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The Impact of Provider Choice on Workers' Compensation Costs and Outcomes

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Abstract

Using survey data collected in 2002 and 2003 in California, Massachusetts, Pennsylvania, and Texas on workers injured 3 to 3.5 years earlier, coupled with information on the associated workers' compensation claims from the Workers Compensation Research Institute, the authors examine how provider choice in workers' compensation is related to costs and to workers' outcomes. They find that employee choice of the provider, by comparison with employer choice, was associated with higher costs and worse return-to-work outcomes. Although the same rate of physical recovery was found for both groups, workers who chose their providers reported higher satisfaction with medical care. The higher costs and worse return-to-work outcomes associated with employee choice arose largely when employees selected a new provider, rather than a provider with whom they had a pre-existing relationship. The findings lend some support to recent policy changes limiting workers' ability to choose a provider with whom they do not have a prior relationship.

KEYWORDS: Provider Choice, Workers' Compensation

THE IMPACT OF PROVIDER CHOICE ON WORKERS' COMPENSATION COSTS AND OUTCOMES

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As health care costs in workers' compensation have grown rapidly and become an increasingly important proportion of system benefits, more attention has focused on the choice of provider (National Academy of Social Insurance 2004). Selection of the provider is critical to both workers and employers because health care providers in workers' compensation influence whether the worker is eligible for benefits, the nature and cost of care, the disability rating and hence the amount of income benefit payments, and the timing of return to work.

Workers and their advocates have argued that provider choice should be left to the worker, or at a minimum that workers should be treated by those they trust and whose interests—prompt return to work, but only as medically indicated, and the fullest restoration possible of physical capacity—align with those of the worker (Ellenberger 1992). In contrast, employer advocates argue that employer choice is necessary because without it there is “little incentive to see that the costs of care remain reasonable and appropriate” (Morrison 1990), and because employer choice “serves to direct injured workers away from those providers who provide excessive services and treatment procedures” and to “retain those providers familiar with the operations of the employer and who can

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The data used in this study are confidential, but special requests for limited analyses pertaining to this study can be made to Richard Victor, Workers Compensation Research Institute, 955 Massachusetts Avenue, Cambridge, MA 02139; wcri@wcrinet.org.

expedite return to work based on that knowledge” (National Federation of Independent Business Research Foundation and National Foundation for Unemployment Compensation and Workers’ Compensation, n.d.).

Although the provider choice issue is typically posed as a simple dichotomy between employer and employee choice, workers’ compensation laws sometimes draw distinctions between employees’ choice of a new provider and their choice of a provider who treated them previously. A recent example is the 2004 workers’ compensation reforms in California (Senate Bill 899). Previously in California, the employer had the right to select the initial provider unless the employee had predesignated a provider, but after 30 days workers had the right to change to a medical provider of their own choice. Under the most recent reforms, employers are allowed to establish networks composed of both occupational and non-occupational physicians, and the legislation grants to the employer (or the insurer) the sole right to decide which medical providers are in the network. Furthermore, the right of workers to choose their physician after 30 days no longer applies if a network is established that complies with the law, unless the worker has predesignated a physician under particular conditions, most importantly the condition that the physician was previously the worker’s primary provider of medical care under an employer-provided group health plan (Neumark 2005). As long as employers establish networks, which many have done or are expected to do, workers will have less scope to choose their physician. Most important, workers’ ability to seek out a new physician after an injury is severely curtailed.

The purpose of this study is to determine whether who selects the provider of medical care in workers’ compensation cases, and the choice of prior versus new providers when employees choose, affect measurable costs and workers’ outcomes. The costs and outcomes we study are medical and indemnity (income benefit) costs, the duration of time out of work, the likelihood that the worker had a substantial return to employment, the worker’s perception of the degree of recovery from the work injury, and the worker’s overall

satisfaction with the health care received. We use detailed data on workers’ compensation claims coupled with interviews of workers. While state law dictates which party has the right to choose the provider, in practice this right is not always exercised, so that, for example, workers may sometimes choose the provider in an employer-choice state. As a consequence, we pay particular attention to differences across sample observations associated with who chose the provider, to try to control as thoroughly as possible for differences between workers and between their injuries that could influence the costs and outcomes we study. Fortunately, we have a rich data set that allows us to capture many of these differences, although ultimately we cannot rule out the possibility that the differences associated with provider choice that we observe are linked to factors we cannot measure rather than a causal effect of provider choice.

Literature Review

Studies of the effects of provider choice on workers’ compensation outcomes have reached mixed conclusions. Boden and Fleischman (1989) found little relationship at the state level between the rate of medical cost growth and changes in eight states’ approaches to provider choice, based on data from 1965–85. In a later paper, Boden found evidence that state-level changes in the approach to provider choice might have affected costs in three of the eight states studied, but not in the other five (Boden 1992). Victor and Fleischman (1990) used insurance industry data to examine the impact of a change to employee choice in Illinois (after 1975) and Texas (after 1973), and found sizable increases in payments, especially in the longer run. Durbin and Appel (1991) studied average state medical payments in the years 1965–84; they did not look explicitly at changes in provider choice, but found that states with employer choice began with lower average medical payments in 1965, and the difference widened substantially by 1984.

In a much more data-intensive study, Pozzebun (1994) reached opposite conclusions for medical payments. Relying on data from

almost 32,000 closed claims (meaning that all issues had been resolved and payments made) obtained from the National Council on Compensation Insurance (NCCI) for 17 states for the years 1979–87, she found that limiting employees' initial choices resulted in higher health care costs, as did limits on changing the provider subsequent to the initial choice. However, she acknowledged that these findings could have resulted from higher costs leading to policies to limit change, rather than cost-increasing effects of policies limiting choice. Pozzebon's somewhat unexpected findings do not seem attributable simply to the source of the data used. In a 1996 study, Durbin et al. also used NCCI data, and found that employer choice was associated with lower costs of medical benefits. However, the sample in this latter study was more limited, including 1,300 closed claims for each of four states studied, with 1987 as the injury year.

In the only study of provider choice using rigorous experimental methods, firms (rather than workers) were split between (a) an experimental group in which workers were treated in a managed care framework and (b) a control group in which workers selected their own provider in a traditional fee-for-service arrangement (Washington Department of Labor and Industries and University of Washington Department of Health Services 1997). The study found that workers in the managed care settings had medical payments that were 27–32% below those in the traditional employee choice fee-for-service model. The study also went beyond medical costs, comparing rates of injured workers who received "time loss costs," role functioning scores (a self-reported measure of how well the individual was able to carry out activities related to personal and social roles), and self-reported opinions on the progress of recovery and on overall outcomes. At six weeks after their injury, workers treated in the managed care setting reported less progress on recovery and lower role functioning, as well as lower rates of satisfaction with their treatment, their attending physician, and their overall access to care. At six months, lower rates of satisfaction were found only with regard to overall access to

care. Although the slower recovery and lower role functioning persisted at six months, at this interview the study found no differences with regard to pain, mental health status, or physical functioning. The findings from this study may reflect differences in more than just provider choice, however, as the treatment and control groups differed on broader dimensions, including the method of payment to the health care providers.

What can we conclude from this review? First, although most studies suggest that lower medical payments are associated with employer choice than with employee choice, the findings are not unchallenged. The discrepancies may in part reflect differences across studies in the states and years examined, and the crudeness of the measures of provider choice. Second, little work has focused on outcome or cost measures other than medical payments—such as physical recovery, duration of time out of work, worker satisfaction, and indemnity benefits. And rarely have many other factors that likely affect outcomes, such as worker and employer characteristics, been controlled for in these studies. Further, no study appears to have considered and analyzed the significance of whether the injured employee had been treated previously by the provider.¹ Our study examines a broad set of outcomes, controls for a rich set of worker and employer characteristics, and pays attention to whether the primary provider had previously treated the worker for an unrelated condition.

