ESTIMATES OF DIFFERENCES IN WORKERS' COMPENSATION DISABILITY RATINGS UNDER CURRENT (2004) LAW AND IMPAIRMENT RATINGS UNDER FUTURE (2005) LAW IN CALIFORNIA

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ABSTRACT

Background. California's Workers' Compensation Law will change on January 1, 2005. Current (2004) methods to evaluate permanent disability will be replaced by new methods to evaluate permanent impairment.

Methods. 250 reports on workers injured in 2003 and 2004 were obtained from 41 attorneys who represented injured workers. A disability expert rated disability and 15 physician-evaluators rated impairment. Physicians provided single best estimates of impairment and intuitive ranges. Thirty-two (12%) of these reports could not be analyzed or rated due to incomplete information or errors. The remaining 218 reports were analyzed with difference-in-means tests as well as linear regression.

Results. On average, disability ratings (using standards from the 2004 law) exceeded the impairment ratings (using the standards from the 2005 law) by 28 percentage points. Ninety-five percent (95%) confidence intervals for the excess of disability over impairment ratings were 25 to 30 percentage points. Sensitivity analysis, using physician-evaluator's intuitive ranges, suggested a range of 22 to 33 percentage points as the excess of disability over impairment ratings. Minor differences in ratings were found for backs, shoulders, wrists, and knees, as well as across the physician-evaluators. Differences did not statistically differ across demographic groups. Evidence for the 28 percentage point excess was strongest for impairment ratings below 40 percentage points and disability ratings above 20 percentage points.

Conclusions. Percentage ratings for impairment under 2005 California Workers' Compensation law were approximately 33% the size of ratings for disability under the previous legal regimen.

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Estimates of Differences in Workers' Compensation Disability Ratings under Current (2004) Law and Impairment Ratings under Future (2005) Law in California

Introduction

One estimate of annual Workers' Compensation (WC) costs suggested an increase from $9 billion in 1999 to $25 billion in 2003 but a decrease to $18 billion in early 2004.[1] This first estimate also suggested insurance premiums rose roughly 135% from 1999 to 2002.[1] A second estimate, by researchers more widely cited in the academic literature than those from the first, suggested dollar benefits rose from $7.4 billion in 1998 to $11.3 billion in 2002 (latest year available).[2] From 1997 through 2002 (latest year available) the rate of job –related injuries and illnesses per 100 full-time equivalent workers has steadily dropped from 7.1 to 6.0. The number of reported injuries and illnesses has also dropped, from 809,300 to 694,100. [3, 4] In 2002 and 2003 the California workers' compensation system was viewed by many as in crisis.[1, 5]

Senate Bill SB 899 from the California Legislature was passed and signed into law by Governor Arnold Schwarzenegger on April 19, 2004.[1] Among other changes to WC law, SB 899 required that the California Workers' Compensation System move from reliance on the current California Permanent Disability Rating Schedule[6] (California Schedule) to the American Medical Association Guides to Evaluate Permanent Impairment, 5th Edition[7] (AMA Guides). These changes need to be studied objectively to determine their effects on injured workers, their families, employers, physicians, and insurance companies.

Prior to January 1, 2005, physicians rendered evaluations of injured workers through examinations and described residuals of injury mandated by the California Schedule. These evaluations were then presented to the State of California, Division of Workers' Compensation, Disability Evaluating Unit (DEU) which was comprised of experts on the California Schedule.

The DEU evaluators then issued a specific percentage rating based on their assessment of the physician-evaluator's report. Either the objective or subjective factors along with disability or work restrictions were used to recommend a final percentage of disability using the California Schedule.[6] The index which produced the highest rating was the index used in the final rating. Since the schedule could not cover every possibility, DEU evaluators used their expertise in interpreting the disability described in the medical report to generate a rating, adjusted for age and occupation.

Under the new law, physicians will still evaluate injured workers with physical exams. But beginning in January, 2005, examining physicians must use the AMA Guides[7] and calculate "whole body impairment" ratings. There may be a minor role for the DEU to adjust for age and occupation.

By December 31, 2004, the Administrative Director of the California Division of Workers' Compensation, Andrea Hoch, will decide on a methodology for moving from the California Schedule to the AMA Guides. The methodology may be in effect for several years. Over these years, studies will likely be conducted to determine whether and to what extent disability ratings from the old law (California Schedule) compare to the impairment ratings under the new law (AMA Guides).

Our study provides estimates for differences in permanent disability and permanent impairment ratings for 218 "matched" reports on injured workers. Our 218 cases represent southern and central valley (68%) as well as northern (32%) California. Fifteen physicians from southern, central valley, and northern California developed ratings on impairment (AMA Guides). Sharon Collins, a disability expert, developed ratings on disability (California Schedule). Our study did not examine all permanent injuries. Rather, we concentrated on the most frequent and costly injuries to the back, shoulder, wrist, and knee. Our study appears to be the only scientific examination of differences in disability and impairment ratings in California.

Method

The California Applicant Attorneys' Association (CAAA) is a group of roughly 1,020 attorneys who frequently represent injured workers in obtaining Workers' Compensation (WC) benefits. At least 80% of contested permanent partial disability WC claims within California are handled by attorneys, the vast majority of whom are CAAA members.[8]

CAAA administrators asked all 110 board members to search their files for recent Agreed Upon Medical Examination (AME) cases involving single and multiple injuries to the back, wrist (carpal tunnel syndrome), shoulder, and knee. . These categories of injuries were selected for three reasons: 1) they are among the most frequent injury sites for WC cases in California (and other states)[9-11]; 2) they are among the most expensive[9-11]; and 3) they can be more difficult to diagnose than other injuries such as amputation. We instructed the administrators that we wanted the 110 attorneys to select only the five most recent (previous 6-12 months) cases within each of the following categories: single injury (back), single injury (shoulder or shoulders), single injury (wrist or wrists), single injury (knee or knees), and multiple injuries involving backs, shoulders, wrists, or knees. If five were not available in a category, the attorneys were told to submit the number (from one to four) that were available. The CAAA administrators obtained a list of 517 cases. Cases were identified by code numbers. We randomized case numbers within each of the five injury categories and selected case numbers for analysis in proportion to their contribution to the 517. The following percentages applied to the 517 cases within injury categories as identified by attorneys: 32.29% for single injury (back), 12.77% for single injury (shoulder or shoulders), 14.12% for single injury (carpal, wrist), 13.35% for single injury (knee or knees), and 27.47% for multiple injuries. Within each injury category, we randomized case numbers using R version 2.0-2004-10-8.[12] A total of 250 case numbers were selected.

