



AMA Guides™ Newsletter

Expert advice, practical information, and current trends on impairment evaluation

**March/April
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The *Guides Newsletter* provides updates, authoritative guidance, and AMA interpretations and rationales for the use of the *AMA Guides to the Evaluation of Permanent Impairment*.

Impairment Ratings: Observations Based on Review of More Than 6,000 Cases

by Christopher R. Brigham, MD; Craig Uejo, MD, MPH; Leslie Dilbeck; W. Frederick Uehlein, JD

The goal of the *AMA Guides to the Evaluation of Permanent Impairment* (*AMA Guides*) is “to provide a standardized, objective approach to evaluating medical impairment” (6th ed, p 20). The appropriate application of the processes defined in the *Guides* should result in reliable, reproducible impairment ratings. Interrater consistency is critical for the purposes for which impairment ratings are used. However, our review of 6,233 impairment ratings between July 2006 and January 2010, reflecting 11,991 ratable diagnoses, demonstrated poor interrater reliability, with a 78% disagreement rate. A previous study, completed in 2005, evaluated 2,100 cases referred for impairment rating review and found that 80% of ratings resulted in different outcomes when reviewed by an expert reviewer.¹

Ratings are used throughout insurance liability systems in the United States, and especially in workers’ compensation, to assist in the determination of appropriate payments to injured parties. Utilization of a detailed guide based on standards developed by consensus of a large group of expert physicians results in reliability and predictability, thereby promoting key goals of the insurance systems: transparency, simplicity, and consistency. In other words, by using the *Guides*, parties can consistently evaluate what the injured party’s impairments are and ensure that benefits are the same for all individuals with a specific condition. Time-consuming and costly litigation can be avoided if ratings are predictable and consistent.

In the current study, there was an average difference of 10.0% whole person permanent impairment (WPI) between the original WPI ratings calculated with the Fifth Edition and the revised ratings, as opined by an *AMA Guides* expert reviewer. In the 2005 study there was a similar difference, 9.9% WPI. The reasons for poor interrater reliability with Fifth Edition ratings are many, including inaccurate clinical and causation analysis, failure to use the *Guides* appropriately, and bias; however, good interrater reliability can be achieved.

Although this study does not represent a randomized sample of all impairment ratings, it does illustrate the problems associated with erroneous ratings and steps to provide reliable, unbiased ratings.

Study Design

The Fifth Edition of the *Guides* states, “if the clinical findings are fully described, any knowledgeable observer may check the findings with the *Guides* criteria” (5th ed, p 17).



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The Sixth Edition makes a similar statement in specifying, “it must be emphasized, however, that even though the *Guides* is mainly written by medical doctors for medical doctors and others permitted to do impairment evaluations, non-physician evaluators may analyze impairment evaluation to determine if it was performed in accordance with the *AMA Guides*. The accurate use of the *Guides* requires a fundamental understanding of anatomy, physiology, pathology, and other appropriate clinical sciences along with a good understanding of the issues related to impairment and disability assessment” (6th ed, p 23).

This study was based on impairment ratings submitted for expert review and therefore is not a random sample of all impairment ratings; however, the data provide insight into some of the challenges seen with *Guides* ratings. In the review process, if the original rating was judged to be incorrect by the expert reviewer and if there was adequate clinical information to rate impairment, then the case was re-rated by using the *Guides* criteria and the data provided.

Results

Of the 6,233 ratings reviewed, 5,237 were cases that could be expressed as WPI; 97% of the WPI ratings were obtained by means of the Fifth Edition, and 81% of all cases reviewed had been rated by California physicians. Of the 5082 Fifth Edition WPI ratings, the average rating was 18.3% WPI, and the revised ratings, as opined by an *AMA Guides* expert reviewer, averaged 8.3% WPI. This reflects a difference of 10.0% WPI. The difference between average WPI ratings was tested with a paired-sample *t* test analysis, with α set at the .05 level of significance. This analysis demonstrated a statistically significant difference between average WPI ratings when original ratings were compared with revised ratings.

Including other Fifth Edition ratings of regional impairments that were converted to WPI increased the sample to 5,845 cases with an original rating averaging 16.9% WPI and a revised rating averaging 7.8% WPI. The relationship between revised and original ratings is illustrated in Figure 1; if there were interrater reliability, the ratings would appear on a diagonal, reflecting a one-to-one relationship.

The profile of the cases is summarized in Table 1.

Edition Observations

Almost all (97%) of the WPI ratings were obtained with the Fifth Edition of the *AMA Guides*. There was an inadequate number of cases and diagnoses rated by the Fourth and Sixth Editions to provide a meaningful comparison among editions, and the observations by edition were impacted by referral patterns. Many of the Fourth Edition referrals were from Ontario, Canada, where the Fourth Edition is used to assess catastrophic impairment from a motor vehicle accident (defined as impairment rating of 55% WPI or greater) or Maine (where there is also a threshold determination); therefore, higher impairment ratings were referred. The observations among the editions are presented in Table 2.

State Observations

Eighty-two percent of the cases were rated by California physicians, with an average original rating of 19.1% WPI, an average revised rating of 8.4% WPI, and an error rate of 81%. The findings based on the state where the physician was located (for states where 20 or more cases were reviewed) are presented in Table 3; again, the observed data were impacted by referral patterns.

Rater Observations

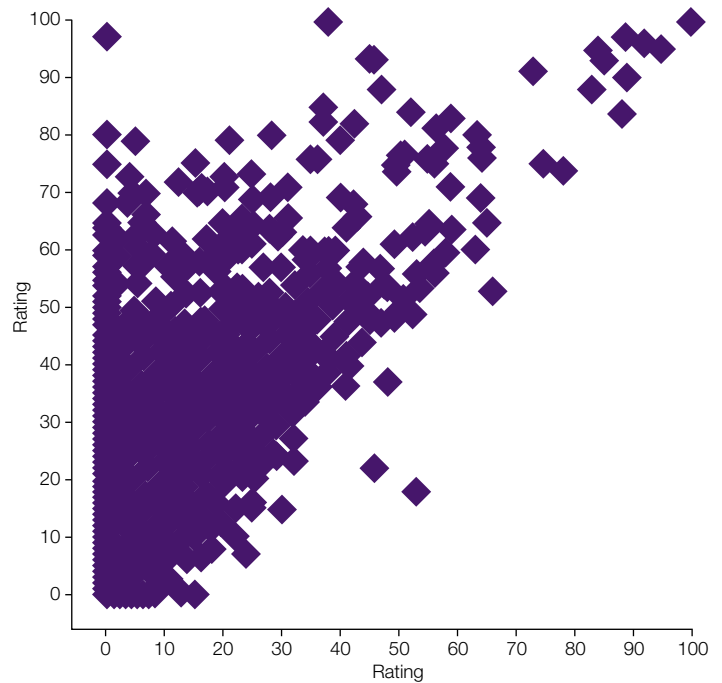
Differences were observed in the location, role, and professional training of the rater.

