

Impact of Case Manager Training on Worksite Accommodations in Workers' Compensation Claimants With Upper Extremity Disorders

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Management of the return-to-work process in claimants with work-related upper extremity disorders often poses challenges to the health care provider, claimant, and employer. Modifying workplace ergonomic risk factors as a component of the workplace accommodation process may improve return-to-work outcomes by reducing recurrent pain and discomfort. The present study is a case-control evaluation of the effects of a 2-day training program for nurse case managers that was designed to facilitate the implementation of workplace accommodations within a workers' compensation health care delivery system. After the training, 101 claimants with compensable upper extremity disorders were randomly assigned to case managers with and without training. Overall, 208 accommodations were recommended and 155 of these were implemented (75%). Claimants of trained nurses received 1.5 times as many recommendations for accommodations as claimants managed by nurses not trained in the process, and 1.4 times as many accommodations were implemented, although no differences were found between the two groups in implementation rates. Trained nurses were more likely to recommend accommodations addressing workstation layout, computer-related improvements, furnishings, accessories, and lifting/carrying aids, whereas the untrained nurses were more likely to suggest light duty and lifting restrictions. This study indicates that the training was associated with a change in the practice behavior of case managers regarding the workplace accommodation process. More research is needed to identify barriers to implementation and develop more effective approaches to facilitate worksite accommodations in disabled workers with carpal tunnel syndrome and other persistent upper extremity disorders. (J Occup Environ Med. 2002;44:237-245)

Work-related upper extremity disorders (WRUEDs) are a major occupational health concern that can be associated with relatively long durations of work disability and significant costs.¹⁻³ The prevalence and impact of these conditions has led to interest in developing interventions aimed at preventing WRUEDs or facilitating a successful return to work after a WRUED. Evidence continues to emerge indicating the importance of workplace ergonomic factors in the development and exacerbation of WRUEDs,^{4,5} suggesting the potential utility of interventions designed to reduce ergonomic exposures in affected workers. Although various methods for providing accommodations to workers with upper extremity musculoskeletal disorders has been described and components of^{6,7} successful job redesign proposed,^{8,9} the outcome literature primarily consists of case studies describing individual accommodations.^{10,11} Also, other than an early study that integrated ergonomic consultation into a comprehensive work rehabilitation program for claimants with a chronic WRUED, there are few studies conducted within a workers' compensation system.¹² To date, no randomized controlled studies have systematically evaluated the effects of ergonomically based workplace accommodations in workers' compensation claimants with WRUEDs.¹³

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In the past decade, an increased emphasis on the need for comprehensive medical management of

WRUEDs has been observed.^{14–20} This finding is based on the rationale that these disorders and their recovery can be influenced by several factors. These factors include the medical status of the worker, physical capabilities in contrast with work demands, and ergonomic factors.^{4,21–25} Also, levels of coping and problem-solving skills for managing pain and other challenges related to return to work can be significant impediments to work reentry.^{22,26,27} Given these multiple factors, an approach that systematically identifies the barriers to recovery across the domains of medical, ergonomic, and problem-solving dimensions using an integrated plan (Integrated Case Management [ICM]) should be more likely to improve health and work outcomes. The ICM was specifically designed to teach nurse case managers principles and methods in ergonomics and problem solving to assist with workplace accommodations and facilitate return to work.

The purpose of this study was to determine whether a 2-day training program on ICM was associated with actual changes in case management practice patterns regarding the recommendation, pattern, and implementation of workplace accommodations. This study also examined the most common types of accommodations implemented and differences in the distribution of accommodation types recommended between those trained and not trained in the ICM approach.

Subjects and Methods

Study Design

This study was a prospective randomized controlled investigation of the effects of nurse case manager training in ICM on actual changes in practice patterns (based on administrative case records) compared with nurses not receiving the ICM training. The training was conducted as the initial process of a larger, randomized controlled trial of ICM on

return to work, health outcomes, and health and indemnity costs.