Data and Descriptive Information

Data Source and Variable Descriptions

One key data source used in this paper is the Workers Compensation Research Institute (WCRI) Detailed Benchmark/Evaluation (DBE) database, which contains over 16 million workers' compensation claims with representative data in at least a dozen large states. These data come from claims

¹In addition, since employer-selected providers are more likely to participate in network arrangements now than they were previously, the relevance of some of the earlier studies may have diminished.

payors—insurers and self-insured employers. The second key data source is telephone interviews conducted on behalf of WCRI by the Center for Survey Research and Analysis at the University of Connecticut as part of a study to compare worker outcomes in California, Massachusetts, Pennsylvania, and Texas, for a subset of cases drawn from the WCRI DBE database. Approximately 750 interviews were completed in each state in 2002 and 2003 with workers who, approximately 3 to 3.5 years previously, had been injured and had subsequently experienced more than seven days of lost work time.² The telephone interviews obtained information on choice of provider, satisfaction with health care, worker and employer characteristics, and return to work, as well as self-reported information on health status. For each interviewed worker, we extracted information about the worker, employer, injury, and costs from the WCRI DBE database. Victor et al. (2003) provide more details regarding the data.

Table 1 lists the key variables used in the present study, including the dependent variables, provider choice, and injury and treatment characteristics. Other variables used as controls in our regression models are noted later; most are quite standard.³ Some of these key variables merit discussion. Additional details are given in Neumark et al. (2005).

Provider Choice

The central focus of this study is the choice of the primary provider—the provider who, according to the worker, made the decisions about the care the worker needed and either gave that care or directed the worker to someone who could give it. Respondents who received initial treatment at a medical doctor's

or chiropractor's office, clinic, hospital, or the like were asked about different providers who treated them. Where there was only a single, non-emergency provider (about 20% of cases), the initial provider was necessarily the primary provider. In the remainder of cases, according to the worker the primary provider was also the worker's initial provider in about 60% of cases, and was a different provider in about 40% of cases.⁴

We classify a case as "employee choice" if the worker said that the provider was selected by self, a family member or friend, or the worker's attorney.⁵ If the worker said that the provider was selected by the employer or insurer, we categorize the case as "employer choice." If a medical center, medical provider, or "someone else" was seen by the worker to have chosen the provider, we exclude the case from this study because of ambiguity as to who chose the provider. Table 2 shows the distributions of these choices for the four states combined and each state separately (the sample of claims in each state is representative of claims in the state).

The numbers in Table 2 indicate that employee choice was more prevalent in Texas and Massachusetts, where the law in effect at the time of the injury gave the worker the choice of initial provider and relatively free reign to change providers. In contrast, in California and Pennsylvania the law allowed the employer to designate the provider for the first 30 days and 90 days, respectively, after which the worker could change providers. But the policy regime did not fully determine choice. Presumably because the law only gives one party the *right* to choose the provider, which can be ceded to the other party, there were many cases of employer-chosen

²Note that these data were collected before the most recent reforms in California affecting provider choice.

³The one exception is a set of controls for industry/occupation cells categorized on the basis of risk, including high-risk services, low-risk services, clerical/professional occupations (regardless of industry), manufacturing, construction, trade, and other industries. Further details are provided in Telles et al. (2004, Technical Appendix).

⁴Some workers received care at the workplace, in an ambulance, or at a hospital emergency room. Because provider choice is not an issue in such cases, these workers were excluded from the study unless they received subsequent treatment from a provider outside of the workplace or emergency room.

⁵Attorney involvement and attorney choice of provider are not the same things. There are plenty of cases in which the employer chose the physician but there turned out to be attorney involvement (18.5% of employer choice cases, versus 24% of employee choice cases based on our classification).

Table 1. Definitions of Key Variables.

<i>Variable</i>	<i>Definition</i>
Dependent Variables:	
Indemnity Benefits	The indemnity payment the worker received.
Medical Benefits	The amount the insurer paid for the worker's medical treatment.
Substantial Return to Work	A dummy variable. The value is 1 if the worker was able to return to work and stay for one full month.
Duration of Disability	The number of weeks from the time of the injury to the first substantial return to work. If the worker did not have substantial return to work, we assigned 156 weeks.
Recovery	Worker's perceived recovery, measured as the change in the SF-12® score from the week after the injury to the time of the interview.
Satisfaction	An ordinal categorical variable. The question is about the satisfaction level with the medical care the worker received overall. 1 is "very satisfied"; 2 is "somewhat satisfied"; 3 is "somewhat dissatisfied"; 4 is "very dissatisfied."
Provider Choice:	
Employer Chose	A dummy variable equal to 1 if the employer or the insurance company chose the provider.
Employee Chose	A dummy variable equal to 1 if the worker or the worker's family, friends, or attorney chose the provider.
Employee Chose, Prior	A dummy variable equal to 1 if the worker or the worker's family, friends, or attorney chose the provider, and the worker was previously treated by this provider for other medical condition.
Employee Chose, New	A dummy variable equal to 1 if the worker or the worker's family, friends, or attorney chose the provider, and the worker was not previously treated by this provider for other medical condition.
Injury Characteristics:	
Back Pain	A dummy variable equal to 1 if the type of injury was back pain.
Non-Back Sprain or Strain	A dummy variable equal to 1 if the type of injury was non-back sprain or strain.
Fracture	A dummy variable equal to 1 if the type of injury was a fracture.
Inflammation, Laceration, or Contusion	A dummy variable equal to 1 if the type of injury was an inflammation, laceration, or contusion.
Other Injuries	A dummy variable equal to 1 if the type of injury was in none of the above categories.
Severity	Worker's perceived severity, measured as the difference between SF-12® score during the four weeks before the injury and the score during the week after the injury.
Treatment Characteristics:	
Overnight Hospitalization	A dummy variable equal to 1 if the worker received "room and board" or "intensive care" based on the revenue code.
Major Surgery	A dummy variable equal to 1 if the total payment for significant surgical services was positive.

providers in Texas and Massachusetts and, conversely, many cases of employee-chosen providers in California and Pennsylvania (Lewis 1992; Barth and Victor 2003; Victor et al. 2003).

When workers chose the primary provider, we also asked if the provider had previously treated the worker for a different condition. We defined providers who were said to have previously treated the worker for a different

Table 2. Choice of Primary Provider.^a

<i>Choice Category</i>	<i>Combined</i>	<i>California</i>	<i>Texas</i>	<i>Massachusetts</i>	<i>Pennsylvania</i>
Employee Chose	41.4	33.8	52.7	51.0	31.3
You/Respondent	36.9	28.4	46.8	46.3	29.4
A Family Member	1.9	0.7	2.9	2.8	1.5
A Friend	1.3	1.6	2.0	1.4	0.2
Your Attorney	1.3	3.1	1.0	0.5	0.3
Prior Versus New					
Prior	18.8	17.0	19.1	26.7	14.1
New	22.6	16.8	33.6	24.3	17.2
Employer Chose	37.5	48.3	27.0	19.4	50.7
Your Employer	31.7	41.0	21.4	14.4	45.4
An Insurance Company	5.8	7.3	5.6	5.0	5.3
Medical Professional/ Hospital/Clinic	17.7	13.8	16.7	25.1	16.3
Someone Else	3.3	4.0	3.6	4.5	1.6
Number of Cases	2,513	665	609	542	697
Number of Cases with Either Employee or Employer Choice	1,960	538	481	376	565

^aIn a handful of cases (10) respondents could not or did not answer the question about prior versus new provider.

condition as prior providers, and those who had not as new providers. This breakdown is also shown in Table 2.⁶ Among the cases in which the workers themselves chose the primary provider, they selected a prior provider about half of the time in California, Massachusetts, and Pennsylvania, but only about one-third of the time in Texas.⁷

Cost and Outcome Measures

The two cost measures we study are in-

⁶The prior/new question for initial provider was not asked of those for whom the initial provider was not primary—one of many compromises made in the design of the survey to reduce its scope to fit into the interview time limit.