Impairment Ratings (continued)

Table 1. Summary of Cases

Characteristic	Finding
AMA Guides Edition, % of cases	
4th	2
5th	97
6th	1
Location of evaluator (state)	
No. of states	45
Leading states, % of cases	
California	82
Hawaii	6
Nevada	2
Kentucky	2
Age of examinee, y	
Average	47
Range	10-88
Gender of examinee, %	
Female	42
Male	58
Degree of evaluator, %	
MD	87
DC	8
DO	3
Other	2
Type of evaluator, % of cases	
IME or equivalent	65
Treating physician	35
Average interval from injury to examination, mo	21.2
Average no. of diagnoses per case	1.9
Body region of diagnosis, %	
Upper extremity	38
Spine	37
Lower extremity	16
Nervous system	2
Other	7

Figure 1. Comparison of Average Original Rating With Average Revised Rating



A relatively small percentage of physicians in most jurisdictions performed many of the ratings. In California, 74 physicians (4.9% of all California physicians in the study) performed 10 or more ratings that were reviewed, resulting in 1,172 of the ratings (28%). Where 10 or more ratings by the California physicians were reviewed, there was an observed error rate of 86%. The average difference between original ratings and revised ratings was 12% WPI; this is in contrast to Hawaii, where the error rate was 29% with an average difference of only 2% WPI (among physicians who had 10 or more ratings revised), and Nevada, where the error rate was 30% with an average difference of only 3% WPI (among the group of higher-volume reviewers).

In California, impairment evaluations may be performed by the treating physician, a qualified medical examiner (QME), or an agreed medical examiner (AME). The lowest observed error rates were seen with treating physicians and the highest error rate was seen with AMEs; these findings are given in Table 4.

Table 2. Observations by Edition

Criteria	Type	Average WPI, %			Error Rate, %	% of Cases
		Original	Revised	Difference		
Fourth Edition	Case	22.7	11.2	11.5	82	2
Fifth Edition	Case	16.9	7.8	9.1	78	97
Sixth Edition	Case	12.9	5.9	7.0	74	1
Fourth Edition	Diagnosis	11.9	5.5	6.4	67	2
Fifth Edition	Diagnosis	9.7	4.3	5.4	67	97
Sixth Edition	Diagnosis	9.8	5.5	4.3	68	1

Impairment Ratings (continued)

Table 3. Observations by State

State	Average WPI, %			Error Rate, %	% of Cases
	Original	Revised	Difference		
Alaska	13.5	9.5	4.0	67	0.9
California	19.1	8.4	10.7	81	81.9
Florida	11.2	0.6	10.6	100	0.8
Hawaii	11.3	8.0	3.3	37	5.8
Kentucky	17.0	7.4	9.6	84	1.7
New Hampshire	21.6	13.2	8.4	92	0.5
Nevada	14.1	10.2	3.9	50	2.4
Vermont	18.4	10.4	8.0	83	0.8

Table 4. Observations by Type of Examiner in California

Type of Examiner	Average WPI, %			Error Rate, %	Cases, %	Diagnoses/Case
	Original	Revised	Difference			
AME	24.5	10.9	13.6	91	31	2.7
QME	19.5	8.2	11.3	83	26	2.2
Treating physician	12.6	5.8	6.8	70	39	1.9
Other or not specified					4	

Table 5. Observations by Professional Degree

Professional Degree	Average WPI, %			Error Rate, %	% of Cases
	Original	Revised	Difference		
MD	18.2	8.6	9.6	77	87
DC	21.3	6.5	14.8	85	8
DO	14.9	6.9	8.0	74	3
DPM	11.5	3.3	8.2	87	1
PhD	23.3	8.7	14.6	83	1
Other or not specified					1

Table 6. Observations by Professional Degree and State

Professional Degree	State	Average WPI, %			Error Rate, %	No. of Cases
		Original	Revised	Difference		
MD	CA	18.8	8.5	10.3	80	3775
MD	NV	17.8	15.6	2.2	42	33
MD	HI	11.5	8.4	3.1	36	276
DC	CA	25.5	7.1	18.4	95	281
DC	NV	11.9	7.8	4.1	56	77
DC	HI	7.9	2.3	5.6	39	18

Figure 2. Hawaii Physician Ratings, Average Original WPI Rating vs Average Revised Rating

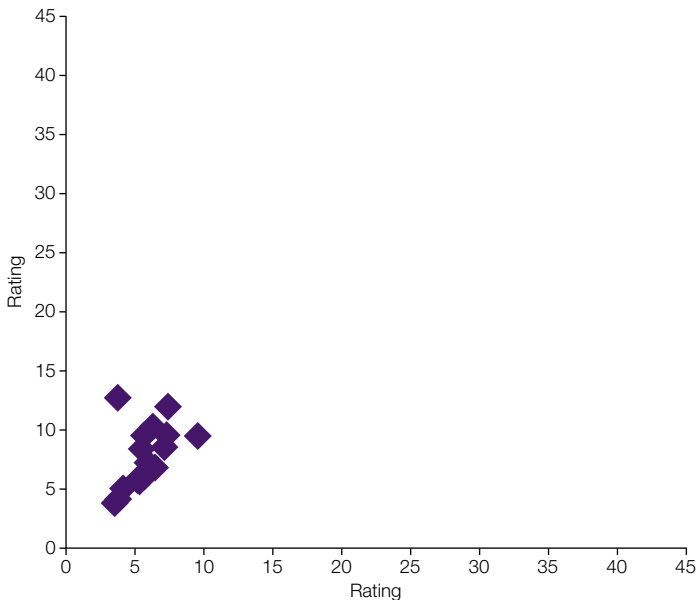
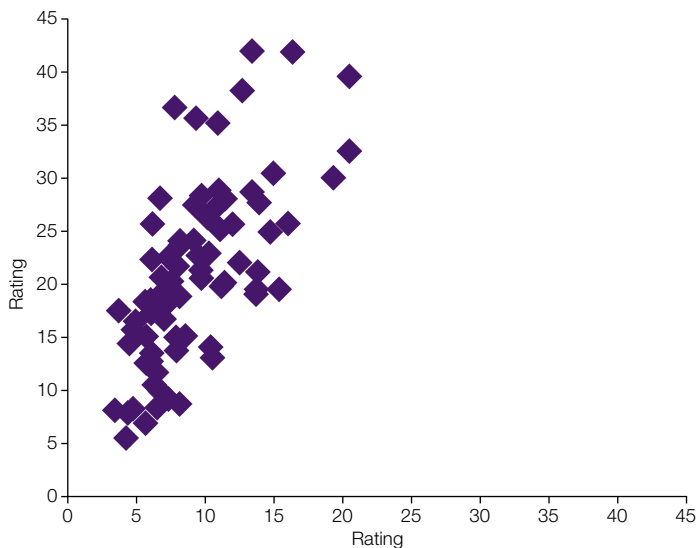


