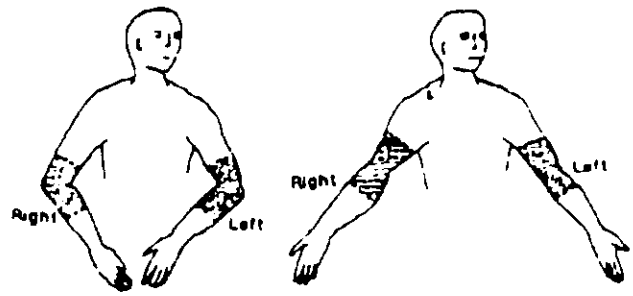
IF YES: How many days in the past year? | | | | (47-49)

k. Have you spent any days doing light or restricted work because of this SHOULDER problem? Yes___1 No___2 (50)

IF YES: How many days in the past year? | | | | (51-53)

ELBOW/FOREARM

27. In the past year, have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on this diagram more than three times or lasting more than one week?



Yes___1 No___2 (54)

IF "NO" TO QUESTION 27, GO TO QUESTION 28, PAGE 11.

a. Which side bothers you? Right___1 Left___2 Both___3 (55)

b. How long does each episode of ELBOW/FOREARM problems usually last? (56)

Less than 1 hour	___1	More than 1 week to 1 month..	___4
1 hour to 24 hours	___2	More than 1 month to 6 months	___5
25 hours to 1 week	___3	More than 6 months.....	___6

c. How many separate episodes of this ELBOW/FOREARM problem have you had in the past year? (57)

Constant...	___1	Once a week	___3	Every 2-3 months	___5
Daily.....	___2	Once a month	___4	Every 6 months..	___6

d. Have you had this problem in the past 7 days? Yes___1 No___2 (58)

e. Have you ever had an accident/sudden injury to your ELBOW/FOREARM (dislocation, fracture, or a tendon tear)? Yes___1 No___2 (59)

f. Do specific activities make this problem worse? Yes___1 No___2 (60)

Specify which activities_____ | | (61)

g. When did you first notice this problem? | | | - 19 | | | (62-65)

h. What job did you have when you first noticed this ELBOW/FOREARM problem? Current job___1 Other job___2 (66)

Specify "other" job_____ | | (67)

i. Have you seen a doctor or other health care provider for this ELBOW/FOREARM problem? Yes___1 No___2 (68)

IF YES: How many times in the past year? | | | (69-70)

j. Have you missed any WORKDAYS because of this problem? Yes___1 No___2 (71)

IF YES: How many days in the past year? | | | | (72-74)

k. Have you spent any days doing light or restricted work because of this ELBOW/FOREARM problem? Yes___1 No___2 (75)

IF YES: How many days in the past year? | | | | (76-78)

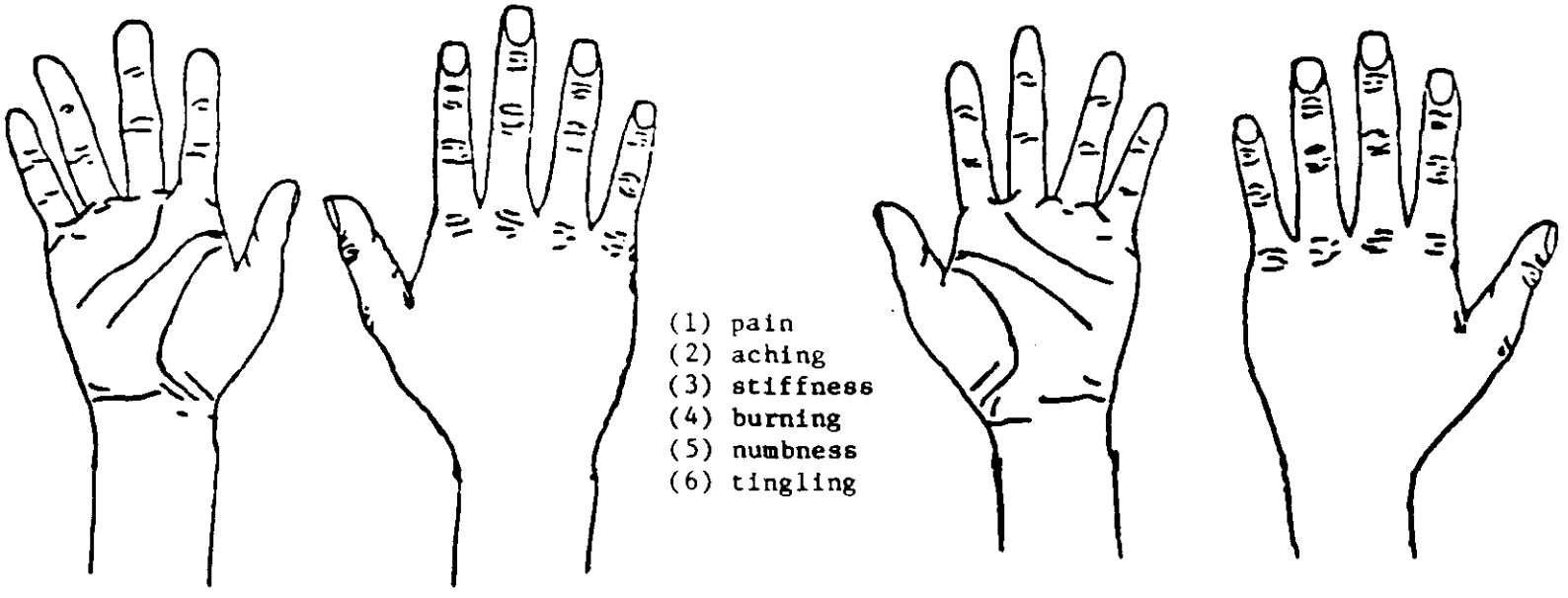
CARD |0|5| (79-80)

HANDS/WRISTS

28. In the past year, have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on the diagram below more than 3 times or lasting more than 1 week? Yes___1 No___2 (5)

IF "NO" TO QUESTION 28, GO TO QUESTION 29, PAGE 13.