We do not have information on new versus prior providers for employer-chosen providers.

⁷We suspect that the difference for Texas arises because injured workers who are not covered by health insurance are less likely to have established relationships with health care providers. We do not know from our survey whether injured workers had health insurance coverage, but persons in Texas are much less likely to have health insurance coverage than are persons in the other three states. For the period 2001–2003, the proportions of the population not covered by health insurance in our four states and in the United States were the following: California—18.7%, Massachusetts—9.6%, Pennsylvania—10.7%, Texas—24.6% (highest in the nation), and United States—15.1% (DeNavas-Walt et al. 2004).

demnity benefits and medical payments per claim, derived from payors' records of payments actually made as of 29 to 31 months after the injury. We also study whether the worker had a "substantial return to work" (that is, returned to work for at least one continuous month at any time between the injury and the interview), and the duration of time out of work as reported by the worker as of the interview date.

A critical outcome is the extent to which the worker recovered his or her physical health after the injury. The measure we use is derived from worker responses to the SF-12[®] survey; this survey, and the longer SF-36[®] survey, are widely used instruments for measuring general health status. We asked workers to recall their health status the month prior to the injury, the week after the injury, and the month prior to the interview. The recovery variable is the change in self-reported health status from one week after the injury to the time of the interview.⁸ Because this vari-

⁸In most cases this change was positive. The severity control used in the regression models that follow is similarly defined as the change from before the injury to one week after. We also experimented with specifications defining each of these variables as relative measures, and the results were very similar.

Table 3. Costs and Health Outcomes.^a

<i>Cost/Outcome</i>	<i>Combined</i>	<i>California</i>	<i>Texas</i>	<i>Massachusetts</i>	<i>Pennsylvania</i>
Costs:					
Average Medical Payment per Claim	\$8,713	\$9,950	\$11,729	\$4,946	\$7,594
Average Indemnity Benefit per Claim	\$12,709	\$15,444	\$10,188	\$13,874	\$11,358
Return to Work:					
Percent of Workers Who Did Not Have Substantial Return to Work	19	19	27	18	13
Average/Median Duration of Time out of Work (Weeks)	44/10	45/12	57/15	43/12	32/8
Recovery:					
Average Recovery Score	19.2	17.6	15.0	24.1	21.0
Satisfaction with Medical Care:					
Percent Very Satisfied	52	47	51	56	57
Percent Somewhat Satisfied	29	33	29	29	26
Percent Somewhat Dissatisfied	8	10	9	6	8
Percent Very Dissatisfied	10	10	11	8	9

^aOnly cases in which the employee or employer chose the primary provider are included in this table and in subsequent tables. The respondent's SF-12[®] scores are scaled scores from 0 to 100, where 100 is the best health. The recovery score is the difference between the SF-12[®] value at the time of the interview and the score one week after injury. The mean value of the preinjury scores for respondents was about 54 or 55, depending on the state. Only those who had substantial return to work were asked, "How many weeks was it from the time you first stopped working because of your injury and the first time that you returned to work for one full month?" For those who had not had a substantial return to work, the mean length of time from the injury to the interview is used (156 weeks).

able is based on workers' perceptions, we often refer to it as "perceived recovery."⁹ The focus is on physical health, not mental health, and because the SF-12[®] scores are insensitive even to extreme variations in the mental health scores, we compute the physical health scores using mental health scores for the period just prior to the interview.

Our final outcome variable is overall satisfaction with care. The variable used in this study is based on answers to the specific question, "Now think about all of the medical care you received from the first treatment for your injury until now. Were you satisfied or dissatisfied with the medical care you received overall?" Table 3 provides summary statistics for all of these measures.

⁹Victor et al. (2003) discussed potential concerns about recall bias, evidence of validity of the health status measure from which both recovery and injury severity are derived, and other issues regarding measurement of health status. Perneger et al. (1996) and Damiano et al. (1998) validated retrospective recall of changes in health status with respect to the SF-36[®].

Empirical Methods

Statistical Models

The analysis is based on a standard regression-type model for a cost or outcome variable generically denoted Y_{is} , where i indexes individuals and s indexes states, of the form

$$(1) \quad Y_{is} = \alpha + \text{CHOICE}_{is}\beta + \text{WORKER}_{is}\gamma + \text{FIRM}_{is}\delta + \text{INJURY}_{is}\theta + \text{STATE}_s\kappa + \text{TREATMENT}_{is}\lambda + \epsilon_{is}.$$

Our dependent variables come in different forms—continuous (for example, the cost measures), dichotomous (for example, substantial return to work), and polytomous (satisfaction)—necessitating different statistical methods. For the three cost and outcome variables that are continuous (indemnity benefits, medical payments, and recovery of physical health), equation (1) is estimated as a linear regression. We transform the estimated coefficients to report the results in terms of the implied percentage change in the dependent variable. For the return-to-work outcome, which is dichotomous, we estimate a logit model, reporting the implied

percentage change in the odds ratio associated with each variable.

The model for the duration of time out of work is estimated using survival methods, to account for the possible truncation of the spell of time out of work. We estimate the accelerated failure time model

$$(2) \quad T_{is} = \exp(Z_{is}\Theta + \sigma\varepsilon_{is}).$$

As is common in these models, we fix the variance of ε at 1, allow σ to be a parameter that is estimated, and estimate the model using maximum likelihood. We assume a logistic distribution for ε (a log-logistic distribution for T_{is}). With this functional form, $\exp(\Theta_k/\sigma)$ measures the effect of a one-unit increase in the corresponding variable on the ratio of the probabilities of the spell lasting at least as long as any time t .¹⁰ However, it is also the case that $\exp(\Theta_k/\sigma)$ equals the ratio of the expected duration when the corresponding variable Z^k is one unit higher to the expected duration when it is not, and therefore $100 \cdot (\exp(\Theta_k/\sigma) - 1)$ measures the percentage by which the expected duration is longer with this change in Z^k . We report the model estimates in terms of these percentages.¹¹

Finally, the satisfaction outcome is also discrete, but takes on four ordered values: very satisfied, somewhat satisfied, somewhat dissatisfied, and very dissatisfied. We estimate an ordered logit model, in which $\exp(\Theta_k)$ measures the effect of a one-unit increase in Z^k on the log of the relative probability $P(Y_{is} \geq j+1)/P(Y_{is} = j)$, or the relative probability of reporting a higher level of satisfaction. We report these effects as the implied percentage change in the likelihood of reporting a higher level of satisfaction.

¹⁰The implication is that the values of the regressors Z and the parameters Θ exert a proportional shift on the odds ratio for all values of t . That is, for any two individuals who have different Z 's but the same values of Θ , the odds of the spell lasting longer than t are constant for any t .

¹¹In work with duration models, attention is sometimes given to the problem of unobserved heterogeneity. That potential problem, however, is more of a concern when estimating the degree of duration dependence or the coefficients of time-varying variables, whereas our controls are time-invariant, and we do not explore duration dependence.

Variables

The provider choice variable or variables are included in the vector CHOICE. In any model of workers' compensation costs or outcomes, it is essential to include characteristics of the worker (WORKER) and the workplace (FIRM), as both have been shown to affect costs or outcomes. For example, older workers have been found to be less likely to return to work; workers with less education may have greater difficulty in the labor market; and workers in some industries (such as construction) may have unique return-to-work problems (Galizzi and Boden 1996). The list of variables included in WORKER includes demographics, education, wages and whether the individual was an hourly worker, tenure at the time of injury, and whether the worker elected to have the interview conducted in Spanish. Workplace characteristics include firm size and the industry/occupation breakdown discussed earlier.

We would expect costs, return to work, recovery, and satisfaction to depend on the characteristics of the injury, of which we have alternative measures. The first, based on the diagnostic (ICD-9) codes assigned by the providers, is a classification of injury types: back pain; non-back sprain or strain; fracture; inflammation, laceration, or contusion; and a residual category of other injuries.¹² A second measure is injury severity as perceived by the worker, constructed from the worker's answers to the SF-12[®] instrument in much the same way that we constructed the measures of perceived recovery.