Figure 3. California Physician Ratings, Average Original WPI Rating vs Average Revised Rating



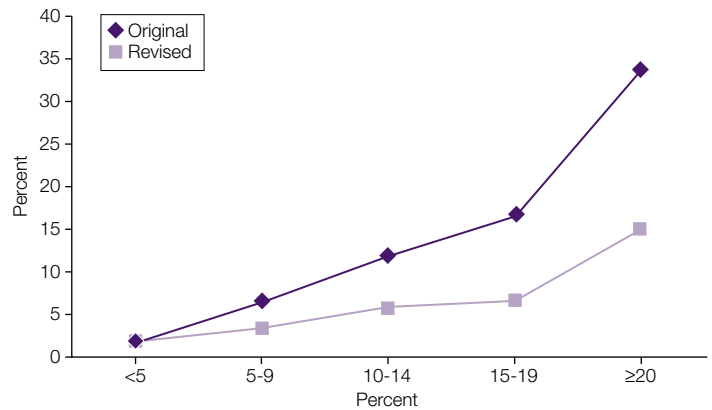
Excludes one physician who averaged original rating of 58% WPI.

Within the category of QME assessments in California, for applicant-referred evaluations the average error rate was 94% (with an average gap of 22.2% WPI), for defense-referred cases the average error rate was 69% (with an average gap of 6.6% WPI), and for panel evaluations the average error rate was 83% (with an average gap of 11.0% WPI).

The data also showed differences in the professional degree of the examiner, as displayed in Table 5.

The differences observed among raters by professional degrees was also associated with the jurisdiction, as shown

Figure 4. Relationship Between Ratings Based on Categorization of Original Rating



in Table 6. The lowest observed error rate was for allopathic physicians in Hawaii, and the highest error rate was for chiropractors in California.

The data demonstrated that performance of a specific physician is usually predictable, ie, some physicians consistently use the *AMA Guides* correctly and others incorrectly, characteristically overrating or (less commonly) underrating. This relationship is illustrated in Figures 2 and 3, which plot data for physicians who had 10 or more ratings reviewed, comparing their average original rating vs the average revised rating. If interrater reliability were achieved there would be a one-to-one relationship, ie, all points would be on a diagonal line. Reliability was much better among physicians in Hawaii than in California, according to these data.

Among the physicians who had 10 or more ratings reviewed, the highest observed average rating for a Hawaii physician was 13% WPI; however, for a California physician, it was 58% WPI. Sixty-nine of the California physicians (84%) had average ratings that exceeded the maximum 13% WPI seen in Hawaii. In Hawaii the maximum revised impairment rating was 9% WPI and in California it was 21% WPI.

Case Observations

Analysis by impairment ratings, categorizing by the initial rating, showed that higher original impairment ratings were more likely to be erroneous. Table 7 presents these findings in California for WPI ratings.

As the value of the original rating increased, there was increasing error. The relationship between the categorization of the original rating (and the resultant average of the ratings within that category) and the average revised rating is illustrated in Figure 4.

Diagnosis Observations

There were 10,474 diagnoses rated as WPI, with the California data reflecting 8,515 of these diagnoses. The average impairment by diagnosis was originally 9.8% WPI, with the revised rating being 4.5% WPI and an observed dif-

Impairment Ratings (continued)

Table 7. Case Observations by Value of Original Rating, California

Criteria	Average WPI, %			Error Rate, %	% of Cases
	Original	Revised	Difference		
Original <5% WPI	2.1	1.8	0.3	38	12
Original ≥5% and <10% WPI	6.7	3.3	3.4	73	19
Original ≥10% and <15% WPI	12.0	5.4	6.6	82	16
Original ≥15% and <20% WPI	16.9	6.3	10.6	95	13
Original ≥20% WPI	34.0	14.8	19.2	94	39

Table 8. Diagnosis Observations by Value of Original Rating, California

Criteria	Average WPI, %			Error Rate, %	% of Diagnoses
	Original	Revised	Difference		
Original <5% WPI	1.9	1.3	0.6	46	30
Original ≥5% and <10% WPI	6.6	2.6	4.0	76	32
Original ≥10% and <15% WPI	11.8	5.0	6.8	84	15
Original ≥15% and <20% WPI	16.7	6.3	10.4	90	9
Original ≥20% WPI	29.9	16.3	13.6	85	14

Table 9. Diagnosis Observations by AMA Guides, Fifth Edition Chapters, California

Chapter	Title	Average WPI, %			Error Rate, %	% of Diagnoses
		Original	Revised	Difference		
3	Cardiovascular System: Heart and Aorta	24.4	18.0	6.4	51	1.0
4	Cardiovascular System: Systemic and Pulmonary Arteries	15.3	4.8	10.5	68	0.2
5	Respiratory System	20.1	11.4	8.7	79	0.2
6	Digestive Tract	11.8	1.8	10.0	88	0.8
7	Urinary and Reproductive Systems	12.2	3.5	8.7	82	0.7
8	Skin	10.7	6.0	4.7	69	0.5
10	Endocrine System	9.3	5.3	4.0	67	0.1
11	Ear, Nose, Throat and Related Structures	5.5	3.0	2.5	53	0.5
12	Visual System	21.2	12.0	9.2	46	0.2
13	Central and Peripheral Nervous System	10.5	1.6	8.9	90	2.4
14	Mental and Behavioral Disorders	19.9	8.6	11.3	79	1.0
15	Spine	11.1	4.4	6.7	76	36.8
16	Upper Extremities	7.7	3.8	3.9	61	37.8
17	Lower Extremities	7.9	4.3	3.6	54	15.8
18	Pain	6.4	1.1	5.3	78	2.1

ference of 5.3% WPI. In California, the average impairment by diagnosis was originally 10.1% WPI, the revised rating was 4.4% WPI, the observed difference was 5.7% WPI, and the error rate was 71%. In Hawaii, the values were lower; the average impairment by diagnosis was originally 6.1% WPI, the revised rating was 4.7% WPI, the observed difference was 1.4% WPI, and the error rate was 28%. Therefore, the average observed rating in California was significantly higher

than that in Hawaii (by 4.0% WPI); however, the corrected ratings were similar (4.4% WPI for California and 4.7% WPI for Hawaii). The error rate in California was 2½ times that of Hawaii.

An increasing error rate and gap between the original and revised rating was seen when the 8,513 diagnoses rated by California physicians were analyzed (Table 8).