We and the CAAA administrators then asked the 110 board members to: 1) make two copies of the 250 selected reports; and 2) redact personal identifiers from the reports in

accordance with University of California Institutional Review Board (IRB) requirements (protocol ID# 200412606-1 approved 8/9/04 and expiring 8/9/05). One report was omitted due to our clerical error.

Two hundred and forty nine (249) data points are sufficient to statistically test for a difference between disability and impairment. Technically, roughly 30 data points, randomly drawn from a population, are required to conduct a single statistical test of one difference. Roughly 60 are required for two tests. Our population consists of claims filed on behalf of injured workers by CAAA attorneys in California during 2003 and 2004. To the extent that this population is representative of all claims for permanent partial disability from 2003 through 2005, our sample of 249 is sufficient to test for the difference for all permanent partial claims. In the Discussion, we address whether our sample is representative of this broader population.

We sent the first set of 249 reports to 16 physician-evaluators practicing medicine within California. These 16 were selected by us (not CAAA) from lists provided by the American Academy of Disability Evaluating Physicians (AADEP) and the California Society of Industrial Medicine and Surgery (CSIMS) as well as two physicians recommended by Patricia Wiggins, a volunteer clinical faculty with the University of California, Davis, Medical School. We selected physician-evaluators based upon their experience with the AMA Guides.[7] Experience involved in-state California employees who either worked for or were under the jurisdiction of the federal government: longshore workers, postal workers, U.S. border patrol, employees of the U.S. Department of Labor. Experience also involved cases from out-of-state where AMA Guides[7] were already in use. We sent letters to all California members of AADEP as well as all members of CSIMS. We discovered that the great majority of California physicians in AADEP and CSIMS had no experience whatsoever with the AMA Guides as of August, 2004.

One physician-evaluator became seriously ill. We agreed that the 10 reports he would have evaluated would be evaluated by one of the other 15 physician-evaluators.

Eleven of these 15 physician-evaluators had served as Agreed Upon Medical Examiners (AME) and 14 as Qualified Medical Examiners (QMEs). The AME physicians are extremely objective. They are "agreed upon" by agents from WC insurance companies as well as attorneys who represent injured workers. (See appendix for list of physician-evaluators and qualifications).

Prior to our conducting this research, the CAAA selected one physician-evaluator to review 8 case reports. To maintain impartiality, we did not include that physician-evaluator or the reports he evaluated in our study.

Most of the physician-evaluators rated 10 reports, four rated 20, and three rated 30. Physicians who rated 20 and 30 were especially well-qualified.

The second set of copies of the 249 reports was sent to Sharon Collins, a disability expert who has been developing ratings under current (pre-SB899) California law for many years. She provided disability ratings (pre-SB899) for each case to be used in comparison with the impairment ratings (post-SB899) provided by the 15 physician-evaluators. She is regarded as fair by insurance companies, defense attorneys and the CAAA alike.

The 41 attorneys who provided the 250 reports also provided us with demographic information for each case: age, gender, marital status, occupation, wage, region of California, whether injury was sprain/strain or other, and whether injury involved surgery.

Our study compared the California disability ratings from Sharon Collins with the AMA Guide ratings from the 15 physician-evaluators. The 249 reports were written under 2004 California law. We expected that some of the reports would not have enough information to allow a rating based either on the AMA Guides or the California Schedule. Our target number was 200 "matched" cases, i.e., case reports for which valid disability and impairment ratings could be compared. As it turned out, the physician-evaluators could not rate 21 cases. Typically, some of the "range of motion" numbers were omitted. Whereas these numbers were not always required for a California Schedule rating, they were always required for an AMA Guides rating.

Fourteen (14) could not be rated by Sharon Collins. There was some overlap between the 21 and 14. The omissions left us with a total of 218 "matched" reports for analysis, representing those cases with both a disability and impairment rating. A flow chart that tracks the case reports appears in Figure 1.

Disability and impairment ratings were tested for mean differences and 95% confidence intervals were calculated. Linear regression was used to test for the relation between disability and impairment ratings as well as associations among demographic groups, injury categories, and physician-evaluators. We used SAS software.[13]

We also gathered data on the physician-evaluators' intuitive reactions to the best estimate they produced for each report. We reasoned that in some cases reports would contain great detail allowing for the physician-evaluator to render a reliable rating. But in other cases, we reasoned reports might be not quite complete and would require some interpretation or extrapolation by the physician-evaluator. In the former case, the physician-evaluator might have very high confidence in the final "whole body impairment" number, but in the latter case the physician-evaluator might have low confidence. We asked physician-evaluators to provide intuitive ranges around their best single number estimate of percent impairment.

Results

Table 1 provides descriptive statistics on key variables. Our variables, impairment through "difference between disability-impairment", appear in column 1. The variables "impairment", "low", and "high" indicate the impairment ratings by our physician-evaluators. The "impairment" is the single best estimate by the physician-evaluator. The "low" number is the physician-evaluator's lower bound estimate and the "high" number is the physician-evaluator's upper bound for the intuitive ranges. The "disability" variable is Sharon Collins's estimate of disability. The "difference between" variables are simply the result of subtractions, for example, the result of subtracting the physician-evaluators' impairment ratings from Sharon Collins' disability ratings. A positive number for the difference indicates by how much the disability exceeded the impairment.

Injury category information applied to Sharon Collins's assessment. We obtained some information from attorneys and physician-evaluators regarding injury classification, but Sharon Collins's data were more reliable. Attorneys are not trained in classifying injuries. Physicians are trained, but physician-evaluators frequently did not provide that data to us on the questionnaire. Sharon Collins always provided the data even when she judged the disability was unrateable.

Attorneys identified injuries within WC reports for the same categories as listed in Table 1. But the attorneys were sometimes in error. Frequently, a "single" injury, identified by an attorney, also had another injury associated with it. Sharon Collins' evaluations clearly identified all injuries. We regarded Sharon Collins' "neck" injuries as "back" injuries, "upper extremity" as shoulder injuries, and "elbow" and "hand" as wrist injuries. Whereas "neck" was frequently mentioned, "upper extremities", "elbow", and "hand" were rarely mentioned. The attorneys were nevertheless extremely successful in restricting WC reports to only our target injuries. With only a few exceptions, the 249 attorneys' WC reports were limited to one or more of our target injuries: back, shoulder, wrist, or knee. The exceptions involved psychiatric injury, ankle, and foot.