The inclusion of the worker, workplace, and injury characteristics in a model of how provider choice affects outcomes is unambiguous, as these variables may be associated with both provider choice and the costs and outcomes we study, but not for reasons

¹²In some cases workers may have been assigned multiple diagnosis codes during the course of their disability. In such cases, we define a primary diagnosis code based on the code that receives the greatest expenditure. Also, in some cases diagnosis codes are missing in the database. In these cases, we use information from the payor about the nature of the injury and the part of the body affected to assign the case to the appropriate injury group.

related to the effects of provider choice on outcomes. For example, older men may have worse medical outcomes because age inhibits recovery. Yet older men may also—because of greater affluence, access to health insurance, and possibly even previous injuries—be most likely to have chosen a primary provider whom they have seen previously. In this case, without controlling for age and sex we might incorrectly infer that choice of a prior provider resulted in worse medical outcomes. Similarly, more severe injuries may make it more likely that, at least in some states, the employee chose the provider; for example, in California, during the sample period we use, the employee had the right to choose a physician 30 days after first receiving treatment, and more severe injuries are more likely to have passed the 30-day window.

Finally, our data come from four states—Texas, Massachusetts, Pennsylvania, and California—across which workers' compensation systems varied along dimensions such as the frequency and source of disputes, the methods used to terminate temporary disability benefits, and the criteria used to rate permanent disability benefits. Given these differences, if we use across-state variation in choice and outcomes to identify β in equation (1), we may incorrectly attribute differences in outcomes associated with other features of states' workers' compensation systems to variation in individual choice of provider. Consequently, we include dummy variables for the states (*STATE*), identifying the effects of provider choice from within-state differences associated with this choice.¹³ The potential

downside of this strategy is that we effectively throw out the variation in provider choice that is driven by differences in state workers' compensation systems. However, we found that results including or excluding the state dummy variables were similar.¹⁴

Differences Associated with Provider Choice

We have to be concerned about characteristics of workers (and their injuries) associated both with provider choice *and* with workers' compensation outcomes that could result in misleading inferences about the effects of provider choice. For example, the most severe injuries may result in workers ending up with a new provider, chosen by them, as their primary provider, because workers with severe injuries seek out particular providers (such as specialists) whom they subsequently report as their primary providers. In this scenario, comparisons of outcomes such as costs and time away from work between these workers and workers for whom the employer chose the provider will tend to indicate that for the former group costs were higher and return-to-work outcomes worse, but this relationship arises only because the most severely injured workers selected into the employee choice/new provider group.

We address this potential problem in four ways. Most important, the rich data we have enable us to include controls for numerous detailed characteristics of workers, workplace characteristics, and injury characteristics, including injury severity. Indeed, we would argue that the data used in this report yield far more detailed sets of control variables than are available in data used in past research.

Second, we document that greater measured severity is not independently associated with a higher likelihood of employee choice, which makes it more plausible that unobserved differences in injury severity do not underlie the relationships we estimate between provider choice and costs and outcomes. In particular, in Table 4 we report estimates of models for provider choice; the

¹³We tested the pooling of observations across the four states in our sample. There was never evidence against equality of effects of the provider choice variable(s). Although there was sometimes evidence of differences in other coefficients, allowing for these differences did not affect the estimated effects of provider choice. We therefore report the pooled estimates with all coefficients (except the intercepts) constrained to be the same across states. Our sample includes roughly the same number of observations from each state, and we do not weight the data by state to make the sample representative of claims in the four states combined, a procedure that would give disproportionate weight to observations from California and Texas. This latter type of weighting would only matter if parameters differ across states.

¹⁴The *TREATMENT* variables in equation (1) are discussed below.

Table 4. Determinants of Provider Choice, Pooled.^a

Variable	Two-Way Classification	Three-Way Classification	
	Employee vs. Employer (Odds Ratio)	Employee Prior vs. Employer (Odds Ratio)	Employee New vs. Employer (Odds Ratio)
Injury Characteristics:			
Back Pain	1.614** (2.23)	1.509 (1.48)	1.658** (2.01)
Non-Back Sprain or Strain	1.148 (0.64)	1.095 (0.33)	1.148 (0.55)
Fracture	1.394 (1.29)	1.341 (0.89)	1.406 (1.13)
Inflammation, Laceration, or Contusion
Other Injuries	1.536* (1.81)	1.669* (1.70)	1.416 (1.25)
Severity	0.996 (0.94)	0.991* (1.67)	1.002 (0.29)
Treatment Characteristics:			
Overnight Hospitalization	0.980 (0.09)	1.134 (0.48)	0.842 (0.67)
Major Surgery	1.376** (2.56)	1.462** (2.47)	1.329* (1.95)
Attorney Involvement:			
	1.553** (3.40)	1.506** (2.61)	1.592** (3.13)
N	1,960	1,951	1,951

^aIn all cases we show the t-statistic for the original coefficient, in parentheses. State dummy variables, and the full set of worker and workplace characteristics, are included in both models. Worker characteristics include age, sex, marital status, wages, whether an hourly worker, tenure, education (6 categories), and whether the survey was conducted in Spanish (at the worker's request). Workplace characteristics include firm size (4 categories) and occupation/industry group (7 categories). Some claims have missing values for some of the independent variables, in which case we include dummy variables indicating missing data (and zeros for missing values). Odds ratios from a logit or multinomial logit model are shown, relative to employer choice.

*Statistically significant at the .10 level; **at the .05 level.

table reports odds ratios for the employee choice options relative to employer choice. We do not show the estimated coefficients for all of the variables, but only for those related to the injury (type, severity, treatment, and attorney involvement). Certain types of injuries, especially back injuries, are significantly ($p < .05$) more likely to be associated with employee choice of provider than is the reference category of inflammation, laceration, or contusion. On the other hand, perceived severity is not associated with a higher likelihood of employee choice of provider, although because the model includes such variables as type of injury, what is captured by the estimated coefficient of severity is the association of severity with provider choice for the same type of injury. Note also that

there is a statistically significant positive association between major surgery and employee choice, although, as discussed more below, it is possible that surgery is more an outcome of employee choice than a measure of injury severity.

Third, in the empirical analysis we include additional control variables related to severity. The claims database includes information on the treatment of the injury, including whether the treatment included an overnight hospitalization and major surgery; these are captured in the variable TREATMENT in equation (1) above. These potential control variables may capture additional variation in the severity of the injury that is not picked up in the other injury-related variables. On the other hand, the treatment variables may

also reflect outcomes of the medical decision-making process, and hence the choice of provider. Because the treatment variables in part capture costs and outcomes, their inclusion may amount to “over-controlling” for injury severity.¹⁵ That is, they may capture not only remaining differences in severity, but also outcomes of provider choice that are more appropriately thought of as effects of provider choice, and that will not be captured when the treatment variables are included. As a consequence, we present both sets of estimates; the specifications with the treatment controls provide a particularly stringent test of whether characteristics of injuries rather than provider choice per se explain the differences in costs and outcomes associated with employer versus employee choice.

Finally, a fourth approach we take to the problem of unmeasured severity is to assess how sensitive the estimates are to omitting from the model variables measuring severity or the nature of the injury. A finding that the estimates are not very sensitive would suggest that additional unmeasured variation in severity when these variables are included cannot play much of a role.

Of course, even with all of these efforts, we cannot definitively rule out the possibility that there is unmeasured variation in injury severity that may affect, for example, costs or return to work. But in our view, the extensive set of control variables we use, coupled with the findings from the various analyses just described that tend to reinforce the results, justify confidence that the estimated relationships we find between provider choice and workers' compensation outcomes are not owing to important unobserved variation in injury severity.