Table 10. Five Most Frequent Regional Impairments, Fifth Edition

Region	Average WPI, %			Error Rate, %	No. of Cases
	Original	Revised	Difference		
Cervical spine	10.6	3.9	6.7	78	1855
Lumbar spine	12.4	5.4	7.0	76	1840
Upper extremity, shoulder	7.5	4.5	3.0	56	1494
Knee	6.8	4.0	2.8	48	1022
Upper extremity, neurological	8.6	3.3	5.3	68	943

Table 11. Five Most Frequent Diagnoses, Fifth Edition

Rank	Diagnosis	ICD-9 Code	Average WPI, %			Error Rate, %	% of Diagnoses
			Original	Revised	Difference		
1	Cervicalgia	723.1	8.6	2.0	6.6	79	12.8
2	Backache NOS	724.5	10.1	3.0	7.1	78	11.0
3	Shoulder region disease NEC	726.2	6.9	4.2	2.7	53	10.6
4	Carpal tunnel syndrome	354.0	8.8	3.4	5.4	67	6.4
5	Disc disease NEC, lumbar	722.93	16.6	9.8	6.8	70	3.7

Upper extremity diagnoses represented 38% of the diagnoses, followed by spine with 37% and lower extremities with 16%. Many of the upper extremity injuries were rated bilaterally, with each injury reflecting a different rating; this may explain why the number of upper extremity diagnoses was greater than that of spine diagnoses.

Table 9 presents the observations seen with Fifth Edition WPI ratings as reflected in the chapters in the Fifth Edition of the *AMA Guides*.

The majority of ratings were musculoskeletal, neurological, or pain-related, reflecting 95% of all ratings. In the 2005 study there were similar findings; 98% of cases were musculoskeletal impairment assessments, the most common of which was spine (36%), followed by upper extremity (31%), lower extremity (21%), and multiple musculoskeletal (12%) conditions. The most commonly rated region at that time was the lumbar spine (17% of all cases).

Higher error rates were seen with central and peripheral nervous system diagnoses (which included ratings for head injury and, in California, ratings given for sexual dysfunction and sleep disorders), digestive system ratings (typically California ratings for gastric complaints attributed to medications), and urinary and reproductive system ratings (typically California ratings for sexual dysfunction associated with pain disorders). Lower error ratings were seen with lower extremity and cardiovascular diagnoses ratings (where many ratings are based on diagnosis-based impairments). The observations for those chapters most commonly used are illustrated in Figures 5 and 6.

The 2 most frequent regional impairments were cervical and lumbar spine, as presented in Table 10.

The 5 most frequent diagnoses are presented in Table 11. These diagnoses were followed, in order of frequency, by internal derangement, knee; disc disease –not elsewhere classified (NEC), cervical; derangement, meniscus, knee; sprain, wrist, not otherwise specified (NOS); and rotator cuff syndrome.

Variations were noted between states for certain diagnoses. For example, carpal tunnel syndrome represented 3.0% of the ratable diagnoses (31 of 1,048) in Hawaii as compared to 6.9% (649 of 9,378) in California. California ratings reflected 84.2% (9,378) of the 11,134 rated diagnoses. However, certain conditions were rated nearly exclusively in California; for example, sleep dysfunction impairments (182 ratings, all but 4 from California, reflecting 1.9% of the ratable diagnoses in California and 0.2% of the diagnoses in other jurisdictions) and hypertension (68 ratings, all but 1 from California) were seen almost exclusively from California.

Other Observations

Higher impairments were seen with older claimants, males, and evaluations that took place later in the course of the claim (Table 12).

Discussion

These data provide several insights, including the following:

- There are significant problems with interrater reliability with Fifth Edition ratings.

Impairment Ratings (continued)

Table 12. Other Observations

Criteria	Average WPI, %			Error Rate, %	% of Cases
	Original	Revised	Difference		
Age, y					
<30	15.5	5.1	10.4	77	9
30-50	17.0	7.6	9.4	80	46
>50	19.8	9.8	10.0	79	45
Timing of evaluation					
<1 y into claim	12.8	5.2	7.6	71	31
1-2 y into claim	18.3	7.9	10.4	80	37
>2 y into claim	23.6	11.8	11.8	84	32
Sex					
Female	17.1	7.0	10.1	80	42
Male	19.2	9.9	9.3	77	58

- The majority of the ratings reviewed were performed incorrectly and resulted in ratings that averaged more than twice what was appropriate.
- Problems are more common in jurisdictions where physicians are encouraged by certain stakeholders to perform impairment ratings by approaches other than those specified by the editors and authors of the *AMA Guides*.
- Good interrater reliability can be achieved by ensuring that impairment ratings are performed by knowledgeable, skilled, and unbiased examiners, and that these ratings are independently reviewed by personnel who are equally skilled and knowledgeable in impairment rating. The data obtained may be useful for total quality improvement.
- Preliminary data suggest that both the error rate and the magnitude of error may be less with Sixth Edition ratings.

Guides Editions

The majority of the ratings were performed with the Fifth Edition (published in 2000), which is the most commonly used edition in workers' compensation cases. Sixteen states make use of the Fifth Edition in workers' compensation; 10 states use the Sixth Edition, which was released at the end of 2007; 8 states still commonly make use of the Fourth Edition; and 2 states use the Third Edition, Revised (published in 1990). One state does not stipulate which edition of the *Guides* to use. Seven states use their own state-specific guidelines, and 6 states do not specify any guideline. Statutes may or may not specify which edition of the *Guides* to use and how the *Guides* are to be utilized. The *Guides* are also used to rate impairment beyond state workers' compensation laws, including in federal, personal injury, and motor vehicle accident cases. Therefore, nearly all states were represented in the analysis. The distribution of cases is not reflective of the permanent impairment ratings performed in each state; rather it reflects the cases referred for review. For example, in California, which uses the Fifth Edition, a change

in approach to rating and significant amounts of litigation have led to more frequent review of ratings to ensure their accuracy; this has resulted in the review of more Fifth Edition cases.

The most recent, Sixth Edition of the *Guides* reflects the most current approach to defining impairment. Although there were relatively few ratings by the Sixth Edition in this study, both the observed error rate and the difference between the original and