Shade in the most affected area on this diagram. Next to the shaded area put the number of the symptom(s) which best describe the problem.



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (6-32)

(LEAVE BLANK - FOR OFFICE USE)

a. How long does each episode of HAND/WRIST problems usually last?

Less than 1 hour	___1	More than 1 week to 1 month..	___4	(33)
1 hour to 24 hours	___2	More than 1 month to 6 months	___5	
25 hours to 1 week	___3	More than 6 months.....	___6	

b. How many separate episodes of this HAND/WRIST problem have you had in the past year?

Constant...	___1	Once a week	___3	Every 2-3 months	___5	(34)
Daily.....	___2	Once a month	___4	Every 6 months..	___6	

c. Have you had this HAND/WRIST problem in the past 7 days? Yes___1 No___2 (35)

28. HANDS/WRISTS (Continued)

d. Have you ever had an accident or sudden injury to your HAND/WRIST such as a dislocation, fracture, or a tendon tear? Yes__1 No__2 (36)

e. Do specific activities make this HAND/WRIST problem worse? Yes__1 No__2 (37)

Specify which activities_____ | | (38)

f. When did you first notice this HAND/WRIST problem? | | | (month) - 19 | | | (year) (39-42)

g. What job did you have when you first noticed this HAND/WRIST problem? Current job__1 Other job__2 (43)

Specify "other" job_____ | | (44)

h. Does this HAND/WRIST problem ever wake you up from sleep? Yes__1 No__2 (45)

i. Have you seen a doctor or other health care provider for this HAND/WRIST problem? Yes__1 No__2 (46)

IF YES: How many times in the past year? | | | (47-48)

j. Have you missed any WORKDAYS because of this HAND/WRIST problem? Yes__1 No__2 (49)

IF YES: How many days in the past year? | | | | (50-52)

k. Have you spent any days doing light or restricted work because of this HAND/WRIST problem? Yes__1 No__2 (53)

IF YES: How many days in the past year? | | | | (54-56)

IF YOU REPORTED HAVING ANY PROBLEMS ON THIS QUESTIONNAIRE, ANSWER QUESTIONS 29-32; OTHERWISE, GO TO QUESTION 33.

29. Of the problems you have just described, which do you consider to be the most serious or troublesome? (CHECK ONE ONLY)

Neck.....___1 (57)
Shoulder.....___2
Elbow/Forearm___3
Hand/Wrist...___4

30. For the problem that bothers you the most, how would you describe the PAIN or DISCOMFORT it has caused you during the PAST 7 DAYS?

None.....___1 (58)
Little.....___2
Moderate.....___3
Bad.....___4
Very bad.....___5
Almost unbearable___6

31. How would you describe the PAIN or DISCOMFORT this problem has caused you during the worst episode?

None.....___1 (59)
Little.....___2
Moderate.....___3
Bad.....___4
Very bad.....___5
Almost unbearable___6

32. Were you using a keyboard at the time this problem first developed? Yes___1 No___2 (60)

IF "NO" TO QUESTION 32, GO TO QUESTION 33.

a. What keyboard were you using when you first experienced your problem?

PLEASE NOTE: IF YOU WERE USING MORE THAN ONE KEYBOARD REGULARLY, PLEASE NUMBER THEM IN ORDER OF FREQUENCY OF USE: "1" = MOST FREQUENT USE; "2" = SECOND MOST FREQUENT USE, ETC.)

Thick Atex		(61)	Tandy.....		(62)
Thin Atex		(63)	Hazeltine.....		(64)
Xeta.....		(65)	Mac II.....		(66)
IBM.....		(67)	Other_____		(68)

33. This series of questions asks you to describe your job in terms of specific qualities. In order to gain a better understanding of your work environment, we want to know how you feel about your job situation. As stated before, your responses will be kept confidential. We would like you to think about the TYPE OF WORK YOU DO IN YOUR JOB. Circle the number that best describes your feelings.

	Rarely	Occasionally	Sometimes	Fairly Often	Very Often	
a. Conflicts can occur in any job. HOW OFTEN are you faced with conflicting demands of people you work with?	1	2	3	4	5	(69)
b. HOW OFTEN does your job leave you with too little time to get everything done?	1	2	3	4	5	(70)
c. HOW OFTEN is your supervisor willing to listen to your work-related problems?	1	2	3	4	5	(71)

34. The next series of questions asks HOW MUCH INFLUENCE you now have in each of several areas of work. By influence we mean the degree to which you determine what is done by others and have freedom to determine what you do yourself.