¹⁵We consider including these variables, but not attorney involvement, because hospitalization and surgery are sometimes likely to be dictated by medical exigencies. At the same time, we recognize the possibility that attorney involvement exacerbates the effects of employee choice of provider. This raises interesting questions about how costs and outcomes—and their relationship to provider choice—might change were policies relating to use of attorneys in workers' compensation cases altered; that question, however, is well beyond the scope of this study.

Provider Choice and Workers' Compensation Outcomes

Employee versus Employer Choice

The results for employee versus employer choice are reported in Table 5. In each case, we first report the results for the model that may under-control for severity by excluding the treatment variables (“model 1”), and then for the model that likely over-controls for severity by including them (“model 2”). As shown in Table 5, when employees chose the primary provider, medical payments were 10–21% higher. Not surprisingly, the estimated differential is higher for the specification excluding the treatment variables, but the estimate is statistically significant at the 10% level (or better) in both cases.¹⁶ Indemnity costs were also higher when workers chose the provider, although the evidence for this relationship is weaker. Estimates from the model excluding the hospitalization and surgery controls indicate that indemnity benefits were 15% higher when workers chose the provider, while the difference falls by nearly half and becomes statistically insignificant when these treatment variables are included.

The results for duration of time away from work and an indicator of substantial return to work consistently indicate that employee choice of provider was associated with slower return to work. Reported time from injury until initial substantial return to employment was 23–32% longer where the employee chose, a finding that is significant at the 5% level for both specifications. Substantial return to work was 16–19% less likely in the three years after the injury when the employee chose; the estimates are similar with or without the treatment controls, although only marginally significant. For the return-to-work outcomes the estimates (and their statistical significance) are similar for models 1 and 2.

Note that the estimates for the percentage increase in duration of time away from work

¹⁶The tables report only the coefficients of provider choice and some other key variables. Full results are available from the authors upon request.

Table 5. Effects of Employee versus Employer Choice.^a

Variable	Medical Benefits (%)		Indemnity Benefits (%)		Duration (%)		Substantial Return to Work (%)		Recovery (%)		Satisfaction (%)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Provider Choice:												
Employee Chose	21** (\$1,868) (3.08)	10* (\$903) (1.73)	15* (\$1,908) (1.85)	8 (\$978) (0.99)	32** (3.19)	23** (2.52)	-19 (1.56)	-16 (1.31)	0 (0.04)	1 (0.27)	57** (4.75)	59** (4.84)
Injury Controls:												
Back Pain	65** (4.67)	52** (4.34)	71** (4.39)	60** (3.89)	54** (2.54)	41** (2.05)	-39* (1.80)	-33 (1.43)	-26** (4.30)	-24** (4.02)	-45** (3.01)	-44** (2.89)
Non-Back Sprain or Strain	54** (3.92)	13 (1.07)	40** (2.51)	12 (0.81)	20 (1.08)	-4 (0.22)	11 (0.36)	23 (0.73)	-16** (2.67)	-14** (2.32)	-37** (2.37)	-35** (2.18)
Fracture	34** (2.07)	26* (1.80)	13 (0.67)	7 (0.37)	19 (0.87)	12 (0.57)	-7 (0.23)	0 (0.00)	7 (0.91)	8 (1.04)	-22 (1.03)	-21 (0.97)
Other Injuries	42** (2.77)	-6 (0.44)	27 (1.55)	-5 (0.32)	9 (0.47)	-17 (1.02)	-14 (0.51)	2 (0.05)	-8 (1.24)	-5 (0.76)	-37** (2.16)	-35** (1.98)
Severity	2** (5.42)	1** (6.06)	2** (6.14)	2** (6.07)	2** (4.87)	2** (4.84)	-1 (0.98)	0 (0.68)	3** (21.49)	3** (21.77)	-2** (5.89)	-2** (5.76)
Treatment Controls:												
Overnight	...	148** (12.17)	...	89** (5.69)	...	140** (4.91)	...	-56** (3.43)	...	-18** (2.94)	...	1 (0.06)
Hospitalization	...	118** (16.80)	...	73** (8.10)	...	73** (5.62)	...	-18 (1.26)	...	-4 (1.16)	...	-6 (0.51)
N	1,954	1,954	1,951	1,951	1,829	1,829	1,829	1,829	1,956	1,956	1,941	1,941

^aIn all cases we show the t-statistic for the original coefficient, in parentheses. For medical benefits, indemnity benefits, and recovery, we divide the coefficients by the average payments to get the percentage effect. For duration, we take $100 \times (\text{coefficient} - 1)$ to get the percentage effect. For the two benefit measures, we also show the dollar estimate. For substantial return to work and for satisfaction, we take $100 \times (\text{odds ratio} - 1)$ to get the percentage effect. In all cases, we show the t-statistic for the original coefficient estimate. State dummy variables, and the full set of worker and workplace characteristics, are included in both models. Worker characteristics include age, sex, marital status, wages, whether an hourly worker, tenure, education (6 categories), and whether the survey was conducted in Spanish (at the worker's request). Workplace characteristics include firm size (4 categories) and occupation/industry group (7 categories). Some claims have missing values for some of the independent variables, and in these cases we include dummy variables indicating missing data (and zeros for missing values).

*Statistically significant at the .10 level; **at the .05 level.

associated with employee choice are larger than the estimated percentage increases in indemnity benefits. This can be explained by the fact that indemnity benefits include both temporary and permanent partial disability cases. While temporary benefits are proportional to time away from work, permanent partial disability payments are determined by the product of the partial disability rating (which is related to the extent to which the worker is considered disabled with respect to work) and the payment rate for that rating (for details on permanent partial disability, see Barth 2003/2004). Thus, provider choice need not affect indemnity benefits and duration of time away from work in the same proportion. Indeed, the effects of provider choice could differ substantially—as the estimates in Table 5 (and Table 6 below) indicate—because permanent partial disability benefits are a large share of total indemnity benefits (67% nationwide in 2004; National Academy of Social Insurance 2006).

Returning to the estimates in Table 5, despite the differences in costs and time out of work, there was no difference in the perceived recovery of physical health between workers who selected the provider and workers for whom the employer selected the provider; the estimated differences in recovery are trivially small (0 to 1%) and not statistically significant. On the other hand, workers who chose their providers were nearly 60% more likely to report higher satisfaction with their medical care, for both specifications. Below, we discuss possible reasons for the finding that the two groups differed in reported satisfaction despite no difference in perceived levels of physical recovery. For example, we investigate whether the higher satisfaction among workers who chose their providers could reflect other dimensions of the quality of medical care.

Employee Choice of Prior Provider, Employee Choice of New Provider, and Employer Choice

We next turn to the three-way classification of provider choice: employer choice cases; employee choice cases in which the worker selected as primary provider a “prior pro-

vider”; and employee choice cases in which the worker selected as primary provider a “new provider.” Each class of employee choice case is compared to employer choice cases, and the two types of employee choice cases are also contrasted. As noted earlier, these results are informative regarding implications of recent public policy changes that restrict workers' ability to choose a new provider.

The results are reported in Table 6. The estimates in the first row measure differences in outcomes for employee choice of a prior provider relative to employer choice. With regard to medical benefits, when the employee chose a prior provider payments were significantly higher when the treatment variables are excluded (22%), but the estimate falls by two-thirds and becomes statistically insignificant when the treatment controls are included. The estimated differences in indemnity benefits are small and statistically insignificant in either case. With regard to the two return-to-work outcomes, paralleling the evidence for medical and indemnity benefits, there is no consistent evidence of differences between employee choice of a prior provider and employer choice, especially when the treatment controls are included. We also find no difference in physical recovery associated with this particular form of employee choice. But we find considerably higher satisfaction—on the order of 90%.