Figure 5. Fifth Edition WPI Averages by Most Common Chapters

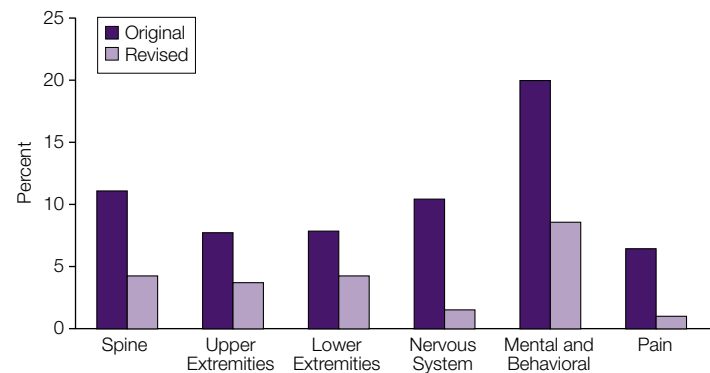
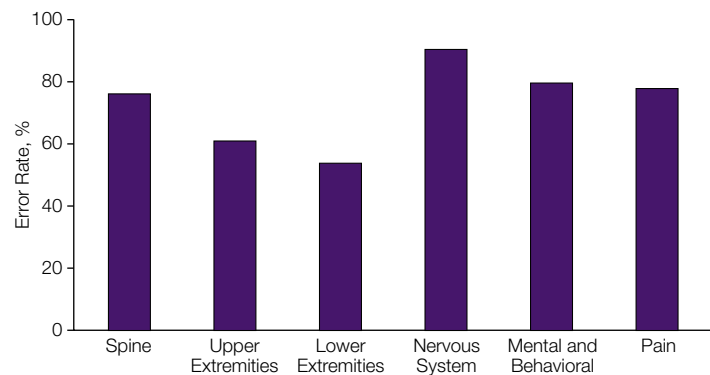


Figure 6. Fifth Edition WPI Error Rates by Most Common Chapters



revised ratings were lower than with previous editions. As with other areas of medicine, concepts and approaches improve with time; for example, some treatments are found to be ineffective and are dropped from practice and new approaches are adopted. This also occurs with the medical assessment of impairment. The change in impairment methodology is accompanied by changes in impairment values associated with specific conditions. The Sixth Edition introduced a new approach to rating impairment that is primarily diagnosis-based. An innovative methodology is used to enhance the relevancy of impairment ratings, improve internal consistency and interrater reliability, promote greater precision, and simplify the rating process. The approach is based on a modification of the conceptual framework of the International Classification of Functioning, Disability, and Health,² although many of the fundamental principles underlying the *Guides* remain unchanged.

Demographics

The average age of the examinees whose condition was rated in this study was 47 years; however, younger examinees were seen for personal injuries and motor vehicle accidents. A Canadian study published in 2003 determined that males, adolescents, and young adults had higher claim rates than adults. Ratings of permanent impairment were positively associated with severity of injury. The study found that the indicators of health consequences, in particular presence of permanent impairment, provide evidence that compensated work injuries sustained by youth are not as serious as injuries sustained by older adults.³

The majority of the impairment ratings in this study involved males. A study published in 2001 compared compensable work-related injuries/illnesses between females and males across all major industrial sectors. The overall injury/illness rate was significantly lower in females than males (5.5 vs 11.5 per 100 employees), a trend that extended to all major industrial classes with the exception of service and agricultural sectors.⁴

In this study the distribution of professionals who performed ratings was similar to that noted in 2005, where 86% of the ratings were performed by allopathic physicians, 10% by chiropractic physicians, and 3% by osteopathic physicians.

Most of the ratings were performed by someone other than the treating physician. The role of the evaluator is dependent on several factors, including state-specific approaches (in some states the preference is to have evaluations done by rating physicians and in other states by treating physicians) and the skill set of the physician.

Maximal Medical Improvement

Evaluations are not done until the claimed condition has reached the point of maximal medical improvement (MMI), the point at which a condition has stabilized and is unlikely

to change (improve or worsen substantially in the next year, with or without treatment) (6th ed, p 612). The average time from the date of claim to the date of the examination was 21.2 months. It is probable that most of the ratable diagnoses had achieved MMI sooner than the date observed; many conditions achieved MMI within 1 year after injury.

Diagnoses

Most of the ratable conditions seen in this study were musculoskeletal, reflecting the types of injuries that are most frequently seen in the workers' compensation arena. Overall, there were 1.9 diagnoses per case; however, the number of diagnoses per case varied, largely depending on the source of the referral to the evaluating physician, with referrals from a plaintiff (applicant) attorney typically resulting in more diagnoses per case.

Extremity impairments are often bilateral, particularly for chronic problems (such as shoulder impingement syndrome or carpal tunnel syndrome). This is reflected in the high frequency counts for upper extremity ratable impairments, which were more frequent than spine-related ratable impairments.

Interrater Reliability

Significant problems with interrater reliability were observed. The Fifth Edition of the *Guides* states, "Two physicians, following the methods of the *Guides* to evaluate the same patient, should report similar results and reach similar conclusions" (5th ed, p 17). The Sixth Edition explains, "the *Guides* is written by medical doctors or medical doctors and others permitted to do impairment evaluations. It is a tool to translate human pathology resulting from trauma or disease process into a percentage of the whole person. This is achieved using criteria that are consistent with the pathology. Thus, to ensure reliable impairment estimates, the assessing doctor must possess the requisite medical knowledge, skills, and abilities" (6th ed, p 19). It continues by explaining, "from its inception, the goal of the *Guides* has been to provide a standardized, objective approach to evaluating medical impairment. Physicians must use their clinical knowledge, skills, and abilities to arrive at a specific diagnosis; define the pathology; and rate impairments based on the *Guides* criteria."

The national variability in permanent partial impairment ratings has been demonstrated by others, including a study published in 2003, where 3 clinical scenarios were presented to physicians for rating by the Third, Fourth, or Fifth Edition of the *AMA Guides*. They observed a great deal of variability in ratings throughout the country.²

The Hartford Property and Casualty Company refers all impairment ratings to internal reviewers before approval of permanent partial disability ratings. In a study published in 2008, Bonner⁵ reported on the review of 40 random files,

Impairment Ratings (continued)

Table 13. California vs Hawaii Ratings

	California	Hawaii
No. of cases	4231	301
No. of diagnoses	9378	1048
No. of diagnoses/case	2.2	3.5
No. of physicians with ≥ 3 ratings reviewed	460	42
Error rate (disagreement in final rating), %	81	37
Original rating, average WPI %	19.1	8.4
Revised rating, average WPI %	8.4	8.0
Average difference in WPI % ratings	10.7	3.3
Rating difference of 3% rating unit or less, % of cases	31	73
Experience (year Fifth Edition first used)	2005	2001 (since publication)
Population (US Census, 2008)	36,756,666	1,288,198

which demonstrated that 50% of the files were incorrectly rated after the rating provided by the treating physician was compared with that of an expert rater. Of the 20 files that were inaccurate, 95% were judged to be rated higher than that which would be appropriate on the basis of *Guides* criteria. Fifteen percent of these claims differed by more than 5 impairment percentage points.

California vs Hawaii: Example of Jurisdictional Influences

There was a significant difference between the observations of ratings performed by physicians in California vs Hawaii. Both jurisdictions make use of the Fifth Edition. The differences between these two jurisdictions are shown in Table 13.

