

# Health Effects of Relocation at Work

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*The health effects of a work-related stressor over a six-month period in 355 employees at a university medical center were prospectively measured. Subjects were assigned to cohorts determined by whether they experienced a move from their office or laboratory during a time of building construction and renovation. After controlling for demographic factors, preexisting health status, prior physician utilization, and bed-disability, movers had a higher rate of bed-disability ( $P = .05$ ). They were also more likely to report a deterioration in their health ( $P < .05$ ). Movers with high support at work and high total social support were more likely to report increased physician utilization. The findings suggest that a work-related stressor can adversely affect health, but this study does not support the hypothesis that such effects are moderated by social supports. Family physicians should be sensitive to the potential adverse health effects of work-related stressors on their patients.*

In recent years increasing attention has been directed to the effects of the social environment on health. One model for conceptualizing the influences of social factors on health involves two dimensions: stressors that decrease host resistance and, hence, increase susceptibility to illness, and social supports that have a buffering, protective effect.<sup>1</sup> There is considerable evidence that stressful changes in customary life experiences increase the risk of a wide variety of illnesses.<sup>2-4</sup> Evidence that social support resources modify or buffer these adverse health consequences is less conclusive. Studies of the health effects of stressful life changes,<sup>5</sup> unemployment,<sup>6</sup> medical complications of pregnancy,<sup>7</sup> childhood respiratory infections,<sup>8</sup> and the treatment of adult asthmatics,<sup>9</sup> however, provide support for the "buffer hypothesis." Research using techniques of multivariate analysis to investigate interactive effects of stressors and social supports has provided evidence consistent with the "buffer hypothesis" in some studies<sup>10-12</sup> but not in others.<sup>13-15</sup>

Several researchers have examined the health effects of stress and social supports in the workplace. Longitudinal studies by Cobb and Kasl<sup>16</sup> and by Gore<sup>6</sup> found that social supports helped to ameliorate the deleterious health effects of unemployment. House and Wells<sup>17</sup> tested the buffering effects of social supports in 1,800 tire plant employees and found that work-related stress was associated with higher rates of morbidity for workers with poor social supports. In the reexamination of Caplan's study of job-related stress in 23 occupational categories, social supports were found to be important in reducing the incidence of depression and somatic complaints.<sup>18</sup>

A natural experiment provided an opportunity to explore further the effects of job-related stress and social supports on health. Over a four- to six-week period in early 1983, many employees of the University of Missouri-Columbia School of Medicine were compelled to relocate their offices or laboratories because of building construction and renovation. Using a prospective cohort design, the following hypotheses were tested: employees directly involved in the move would have higher rates of physician utilization and morbidity than those who were not so involved; and strong social supports would reduce these effects of the move.

## METHODS

In February 1983, at the peak of relocation activity, all 807 employees of the medical school were surveyed. A mailed self-administered questionnaire obtained in-

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formation about demographic characteristics, faculty status, and health status. The questionnaire asked whether respondents had recently experienced a move from their place of work or anticipated such a move in the near future. Those responding affirmatively to either question were then asked how they felt about the move (positive, negative, or neutral) and how difficult it would be to accomplish (very difficult, somewhat difficult, relatively easy).

The respondents indicated the number of times during the preceding six months they had visited a physician (prior physician visits) and the number of days spent in bed or hospital because of sickness (prior bed-disability days). The variable, prior health status, was constructed from responses to two questions: subjects were asked to rate their health as excellent, good, fair, or poor and were asked whether they were currently under the care of a physician for any ongoing medical condition. This variable was analyzed at three levels: (1) good or excellent health without a medical condition, (2) fair or poor health or a medical condition, (3) fair or poor health and a medical condition.