The results are substantively different when we compare outcomes associated with employee choice of a new provider versus employer choice, as reported in the second row of Table 6. The estimates for medical benefits indicate that these payments were 12–20% higher when the employee chose a new provider, with both estimates statistically significant at the 10% level (or better). Indemnity benefits are also estimated to have been higher—by 15–20%—when employees chose a new provider, although the smaller estimate when the treatment variables are included is only marginally significant. The evidence consistently indicates a considerably (28%) lower rate of a substantial return to work and considerably (40–48%) longer durations of time out of work for employees who chose a new provider; all of these differences are statistically significant at the 5% level. In

Table 6. Effects of Employee Choice of Prior Provider and Employee Choice of New Provider versus Employer Choice.

Variable	Medical Benefits (%)		Indemnity Benefits (%)		Duration (%)		Substantial Return to Work (%)		Recovery (%)		Satisfaction (%)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Provider Choice:												
Employee Chose Prior Provider	22** (\$1,924) (2.58)	7 (\$629) (0.98)	9 (\$1,116) (0.88)	-1 (-\$162) (0.13)	17 (1.46)	7 (0.70)	-4 (0.22)	-3 (0.18)	-3 (0.70)	-1 (0.35)	86** (5.14)	89** (5.24)
Employee Chose New Provider	20** (\$1,745) (2.48)	12* (\$1,052) (1.74)	20** (\$2,538) (2.12)	15 (\$1,879) (1.64)	48** (3.82)	40** (3.44)	-28** (2.18)	-28** (2.11)	2 (0.59)	3 (0.76)	38** (2.89)	39** (2.97)
(Employee Chose New Provider) — (Employee Chose Prior Provider)	-2 (-\$180) (0.23)	5 (\$422) (0.62)	11 (\$1,422) (1.05)	16 (\$2,040) (1.59)	26** (2.05)	30** (2.41)	-26* (1.72)	-30** (2.05)	5 (1.18)	4 (1.00)	-26** (2.35)	-26** (2.39)
Injury Controls:												
Back Pain	65** (4.67)	52** (4.34)	71** (4.38)	60** (3.88)	55** (2.55)	41** (2.04)	-39* (1.79)	-33 (1.42)	-26** (4.30)	-25** (4.02)	-45** (3.03)	-44** (2.91)
Non-Back Sprain or Strain	54** (3.97)	13 (1.10)	40** (2.52)	12 (0.81)	21 (1.15)	-3 (0.17)	10 (0.36)	23 (0.74)	-16** (2.66)	-14** (2.32)	-37** (2.38)	-35** (2.16)
Fracture	34** (2.06)	26* (1.81)	13 (0.68)	7 (0.39)	19 (0.87)	12 (0.59)	-8 (0.25)	-1 (0.03)	7 (0.90)	7 (1.02)	-22 (1.04)	-21 (0.98)
Other Injuries	42** (2.80)	-5 (0.39)	28 (1.58)	-5 (0.28)	10 (0.51)	-16 (0.97)	-15 (0.54)	0 (0.01)	-8 (1.23)	-5 (0.76)	-38** (2.21)	-36** (2.01)
Severity	2** (5.36)	1** (6.02)	2** (6.03)	2** (5.97)	2** (4.71)	2** (4.70)	0 (0.87)	0 (0.58)	3** (21.35)	3** (21.61)	-2** (5.79)	-2** (5.67)
Treatment Controls:												
Overnight Hospitalization	...	145** (11.86)	...	88** (5.60)	...	138** (4.85)	...	-56** (3.42)	...	-18** (2.86)	...	1 (0.06)
Major Surgery	...	118** (16.77)	...	73** (8.07)	...	73** (5.59)	...	-18 (1.27)	...	-4 (1.11)	...	-7 (0.66)
N	1,945	1,945	1,942	1,942	1,820	1,820	1,820	1,820	1,947	1,947	1,932	1,932

Notes: See notes to Table 5.

contrast to these differences in the findings when the employee chose a new provider, we again find no difference in physical recovery associated with this type of employee choice, but higher satisfaction with the health care received.

The results discussed thus far suggest that the higher costs and worse return-to-work outcomes associated with employee choice overall are driven, in large part, by employee choice of a new provider as opposed to employee choice of a prior provider. The third row of Table 6 provides more direct measurement of the differences in costs and outcomes between employees who choose a new provider and those who choose a prior provider.¹⁷ The estimates indicate that the sharpest differences between the two types of employee choice are for return to work. Employee choice of a new provider is associated with significantly poorer return-to-work outcomes, with the odds of having a substantial return to work 26–30% lower, and the duration of time out of work 26–30% longer; all of these effects are significant at the 10% level, and three of the four are significant at the 5% level. There is little difference in medical payments, but indemnity benefits were 11–16% higher when the employee selected a new provider (although the estimated difference is at best weakly statistically significant). Workers who selected a new provider expressed lower satisfaction than those who selected a prior provider, yet, as we have found throughout, choice was unrelated to physical recovery.

We also examined whether the higher costs and worse return to work when employees chose a new provider were associated with

particular types of injuries—in particular, more subjective injuries for which there is greater scope for variation in treatment and return to work.¹⁸ For this purpose, we defined three categories of injury: objective (fracture, inflammation, laceration, or contusion); subjective (back pain, non-back sprain or strain); and other. We then augmented model 2 in Table 6 to include interactions between the dummy variables for employee choice of prior and of new providers with dummy variables for these injury categories.¹⁹ For the most part, the estimates were sufficiently imprecise that the restricted models excluding these interactions could not be rejected (the only exception was substantial return to work, for which the restrictions were rejected at the 10% level). However, the point estimates indicated that for the costs and outcomes for which there are statistically significant differences between the two types of employee choice—indemnity benefits (weakly), duration, and substantial return to work, as reported in the third row of Table 6—the differences emerge largely for the subjective set of injuries; indeed, for the objective injuries, the point estimates indicate if anything slightly smaller indemnity payments, shorter durations, and a higher likelihood of substantial return to work with employee choice of a new provider than with employee choice of a prior provider, although the differences are slight and statistically insignificant. This issue merits further research, but there is at least suggestive evidence that employee choice of a new provider is problematic mainly for more subjective injuries—cases in which care may be less routine and standardized and there may be more ambiguity about when a worker is ready to return to work.

Finally, we explore further whether the estimates just presented reflect unmeasured residual variation in injury severity that is associated with provider choice. In Table 7, instead of incorporating additional con-

¹⁷These results come from including in the regression models a dummy variable for either type of employee choice and an interaction between this dummy variable and a dummy variable for employee choice of a new provider; the estimated coefficient on the latter interaction is reported. Note that this is not always simply the difference between the estimates reported in the first two rows of the table for the two types of employee choice, because the numbers reported in the table are in some cases calculated from the exponentials of the regression coefficients.

¹⁸This analysis was suggested by a reviewer.

¹⁹The models already include dummy variables for injury type, which pick up differences by injury type associated with employer choice.

Table 7. Effects of Employee Choice of Prior Provider and Employee Choice of New Provider versus Employer Choice, Excluding Severity and Injury Measures.^a

Choice Category	Medical Benefits (%)	Indemnity Benefits (%)	Duration (%)	Substantial Return to Work (%)	Recovery (%)	Satisfaction (%)
Model 1: Without Treatment Controls:						
Employee Chose Prior Provider	22** (\$1,924) (2.58)	9 (\$1,116) (0.88)	17 (1.46)	-4 (0.22)	-3 (0.70)	86** (5.14)
Employee Chose New Provider	20** (\$1,745) (2.48)	20** (\$2,538) (2.12)	48** (3.82)	-28** (2.18)	2 (0.59)	38** (2.89)
Omit Severity Variable:						
Employee Chose Prior Provider	21** (\$1,817) (2.42)	7 (\$916) (0.71)	15 (1.28)	-3 (0.20)	-5 (1.21)	87** (5.22)
Employee Chose New Provider	21** (\$1,811) (2.56)	21** (\$2,651) (2.19)	47** (3.78)	-28** (2.20)	3 (0.78)	36** (2.82)
Omit Severity and Injury Variables:						
Employee Chose Prior Provider	22** (\$1,940) (2.57)	9 (\$1,116) (0.86)	17 (1.44)	-7 (0.41)	-5 (1.15)	83** (5.07)
Employee Chose New Provider	23** (\$2,027) (2.85)	24** (\$3,093) (2.54)	52** (4.05)	-31** (2.43)	3 (0.73)	32** (2.55)

^aFor the two benefit measures, we also show the dollar estimate.