The ICM group received training in (1) conducting an ergonomic assessment, (2) using ergonomic evaluations as the basis for implementing workplace accommodations, (3) training claimants in a problem-solving approach to reduce barriers to return to work, while also maintaining a focus on coordinating medical care.²⁸ “Usual Care” nurses did not receive the ICM training and followed the standard operating practices performed by nurses in the Department of Labor’s Office of Workers’ Compensation Programs (OWCP), which focuses on medical management and workplace accommodation with the absence of a structured protocol that included the use of various ergonomic and problem-solving procedures and tools as in ICM.

Study Population

Nurses. Nurses were randomly selected from the active lists of registered nurses under contract to the US Department of Labor’s workers’ compensation program to provide services to injured workers in the following metropolitan areas: Washington/Baltimore, Chicago, Boston, Philadelphia, Los Angeles/San Diego, San Francisco, Seattle, and Dallas/Fort Worth. Incentives for participation included 13.0 continuing education credits from the Case Management Society of America and the opportunity to learn new case management skills.

Injured workers. The claimants were federal civilian workers with accepted claims for WRUEDs. Volunteers completed a consent form and were randomized into two groups (ICM or Usual Care). Eligible claimants for this study included single claims with no previous claims within the past 2 years, and claimants had one or more of the following International Classification of Diseases, 9th Revision, Clinical Modification diagnoses: mononeuritis (354), enthesopathies (726), tendon

disorder (727); soft-tissue (729), nerve root and plexus (353), and cervical (723) disorders; osteoarthritis (715); and muscle/ligament/fascia disorder (7283) (Table 1). Only those cases accepted within 30 to 90 days from the initiation of lost work time were included. Letters were sent offering these injured workers the opportunity to participate in the study.

Eligible cases were identified through the claims management database of the US Department of Labor OWCP over a 2-year sampling period. A batch computer program, run daily, produced the names of newly eligible claimants ($n = 935$), along with claims history, compensable diagnoses, employing agency, and home address and phone number. Computer-generated claims histories were visually inspected to confirm that all inclusionary criteria were met, and eligible employees ($n = 573$) were sent a letter of invitation by overnight express mail from the Medical Director of the OWCP. The letter provided information required for informed consent, including the role of a case manager, the rationale for the study, requirements for participation, the voluntary nature of the study, and the right to decline participation at any time.

In the letter of invitation, prospective participants were informed that declining participation would not affect workers’ compensation benefits and that a (study or nonstudy) nurse case manager would be assigned in any event. Claimants signed, dated, and returned the letter to OWCP, indicating either “interested” or “not interested.” For those workers who failed to respond within a week, a follow-up phone call was made by OWCP staff to answer any questions and determine whether the worker was interested in participating. This recruitment process produced 205 participants over 2 years (35.8% volunteerism).

Case Definition

Participants included in this series met the inclusion criteria stated

TABLE 1
Study Population

Characteristic	ICM Group (n = 53)*		Usual Care Group (n = 48)		Total (n = 101)	
	n	%	n	%	n	%
Gender (%)						
Men	14	26	12	25	26	26
Women	39	74	36	75	75	74
Mean age ± SD						
ICM group: 49.7 ± 8.9						
Usual care group: 49.7 ± 8.5						
Total: 49.7 ± 8.7						
Diagnostic group†						
Mononeuritis of upper extremity (354.0, 354.2, 354.9)	31	58	30	62	61	60
Arthropathy (716.32, 717.05)	0	0	2	4	2	2
Peripheral enthesopathy (726.0, 726.10, 726.2, 726.3, 726.31, 726.32)	12	23	8	17	20	20
Disorders of synovia, tendon, bursa (727.0, 727.05, 727.4, 727.9)	8	15	7	15	15	15
Sprain/strain of upper extremity (840, 840.0, 842)	2	4	1	2	3	3
No. of accepted diagnoses (comorbidities)						
2nd diagnosis		28%		31%		30%
3rd diagnosis		6%		6%		6%
4th diagnosis		0%		0%		0%
Occupational categories‡						
Managerial	6	12	5	10	11	11
Clerical	11	22	12	25	23	23
Mechanical/electrical	4	8	5	10	9	9
Postal/carrier	9	18	12	25	21	21
Postal/clerical	12	24	13	27	25	26
Other	8	16	1	2	9	9

* ICM, Integrated Case Management.