	Very Little	Little	Moderate Amount	Much	Very Much	
a. HOW MUCH influence do you have over the amount of work you do?	1	2	3	4	5	(72)
b. HOW MUCH influence do you have over the availability of materials you need to do your work?	1	2	3	4	5	(73)
c. HOW MUCH do you influence the policies and procedures in your work group?	1	2	3	4	5	(74)
d. HOW MUCH influence do you have over the arrangement of furniture and other work equipment at your workstation?	1	2	3	4	5	(75)

35. The next series deals with HOW SATISFIED you are with your work situation.

	Not at all	Not too	Some what	Quite a bit	Very	
a. HOW SATISFIED are you with the amount of influence you have over the decisions that affect your job?	1	2	3	4	5	(76)
b. All in all, HOW SATISFIED are you with your job?	1	2	3	4	5	(77)

CARD |0|6| (79-80)

36. Is there anything else you would like to add?_____

_____

_____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.

APPENDIX B

Medical Management

These proposed draft guidelines were published by the Bureau of National Affairs, Inc., as "Medical Management Program for the Prevention and Treatment of CTD in Meat Packing Establishments" in the Occupational Safety and Health Reporter, volume 19, number 24, November 15, 1989, pages 1139-1143. Although they were intended for the meatpacking industry, the suggestions for medical management of cumulative trauma disorders may be helpful in other industries.

MEDICAL MANAGEMENT PROGRAM FOR THE PREVENTION AND TREATMENT OF CUMULATIVE TRAUMA DISORDERS IN MEATPACKING ESTABLISHMENTS

GENERAL

As noted in several sections of these guidelines, an effective medical management program for cumulative trauma disorders (CTDs) is essential to the success of an employer's ergonomic program in the meatpacking industry.

It is not the purpose of these guidelines to dictate medical practice for an employer's health care providers. Rather, they describe the elements of a medical management program for CTDs to ensure early identification, evaluation, and treatment of signs and symptoms, to prevent their recurrence, and to aid in their prevention. Medical management of CTDs is a developing field, and health care providers should monitor developments on the subject. These guidelines represent the best information currently available.

A physician or occupational health nurse (OHN) with training in the prevention and treatment of CTDs should supervise the program. Each work shift should have access to health care providers, in order to facilitate treatment, surveillance activities, and recording of information. Where such personnel are not employed full-time, the part-time employment of appropriately trained health care providers is recommended.

In an effective ergonomics program, health care providers should be part of the ergonomics team, interacting and exchanging information routinely in order to prevent and properly treat CTDs. The major components of a medical management program for the prevention and treatment of CTDs are trained first-level health care providers, health surveillance, employee training and education, early reporting of symptoms, appropriate medical care, accurate recordkeeping, and quantitative evaluation of CTD trends throughout the plant.

For a definition of disorders associated with repeated trauma, also known as cumulative trauma disorders, see the Glossary.

TRAINED AND AVAILABLE HEALTH CARE PROVIDERS

Appropriately trained health care providers should be available at all times, and on an ongoing basis as part of the ergonomic program.

In an effective medical management program, first-level health care providers should be knowledgeable in the prevention, early recognition, evaluation, treatment and rehabilitation of CTDs, and in the principles of ergonomics, physical assessment of employees, and OSHA recordkeeping requirements.

PERIODIC WORKPLACE WALKTHROUGH

In an effective program, health care providers should conduct periodic, systematic workplace walkthroughs to remain knowledgeable about operations and work practices, to identify

potential light duty jobs, and to maintain close contact with employees. Health care providers should also be involved in identifying risk factors for CTDs in the workplace as part of the ergonomic team.

These walkthrough surveys should be conducted every month or whenever a particular job task changes. A record should be kept documenting the date of the walkthrough, area(s) visited, risk factors recognized, and action initiated to correct identified problems. Followup should be initiated and documented to ensure corrective action is taken when indicated.

SYMPTOMS SURVEY

Those responsible for the medical management program should develop a standardized measure of the extent of symptoms of work-related disorders for each area of the plant, to determine which jobs are exhibiting problems and to measure progress of the ergonomic program. (See Putz-Anderson, pp. 42-44, Selected Bibliography.)

Institute a Survey

A survey of employees should be conducted to measure employee awareness of work-related disorders and to report the location, frequency, and duration of discomfort. Body diagrams should be used to facilitate the gathering of this information.

Surveys will not normally include employees' personal identifiers; this is in order to encourage employee participation

in the survey. Survey information should include information such as that discussed in Exhibit 1 (Symptoms Survey Checklist).

The survey is one method for identifying areas or jobs where potential CTDs problems exist. The major strength of the survey approach is in collecting data on the number of workers that may be experiencing some form of CTDs. Reported pain symptoms by several workers on a specific job would indicate the need for further investigation of that job.

Conduct the Survey Annually

Conducting the survey annually should help detect any major change in the prevalence, incidence, and/or location of reported symptoms.

COMPILE A LIST OF LIGHT-DUTY JOBS

The ergonomist or other qualified person should analyze the physical procedures used in the performance of each job, including lifting requirements, postures, hand grips, and frequency of repetitive motion. (See Section III. A. and Putz-Anderson, pp. 47-73, Selected Bibliography.) Positions with ergonomic stress should be labeled as such.

The ergonomist and health care providers should develop a list of jobs with the lowest ergonomic risk. For such jobs, the ergonomic risk should be described. This information will assist health care providers in recommending assignments to light or restricted duty jobs. The light duty job should therefore not increase ergonomic stress on the same muscle-tendon groups.

Health care providers should likewise develop a list of known high-risk jobs.

Supervisors should periodically review and update the lists.

HEALTH SURVEILLANCE

Baseline

The purpose of baseline health surveillance is to establish a base against which changes in health status can be evaluated, not to preclude people from performing work. Prior to assignment, all new and transferred workers who are to be assigned to positions involving exposure of a particular body part to ergonomic stress should receive baseline health surveillance.