Notes: See notes to Table 5.

controls (such as the treatment variables), we begin with the model 1 estimates and then *drop* variables—first the perceived severity variable, and then the “type of injury” variables as well. If unmeasured injury severity accounted to an important extent for the apparent effects of provider choice on workers’ compensation outcomes, then when we drop the perceived severity measure the effects of provider choice should appear even larger. However, as indicated in the third and fourth rows (the first two rows repeat the findings for model 1 from Table 6), the estimated effects of employee choice of either a prior or a new provider, relative to employer choice, scarcely change when we omit the perceived severity variable. Taking this one step further, in the last two rows of the table we even drop the injury type variables, which surely capture information on the severity of the injury. For choice of a new provider, the estimated effects on costs and return to work grow (in absolute value), but only slightly. In our view, the modest changes that ensue when we drop measures related to injury severity indicate that unmeasured injury severity probably is not materially distort-

ing the estimated effects of provider choice that we find.²⁰

²⁰Another potential argument for a relationship between unmeasured severity and employee choice of a new provider is that it arises by construction. In particular, in employer choice states employee choice of a new provider is likely to coincide with having at least two providers—the initial one chosen by the employer and a subsequent one chosen by the employee. If more serious or complex injuries are also associated with multiple providers, then this can lead to a systematic sorting of more serious cases into the employee choice of new provider category. We examined the data and found that the share of claims involving two or more providers was in fact slightly lower (rather than higher) for claims with employee choice of new providers—both for the pooled data and for each state separately. We also examined this question by estimating logit models for whether there were two or more providers, including as independent variables dummy variables for provider choice and all of the other controls included in Table 4. When we used the pooled data (with state dummy variables) and data for the states separately, the estimated differential associated with employee choice of a new provider was either zero or negative (rather than positive). Indeed, the pattern of differences across states does not even suggest that in employer choice states there was a greater *relative* likelihood that employee choice of a new provider was associated with having multiple providers. Thus, we conclude that employee choice of a new provider was not associated with a greater likeli-

Employee Choice and Worker Satisfaction with Health Care

One consistent finding thus far is that workers' satisfaction with the overall health care they received was higher when the primary provider was employee-selected rather than employer-selected—a gap in satisfaction that was especially great when the choice was a prior provider, not a new provider—even though employee choice was not associated with better physical recovery as reported by the worker. In this subsection we explore three alternative conjectures to explain this finding.

One conjecture is that the higher satisfaction with employee-selected providers reflects independent information about better medical outcomes beyond what is captured by our physical recovery measure, whether because employer-selected providers tend to rush workers back to work prematurely, leading to subsequent difficulties and hence lower satisfaction, or, perhaps, because employee-selected providers actually give better medical care.²¹ One way or another, this conjecture would suggest that, although direct costs associated with employee choice are higher, medical outcomes are also better along dimensions not captured by our physical recovery measure, in which case the higher costs associated with employee choice may be worthwhile.

A second conjecture is that employee-selected providers help workers extend time away from work beyond what is needed for physical recovery. Preferences on the part of workers to delay their return to work are

perfectly consistent with the typical assumption in economic models that there is some disutility from work, so that for some workers staying away from work and collecting indemnity benefits—even if such benefits are monetarily inferior to earnings on the job—is preferable. Worker-selected providers, perhaps because their interests are less aligned with those of employers, may be more willing than employer-selected providers to support workers' efforts to delay returning to work, and as a consequence workers might be more satisfied with such care even if physical recovery is no better. In contrast to the previous case, under this scenario policy-makers would have justification for discounting the evidence of higher satisfaction associated with employee choice.

The final conjecture pertains to aspects of the medical care that may be important to workers, yet have little impact on physical recovery. First, workers may have expectations about the processes of care (for example, speed of time to first visit, time spent with the provider, or bedside manner), and employee-selected providers may be more likely to meet those expectations, regardless of physical recovery. Second, some workers who select their own provider may experience an "empowerment effect" that, by itself, leads to higher levels of satisfaction regardless of physical recovery. And finally, workers may suspect that employer-selected providers are more concerned with satisfying the needs of the employer than of the worker. Such a suspicion could result in a lower degree of trust, and hence influence satisfaction with the treatment even if recovery is not affected.

For help in evaluating the first two conjectures offered above, we can make use of two as-yet undiscussed variables in the data set: whether there was a second absence from work, and whether, in the worker's perception, he or she was sent back to work "too soon" (both questions were asked of those who had a substantial return to work). Both variables could reflect variation in medical outcomes that is independent of reported physical recovery. In addition, a finding that workers' responses regarding premature return to work differed systematically between

hood of having multiple providers, which we believe further argues against the likelihood of unmeasured severity differences associated with provider choice, especially of the type that would generate higher costs and worse return to work for cases with employee choice of new providers.

²¹Alternatively, given that our physical recovery measure refers to the period about 3 to 3.5 years after the injury, by which time nearly all workers may have recovered regardless of who chose the provider, the higher satisfaction with care under employee choice may reflect *how* the recovery occurred rather than how extensive it was, possibly including slower return to work when the employee chose the provider. The evidence we present below also speaks to this interpretation.

Table 8. Satisfaction with Medical Care, Second Absences, and Return to Work.^a

<i>Absence/Return to Work Variable</i>	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>
Second Absence Due to Injury:				
No Second Absence	60	28	6	6
Second Absence	35	32	14	19
Workers' Perception of Return to Work:				
Right Time	63	28	6	4
Too Soon	42	32	11	16

^aAll entries are row percentages.

employee-chosen and employer-chosen providers might shed indirect light on whether employee-selected providers help workers avoid returning to work.

We first verify that workers expressed satisfaction with their medical care is associated with these two variables in the manner we would expect if the variables are informative about the first two conjectures explaining why employee choice of provider is associated with higher satisfaction. As reported in Table 8, considerably lower average satisfaction was reported by workers who experienced a second work absence than by those who did not, and by those who believed they had been returned to work too soon than by those who thought their return to work was timed right. Thus, if these outcomes are to some extent independent of physical recovery, they could explain higher worker satisfaction, although the interpretation regarding return to work is ambiguous, as it could reflect, on the one hand, better medical treatment, or, on the other, cooperation of employee-selected providers in employee malingering.

In Table 9, we turn to evidence on these two conjectures, reporting estimates of models—paralleling those in Tables 5 and 6—that measure how provider choice is related both to second absences and to perceptions of the timing of return to work. As seen in the first two columns, there is no statistical relationship between provider choice and a second absence. This result is not consistent with the hypothesis that the large impact of employee choice on satisfaction is due to employer-selected providers returning workers to work prematurely, causing these workers to suffer

a second absence. Similarly, the estimates in the third and fourth columns indicate no relationship between provider choice and a perception of having been returned to work too soon. Most important, employee choice—whether we consider all employee choice cases, cases in which the worker chose a prior provider, or cases in which the worker chose a new provider—was not associated with a higher likelihood of having returned to work at the right time, versus too soon. Thus, whether better timing of return to work, from the employee's perspective, reflected better care or patient advocacy (or both), the estimates provide no evidence to suggest that either one of these channels can explain the higher satisfaction workers expressed when they chose the provider.

Overall, then, we find no evidence consistent with the conjecture that the higher satisfaction associated with employee choice of provider was attributable to better medical care by employee-chosen providers along dimensions not captured by the physical recovery measure, or by delays in return to work that were abetted by these providers. We cannot, however, rule out the conjecture that the higher satisfaction with employee choice stemmed from intangibles of medical care, such as the manner in which care was delivered, empowerment of the worker, or trust, rather than more objective medical outcomes.