The questionnaire assessed three dimensions of social support. Perceived support from a confidant was measured with the question: "Do you have someone you can let know how you really feel about things—someone you can be frank with and confide in?" Perceived support from family and friends was assessed with the question: "Are you satisfied with the support you get from family and friends?" Perceived support at the workplace was assessed with the question: "Are you satisfied with the support you get from colleagues and co-workers?" Response options to each of these questions were (1) almost always, (2) usually, (3) occasionally, and (4) rarely. In addition, a total support score was computed by adding the values of the three responses. This sum had a range of 3 to 12; a score of less than 7 was classified as high support and a score of 7 or more was defined as low support.

Respondents rated stress on the job, stress at home, and overall life stress using scales with a range of 0 (no stress at all) to 5 (very high stress).

The dependent variables, productivity at work, perceived change in health status, cumulative bed-disability days, and cumulative physician visits, were measured by a follow-up questionnaire mailed six months later in August 1983. Change in work productivity over the previous year was dichotomized as increased or same vs decreased. Likewise, perceived change in health status over the previous year was dichotomized as better or same vs worse.

Linear multiple regression models were used to assess the effects of relocation on the three health outcomes while simultaneously controlling for potential confounding by baseline demographic and health characteristics. To perform these multivariate analyses, the subprogram "Regression" from the *Statistical Package for the Social Sciences*<sup>19</sup> was used. To inves-

**TABLE 1. COMPARISON OF BASELINE CHARACTERISTICS BETWEEN MOVERS AND NONMOVERS**

	Movers (n = 128)	Nonmovers (n = 227)
Mean age (years)	39	38
Male (%)	45	52
Married (%)	72	78
Faculty (%)	51	48
Prior health problem (%)	25	23
Mean prior physician visits	1.8	1.3
Mean prior bed-disability days	1.7	1.2
Mean confidant support	1.5	1.5
Mean family or friends support	1.5	1.4
Mean work support	2.0	1.9
High total support (%)	83	87
Mean job stress	3.0	3.0
Mean home stress	2.2	2.1
Mean overall life stress	2.6	2.5

*None of the differences were statistically significant. P > .1 for all comparisons*

tigate possible interactive effects of move status and social support variables, contrast coding described by Cohen and Cohen<sup>20</sup> was used. Contrast coding is a method that demonstrates main effect and interaction contrasts between independent variables and provides a test of the statistical significance of these effects. In the statistical analysis of the data, the *t* test was used to assess differences in means, and the chi-square statistic was used to detect differences in the distributions of dichotomous variables.

## RESULTS

There were 449 respondents (56 percent) to the initial questionnaire and 355 (79 percent) of this group responded to the follow-up questionnaire. The response rate to the second questionnaire was 78 percent for the movers and 80 percent for the nonmovers. Those who responded to both questionnaires constituted the sample (355, 44 percent of the original population). The distribution of subjects by sex and faculty or non-faculty status was similar to that of the total population of employees. Information about other demographic characteristics of the population was not available for comparison. The sample consisted of 128 employees in the move group and 227 in the nonmove group. As indicated in Table 1, the two groups were comparable with respect to the distribution of baseline characteristics.

Movers were compared with nonmovers with respect to the outcome variables: work productivity, change in health status, physician visits, and bed-disability days. Movers were no more likely than non-



TABLE 2. STANDARDIZED REGRESSION COEFFICIENTS FOR DETERMINING HEALTH OUTCOMES

	Health Status at End of Study		Bed- Disability Days		Physician Visits	
	Beta	F	Beta	F	Beta	F
Age	.050	1.24	-.015	0.09	-.009	0.02
Sex (male= 1, female=2)	-.002	0.18	.026	0.17	.186	9.26*
Marital status (unmarried= 1, married= 2)	-.012	0.17	-.030	0.29	.012	0.05
Faculty status (faculty= 1, nonfaculty= 2)	-.038	0.45	-.019	0.83	-.100	2.35
Prior health status (good= 1, fair= 2, poor= 3)	.056	0.93	.289	31.50*	.219	21.01*
Prior physician visits	.144	5.91**	—	—	.458	95.43*
Prior bed-disability days	.033	0.34	.247	24.18*	—	—
Stress at home	.075	1.97	.027	0.29	.067	2.28
Total support (high= 1, low= 2)	-.065	1.27	-.033	0.39	-.018	0.14
Move (nonmover= 1, mover= 2)	.119	5.00**	.097	3.78**	.021	0.22