† First listed accepted condition. (International Classification of Diseases, 9th Revision, Clinical Modification code).

‡ Three missing cases.

above and completed the study protocol, and the cases had been closed by the case manager.

Intervention

Nurse case managers were instructed in each of the components of the ICM intervention in a 2-day (16-hour) training workshop. Those components included medical management,²⁹ a comprehensive initial interview, developing a case management plan, applying the problem-solving process, worksite ergonomic assessment, providing ergonomic accommodations, preventing reinjury, and follow-up instruction. These workshops included a combination of didactic presentations, case simulations, and hands-on exercises. ICM nurses were informed at the initial training session that project staff would be available for consultation

by telephone, e-mail, and Internet site throughout the project to provide a sounding board for discussing strategies for individual cases, provide suggestions, and receive feedback. A detailed training manual was also provided.²⁸ The intervention included the following additions to the current OWCP nurse case management program:

Semistructured interview. Nurses were provided instruction and given opportunities to practice administering a semistructured interview technique to be used with WRUED claimants. The interview was designed to obtain useful information about a claimant's medical history, current medical status, work, prior workplace accommodations, non-work-related activities, and other factors both within and outside of work that could impede a positive return-to-work outcome.

Problem solving. Nurses were trained in a six-step problem-solving technique.³⁰ Using this approach, nurses reviewed with the claimant past attempts to solve problems, including both effective and ineffective problem-solving strategies. Then, case managers introduced and taught the problem-solving process to help the claimant more effectively address challenges related to medical management, symptoms, function, reasonable accommodations, and return to work.

Self-report of ergonomic assessment. Nurses were instructed how to administer and use a brief self-report measure of ergonomic risk exposure.³¹ After having the claimant complete the questionnaire, nurses reviewed all of the tasks and asked for additional details about the impact of these factors on the ability to return to work. This method pro-

vided additional details about the claimant's perceptions of challenges in the workplace and the need for changes to reduce the risk of reinjury.

Worksite ergonomic assessment. Nurses were trained to conduct a worksite analysis using a standardized protocol that included a self-report measure of exposure, a brief workstation checklist, and a measurement of workstation factors that may contribute to increased fatigue, discomfort, and pain. Ergonomic factors that contribute to awkward postures, excessive repetition, increased force, contact stress, glare, temperature extremes, work organization, and potential high-risk work style were identified.

Worksite accommodation process. Nurses were trained to generate a plan for the provision of reasonable accommodations targeted at eliminating or reducing ergonomic risk factors. Discussion with and input from the claimant, immediate supervisor, and other agency representatives regarding possible accommodations and their schedule for implementation was a key component. Purchases of appropriate assistive devices were pursued.

Data Collection

Data on participant demographics were obtained from OWCP's Automated Claimant Information Management File, whereas data on accommodations were extracted from nurses' progress reports and coded into specific categories by project staff. In addition, each accommodation was classified as to whether it was recorded to having been implemented, not implemented, or unknown (ie, status of the implementation of the accommodation at the time the case was closed was not determined). Accommodations for each participant were coded, along with the implementation status and additional descriptive information.