Age was divided into ten 5-year increments. Occupation was divided into four broad categories. Unskilled labor referred to, for example, laborers, attendants, and janitors. Skilled labor referred to, for example, drivers, painters, and mechanics. The hourly wage was divided into three categories. The area variable was divided into four categories. The category of "either southern or central valley" represented a mistake in our design of the questionnaire but was nevertheless more informative than "area missing." Our questionnaire included "south/central" on one line rather than "south" on one line and "central" on another.

In Table 1, the mean for impairment, best estimate, was 14; the mean for disability was 42. The ratio, which could be regarded as a "conversion factor" was 3.0. But this is not our best estimate since it is not based on "matched" cases. For "matched" cases, the mean disability exceeded the mean impairment by 28 percentage points.

The standard deviation and the highest and lowest values for continuous variables also appear in Table 1. The highest and lowest values for the difference between disability and impairment were 87 and -33 percentage points, respectively.

The number of valid data points (observations) also appears in Table 1. For example, impairment, best estimate, had 229 valid data points, i.e. 21 reports were unrated or had an error.

Figure 2 presents a histogram of impairment with disability for 218 "matched" data points. The ranges along the horizontal axis are 0%, 1 to 5%, 5 to 10%, and so on, up to 96 to 100%. The greatest numbers of impairment cases were in the 0%, 1 to 5%, 5 to 10%, and 11 to 15% range for impairment. The greatest numbers of disability cases were in the 21 to 25%, 26 to 30%, and 31 to 35% range for disability. Approximately 21 (10%) injured workers had impairment ratings at zero percentage points. Only 11 injured workers had disability ratings at 10 percentage points or less. Only seven injured workers had impairment ratings more than 40 percentage points. .

Table 2 presents results on mean differences. Only data with both disability and impairment "matched" cases were included in Table 2. Category of injury appears in the first column. The first category is for all injury categories combined, the most significant category for our study. Remaining categories are for single and multiple injuries.

The first and second columns produce information on number of valid data points (observations) and estimates of the means. (Notice these numbers do not precisely coincide with those in Table 1 because Table 1 did not require a match between valid impairment values and disability values).

Arguably, the most important numbers in our study appear in the final two columns of the first row, of Table 2. The estimated mean difference between the disability and the impairment estimate was 28 percentage points. Given that the mean impairment was 14%, then the ratio of disability to impairment (a "conversion factor") would be roughly 3.0 to 1 (or 42%/14%). This suggests that on average, the disability rating was triple the impairment rating. Stated a different way, at the means, for "matched" data, the impairment rating was 33% the size of the disability rating. The statistical confidence interval (not the physician-evaluators' intuitive ranges) for the difference was 25 to 30 percentage points. This suggests that at the lower bound, the rating ratio ("conversion factor") would be roughly 2.8 to 1 and at the upper bound, roughly 3.1 to 1. But there are two qualifications for these estimated ratios. First, because of few data points, we are not confident that the ratios apply for disability less than 20 percentage points or for impairment greater than 40 percentage points. Second, because zero times anything is zero, application of a "conversion factor" cannot be applied to the 10% of cases with impairment at zero.

Mean differences vary somewhat across injury categories. From greatest to least difference, the ranking for injury category was multiple with back, single knee, multiple non-back, single back, wrist (carpal tunnel), and shoulder. The confidence intervals were wider for

the shoulder, wrist, knee, and multiple non-back, than for single back and multiple back, likely due to the larger sample sizes for single back and multiple back injuries.

Table 3 presents linear regression results in which the dependent variable was the difference between disability and impairment and independent variables were injury categories and surgery.(Sprain/strain was omitted due to the great number of missing values). Two results emerge from Table 3. First, injury categories, and whether or not surgery was performed were not especially helpful in explaining variation in the difference. Six of seven covariates were statistically insignificant ($p > 0.05$). These results suggest that the mean difference in Table 2 is unlikely to be due to injury characteristics of patients. The one injury category that appeared unique was single shoulder. The p-value was smaller than 0.001. The size of the difference between disability and impairment was likely lower for single shoulder injuries than the omitted category, single back injuries, or for any other injury category. .The single back injury was chosen as the reference category because of the great number of cases (73) and the fact that the single back mean difference was closer than multiple injury with back to the mean difference for all categories combined.

Table 4 presents linear regression results for which the dependent variable was the difference between disability and impairment and other independent variables were dummy variables for 14 of the 15 physician-evaluators. The physician-evaluator with 30 cases and whose mean difference was closest to the mean difference for all physician-evaluators combined was the reference category.[12] There was one statistically significant covariate (physician-evaluator).[13] These results suggest that the mean difference of 28 percentage points in Table 2 is unlikely to be due to variations in physician-evaluator ratings. Table 5 further illustrates this point. Mean differences were positive for all 15 physician-evaluators with a range of 17% for physician-evaluator number 13 to 40% for physician-evaluator number 7.

In results available from the authors, a linear regression was run using demographic variables as covariates. R^2 was especially low. In fact, the p-value for the regression was 0.41,

indicating statistical insignificance for the entire model. The mean difference in Table 2 is unlikely to be due to demographic characteristics of the patients. A "long" regression that included all covariates in Tables 3, 4, and 6 was not possible for technical statistical reasons (perfect multicolinearity).

Table 6 presents a sensitivity analysis for mean differences using low and high impairment estimates (the intuitive ranges provided by physician-evaluators). The mean difference using the low impairment estimate was 31% (C.I. = 28-33%); the mean using the high impairment estimate was 24% (C.I. = 22-27%). The corresponding rate ratios or "conversion factors" were 2.5 and 3.8.

A scatter plot appears in Figure 3. Disability appears on the vertical axis and impairment appears along the horizontal axis. Data were entered only for matched data on disability and impairment (n = 218). The data show a strong correlation between disability and impairment. Statistical significance was better than 0.001. The estimated intercept for the regression line was roughly 31% and the slope was 0.77. Notice the estimated line ends just above 100% for disability. This was expected since neither impairment nor disability can exceed 100%. The 0.77 slope means that for an estimated 10 unit increase in impairment, the disability increased by 0.77 units. In our data, the typical impairment value of 10% corresponded to a 31% + 7.7% = 38.7% predicted value for disability. Predicted disability exceeded impairment by 28.8 percentage points for an impairment value of 10. In our data, the typical impairment value of 30% corresponded to a disability of 31% + 30% x .77 = 31% + 23.1% = 54.1% along this prediction line. Predicted disability exceeded impairment by 23.1%, for an impairment value of 30%. Along this line, the estimated mean difference between the two decreased for higher values of either disability or impairment. This is an important result. It suggests that the "conversion factor" should vary: it should be higher for low values of impairment and lower for high values of impairment. However, again, we do not have confidence in this prediction

equation below disability values of 20 percentage points or impairment values above 40 percentage points.

