


AMA Guides to Evaluation of Permanent Impairment – Sixth Edition

Current Standard vs. Older Editions

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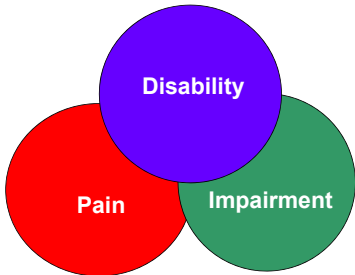
Issues to Discuss

- Concept of impairment
- *AMA Guides* evolution
- Sixth Edition fundamentals and five axioms
- Case example (to illustrate process)
- Impact
- Future

Impairment – In Perspective

- Impairment, a “loss”, reflects failure to prevent an injury or illness and/or to restore function.
- Goal is an accurate, unbiased assessment of impairment via efficient means – assuring valid and reliable definition.
- The Sixth Edition reflects the current standard; responding to opportunities for improvement from prior Editions.
- Reaction to the Sixth Edition exemplifies challenges core to workers compensation.


Impairment ≠ Disability



Impairment ≠ Work Restrictions

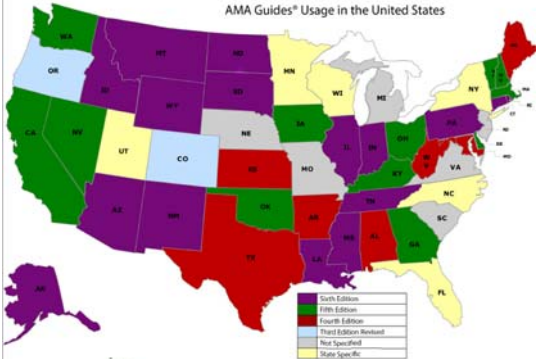
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History of the *Guides*

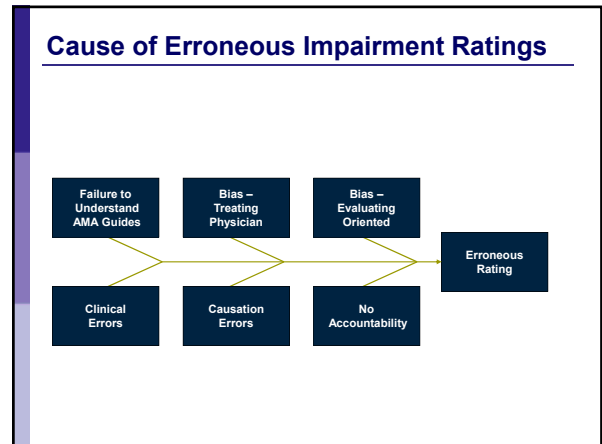
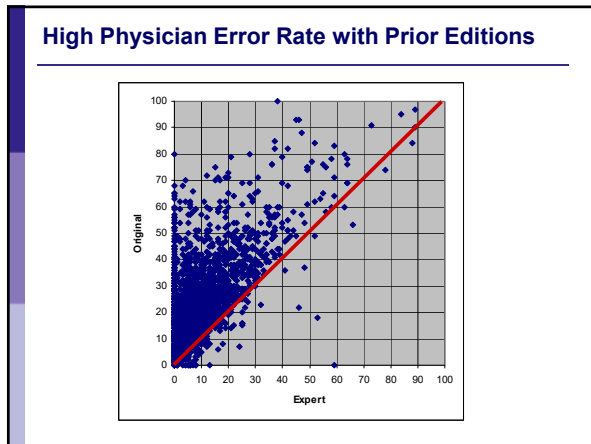



Use of *AMA Guides* Varies By Jurisdiction

AMA Guides® Usage in the United States

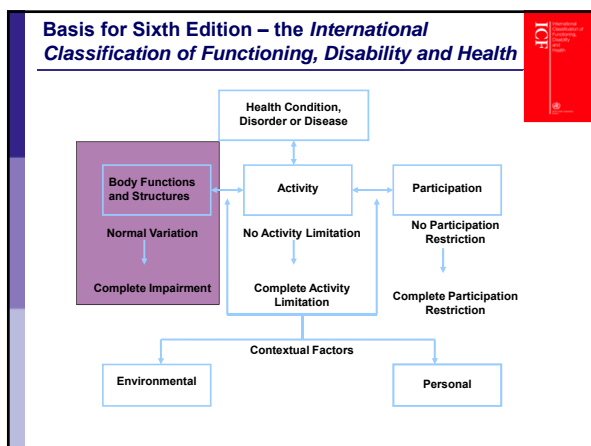



Color	Usage
Purple	Sixth Edition
Green	Fifth Edition
Red	Fourth Edition
Blue	Third Edition Revisited
Grey	Not Specified
Yellow	State Specific