On receipt of the signed consent form, participants were randomized to either the Usual Care or ICM arm of the study, and nurse case manag-

ers were assigned accordingly. Of the 205 participants who initially volunteered, 44 individuals were not included in the study for the following reasons: (1) the claims manager ultimately chose not to refer for case management ($n = 19$), (2) the employee already returned to full-duty work before a nurse could be assigned ($n = 15$), (3) the employee withdrew consent to participate ($n = 6$), or (4) no ICM nurses were available within a reasonable driving distance ($n = 4$). Of the remaining 161 participants assigned a nurse case manager, the following analyses pertain to the first 101 participants who completed their case management intervention.

Classification of Workplace Accommodations

Accommodations were classified into the following eight general categories:

1. administrative: temporary or permanent initiatives to modify the work process or work tasks to reduce repetition and inadequate recovery³²
2. computer-related: interventions to reduce the static loading, awkward postures associated with tasks involving the computer in terms of the input devices (eg, keyboard, mouse, voice), display unit, or peripherals associated with computer use (eg, wrist supports, document holder)
3. furnishings: modifications of the physical equipment used to support the worker (eg, chair, footrest, and writing table) to reduce postural strain, fatigue, and improve comfort, but not associated with the operation of a computer per se
4. workstation layout: modifications of the physical workstation to reduce such ergonomic hazards as awkward postures or reaches and to improve worker comfort and efficiency of the work process
5. environmental: changes in the physical surroundings to avoid discomfort or strain, such as improved lighting

6. accessories: tools and equipment used in the work process to improve comfort and avoid strain (eg, telephone headset, updated hand tools, electric stapler)

7. lifting/carrying aids: devices to reduce the stress of a task by reducing or better distributing the physical load associated with a specific task

8. personal protective equipment: items worn by the worker to provide protection from the risk of injury by creating a barrier against workplace hazards (eg, antivibration gloves)³³

Exposure Assessment

Self-reported ergonomic exposure was assessed by the Job Tasks section (38 items) of the US Air Force Job Requirements and Physical Demands Survey.³¹ This survey has been studied recently in terms of its relationship to observable ergonomic stressors using a standardized worksite walk-through in an office work environment. A significant correlation ($r = 0.33$, $P < 0.01$) was observed between self-reported ergonomic stressors and the observational measure.³⁴

Statistical Analyses

Bivariate analyses included t tests for continuous variables (eg, participants' age, number of accepted conditions, numbers of accommodations recommended and implemented) and Fisher's exact tests for categorical variables (eg, types of diagnoses and accommodations by intervention grouping). One-sided tests were used to evaluate the hypotheses that numbers of accommodations recommended and implemented should be higher for the ICM group. All analyses were performed on SPSS 9.1 (Statistical Products and Service Solutions, Chicago, IL).

Results

This study documents the findings of 101 participants; 53 (52%) were in the ICM group and 48 (48%) were in the Usual Care group. To test for a possible self-selection sampling bias, volunteers ($n = 205$) and nonvolun-

TABLE 2
Accommodation Characteristics

Characteristic	ICM Group (n = 53)	Usual Care Group (n = 48)	Total (n = 101)
Recommended accommodations			
Total number	129	79	208
Average per claimant**	2.43	1.63	2.06
Standard deviation	2.14	1.39	1.86
Range	0–11	0–5	0–11
Implemented accommodations			
Total number	95	60	155
Average per claimant*	1.81	1.25	1.54
Standard deviation	1.84	1.25	1.60
Range	0–9	0–5	0–9
Accommodation implementation rate (%)	73	77	75
Recommended accommodation types (n/%)**			
Administrative	55/43	58/73	113/55
Computer-related	16/13	6/8	22/11
Furnishings	20/16	1/1	21/10
Workstation layout	9/7	2/3	11/5
Environmental	4/3	0/0	4/2
Accessories	8/6	5/6	13/6
Lifting/carrying aids	7/5	0/0	7/3
Personal protective equipment	9/7	7/9	16/8

* $P < 0.05$.