In California, the 4,231 ratings reviewed were performed by 1,509 physicians. The *Guides* was introduced to California in 2005 as a result of workers' compensation reform and enactment of California Senate Bill 899; it replaced a rating system that was based largely on subjective reports and work restrictions. The impairment rating values obtained with the Fifth Edition are significantly less than those calculated by the previous system. In California litigation is often involved in workers' compensation cases, and there have been attempts by certain stakeholders to provide ratings beyond the directives in the *Guides*; for example, the California Applicant Attorneys Association publishes "Practice Tips" that include guidance, from their perspective, on how to make use of the *AMA Guides*. As a result of controversy over the use of an objective standard, the *AMA Guides*, a legal decision in 2009 known as "Almaraz-Guzman II" stated that in certain circumstances physicians may use their judgment in rating impairment as long as it is "within the four corners" of the *AMA Guides*.⁶ Studies have demonstrated that certain attributes, including attorney involvement and claim duration, are associated with unanticipated cost escalation in a small number of cases that drastically affect overall insurer losses.⁷⁻⁹

The error rate was the lowest in Hawaii. In that state, the *AMA Guides*, Fifth Edition, has been used since 2001, a relatively small pool of physicians perform ratings and most have been trained in the use of the *Guides*, there is no systematic coaching by attorneys on how to use the *Guides*, and impairment ratings are routinely reviewed to determine their accuracy.

Conclusion

The analysis of data resulting from the review of more than 6,000 cases provides unique insight into the opportunities available for improvement, particularly with the Fifth Edition. Most of the ratings sent for outside review were found to have been done incorrectly. It is imperative that physicians perform impairment evaluations according to the processes defined in the *Guides*; improved interrater reliability is achievable.

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Causes of Erroneous Fifth Edition Ratings

by Christopher R. Brigham, MD, Marjorie Eskay Auerbach, MD, JD, James B. Talmage, MD, Robert Barth, PhD, Craig Uejo, MD, MPH, Mark Melhorn, MD and Leslie Dilbeck

The application of the processes defined in the *Guides* should result in reliable impairment ratings, ie, reproducible impairment ratings when the *Guides* are applied appropriately. An understanding of errors associated with Fifth Edition ratings provides an opportunity to intervene and reduce the frequency and severity of these errors. This understanding also provides insight to changes that occurred with the current Sixth Edition, which was developed to improve the assessment process, provide a standard framework which would reduce error, and serve as a basis for more valid and reliable impairment ratings.

The goal of the *Guides* is to provide consistent ratings that accurately reflect the loss associated with a medical condition, and thereby, reduce the number of disputes over impairment ratings. There are many causes of erroneous Fifth Edition ratings, including bias, differences in clinical and causation assessment, and misapplication of *Guides* criteria, either through a lack of knowledge and skills in rating impairment or willful intent. The nature of the type of errors that may occur is such that it is more likely that an erroneous rating will be higher, rather than lower, than is appropriate.

Principles of Impairment Assessment

The principles of assessing impairment are provided in Chapters 1 and 2; however, it appears that physicians do not consistently adhere to these principles or the processes defined in the chapters specific to the region they are rating. Failure to follow standards provided in the *Guides* will result in an inaccurate rating.

The rating physician must be independent and unbiased. This can be challenging for any evaluator; however, it is not possible for the treating physician to be independent and unbiased because there is an inherent patient advocacy role.¹ The Fifth Edition of the *Guides* states, “The physician’s role in performing an impairment evaluation is to provide an independent, unbiased assessment of the individual’s medical condition, including its effect on function, and identify abilities and limitations to performing activities of daily living as listed in Table 1-2” (5th ed, 18). Failing to follow the *Guides*’ call for unbiased assessments that may play a role in the genesis of erroneous ratings.

A corollary of influences on the rating of impairment is that these influences also affect the assessment of disability. Disability assessment is more complex than that of rating impairment, because the process is less structured and requires considerations of other variables. Physician recommendations limiting activity and work after injury are highly

variable, often reflecting the physician’s own pain attitudes and beliefs.² One study revealed that 87% of “sick-listing” certifications were not medically justified.³ Another study revealed that almost half of physicians surveyed were willing to exaggerate clinical data to help a patient obtain disability certification.⁴ Some physicians may feel that an impairment rating does not fully reflect the impact of an impairment on the patient, resulting in a search for approaches that will increase the rating. Physicians in California have also reported that in order to be an Agreed Medical Examiner they must distort their reports away from the standards of the *AMA Guides* to achieve acceptance by applicant attorneys; ie compromise their integrity for the purpose of achieving referrals. Some physicians have reported that they express their dissatisfaction with insurance payers that curtail treatment or reduce fees by retaliating with inflated impairment ratings.

Patients who receive an impairment evaluation as a result of a workers’ compensation or personal injury claim reflect a subset of patients. Often these patients have sought extensive medical care. Patients who seek extensive medical care for musculoskeletal complaints have more restrictive beliefs about pain and function, and report higher levels of disability.⁵ Evaluators must vigilantly guard against the risk that such biased presentations of disability will lead to biased impairment ratings.

Clinical and Causation Errors

There are many potential rating errors that result from inaccurate clinical or causation analysis. These include inappropriate diagnosis, rating prior to maximal medical improvement, use of unreliable examination findings, inaccurate assessment of causation, and failure to apportion impairment to underlying etiology. Patient exaggeration of complaints is common.⁶ Incorrect clinical assessment based on these subjective complaints can result in the rating of impairment for a condition that is not present, has no objective findings, or that is unrelated to the alleged injury. A physician may choose to provide an inappropriate diagnostic label. Such mislabeling may have undesirable consequences, including creation of a false self-perception of illness, legitimizing medical intervention, and providing a basis for erroneous rating of impairment.⁷

The rating of permanent impairment cannot occur until the patient has achieved maximal medical improvement (MMI); rating prematurely or delaying the assessment of impairment is likely to result in an erroneous rating and/or interfere with case resolution.

An erroneous rating will occur if the rating is based on clinical findings that are invalid. Findings must be reproducible if they are to serve as a basis for impairment rating.⁸ Many clinical findings are not totally objective, ie, independent of the examinee. For example, an impairment rating for loss of range of motion is based on findings of active motion, ie, what the individual demonstrates. An individual may display less range of motion than his or her actual capability. Neurological findings, such as reports of diminished sensation or strength, are dependent on self-report, and an individual may report less sensation or demonstrate less strength than his or her true capability. Because an individual may demonstrate less than his or her capacity, but cannot demonstrate more than his or her capacity, inconsistent examination findings frequently will result in an improper assessment of greater impairment. Examiners vary in their clinical examination skills; therefore, there may be a lack of reliability in demonstrating clinical findings. Varying interpretations of electrodiagnostic and imaging studies may also alter the rating. Further guidance on who should perform electrodiagnostic studies is provided in the Sixth Edition.

The musculoskeletal chapters define standards for evaluation and consistency in approach. There are multiple potential sources of error in a quantitative physical examination. The greatest *source of error* that occurs is examiner inexperience or lack of knowledge. Problems may also occur when the evaluating physician has another staff member, such as a physical therapist or nurse, obtain measurements, rather than obtaining these directly. Another common error is lack of consideration of normal for the individual (opposite uninjured extremity or baseline, pre-injury status).