- ### Sixth Edition Responded to Prior Concerns
- Prior editions
 - Did not provide a comprehensive, valid, reliable, unbiased, and evidence-based rating system
 - There were inconsistencies with some approaches
 - Incorporated principles not consistent with clinical care (such as the premise that treatment – including surgery – should improve function)
 - Resulted in poor interrater reliability
 - Medical care changes with time, as do the *Guides*
- 

- ### Sixth Edition Five Axioms
1. Adopt methodology of International Classification of Functioning, Disability and Health (ICF)
 2. Become more diagnosis-based
 3. Simplicity and ease
 4. Conceptual and methodological congruity
 5. Provide rating percentages that consider clinical and functional history, examination and clinical studies



- ### Impairment Rating Considerations
1. What is the problem?
 2. What difficulties are reported?
 3. What are the exam findings?
 4. What are the results of the clinical studies?
- 


Diagnosis-Based Impairment Classes

- Class 0: No objective problem
- Class 1: Mild problem
- Class 2: Moderate problem
- Class 3: Severe problem
- Class 4: Very severe problem

Vast majority of impairment ratings are based on diagnosis-based impairments, with adjustments (as applicable) for function, physical examination and clinical studies)

Example: Upper Extremities

- **History:** s/p wrist fusion for osteoarthritis
- **Current Symptoms:** difficulties with many ADLS, however self-care unassisted
- **Functional Assessment:** QuickDASH 45
- **Physical Exam:** Fused in neutral position, mild tenderness
- **Clinical Studies:** X-rays reveal solid fusion, prior X-rays revealed severe post-traumatic osteoarthritis



Fifth Edition

16.4g Wrist Motion Impairment
Figure 16-26 = 21% UEI
Figure 16-31 = 9% UEI
Total = 30% UEI




Table 15-3 Wrist Regional Grid (6th ed, 396)

Diagnostic Criteria	Class 0	Class 1	Class 2	Class 3	Class 4
RANGES	0%	1% - 13%	14% - 25%	26% - 49%	50% - 100%
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Ligament / Bone / Joint / Wrist Arthrodesis (Fusion)				26 28 30 32 34 Wrist arthrodesis in functional position (10° extension to 10° flexion, radial 5° to ulnar 10°)	If non-optimal positioning assess per Section 15.7, Range of Motion Assessment

Sixth Edition Adjustments

- **Functional Assessment**
 - Symptoms with normal activity and QuickDASH 45
 - Grade Modifier 2
- **Physical Exam**
 - n/a – Used in placement process
- **Clinical Studies**
 - Confirms diagnosis, prior findings of “severe post traumatic arthritis” (consistent with diagnosis, i.e. “severe”)
 - However, would consider n/a since also identifies the class placement

Table 15-7 Functional History Adjustment: Upper Extremities (6th ed, 406)

Functional History Factor	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
	Asymptomatic	Pain / symptoms with strenuous / vigorous activity	Pain / symptoms with normal activity	Pain / symptoms with less than normal activity	Pain / symptoms at rest
		AND Able to perform self-care activities independently	AND Able to perform self-care activities with modification but unassisted	AND Requires assistance to perform self-care activities	AND Unable to perform self-care activities
QuickDASH Score	0-20	21-40	41-60	61-80	81-100

15.3 | 405 - 419

Sixth Edition Diagnosis and Adjustments

Diagnosis-Based Impairment

Grid	Class 0	Class 1	Class 2	Class 3	Class 4
Diagnosis Table 15-3	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem

Adjustment Factors – Grade Modifiers

Non-Key Factor	Grid	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
Functional History Table 15-7	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem	Very severe problem
Physical Exam Table 15-8	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem	Very severe problem
Clinical Studies Table 15-9	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem	Very severe problem

Sixth Edition Adjustments

CDX	GMFH	GMPE	CMCS
3	2	n/a	n/a

Net Adjustment Calculations

(GMFH-CDX) 2 - 3 = -1
 (GMPE-CDX) n/a - 3 = n/a
 (GMCS-CDX) n/a - 3 = n/a
 Net Adjustment = -1

Result is class 3 with adjustment of -1 from the default value C which equals grade B.