[NOTE: The use of medical screening tests or examinations have not been validated as predictive procedures for determining the risk of a worker developing a CTD.]

These positions should be identified through the worksite analysis program discussed in Sections II. A. and III. A. and from the list of known high-risk jobs compiled by the health care provider. The majority of employees in the meatpacking industry can be expected to be in high-risk jobs.

The baseline health surveillance should include a medical and occupational history, and physical examination of the musculoskeletal and nervous systems as they relate to CTDs. The examination should include inspection, palpation, range of motion (active, passive and resisted), and other pertinent maneuvers of

the upper extremities and back. Examples of the pertinent maneuvers for the hands and wrists include Tinel's test, Phalen's test, and Finkelstein's test. (See Exhibit 2 of this Section.) Laboratory tests, X-rays and other diagnostic procedures are not a routine part of the baseline assessment.

Conditioning Period Followup

New and transferred employees should be given the opportunity during a 4-to-6-week break-in period to condition their muscle-tendon groups prior to working at full capacity. (See Section II. B. 2. of the guidelines on "Work Practice Controls.") Health care providers should perform a followup assessment of these workers after the break-in period (or after one month, if the break-in period is longer than a month) to determine if conditioning of the muscle-tendon groups has been successful; whether any reported soreness or stiffness is transient and consistent with normal adaptation to the job or whether it indicates the onset of CTD; and if problems are identified, what appropriate action and further followup are required.

Periodic Health Surveillance

Periodic health surveillance--every 2 to 3 years--should be conducted on all workers who are assigned to positions involving exposure of a particular body part to ergonomic stress. The content of this assessment should be similar to that outlined for the baseline. The worker's medical and occupational history should be updated.

Documentation

Data gathered on workers as a result of health surveillance should be documented and filed in individual employee medical records.

EMPLOYEE TRAINING AND EDUCATION

Health care providers should participate in the training and education of all employees, including supervisors and other plant management personnel, on the different types of CTDs and means of prevention, causes, early symptoms and treatment of CTDs. This information should be reinforced during workplace walkthroughs and the individual health surveillance appointments. All new employees should be given such education during orientation. This demonstration of concern and the distribution of information should facilitate the early recognition of CTDs prior to the development of more severe and disabling conditions and increase the likelihood of compliance with prevention and treatment.

ENCOURAGE EARLY REPORTING OF SYMPTOMS

Employees should be encouraged by health care providers and supervisors to report early signs and symptoms of CTDs to the in-plant health facility. This allows for timely and appropriate evaluation and treatment without fear of discrimination or reprisal by employers. It is important to avoid any potential disincentives for employee reporting, such as limits on the number of times an employee may visit the health unit.

PROTOCOLS FOR HEALTH CARE PROVIDERS

Health care providers should use written protocols for health surveillance and the evaluation, treatment, and followup of workers with signs or symptoms of CTDs. The protocols should be prepared by a qualified health care provider(s). These protocols should be available in the plant health facility. Additionally, the protocols should be reviewed and updated annually and/or as state-of-the-art evaluation and treatment of these conditions changes. An example algorithm for the evaluation and treatment of upper extremity CTDs is included as Exhibit 3 of this Section. The date of review and signature of the reviewer should appear on each protocol.

EVALUATION, TREATMENT, AND FOLLOWUP OF CTDS

If CTDs are recognized and treated appropriately early in their development, a more serious condition likely can be prevented; therefore, a good medical management program that seeks to identify and treat these disorders early is important. The following systematic approach, in general outline, is recommended in evaluating and following workers who report to the health unit.

Screening Assessment

Upon the employee's presentation of symptoms, the health care provider's screening assessment should include obtaining a history from the worker in order to identify the location, duration and onset of pain/discomfort, swelling, tingling and/or

numbness, and associated aggravating factors. A brief non-invasive screening examination for the evaluation of CTDs consists of inspection, palpation, range of motion testing and various applicable maneuvers. (See Barbara Silverstein, Evaluation of Upper Extremity and Low Back, Selected Bibliography.)

Based on the severity of symptoms and physical signs, the OHN or other health care provider should decide whether to initiate conservative treatment and/or to refer promptly to a physician for further evaluation. For example, an employee experiencing pain with a positive physical sign, such as positive Tinel's, Phalen's, or Finkelstein's tests, should be referred for physician evaluation. (See Exhibits 2 and 3 of this Section.)

If mild symptoms and no physical signs are present, conservative treatment is recommended. Examples include the following:

- o Applying heat or cold. Ice is used to treat overuse strains and muscle/tendon disorders for relief of pain and swelling, thus allowing more mobility. Ice decreases the inflammation associated with CTDs even if no overt signs of inflammation (redness, warmth, or swelling) are present. The use of ice may be inappropriate for Raynaud's disease (vibration syndrome), rheumatoid arthritis, and diabetic conditions. Heat treatments should be used only for muscle strains

where no physical signs of inflammation are present. (See Putz-Anderson, p. 125, Selected Bibliography.)

- Nonsteroidal anti-inflammatory agents. These agents may be helpful in reducing inflammation and pain. Examples of these types of agents include aspirin and ibuprofen.

- Special exercise. If active exercises are utilized for employees with CTDs, they should be administered under the supervision of the OHN or physical therapist. If these active exercises are performed improperly, they may aggravate the existing condition. (See Putz-Anderson, p. 126, Selected Bibliography.)