*F* statistic for variable at entry (*P* for one degree of freedom in the numerator)  
\**P* < .01  
\*\**P* ≤ .05

movers to report a decline in work productivity ( $\chi^2 = .591$ ,  $P > .25$ ).

A regression statement was developed for each of the health outcome variables to control for the potential effects of confounding. Sets of variables were entered in a hierarchical fashion on a conceptual basis; that is, basic sociodemographic variables (age, sex, marital status, and faculty status) were entered before measures of preexisting health status and utilization (prior health status, prior bed-disability days, prior physician visits). The effects of stress at home were also controlled (the measurements of job stress and overall life stress may have been contaminated by the move itself). Finally, the effects of social support were controlled by including the dichotomous total support score. Since the effects of the move were of principal interest, this variable was entered into the regression equation last, thus controlling for all other variables.

As indicated in Table 2, moving was significantly associated with a report of worsening health status after controlling for baseline variables reflecting demographics, prior health status, prior physician utilization, prior bed-disability, stress, and support ( $F = 5.00$ ,  $P < .05$ ). Moving was also associated with increased bed-disability after controlling for possible confounders ( $F = 3.78$ ,  $P = .05$ ). In examining uncontrolled means, movers had on the average one more day in bed than nonmovers during the six-month period (2.0 vs 0.9). Moving was not associated with increased physician visits. Not surprisingly, the regression analyses revealed the best predictors of bed-disability and physician utilization to be previous

bed days and physician visits. Total social support did not independently affect the health outcomes.

Those movers who had negative feelings about their relocation were no more likely to have worse health outcomes or to report a decline in work productivity than those who had positive or neutral feelings. There were also no significant differences in the outcomes of those who thought the move would be easy as compared with those who anticipated difficulty. There was a tendency for those who anticipated some difficulty with the move to report an unfavorable change in their health six months later ( $P = .09$ ).

Next, the potential interaction of relocation with measures of social supports was examined. Since the effects of a work-related stressor was being assessed, the interaction of moving and work support was analyzed first, controlling for age, sex, marital status, faculty status, prior health status, prior physician visits, prior bed-disability days, and home stress. In this analysis, work support was analyzed as a dichotomous variable. Responders who reported having work support almost always or usually were considered to have high support, while those reporting occasional or rare support were categorized as low. As Table 3 indicates, the only significant interaction effect detected was for physician utilization. Surprisingly, movers with high support at work were more likely to report more physician utilization ( $P < .05$ ). When examining the interaction of moving and total social support, the same effect was evident ( $P < .01$ ). Neither moving nor social supports independently affected physician visits. Social supports did not buffer the negative affects of the



TABLE 3. INTERACTION EFFECTS OF RELOCATION AND WORK SUPPORT AND RELOCATION AND TOTAL SUPPORT

	Health Status at End of Study		Bed- Disability Days		Physician Visits	
	Beta	F	Beta	F	Beta	F
Move and/or work support	-.005	0.01	.021	0.11	-.133	5.53*
Move and/or total support	.039	0.27	-.025	0.13	-.163	6.96**

\*P < .05  
\*\*P < .01

move with respect to perceived health status or bed-disability.

## DISCUSSION

Medical school employees who experienced relocation of their place of work subsequently had an increased rate of bed-disability and were more likely to report deterioration in health status than nonmovers. The movers did not have increased physician utilization when controlling for all other baseline health and demographic characteristics. These findings confirmed at least in part the first hypothesis.