The final figure (Bar Graph for Mean Difference) presents what we believe is the best approach to constructing a "conversion factor." The final figure has impairment deciles (0-9%, 10-19%, 20-29%, etc.) along the horizontal axis. Along the vertical axis, it has mean values of the difference between disability and impairment as well as frequencies within each decile. For example, the mean is 28.41 for the first decile (<10), and the number of values (reports) within the first decile is 96. The bar graph suggests two implications. First, for impairment values less than 40, there is approximately the same amount that separates disability from impairment: 28 percentage points. Second, too few data points are available for impairment values to draw any firm conclusion for impairment at 40 or above.

Discussion

We found substantial differences between disability and impairment ratings. On average, disability ratings appeared to be roughly 28 percentage points higher than impairment ratings. Confidence intervals and our sensitivity analysis suggested that these differences likely ranged from 22 to 33 percentage points higher. Given that the mean impairment estimate in our sample was 14%, we estimated the ratio of disability to impairment to be roughly 3.0 with a range of 2.5 to 3.8. We found the excess of disability over impairment ratings was unlikely to be due to variation across injury categories(except shoulder), or across physician-evaluators, or across demographic characteristics of our sample. Finally, we found that the difference dropped modestly for impairment values from zero to less than 40 percentage points (comprising 96 % of our sample of 218).

Our study has several limitations. Our 250 case reports did not represent a random sample of all WC claimants in California. We were limited to collecting data from attorneys who represented injured workers and we restricted attention to permanent injuries to the back, shoulder, knee, and wrist. However, for 80% of contested cases, the worker is represented by an attorney, and in 20% of claims, the worker is "in pro per," (represents self).[8] In addition, all of our cases were written by AME physicians and AME cases are only available through attorneys. Moreover, injury claims for back, shoulder, knee, and wrist comprise the majority of all permanent disability claims and an even larger share of costs.[9-11] Our sample of 250 therefore represented a significant share of the WC market for permanent disability. It may or may not be representative of all injured workers filing permanent partial disability claims. Some workers my simply file a claim with the insurance company and accept the company's judgment and benefits. These workers will not contest the case. Research from other states suggests that persons with low levels of disability are less likely to use attorneys due to the smaller expected gain.[13] Again, our sample has few cases with disability at or below 10 percentage points. The same study also shows that age and geographic location of the injured worker predicts whether

he or she will contest the case. We found no demographic predictors of the difference between disability and impairment ratings. More research is needed on injured workers with disability values below 20 percentage points.

There are strengths to the study. Our 517 cases were written by AME physicians. Our reports were likely to be more objective than those written by non-AME physicians. Moreover, any sample of cases that does not use attorneys may have many non-AME cases. We were careful to randomly select from the 517 cases the attorneys initially offered to us. We required that the attorneys take only the five most recent cases, i.e., we did not allow attorneys to pick cases. (We concede, however, that we were not able to monitor attorney compliance with this requirement.) Our physician-evaluators represented the three regions of California: southern, central, and northern. Our physician-evaluators each had experience with the AMA Guides. The physicians who provided the greatest number of evaluations had extensive experience. For example, one is one of the primary raters for the U.S. Department of Labor within California who has rated "roughly 7,500" cases over the past 20 years. A second works near the Los Angeles airport and rates many out-of-state workers who fly in and out of the airport. A third recently moved to California, having previously resided in Oklahoma and Colorado where the AMA Guides were used for WC cases. A related strength is the credibility of our disability evaluator, Sharon Collins. She is regarded as fair by insurance companies, defense attorneys, and the CAAA alike. She was one of two primary teachers for most DEU raters from southern California. She chaired the committee that revised the current California Schedule and , with two others, authored the current California Schedule. She is a former supervisor of the DEU.

Another strength is the finding that neither demographic characteristics, different physicians , nor injury categories had much statistical influence on the 28 percentage point difference. This finding was not expected, but appeared robust across several statistical tests. The finding suggests that the 28 percentage point difference was solely due to the change in the

law from reliance on the California Schedule to reliance on the AMA Guides. Finally, a strength is our transparency: our data and records are available for public perusal.

In conclusion, the AMA Guides appeared to provide rating values that were roughly one-third the size of the rating values provided by the California Permanent Partial Disability Schedule for our sample of injuries to the back, shoulder, knee, and wrist.