** $P < 0.01$.

teers ($n = 368$) were compared using available demographic data from the administrative database (independent samples t tests for continuous variables, chi-squared tests for categorical variables). There were no statistically significant group differences ($P > 0.05$) in gender, number or type of upper extremity diagnoses, agency of employment, geographical region, days to adjudicate the claim, or percentage of controverted claims. However, volunteers (mean, 46.5; SD, 8.5) were older than nonvolunteers (mean, 44.6; SD, 8.8; $t(571) = 2.46$, $P = 0.014$).

Participant Characteristics

The study population was predominantly female (74%) with a mean age of 49.7 years (SD, 8.7). Participants were classified by their first accepted diagnostic condition (Table 1). The majority of claimants (60%) had a diagnosis of mononeuritis of the upper extremity, which was typically carpal tunnel syndrome. The next largest diagnostic group were the peripheral enthesopathies (20%), composed primarily of lateral epicondylitis.

Claimants often had additional upper extremity diagnoses that were accepted by the carrier as being work-related. Among all participants, 30% had a second accepted condition and 6% had a third accepted condition. Nearly half (47%) of the claimants were employed by the US Postal Service, with 26% serving in clerical positions and 21% serving as postal carriers. An additional 23% held clerical positions with other federal agencies.

Accommodation Characteristics

A total of 208 accommodations were recommended among these 101 claimants, and 155 recommendations were implemented (75%) (Table 2). Claimants of ICM nurses received an average of 2.4 (SD, 2.1) recommendations for accommodations, which represented 1.5 (95% confidence interval, 1.1 to 2.0) times as many recommendations for accommodations as their Usual Care counterparts. Similarly, claimants of ICM nurses were 1.4 (95% confidence interval, 1.0 to 2.0) times as likely to have accommodations implemented. Table 2 illustrates the results from t

tests comparing the two groups on the average number of accommodations recommended and implemented and the Fisher's exact tests of the distribution of accommodation types.

Analyses of the patterns of recommended and implemented accommodations demonstrated significant variability between the study groups. Among ICM claimants, 70% received two or more recommendations, compared with 44% for Usual Care claimants (one-sided $P < 0.01$ by Fisher's exact test) (Fig. 1). This pattern continued through four or more recommendations, which were received by 25% of ICM claimants and 10% of Usual Care claimants ($P = 0.05$). The discrepancy was less dramatic regarding the number of implemented accommodations: 47% of ICM claimants had two or more accommodations implemented, whereas the corresponding rate was 31% for Usual Care claimants ($P < 0.10$) (Fig. 2).

The most commonly recommended accommodations were administrative in nature (55%) (Ta-

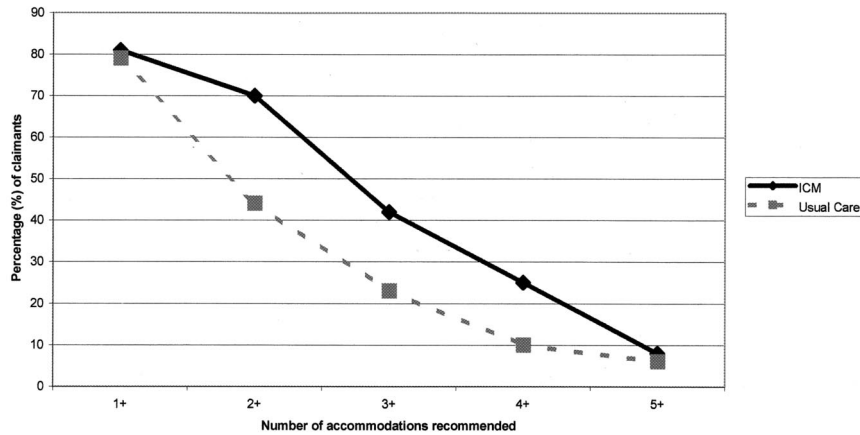


Fig. 1. Number of accommodations recommended by study group.