Conclusions and Discussion

Over the past several decades, public policy changes in workers' compensation have placed new restrictions on the abil-

Table 9. Effects of Provider Choice on Completeness of Recovery/Perception of Return to Work, and Second Absences.^a

Variable	Second Absence (%)		Perception of Return to Work Too Soon (%)	
	Two-Way	Three-Way	Two-Way	Three-Way
Provider Choice:				
Employee Chose	-1 (0.05)	...	7 (0.56)	...
Employee Chose Prior Provider	...	20 (0.99)	...	4 (0.28)
Employee Chose New Provider	...	-17 (0.98)	...	14 (0.90)
Injury Controls:				
Back Pain	93* (1.94)	93* (1.95)	63* (1.92)	65** (1.96)
Non-Back Sprain or Strain	88* (1.91)	90* (1.93)	47 (1.55)	50 (1.62)
Fracture	-54 (1.59)	-57* (1.69)	16 (0.49)	17 (0.53)
Other Injuries	7 (0.18)	7 (0.17)	12 (0.40)	12 (0.41)
Severity	2** (2.99)	2** (2.93)	3** (4.77)	3** (4.66)
N	1,361	1,355	1,357	1,351

^aWe estimate logit models. Positive estimates imply better outcomes—that is, a lower probability of a second absence and a higher probability of return to work at the right time. We take $100 \times (\text{odds ratio} - 1)$ to get the percentage effect. In all cases, we show the t-statistic for the original coefficient estimate. State dummy variables, and the full set of worker and workplace characteristics, are included in both models. Worker characteristics include age, sex, marital status, wages, whether an hourly worker, tenure, education (6 categories), and whether the survey was conducted in Spanish (at the worker's request). Workplace characteristics include firm size (4 categories) and occupation/industry group (7 categories). The treatment variables are not included in these models. Some claims have missing values for some of the independent variables, and in these cases we include dummy variables indicating missing data (and zeros for missing values).

*Statistically significant at the .10 level; **at the .05 level.

ity of workers to choose their own medical providers. For example, during the period of rising costs of the late 1980s and early 1990s, a number of states modified “employee choice” laws to require that workers select providers from within approved networks of providers created by the employer. And an important cost-containment provision of the 2004 California workers’ compensation reforms is a requirement that workers select providers from employer-selected networks of providers, unless the workers predesignate a provider who previously treated them under a qualifying employer-sponsored group health plan. In this paper, we provide estimates of the relationships between provider choice

and a variety of workers’ compensation outcomes, including medical and indemnity costs, return to work, physical recovery, and worker satisfaction with medical care. Our study, focusing on the primary provider, exploits an exceptionally rich data set to extend previous work by looking at outcomes beyond medical costs and by providing evidence not simply on employee versus employer choice of the provider, but also on employee choice of prior versus new providers, which has some relevance to the most recent policy changes.

The results can be summarized relatively succinctly. When we look at the simple dichotomy of employee versus employer choice,

we find evidence that costs were generally higher and return-to-work outcomes poorer when workers selected the provider, even though the two groups of workers reported similar recovery of physical health. However, workers choosing their provider reported higher satisfaction with overall care. When we subdivide employee choice into choice of new versus prior providers, we find that the adverse cost and return-to-work outcomes are largely associated with employee choice of new providers.

We also explore why employee choice (overall, and of new or prior providers) was not associated with better medical outcomes than employer choice, as measured by workers' perceived physical recovery, but was associated with higher worker satisfaction with medical care received. Most likely at the heart of the explanation for this pattern, we have concluded, were intangibles of medical care such as trust, empowerment, or simply the manner of care delivery, rather than employee-selected providers either achieving better medical outcomes not captured in our physical recovery measure or helping employees stay out of work longer. Policy-makers weighing the costs and benefits of alternative laws regarding provider choice should not necessarily ignore these intangible characteristics of medical care, especially if future research links them to improved medical outcomes.

Overall, our findings suggest that public policies and private practices that encourage employer (versus employee) choice of provider may serve to lower costs and quicken injured employees' return to work without compromising the rate of recovery of physical health. But employee choice of providers offers similar advantages, and also delivers higher satisfaction, when the providers chosen are ones who have treated the worker previously. In contrast, the more problematic model of employee choice is choice of a new provider, which, although it too yields higher satisfaction with care than does employer choice, on average is associated with higher costs, slower return to work, and no better recovery of physical health. Together, these findings suggest that policy-makers may be able to

find a middle ground that moderates costs without sacrificing recovery of physical health by allowing workers to continue to receive treatment from providers with whom they have a pre-existing relationship, but otherwise allowing the employer to select providers. In states where the law gives the employer the choice of provider, this would increase worker choice. In states where the law provides that workers may select providers, it would increase employer control of the choice.

Any such policy conclusions must be drawn cautiously, however, because there may be endogenous selection into different categories of provider choice based on characteristics that are independently associated with the costs and outcomes we study, which could generate some of our findings. We do have very rich data capturing characteristics of injuries and their severity, and estimates using these controls, as well as a number of sensitivity analyses, make it unlikely that unmeasured injury severity associated with provider choice underlies our results. But because no currently available data permit us to use some of the more convincing strategies for establishing causal effects—including time-varying policy rules, an instrumental variable, or random assignment—it is still possible that unmeasured differences associated with provider choice are generating apparent effects of provider choice. Applying such strategies to analyze the effects of provider choice in workers' compensation—if and when appropriate data become available—is an important task for future research.

There are some other qualifications to our findings, as well. First, only four states are included in our sample. Second, our results focus on who chose the provider in specific cases, rather than the state legal provision about provider choice or laws about ongoing control of provider choice; while state laws influence the actual choice, there is not a perfect correspondence. However, because state laws do influence the choice of provider, if our results accurately capture the effects of who chooses the provider, they should also correctly predict the sign of the effects of changes in state laws affecting

provider choice.²² And third, the California and Pennsylvania laws and practices in effect during the sample period were not strong versions of employer choice laws—in both states, the employer retained the right to select the provider for only a limited period of time, after which the worker could change providers. The results could differ for stronger employer choice laws.

Finally, it may be useful to speculate as to why employee choice of new providers is associated with higher costs but no better

physical recovery, in part to stimulate other research that aims at improved understanding of the mechanisms that drive the effects of provider choice. One possibility is that employer-selected providers are more knowledgeable about working conditions, and therefore better equipped to recommend sound return-to-work conditions, than are employee-selected providers. In addition, many employers participate in medical network arrangements, which often entail screening of providers. In contrast, when workers choose new providers they may be operating in an environment where they have inadequate information about provider quality or insufficient access to higher-quality providers.²³ New providers may also have less information about workers, and hence may practice more defensive medicine, engaging in unnecessary tests and procedures.

²²One question is if the effects of provider choice differ depending on whether the actual choice exercised is that dictated by state law. For example, is the effect of employee choice the same in California and Pennsylvania, which are employer-choice states, as in Massachusetts and Texas, which are not? As noted earlier, we test for differences in the effects of provider choice across states, and do not reject equality of these effects. In addition, we have performed all of the analyses separately by state. Consistent with the statistical tests just described, most of the results are qualitatively similar across the four states, although the individual state results are less strongly significant. Interestingly, however, they are strongest (and most consistent with the pooled results we report in the tables) for California and Texas. Since one of those states is employer-choice and the other employee-choice, it appears safe to conclude that there is little systematic difference in the results based on what the law specifies regarding provider choice.

²³A reviewer suggested that a useful way to study this issue would be to compare outcomes across two subgroups of workers who selected new providers: those who had little attachment to the health care system (no insurance, no regular doctor, and so on), and those with more attachment. Workers in the former group are likely to have poor information and guidance in selecting a provider. This is an interesting question for future research.

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