It is necessary to distinguish between impairment related to the alleged injury and impairment that may be due to other injury, degenerative disease, or illness.⁹ Causation must be based on scientific evidence, not merely on self-reports or historical time frames. Impairment may be related to multiple causes, and therefore causation and apportionment analysis is required. The conclusions should be based on scientific evidence and the facts of the case.

If a prior impairment evaluation was not performed, but sufficient historical information is available to estimate the prior impairment, the assessment of impairment is performed based on the most recent *Guides* criteria. This facilitates apportionment. The value for the preexisting impairment rating can be subtracted from the present impairment rating to account for the effects of the intervening injury or disease. This is especially important for those cases that have been rated in the past, using prior editions of the *Guides* or some other rating scheme. The current impairment rating must reflect the rating resulting from the current examination minus the rating from the prior problem(s), after the rating for the prior problem(s) is calculated using the current edition of the

Guides. This analysis is often more complex for impairments that are related to chronic conditions, in which case, it is necessary to identify both occupational and nonoccupational factors contributing to the impairment. This assessment is particularly applicable to conditions falsely labeled as “cumulative trauma disorders,” such as degenerative disk disease or carpal tunnel syndrome.^{10,11}

Criteria Misapplication

The *Guides* criteria must be applied appropriately and consistently. Common errors include rating based on unreliable data, rating of uninvolved regions, selecting the wrong method, and misapplying the criteria. Typically, if there is more than one impairment the values are combined; adding impairments that should be combined may inflate the rating.

Most common rating errors with the Fifth Edition are provided in the box below. Certain injuries are more likely to be rated incorrectly; for example, spine injuries (particularly those based on range of motion) are more likely to be erroneous than knee injuries (based on a diagnostic impairment).

Spine-related impairments are often a source of controversy and erroneous ratings. Disagreements occur over the appropriate method for calculating spine-related impairments (diagnosis-related estimate versus range of motion method), categorization of the diagnosis-related estimate impairment, selection of the value within the range associated with a diagnosis-related estimate, and inaccurate range of motion measurement methods.

Variance in ratings for upper extremity shoulder injuries is most often related to inaccurate motion assessments, incorrect reference to pie charts for defining impairment, failure to consider the opposite uninjured extremity as baseline, and rating conditions that are not present, such as distal clavicle resection that has not occurred. The most frequent upper extremity neurological impairment errors for entrapment disorders, such as carpal tunnel syndrome, relate to inadequate clinical assessment and defining impairment on subjective complaints versus the criteria provided in the *Guides*.

Software programs designed to assist physicians with performing impairment ratings may be useful. However, they may result in an inaccurate calculation if there is overreliance by the physician on the software in the absence of a thorough understanding of the *Guides*. If erroneous data are entered or incorrect criteria are selected, then inaccurate rating results. If the software contains an error, the report it generates will be incorrect. “Garbage In, Garbage Out” (GIGO) is a phrase in the field of computer science used primarily to call attention to the fact that computers will unquestioningly process the most nonsensical of input data (Garbage In) and produce nonsensical output (Garbage Out).

Strategies to Drive Accurate Ratings

There are several strategies that may be used to ensure accurate impairment ratings, and to minimize misuse and abuse of the *Guides*. Accuracy of a rating relies on an unbiased assessment of the medical condition causally related to the claim, based on reliable clinical data, use of scientific approaches, and appropriate application of the *Guides*. It is important for both the rating physician and the party requesting the rating to recognize the high likelihood of error and to become knowledgeable about the *Guides*. Impairment evaluations should be performed by a physician experienced in the assessment of injuries and the use of the *Guides*. Ideally, the physician should have had formal training on the use of the *AMA Guides* and demonstrated competency in the knowledge, skills and experience required to assess impairment.

The client requesting an impairment rating by a physician may want to carefully review that physician's curriculum vitae and sample reports, discuss with others their experiences with that physician, and review data about the accuracy of prior ratings. The client requesting the evaluation should provide a cover letter describing the specifics of the evaluation which should be carefully reviewed by the physician. Providing guidance on the assessment process and defining standards for the evaluation and the report will improve the probability of obtaining a correct rating. All relevant medical records and any other nonmedical documents that may be helpful in the rating process should be provided. The physician needs to allocate adequate time to perform a thorough evaluation, including obtaining the clinical history, reviewing studies, and performing an appropriate examination. A high-quality evaluation and report will be consistent with standards defined in the *Guides*.

All impairment reports should be critically reviewed by determine the accuracy of the rating, ie, was the rating performed consistent with the *AMA Guides* and does clinical data support the rating. The reviewer should be experienced in the use of the *Guides* and the process of auditing reports. Clinical knowledge, skills, and judgment are required to adequately analyze the clinical data and to appropriately apply the *AMA Guides*. Typically a nonphysician, working independent of a physician, will be unable to accurately determine the reliability of ratings, since he/she will not have the skills to judge the significance of specific clinical findings upon which an impairment assessment is based. The impairment review may be used to provide feedback to the

rating physician, and will promote improvement in the rating process (particularly if constructive, tactful feedback is provided from a credible expert). Reviews may also be used as a negotiation tool, as basis for effective cross-examination, and for evidence. The collection of data from individual reviews provides valuable insight to ratings, the types of impairments seen with certain conditions, and physician performance. Analysis of data is essential to total quality improvement in achieving accurate, unbiased ratings.

Conclusion

Impairment ratings performed using the Fifth Edition should be reviewed for accuracy. Inaccurate ratings often are the result of bias, confusion, and misapplication of the *Guides*. It is imperative that physicians perform impairment evaluations according to the processes defined in the *Guides*, in an effort to avoid errors in rating. Clients requesting ratings should be aware of the high incidence of error and take steps to drive accurate impairment ratings, including advocating for the use of the most current standard, the Sixth Edition.

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Common Causes of Erroneous Impairment Ratings Using the Fifth Edition

Spine

Chapter 15, The Spine, in the Fifth Edition, explains two methods for rating impairment: the Diagnosis-Related Estimates (DRE) method and the Range of Motion (ROM) method, in the three spinal regions, cervical, thoracic, and lumbar. Section 15.2, Determining the Appropriate Method for Assessment explains “*The DRE method is the principal methodology used to evaluate an individual who has had a distinct injury*” (page 379). Typically, the ROM method will result in a higher rating than the DRE method, with the notable exception of cervical spine fusions. (When rating spinal fusions, a single level fusion is rated using the DRE method, and typically, in the cervical spine, this results in a higher rating than a multi-level fusion that is rated using the ROM method.) A common inappropriate excuse for using the ROM method is multiple level degenerative disease, a finding associated with aging and genetics and not attributable to cumulative trauma. Section 15.2, Determining the Appropriate Method for Assessment, stipulates specific situations in which the ROM method is used.