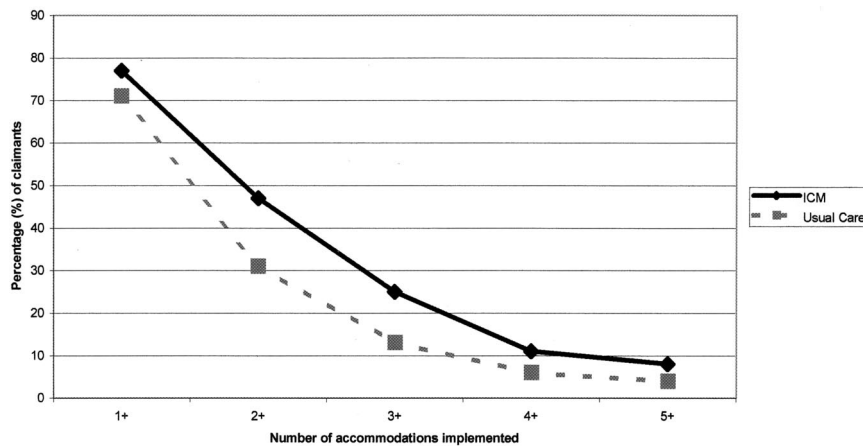


Fig. 2. Number of accommodations implemented by study group.

bles 2 and 3). These included recommendations for lifting restrictions (recommended 34 times), modified or light duty (recommended 46 times), and increased work breaks (recommended 14 times). Other commonly recommended accommodations were computer-related (11%), mostly associated with changes to the keyboard, keyboard tray, or wrist rest, and those associated with “furnishings” (10%), which were primarily modifications to the chair, back rest, or arm rest (recommended 14 times).

The distribution of types of accommodations recommended differed significantly between the groups ($P < 0.001$). Administrative accommodations represented a greater proportion of the Usual Care

claimants’ recommendations than those for ICM claimants (73% vs 43%). The vast majority of recommendations for Usual Care claimants were composed of modified/light duty ($n = 26$) and lifting restrictions ($n = 21$). ICM claimants were more likely than Usual Care claimants to receive recommendations to improve their seating posture (13 vs 1), modify their workspace (9 vs 2), adapt their computer (16 vs 6), or use lifting/carrying aids (7 vs 0).

Some federal accommodation programs and their Web sites that were provided to ICM nurses are listed in Table 4.

Discussion

In this evaluation of worksite accommodations among 101 claimants with compensable upper extremity

disorders, 208 accommodations were recommended and 155 of these were implemented (75%). Claimants of ICM nurses received 50% more recommendations for accommodations as claimants of Usual Care nurses and were nearly twice as likely to receive three or more recommendations for accommodations.

Although claimants of ICM nurses received significantly more recommendations on average (2.4 vs 1.6) and had more accommodations implemented (1.8 vs 1.3), the implementation rate between the two groups was very similar. The pattern of the types of accommodation, however, differed between the groups. Three quarters of the recommended accommodations among claimants of Usual Care nurses were administrative, relating to either light or modified duty or lifting restrictions. Recommendations among claimants of ICM nurses were more diverse and addressed a variety of potential ergonomic solutions that seem to reflect the specific training received by this group (eg, workstation layout and computer-related improvements, furnishings, accessories, and lifting/carrying aids). This diversity provides encouraging results, suggesting that relatively brief training can exert a lasting and positive impact on the approach case managers take when attempting to implement accommodations to facilitate return to work.