- Splints. A splint may be used to immobilize movement of the muscles, tendons, and nerves. Splints should not be used during working activities unless it has been determined by the OHN and ergonomist that no wrist deviation or bending is performed on the job. Splinting can result in a weakening of the muscle, loss of normal range of motion due to inactivity, or even

greater stress on the area if activities are carried out while wearing the splint.

Followup Assessment After Two days

If the condition has resolved, reinforce good work practices and encourage the employee to return to the health facility if there are problems.

If the condition has improved but is not resolved, continue the above treatment for approximately 2 days and reevaluate.

If the condition is unchanged or worse, check compliance with the prescribed treatment and perform a screening examination. (See also section above, Screening Assessment, for screening examination.)

- If the screening examination is positive, or if the condition is worse, refer the worker to the company physician, and seek reassignment of the employee to a light or restricted duty position.
- If the screening examination is negative for physical signs, but the condition is unchanged, continue conservative treatment.

A job reassignment must be chosen with knowledge of whether the new task will require the use of the injured tendons, or place pressure on the injured nerves. Inappropriate job reassignment can continue to injure the inflamed tendon or nerve, which can result in permanent symptoms or disability. The appropriate light duty job can be selected from the list maintained by the health care provider.

Restricted or light duty jobs are one of the most helpful treatments for CTDs. These jobs, if properly selected, allow the worker to perform while continuing to ensure recovery. Some CTDs require weeks (or months, in rare cases) of reduced activity to allow for complete recovery.

Followup Assessment After Six Days

After about 6 days, if the condition has now resolved, reinforce good work practices and encourage the employee to return to the health facility with problems.

If the condition has improved but is not resolved, continue the above treatment for approximately 2 more days and reevaluate.

If the condition is unchanged or worse, check compliance with prescribed treatment and perform a screening examination. If the screening examination is positive, refer the worker to the company physician.

Followup After Eight Days

If, after about 8 days, the condition has now resolved, reinforce good work practices and encourage the employee to return to the health facility with problems.

If the condition has not resolved within approximately 8 days, refer to the company physician automatically.

Other Considerations

If an employee misses a scheduled reevaluation, the health care provider should contact the employee to assess the condition within approximately 5 days of the last presentation.

The referring physicians or health care providers should be furnished with a written description of the ergonomic characteristics of the job of the worker who is being referred.

Surgery. Recommendations for surgery should be referred for a second opinion.

If surgery is performed, an appropriate amount of time off work is essential to allow healing to occur and prevent recurrence of symptoms. The number of days off work will depend on each worker's individual response, and should agree with the recommendations of the treating physician; however, this typically involves from 6 to 12 weeks recovery after carpal tunnel surgery.

A physical evaluation of the worker after time away from work, to assess work capabilities, should be performed to ensure appropriate job placement.

Return to Work. When an employee returns to work after time off, after an operation or to rest an inflamed tendon, ligament, or nerve, there must be a reconditioning of the healing muscle-tendon groups. (See the guidance on Conditioning Period Followup in this Section.) Consideration should be given to permanently reassigning the worker to an available job with the lowest risk of developing CTDs.

The effectiveness of Vitamin B-6 and hot wax for treatment of CTDs has not been established. The use of Vitamin B-6, anti-inflammatory medications such as aspirin, hot wax, constrictive wrist wraps, and a variety of exercise programs have been

advocated as effective methods for preventing work-related musculoskeletal disorders of the upper extremity. **NIOSH and OSHA, however, are unaware of any scientifically valid research that establishes the effectiveness of these interventions.** Exercises that involve stressful motions or an extreme range of motions or that reduce rest periods may actually be harmful.

Every attempt to evaluate, treat or follow up a worker with complaints of a CTD should be documented by the servicing health care provider in the individual employee medical record.

RECORDKEEPING--OSHA RECORDKEEPING FORMS

The Occupational Safety and Health Act and recordkeeping regulations in 29 CFR 1904 provide specific recording requirements that comprise the framework of the occupational safety and health recording system. The Bureau of Labor Statistics (BLS) has issued guidelines that provide official Agency interpretations concerning the recordkeeping and reporting of occupational injuries and illnesses. These guidelines, U.S. Department of Labor, BLS: Recordkeeping Guidelines for Occupational Injuries and Illnesses, September 1986 (or later editions as published), provide supplemental instructions to the OSHA recordkeeping forms (OSHA Forms 200, 101, and 200-S) and should be available in every plant health care facility. Since health care providers often provide information for OSHA logs, they should be aware of recordkeeping requirements and participate in fulfilling them.

Occupational Illnesses

Under the OSH Act, all work-related illnesses must be recorded on the OSHA-200 form, even if the condition is in an early stage of development. Diagnosis of these conditions may be made by a physician, registered nurse, or by a person who, by training or experience, is capable of making such a determination. If the condition is "diagnosed or recognized" as work-related, the case must be entered on the OSHA-200 form within 6 workdays after detection.

Most conditions classified as CTDs will be recorded on the OSHA-200 form as an occupational illness under the "7f" column, which are "disorders associated with repeated trauma." These are disorders caused, aggravated, or precipitated by repeated motion, vibration, or pressure.