Once the appropriate method of rating is selected, based on the criteria provided in the *Guides*, the correct impairment rating requires reliable examination findings. The *Guides* provides detailed standards for the physical examination in Section 15.1, Principles of Assessment, and for assessing motion in Section 15.8, Range-of-Motion Method. If the DRE method is used, the physician must select 1 of 5 categories based on specific, reliable findings, and then within the category, choose an appropriate numeric rating within a 3% range. A common error is assignment of the condition to the wrong category. With the ROM method, the rating is based on a combination of impairments consisting of diagnosis, range of motion assessed by an inclinometer, and neurological deficit. Each of these components must be appropriately assessed to provide an accurate rating.

Upper Extremities

Upper extremity joint disorders and neurological problems, such as carpal tunnel syndrome, are rated using Chapter 16, The Upper Extremities. Common errors include: failure to perform an appropriate assessment as explained in Section 16.1, Principles of Assessment; not considering the opposite uninjured extremity as normal for that individual; erroneous sensory impairment assessment for carpal tunnel syndrome; rating for tendonitis; and inappropriately including grip strength in the rating. Ratings are frequently performed for nonverifiable complex regional pain syndrome, ignoring the *Guides*' directive for an extensive differential diagnostic analysis, specifically including

psychological evaluation. Each of these errors typically will result in overrating impairment. The *Guides* states specifically in Section 16.8, Strength Evaluation, “Decreased strength cannot be rated in the presence of decreased motion, painful conditions, deformities, or absence of parts (eg, thumb amputation) that prevent effective application of maximal force in the region being evaluated” (page 508). This directive is intended to preclude rating based on strength testing when one of those factors is present.

Lower Extremities

The most common problem associated with the use of Chapter 17, The Lower Extremities, is combining duplicative impairments. There are 13 approaches to assessing lower extremity impairment, and as noted on page 527, “Typically, one method will adequately characterize the impairment and its impact on the ability to perform ADL (activities of daily living).” Table 17-2 (5th ed, 526) provides the necessary information for determining which impairments may or may not be combined in lower extremity ratings. Other common problems are inappropriate rating for gait derangement or muscle strength loss, and rating for arthritis that is associated with aging rather than injury.

Pain

Chapter 18, Pain, provides information on the evaluation and rating of pain. Pain is rated qualitatively, although in certain unusual circumstances an incremental increase of up to 3% whole person permanent impairment may be given. Any rating for pain should be reviewed to determine if it is appropriate and accurate. In assessing spinal impairment using the DRE method, it is incorrect to award additional impairment for pain beyond the maximum value assigned within a DRE Category. The DRE Category ranges of 3% whole person permanent impairment and the Chapter 18 provision for up to 3% whole person permanent impairment reflect the same discretionary range of impairment; inclusion of both is duplicative. There is no ratable impairment in the case of controversial or ambiguous disorders, such as myofascial pain syndrome, fibromyalgia, and “disputed neurogenic” thoracic outlet syndrome. (5th ed, 569).

Rating Subjective Complaints

It is improper to rate for subjective reports of interference in activities of daily living that are not consistent with the process defined in the *Guides*. Interference with activities of daily living is already considered in assignment of rating values provided in the *Guides* and self-reports are often unreliable. This tactic is nearly unique to California, where some physicians are inclined to increase ratings.

The following are examples of approaches that result in incorrect impairment ratings:

- Rating by chapters or approaches that maximize the impairment, rather than by the approaches specified in the *Guides* for the specific organ system that is involved; eg, rating spinal pain with “disc herniations” using Table 6-9, Criteria for Rating Permanent Impairment Due to Herniation (5th ed, 136) in Section 6.6 Hernias found in Chapter 6 The Digestive System.
- Providing further impairment for regular use of medication. Section 2.5g, Adjustments for Effects of Treatment or Lack of Treatment (5th ed, 2) is used to rationalize additional

impairment for medication. However, the example demonstrates the assignment of a 1%-3% when treatment results in and is required to regain and maintain a previous state of normal good health. It is intended to be the only rating, and not as an “add-on” to inflate the rating.

- Rating for impairment using Chapter 13, The Central and Peripheral Nervous System, when there has not been an injury or illness involving that system; eg, rating for subjective complaints of sleep dysfunction, sexual dysfunction, or pain. Sleep and sexual function are activities of daily living, and as such, difficulties in these areas are already included in the ratings in the *Guides*. Adding additional ratings for these ADL difficulties inappropriately increases the rating.

Calendar of Events

Date	Activities	Location	Organization
Ongoing	Sixth Edition Training and Resources - Web-based www.sixthedition.com	Online	IR
Ongoing	Fifth Edition Training and Resources - Web-based www.fifthedition.com	Online	IR
4/30-5/1/10	AMA Guides Sixth Edition Seminar	Dallas, TX	ACOEM
6/10/10	Multiple Impairment Evaluation-related Workshops Causation-Report Writing-Medico-legal issues	Las Vegas, NV	ABIME
6/11-13/10	ABIME Comprehensive AMA Guides 5 th and 6 th edition training	Las Vegas, NV	ABIME
7/16-17/10	Advanced Designated Doctor and Physician Training Course	Dallas/Ft. Worth, TX	AADEP
8/5/10	Multiple Impairment Evaluation-related Workshops Causation-Report Writing-Medico-legal issues	Chicago, IL	ABIME
8/6-8/10	ABIME Comprehensive AMA Guides 5 th and 6 th edition training	Chicago, IL	ABIME
9/24-25/10	Advanced Designated Doctor and Physician Training Course	Houston, TX	AADEP
10/7/10	Multiple Impairment Evaluation-related Workshops Causation-Report Writing-Medico-legal issues	Charlotte, NC	ABIME
10/8-10/10	ABIME Comprehensive AMA Guides 5 th and 6 th edition training	Charlotte, NC	ABIME
11/19/10	Advance AMA Guides – Focus on Extremity Impairments (Fifth Edition)	Spokane, WA	AADEP
11/20-11/21/10	Advance AMA Guides – Focus on Extremity Impairments (Fifth Edition)	Seattle, WA	AADEP

For further information about training, contact:

AADEP	American Academy of Disability Evaluating Physicians (www.aadep.org)	800-456-6095
ABIME	American Board of Independent Medical Examiners (www.abime.org)	877-523-1415
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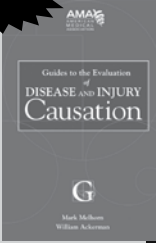
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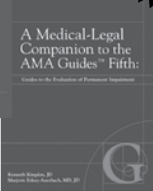


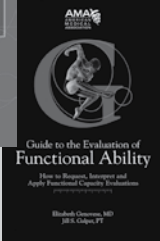
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