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Figure 1

Flow Chart for Workers' Compensation Case Reports Written under the 2004 Law

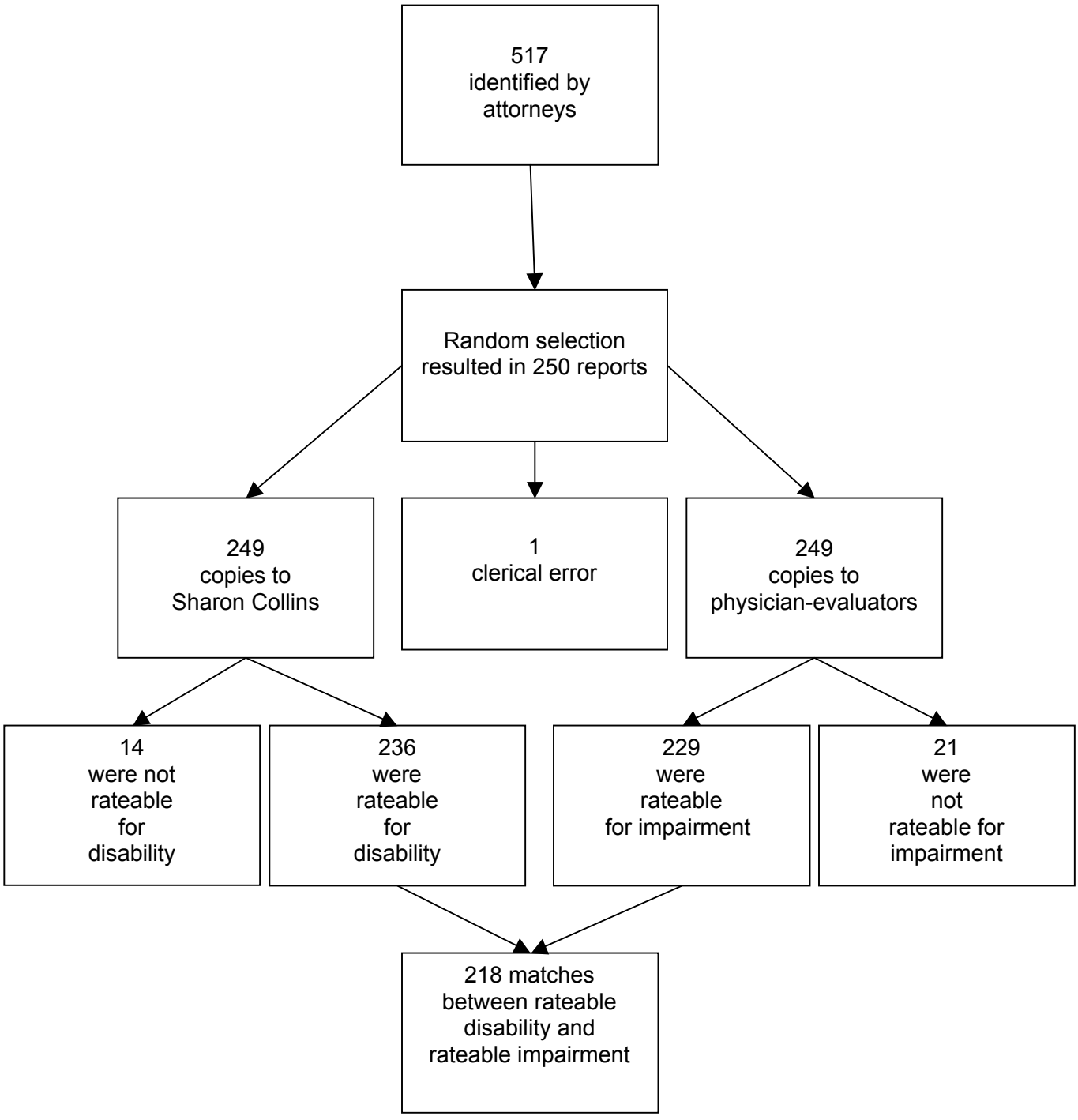


Table 1

Descriptive Statistics

Variable	Number of valid cases	Mean (or percent)	Standard deviation	Lowest value	Highest value
impairment	229	14.20	13.27	0	68
low impairment estimate (intuitive range)	228	11.48	11.21	0	64
high impairment estimate (intuitive range)	228	17.82	14.79	0	80
impairment unrateable	21	9%			
disability	236	41.99	21.59	3	100
disability unrateable	14	6%			
difference between disability – impairment	218	27.81	18.75	-33	87