In order to be recordable, the following criteria must be met:

- **The illnesses must be work related.** This means that exposure at work either caused or contributed to the onset of symptoms, or aggravated existing symptoms to the point that they meet OSHA recordability criteria. **Simply stated, unless the illness was caused solely by a non-work-related event or exposure off-premises, the case is presumed to be work related.** Examples of work tasks or working conditions that **are likely** to elicit a **work-related CTD** are as follows:

- Repetitive and/or prolonged physical activities.
- Forceful exertions, usually with the hands (including tools requiring pinching or gripping).
- Awkward postures of the upper body, including reaching above the shoulders or behind the back, and angulation of the wrists to perform tasks.
- Localized contact areas between the work or work station and the worker's body; i.e., contact with surfaces or edges.
- Excessive vibration from power tools.
- Cold temperatures.

o **A CTD must exist.** There must be <u>either physical findings</u>, OR <u>subjective symptoms and resulting action</u>. Namely, there must be either:

- At least one <u>physical finding</u> (e.g., positive Tinel's, Phalen's, or Finkelstein's test; or swelling, redness, or deformity; or loss of motion); OR
- At least one <u>subjective symptom</u> (e.g., pain, numbness, tingling, aching, stiffness, or burning), <u>and at least one</u> of the following:

(1) medical treatment (including self-administered treatment when made available to employees by their employer), (2) lost workdays (includes restricted work activity); or (3) transfer/rotation to another job.

- **If the above criteria are met, then a CTD illness exists that must be recorded on the OSHA-200 form.**

EXAMPLE. A production line employee reports to the health unit with complaints of pain and numbness in the hand and wrist. The employee is given aspirin and, after a followup visit with no change in symptoms, is reassigned to a restricted duty job. Even though there are no positive physical signs, the case is recordable because work activity was restricted.

Occupational Injuries

Injuries are caused by instantaneous events in the work environment. To keep recordkeeping determinations as simple and equitable as possible, back cases are classified as injuries even though some back conditions may be triggered by an instantaneous event and others develop as a result of repeated trauma. (See BLS Recordkeeping Guidelines, Selected Bibliography.)

Any occupational injury involving medical treatment, loss of consciousness, restriction of work or motion, or transfer to

another job is to be recorded on the OSHA-200 form. Refer to the BLS guidelines for a definition of "medical treatment."

Other Considerations

A case is considered to be complete once there is complete resolution of the signs and symptoms. After resolution of the problem, if signs or symptoms recur, a new case is established and thus must be recorded on the OSHA-200 form as such. Furthermore, failure of the worker to return for care after 30 days indicates symptom resolution. Any visit to a health care provider for similar complaints after the 30-day interval implies reinjury or reexposure to a workplace hazard and would represent a new case.

It is essential that required data, including job identification, be consistently, fully, and accurately recorded on the OSHA-200 form. "Job identification" will include the appropriate job title for "Occupation" and the appropriate organizational unit for "Department" on the OSHA-200.

OSHA recognizes that when an effective ergonomics program is implemented and occupational illnesses and injuries are recorded properly on the OSHA-200 form, the plant's total annual number of CTDs may increase. When engineering and administrative controls are put into place, however, these numbers should gradually decrease.

Health care providers and others should contact the BLS Regional Office or participating State agency serving their area with questions regarding OSHA recordkeeping. Refer to the BLS

guidelines (or the list at the end of these guidelines) for addresses and telephone numbers of Regional Offices.

MONITOR TRENDS

Health care providers should periodically (e.g., quarterly) review health care facility sign-in logs, OSHA-200 forms, and individual employee medical records to monitor trends for CTDs in the plant. This ongoing analysis should be done in addition to the "symptoms survey" (described previously in this Section) in order to monitor trends continuously and to substantiate the information obtained in the annual symptoms survey. The analysis should be done by department, job title, work area, etc. (See also Section III. A., "Worksite Analysis Program.")

The information gathered from the annual symptoms survey will help to identify areas or jobs where potential CTD problems exist. This information may be shared with anyone in the plant, since employees' personal identifiers are not solicited. The analysis of medical records (e.g., sign-in logs and individual employee medical records) may reveal areas or jobs of concern, but it may also identify individual workers who require further followup. The information gathered while analyzing medical records will be of a confidential nature; thus care must be exercised to protect the individual employee's privacy.

The information gained from the CTD trend analysis and symptoms survey will help determine the effectiveness of the various programs initiated to decrease CTDs in the plant.

Exhibit 1
Symptoms Survey Checklist

Symptoms Survey: Ergonomics Program

DATE___/___/___

_____ ___/___/____
(Last Name) (First Name) Soc Sec #

____ ____ ____ _____
Plant Dept# Job # Job Name

____ _____ _____ ____years____months
Shift Supervisor Hours worked/week Time on THIS job

Other jobs you have done in the last year (for more than 2 weeks)

____ ____ _____ _____months____weeks
Dept Job # Job Name Time on THIS job

____ ____ _____ _____months____weeks
Dept Job # Job Name Time on THIS job

(If more than 2 jobs, include those you worked on the most

Have you had any pain or discomfort during the last year?

1) Yes____ 2) No____ (If NO, stop here)

If YES, carefully shade in the area of the drawing which bothers you the MOST.