This study differed from most others that have assessed the effects of social stressors by focusing on a single event (relocation at work) rather than cumulative changes or summary objective measures of psychological stress. The single events that have been studied with respect to their effects on health have been relatively catastrophic, usually natural or man-made disasters. Job-related relocation of the nature examined in this study would not be expected to generate a comparable threat to health. Yet, the move did have some impact, suggesting that there is a range of more or less disruptive experiences with the potential to impair health.

Moving was associated with increased bed-disability and a perception of health decline despite movers being no more likely than nonmovers to identify high stress at work. Also, feelings about the move did not seem to affect outcomes. These findings suggest that the event itself, independent of its perceived desirability or stress, affected health. This result addresses a controversial issue in the area of life events research, the differential risks conferred by undesirable as opposed to desirable or neutral events. The results of some studies suggest that undesirable events account for much, if not all, of the health effects of life changes.<sup>15,21,22</sup> The findings of the current study, however, support other evidence that events do not have to be perceived as undesirable or negative to pose a detriment to health.<sup>2,23</sup>

In this study social support did not have a main effect on health outcomes, nor did it buffer the adverse health effects of relocation. In fact, movers with higher levels of social support tended to report more physician visits. This finding may indicate that individuals under the stress of a life change who are well supported are also encouraged to seek medical attention. Since the level of social support may covary with other variables such as underlying health status, some of the effect of social support may be parcelled out with variables entered earlier into the regression equation, thus decreasing the apparent effect of social support on morbidity. Only the interactions of social support and moving were examined.

It is possible that the failure to detect a buffering effect or supportive relationships resulted from limitations in the assessment of social supports. Using a single item for each, supports were measured in three areas: the availability of a confidant, satisfaction with support from friends and family, and satisfaction with support from co-workers. Other dimensions of social resources (number of friends, frequency and quality of contacts with friends and family members, and participation in community activities) were not assessed. In comparison with more elaborate indices of social supports, the measures used in this study are simple, and the reliability and validity of responses are unknown. Significant conceptual and methodologic problems continue to afflict the assessment of social supports, however, and as yet, there is no widely accepted instrument for this purpose.<sup>24</sup>

There are other methodological limitations to this study. The overall response rate of 44 percent raises the possibility of a selection bias. As in most cohort studies of psychosocial phenomena, the respondents were volunteers. Although they were representative of the population of employees with respect to sex and faculty status, the extent to which they were representative of the population with respect to relocation status and health experience is unknown. In addition, the generalizability of findings from a medical school setting to other work environments may be problematic.

Since all variables were based on self-report, a re-



porting bias could have conceivably accounted for the findings. Such a bias would have occurred if those who moved systematically exaggerated their morbidity. Two factors mitigate against this possibility. First, the health outcomes were measured six months after the initial survey. At the time of the follow-up questionnaire, respondents neither mentioned, nor were they reminded of moving. Second, if there were a substantial reporting bias, it would be expected to find that relocation was associated with increased job-related stress and with decreased work productivity. In addition, adverse outcomes would be expected to be associated both with negative feelings about the move and with anticipated difficulty adjusting to the move. Such associations were not found; therefore, it is unlikely that the selective associations of relocation with the health outcomes are attributable to reporting bias.

The assessment of occupational risk should be an important part of family practice. Relocation is probably a common experience in many work environments. Family physicians and employers should be aware of the potential harmful effects of such an experience and should consider strategies to prevent such consequences. While this factor was not examined, there is evidence from other studies that a perception of having some control over an event or its consequences may afford protection from deleterious effects.<sup>25-27</sup> Karasek et al<sup>28</sup> found that workers who had some degree of control over their work environments had lower cardiovascular mortality than those with little or no control. Allowing worker input into decision making, planning, and preparation for a move or other job-related change may help to avert adverse health outcomes. This and other strategies designed to ameliorate harmful effects of job-related stress provide a focus for further research.

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