Figure 2
Histogram: Impairment vs Disability

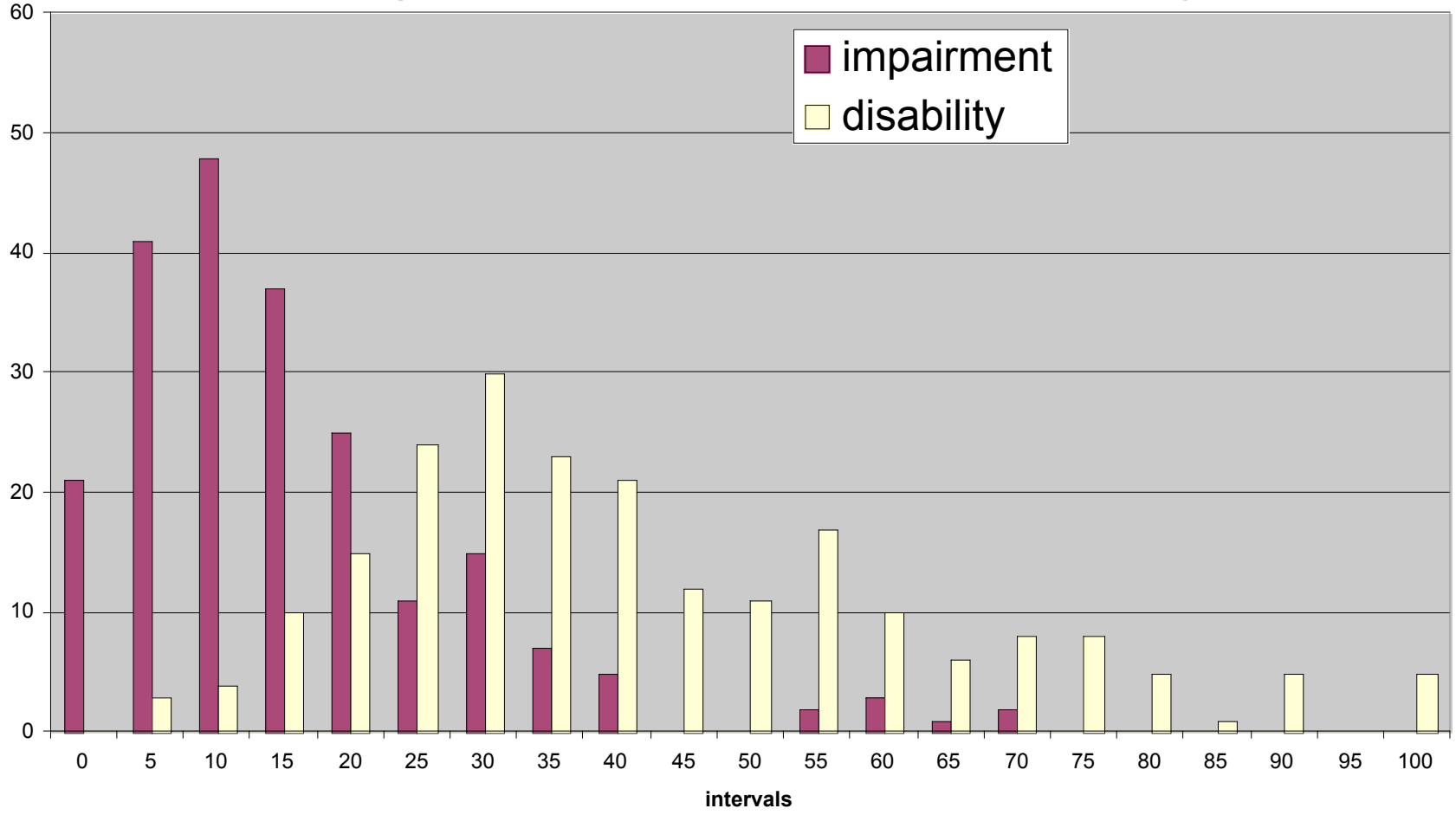


Table 2

Results on Mean Differences for "Matched" Cases*

Category	Disability		Impairment		Mean Difference (disability – impairment)		95% confidence interval for the difference
	Number of valid cases	Value	Number of valid cases	Value	Number of valid cases	Value	
All single and multiple ratings combined	218	42%	218	14%	218	28%	25%-30%
Single injury							
Single back	73	42%	73	15%	73	27%	24%-31%
Single shoulder	24	27%	24	13%	24	14%	7%-22%
Single wrist	9	33%	9	9%	9	24%	11%-37%
Single knee	20	39%	20	10%	20	29%	20%-37%
Multiple injury							
Multiple with back	77	49%	77	16%	77	33%	28%-37%
Multiple without back	15	36%	15	8%	15	28%	16%-40%

* Each case had an impairment and a disability rating

Table 3

Linear Regression. Difference Regressed on Injury Category and Surgery

Covariates	Dependent Variable is disability – impairment	
	Coefficient	p-value
Injury Information		
Single back (reference category)		
Single shoulder or shoulders	-14.96	<0.001
Single wrist or wrists	-5.76	0.38
Single knee or knees	-0.66	.89
Multiple injuries with back	4.76	0.12
Multiple injuries without back	-1.58	0.77
Surgery = 1	5.07	0.06
Intercept	25.25	<0.0001
R^2	0.10	<0.001
Sample size	212*	

* Missing values on covariates results in entire case being discarded.

Table 4

Linear Regression. Difference Regressed on Physicians

Covariates	Dependent Variable is disability – impairment best	
	Coefficient	p-value
Physician-Evaluators		
Physician-Evaluator #1	**-12.11**	**0.12**
Physician-Evaluator #2	**-9.30**	**0.06**
Physician-Evaluator #3	**-3.08**	**0.66**
Physician-Evaluator #4	**0.87**	**0.92**
Physician-Evaluator #5	**4.70**	**0.50**
Physician-Evaluator #6	**2.14**	**0.75**
Physician-Evaluator #7	**9.57**	**0.09**
Physician-Evaluator #8	**1.62**	**0.77**
Physician-Evaluator #9	**-3.04**	**0.67**
Physician-Evaluator #10	**-0.04**	**1.00**
Physician-Evaluator #11	**1.62**	**0.77**
Physician-Evaluator #12 (reference)		
Physician-Evaluator #13	**-13.20**	**0.02**
Physician-Evaluator #14	**-0.91**	**0.87**
Physician-Evaluator #15	**-8.74**	**0.21**
Intercept	**29.96**	**<0.0001**
R^2	**0.11**	**0.05**
Sample size	**218**	