The findings as a whole suggest that barriers to the realization of technology-based accommodations may exist. Although the investigators went to extensive efforts to enable nurses to place assistive technology accommodations in the workplace (ie, provided a detailed accommodation outline with names and dates of personnel responsible for ordering, setup, training, and evaluation of devices; offered technical support for device selection; provided contacts within agencies to facilitate device acquisition), the relatively similar rates of implementation in the two groups suggest that additional barriers may have been

TABLE 3
Common Accommodations and Implementation

Accommodation	ICM Group (n = 53)*		Usual Care Group (n = 48)	
	No. Recommended	No. Implemented	No. Recommended	No. Implemented
Administrative (general)	1	1	0	0
Modified/light duty	20	18	26	24
Lifting restriction	13	11	21	17
Increased work breaks	9	4	5	3
Get help from other workers	3	2	1	1
Limit writing time/vary activity	3	3	5	3
Shortened days	2	2	0	0
Carry smaller loads	4	4	0	0
Computer-related (general)	2	1	3	0
Keyboard/tray/wrist rest	8	5	2	1
Monitor adjustment	3	2	0	0
Voice activation	1	1	1	0
Document holder	1	0	0	0
Mouse/trackball	1	1	0	0
Furnishings (general)	3	1	0	0
Chair/back support/arm rest	13	8	1	1
Foot rest	4	3	0	0
Desk/furnishings	1	1	0	0
Workstation layout modified	9	5	2	1
Environmental (general)	3	3	0	0
Modify lighting	1	1	0	0
Accessories	3	3	3	2
Telephone headset	4	3	2	2
Electric stapler	1	1	0	0
Lifting/carrying aids (general)	2	2	0	0
Mail cart	3	1	0	0
Dolly	1	0	0	0
Weight belt	1	0	0	0
Personal protective equipment (general)	2	2	1	1
Wrist splints	6	5	6	4
Antivibration gloves	1	1	0	0
Total	129	95	79	60

* ICM, Integrated Case Management.

TABLE 4
Federal Accommodation Programs

Host Agency	Program	Web Address
General Services Administration	Center for Information Technology Accommodation	http://www.itpolicy.gsa.gov/cita/
US Department of Agriculture	Technology Accessible Target Center (TARGET)	http://www.usda.gov/oo/target.htm
Department of Defense	Computer/Electronic Accommodations Program (CAP)	http://www.tricare.osd.mil/cap/
US Department of Education	Assistive Technology Program	http://www.ed.gov/offices/OCIO/programs_services/assistive_technology/index.html
Department of Veterans Affairs	Adaptive Training Program	http://www.va.gov/oirm/itss/itc/brochsb.htm

present. Further research is necessary to identify and address barriers to accommodation (eg, cost, inadequate demonstration of effectiveness, complexity, and support for implementation) to facilitate future implementation of recommended accommodations.

This study indicates that case manager practices can be modified by a relatively brief training program. However, the findings must be considered in light of certain limitations. It is likely that certain accommodations were actually implemented after the nurses' final reports were

submitted. Consequently, the implementation rates reflected in this study may be lower than what actually occurred. Also, the data were derived from clinical reports submitted by nurses and not direct observation by the investigators as to the type of accommodation and its actual

implementation. Nurses in the ICM group were aware of the goals of the larger scale outcome study (ie, safe and expedient return to work) and were informed that workplace accommodations would be reviewed sometime in the future. It is possible that the differences in accommodations could have occurred as a consequence of a differential awareness that the nurse records would be eventually reviewed. The generalizability of these findings to workers' compensation claimants with WRUEDs did not seem to be limited by any systematic bias attributable to the voluntary nature of the study, as volunteers and nonvolunteers in the study differed only by age. Future research on provider-initiated workplace accommodations that uses record review should be validated, when feasible, by independent direct observation at the workplace and/or supervisor report.

Findings from this study suggest that the ICM approach is associated with a change in practice behavior by case managers in relation to addressing suspected ergonomic factors in the case management and workplace accommodation process. These data indicate that the ICM training is associated with a greater number and diversity of worksite accommodations recommended and, to a lesser extent, implemented.

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Reorganizing is Good

“We trained hard . . . but it seemed that every time we were beginning to form up into teams we would be reorganized. I was to learn later in life that we tend to meet any situation by reorganizing; and a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency, and demoralization.”

—Petronius, 256 bc. Quoted by Mange PW. *Radiations*. 2000;6(2):13.