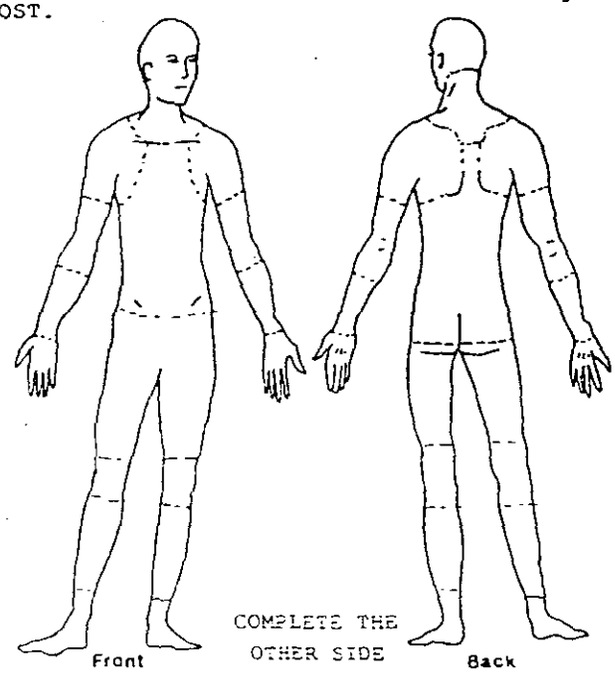


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Exhibit 1
Symptoms Survey Checklist, Continued

NAME_____ ID#_____
(Complete a separate page for each area that bothers you)

Check Area: Neck__ Shoulder__ Elbow/Forearm __ Hand/Wrist__ Fingers__
Upper Back__ Low Back__ Thigh/Knee__ Low Leg__ Ankle/Foot__

1. Please put a check by the word(s) that best describe your problem

___1) Aching	___5) Numbness(asleep)	___9) Tingling
___2) Burning	___6) Pain	___10) Weakness
___3) Cramping	___7) Swelling	___11) Other
___4) Loss of Color	___8) Stiffness	

2. When did you first notice the problem? _____(month)_____(year)

3. How long does each episode last? (Mark an X along the line)

1 hour / 1 day / 1 week / 1 month / 6 months

4. How many separate episodes have you had in the last year? _____

5. What do you think caused the problem_____

_____

6. Have you had this problem in the last 7 days? 1) Yes___ 2) No___

7. How would you rate this problem (mark an X on the line)

NOW
_____
None Unbearable

When it was the WORST
_____
None Unbearable

8. Have you had medical treatment for this problem? 1)Yes___2)No___

8a. If NO, why not_____

8b. If YES, where did you receive treatment?
1. Company Medical_____ Times in past year____
2. Personal doctor_____ Times in past year____
3. Other_____ Times in past year____