Table 5

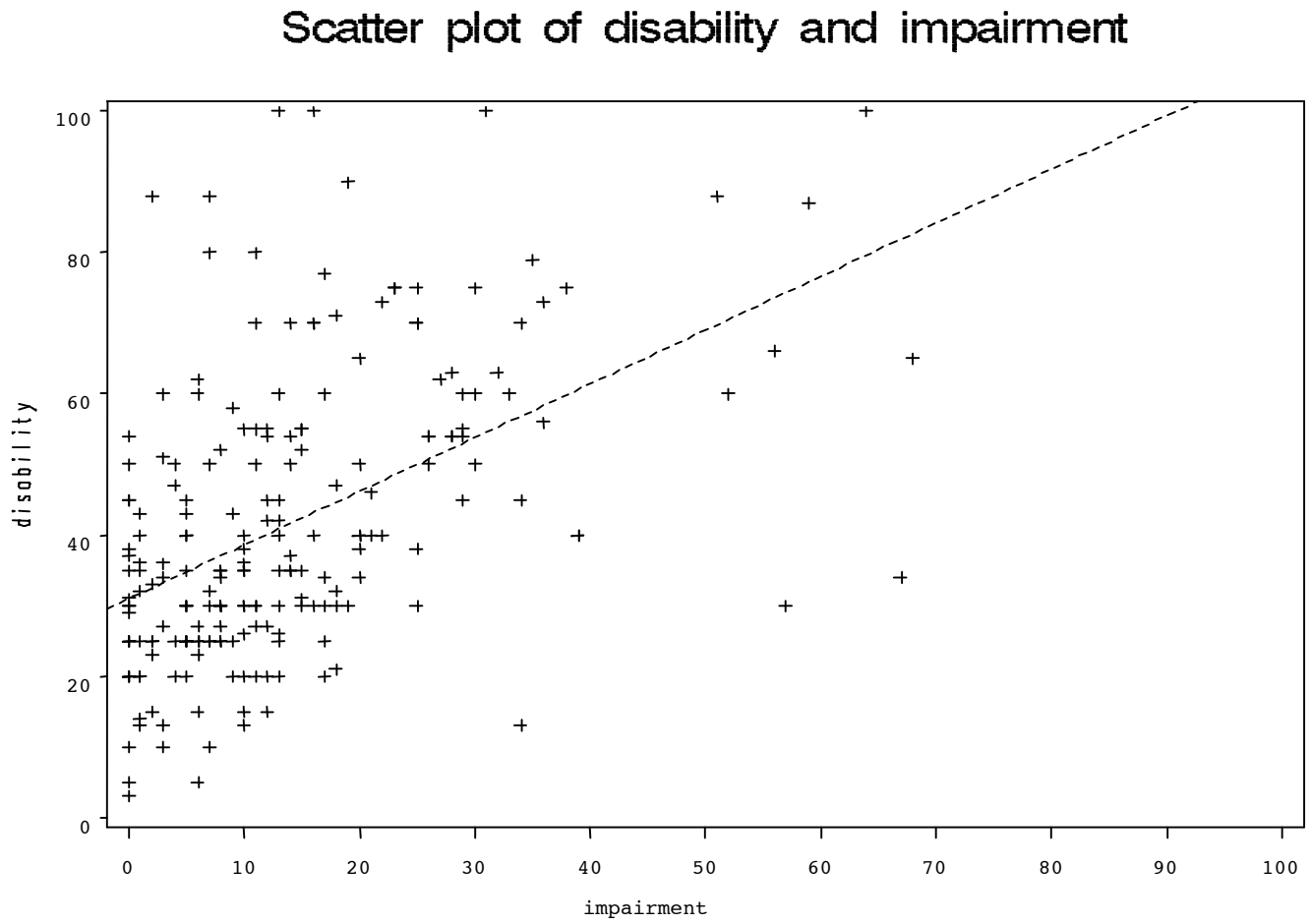
Individual Physicians, "Matched" Data

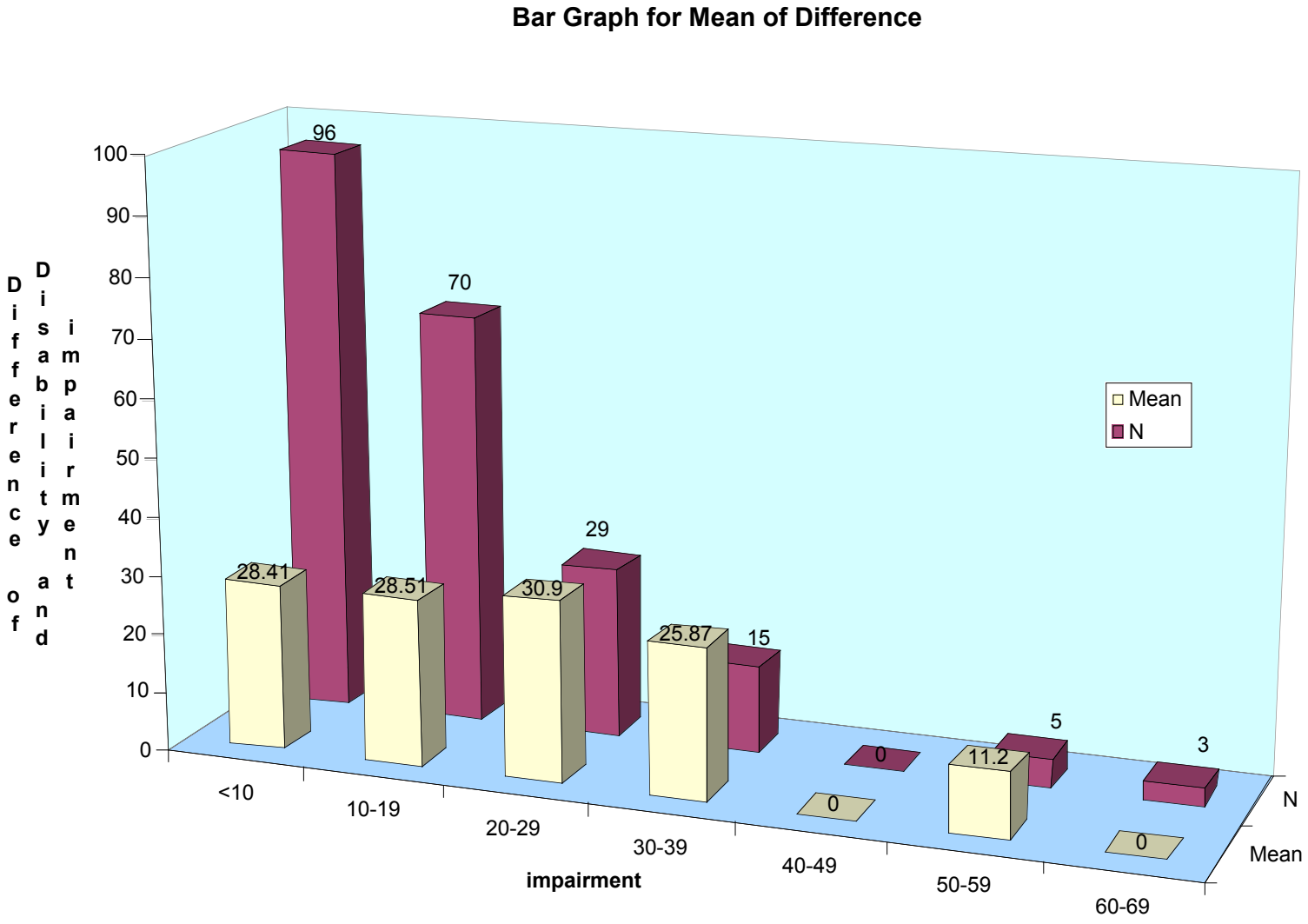
	Mean disability		Mean impairment		Mean difference disability – impairment		95% confidence interval for difference
	number of valid cases	value	number of valid cases	value	number of valid cases	value	
Physician-Evaluator #1	7	34%	7	16%	7	18%	5%-31%
Physician-Evaluator #2	27	36%	27	16%	27	21%	15%-26%
Physician-Evaluator #3	9	47%	9	20%	9	27%	16%-38%
Physician-Evaluator #4	6	46%	6	15%	6	31%	22%-39%
Physician-Evaluator #5	9	37%	9	3%	9	35%	17%-52%
Physician-Evaluator #6	9	43%	9	10%	9	33%	15%-51%
Physician-Evaluator #7	17	51%	17	11%	17	40%	28%-51%
Physician-Evaluator #8	10	48%	10	16%	10	32%	24%-41%
Physician-Evaluator #9	26	39%	26	12%	26	27%	19%-35%
Physician-Evaluator #10	8	40%	8	10%	8	30%	20%-40%
Physician-Evaluator #11	17	44%	17	12%	17	32%	25%-38%
Physician-Evaluator #12	28	42%	28	12%	28	30%	23%-37%
Physician-Evaluator #13	17	44%	17	27%	17	17%	5%-28%
Physician-Evaluator #14	19	44%	19	14%	14	29%	17%-41%
Physician-Evaluator #15	9	30%	9	9%	9	21%	16%-26%