8c. If YES, did the treatment help? 1)Yes___ 2)No___

9. How much time have you lost in the last year because of this problem? _____days

10. How many days in the last year were you on restricted or light duty because of this problem? _____days

11. Please comment on what you think would improve your symptoms

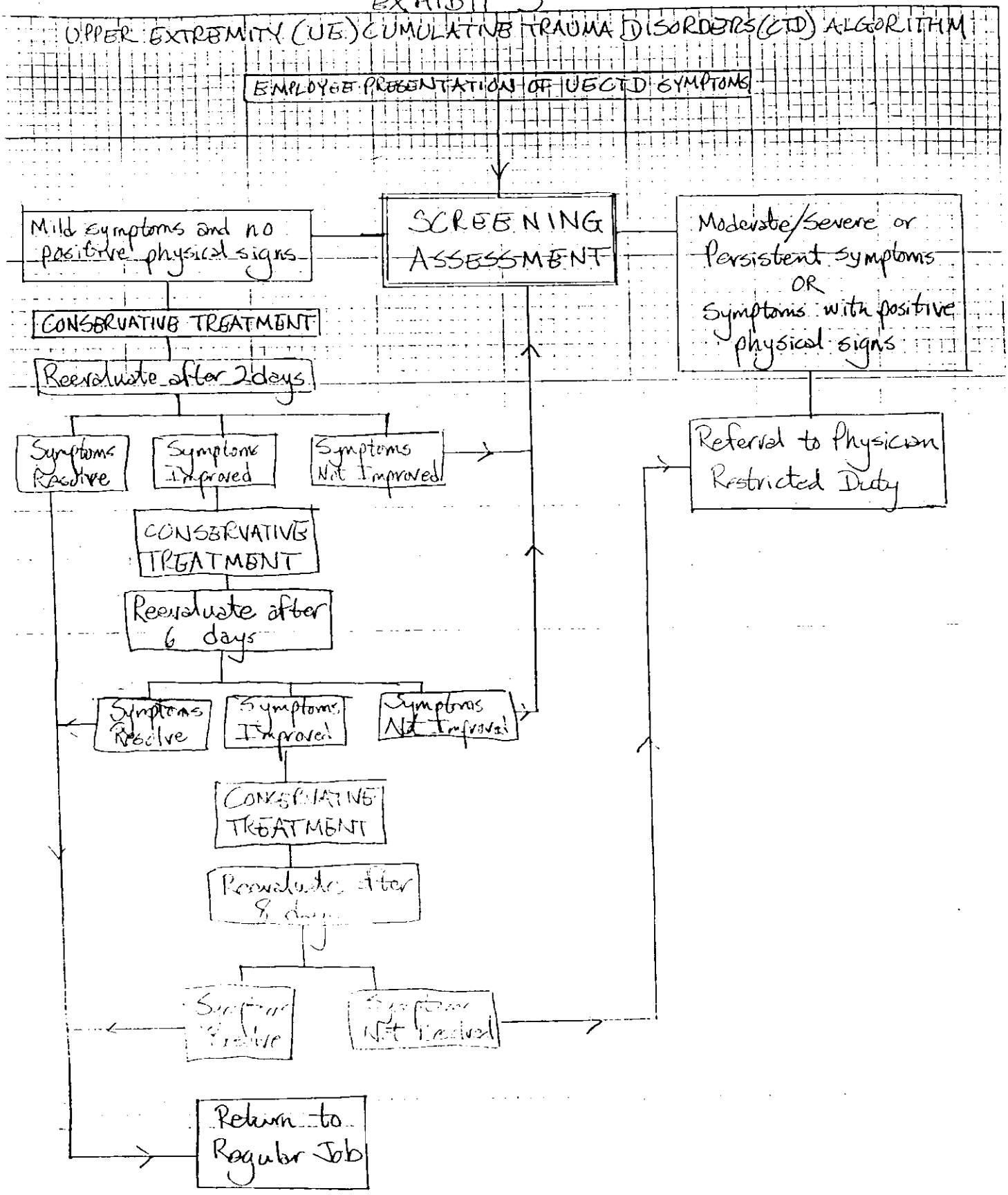
Exhibit 2

Screening Tests

Positive Tinel's sign:	Gentle tapping over the median nerve at the wrist resulting in pain, tingling, or numbness in the median nerve distribution.
Positive Finkelstein's test:	Ulnar deviation of the hand with the thumb flexed against the palm and the finger flexed over the thumb. Severe pain results at the radial styloid due to stretching of the abductor pollicus longus and extensor pollicis brevis.
Positive Phalen's test:	Unforced, complete flexion of the wrist for 60 seconds resulting in pain, numbness, or tingling in the median nerve distribution.

EXHIBIT 3

UPPER EXTREMITY (UE) CUMULATIVE TRAUMA DISORDERS (CTD) ALGORITHM



APPENDIX C

Prevalence Rates for Cumulative Trauma Disorder Symptoms

by Job Title

1) Hand/Wrist CTD Symptom Prevalence by Job
in Decreasing Order of Prevalence

Job title	Number of Cases Divided by Number of Participants	Prevalence
Reporter/Writer	74/195	(38%)
Editorial Asst.	9/27	(33%)
Researcher	5/15	(33%)
News Editor	7/25	(28%)
Lister	3/11	(27%)
Asst. News Editor	12/51	(24%)
Class. Sales Rep.	19/81	(23%)
Other S/V Editors	11/52	(21%)
Librarian	3/16	(19%)
Account Clerk	2/11	(18%)
Copy Editor	8/52	(15%)
Secretary	2/13	(15%)
Billing Clerk	2/15	(13%)
Customer Svc. Rep.	3/25	(12%)
Credit Clerk	1/10	(10%)
Editorial Aide	1/11	(9%)
Photographer	2/25	(8%)
Artist	3/38	(8%)
Key Manager	3/38	(8%)
Programmer/Analyst	1/13	(8%)
Publications Clerk	1/26	(4%)

2) Neck CTD Symptom Prevalence by Job
in Decreasing Order of Prevalence

Job title	Number of Cases Divided by Number of Participants	Prevalence
Secretary	4/13	(31%)
Programmer/Analyst	4/13	(31%)
Classified Sales Rep.	23/81	(28%)
Account Clerk	3/11	(27%)
Reporter/Writer	47/195	(24%)
Editorial Asst.	6/27	(22%)
Artist	8/38	(21%)
Researcher	3/15	(20%)
Lister	2/11	(18%)
Other Supervisory Editor	9/52	(17%)
News Editor	4/25	(16%)
Customer Svc. Rep.	3/25	(12%)
Photographer	3/25	(12%)
Copy Editor	5/52	(10%)
Publications Clerk	2/26	(8%)
Billing Clerk	1/15	(7%)
Librarian	1/16	(6%)
Key Manager	2/38	(5%)
Asst. News Editor	2/51	(4%)
Credit Clerk	0/10	(0%)
Editorial Aide	0/11	(0%)

3) Elbow CTD Symptom Prevalence by Job
in Decreasing Order of Prevalence

Job title	Number of Cases Divided by Number of Participants	Prevalence
Editorial Asst.	7/27	(26%)
News Editor	6/25	(24%)
Reporter/Writer	39/195	(20%)
Asst. News Ed.	9/51	(18%)
Secretary	2/13	(15%)
Billing Clerk	2/15	(13%)
Researcher	2/15	(13%)
Librarian	2/16	(13%)
Classified Sales Rep.	10/81	(12%)
Copy Editor	6/52	(12%)
Credit Clerk	1/10	(10%)
Account Clerk	1/11	(9%)
Lister	1/11	(9%)
Other Supervisory Editor	4/52	(8%)
Publications Clerk	2/26	(8%)
Artist	2/38	(5%)
Customer Service Rep.	1/25	(4%)
Photographer	1/25	(4%)
Key Manager	1/38	(3%)
Editorial Aide	0/11	(0%)
Programmer/Analyst	0/13	(0%)

4) Shoulder CTD Symptom Prevalence by Job in Decreasing Order of Prevalence

Job title	Number of Cases Divided by Number of Participants	Prevalence
Editorial Asst.	7/27	(26%)
Photographer	4/25	(16%)
Publications Clerk	4/26	(15%)
Secretary	2/13	(15%)
Classified Sales Rep.	12/81	(15%)
Reporter/Writer	28/195	(14%)
News Editor	3/25	(12%)
Copy Editor	6/52	(12%)
Artist	4/38	(11%)
Lister	1/11	(9%)
Other Supervising Editors	4/52	(8%)
Programmer/Analyst	1/13	(8%)
Researcher	1/15	(7%)
Billing Clerk	1/15	(7%)
Asst. News Editor	2/51	(4%)
Key Manager	1/38	(3%)
Editorial Aide	0/11	(0%)
Credit Clerk	0/10	(0%)
Customer Service Rep.	0/25	(0%)
Account Clerk	0/11	(0%)
Librarian	0/16	(0%)