Table 6

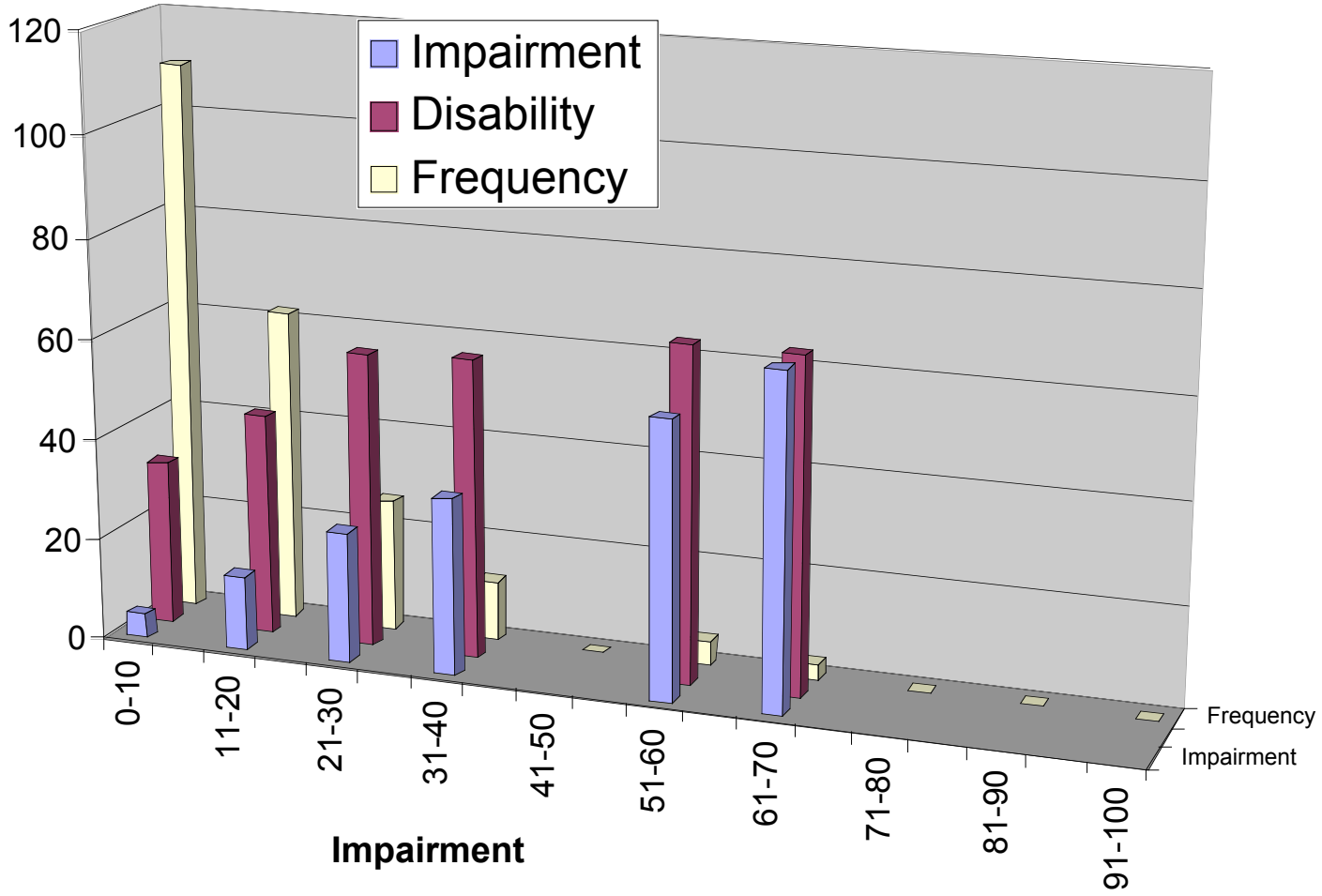
Sensitivity Analysis for Mean Differences Using Intuitive Ranges

Category	Mean for low impairment estimate		Mean for difference between disability and low impairment estimate		95% confidence interval for mean of difference between disability and low impairment estimate	Mean for high impairment estimate		Mean for difference between disability and high impairment estimate		95% confidence interval for mean of difference between disability and high impairment estimate
	Number of valid cases	Value	Number of valid cases	Value		Number of valid cases	Value	Number of valid cases	Value	
All single and multiple injuries combined	217	11%	217	31%	28%-33%	217	17%	217	24%	22%-27%


Scatter plot of disability and impairment
disability
impairment
0
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
100


Bar Graph for Mean of Difference
Difference of Disability and impairment
100
90
80
70
60
50
40
30
20
10
0
96
70
29
15
5
3
28.41
28.51
30.9
25.87
0
11.2
0
Mean
N
<10
10-19
20-29
30-39
40-49
50-59
60-69
impairment
N
Mean

Bar Graph for Means



APPENDIX TABLE OF CONTENTS

Appendix Table 1

Physicians and Reports

Name	City	Number of Reports Physician Received	Number rated	Experience with AMA Guides and Comments	QME or AME?
Bertoldi, Roger	Los Angeles	20	19	20-30 cases in last 10 years. Out-of-state: Idaho, Utah, Arizona, New Mexico	QME AME
Bronshvag, Michael	Clovis	30	28	10-20 last 10 years. Out-of-state and federal workers	QME AME
Corkill, Guy	Redding	10	6	Out-of-state. Alaska, New York. 20 in last 3 years	QME
de la Llana, Sylvia	Granada Hills	10	9	6 cases in last 4 years. Out-of-state. Ohio, Oregon, Nevada	QME
Fenison, Anthony	Moreno Valley	10	8	Longshore and post office over past 3 years	QME AME
Harris, Arthur	Westlake Village	30	29	U.S. Dept. of Labor, Federal Office Workers Compensation Program. Over 7500 cases in 20 years	QME AME
Khasigian, Harry	Sacramento	10	9	20 cases in last five years and 15 since April 2004. Mostly out-of-state	QME AME
Konce, Allen*	San Francisco				
Kucera, Gilbert	Burlingame	10	9	10-15 cases in past 10 years	QME AME
Lipton, Martin	Burlingame	10	9	24 in past 5 years. Longshore and postal workers	QME AME
anonomous		30	29	Over 300 cases over past 5 years. Longshore, prison guards, border patrol agents, Dept. of Labor employees, postal workers	QME AME
Ramsey, William	Santa Rosa	10	9	10-15 patients from out-of-state over past 5 years. New York, Virginia, Arizona	QME AME
Sikka, Varsha	Fairfield	20	20	Worked 23 years in Oklahoma where AMA Guides used	
Sturtz, Howard	Walnut Creek	20	18	35-50 AMA reports in last 5 to 7 years. Out-of-state.	AME

				Longshore and postal workers. Extremely detailed explanations	
Young, Jeffery	Sacramento	10	10	10-30 per year	QME
Zerwin, Marvin B.	San Rafael	20	17	Longshore, Nevada. 60 cases last 10 years	QME AME
* Dr. Konce became ill and could not complete task. We sent his 10 reports to Marvin Zwerin.					