Table 15-3 Wrist Regional Grid (6th ed, 396)

Diagnostic Criteria	Class 0	Class 1	Class 2	Class 3	Class 4
RANGES	0%	1% - 13%	14% - 25%	26% - 49%	50% - 100%
GRADE		A B C D E	A B C D E	B C D E	A B C D E
Ligament / Bone / Joint / Wrist Arthrodesis (Fusion)				21 22 30 32 34 Wrist arthrodesis in functional position (10° extension to 10° flexion, radial 5° to ulnar 10°)	If non-optimal positioning assess per Section 15.7, Range of Motion Assessment

- ### Impairment Rating Value Issues
- Fifth Edition resulted in higher ratings for surgical spine impairments – despite goal of treatment being increased function (and decreased impairment) the procedure itself resulted in unsubstantiated ratings.
 - Fifth Edition did not provide ratings for common conditions, such as non-specific spinal pain (unless objective ratable findings) and soft tissue injuries.
 - Fifth Edition ratings for knee and hip replacements were higher than those with the Sixth Edition (functional results are better from the surgical procedure than years ago).

- ### Future
- Refinement of approaches piloted in the Sixth Edition.
 - Use of best practice approaches and guidelines based on science (rather than faulty belief systems).
 - Recognition and management of root causes for erroneous ratings – and ultimately needless impairment and disability (with associated human and financial costs).
 - Recognition and promotion of human potential rather than focus on deficits.
 - Changes in incentives to drive changes in behavior.
 - Accountability of all stakeholders.
 - Transformation of the workers compensation and disability field – to focus on empowerment and not disablement.



The Guides Newsletter

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

January/February
2008

In upcoming issues

Upper Extremities: Sixth Edition

Lower Extremities: Sixth Edition

International Classification of
Function, Disability and Health

Functional Inventories

Sixth Edition Case Exercises

Sixth Edition: the New Standard

by Christopher R. Brigham, MD, MMS, Robert D. Rondinelli, MD, PhD, Elizabeth Genovese, MD, MBA, Craig Uejo, MD, MPH and Marjorie Eskay-Auerbach, MD, JD

The Sixth Edition¹, published in December 2007, introduces new approaches to rating impairment. An innovative methodology is used to enhance the relevancy of impairment ratings, improve internal consistency, 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 (ICF),² although the fundamental principles underlying the *Guides* remain unchanged. To appreciate the impact of the Sixth Edition, it is useful to understand the history and structure of the *Guides*, previous criticisms, and these new approaches.

Use of the Guides

The approach to impairment evaluation has evolved over the past fifty years since the *Guides* started in 1958 with publication by the American Medical Association (AMA) of the article, "A Guide to the Evaluation of Permanent Impairment of the Extremities and Back"³. In 1971 a compendium of 13 guides became the First Edition.⁴ The Second Edition⁵ was published thirteen years later in 1984, and the Third Edition⁶ was published in 1988. The Third Edition was the first to use the Swanson methodology⁷ which assigned discreet impairment ratings to specific range of motion (ROM) deficits of the upper extremities. It was replaced two years later by the Third Edition, Revised⁸, which is still used by the State of Colorado for workers compensation cases.

The Fourth Edition⁹, published in 1993, provided many refinements, including the Diagnosis-Related Estimates (DRE) or "injury" model for evaluation of spinal injuries, alternative approaches to assessing lower extremity impairment, and a pain chapter. The DRE model was unique in allowing for assignment of an impairment rating based solely on the diagnosis, even if maximum medical improvement (MMI) had not yet been reached. The Fourth Edition is still used for assessing workers' compensation cases in Alabama, Arkansas, Connecticut, Kansas, Maine, Maryland, Mississippi, South Dakota, Texas, and West Virginia.

The Fifth Edition¹⁰, published in 2000, was nearly twice the size of its predecessor. It provided more detailed directives in all chapters, and modified the approaches used for spinal impairment evaluation by providing guidance on the choice of the rating method and the impairment ranges for DRE categories. Prior to the availability of the Sixth Edition twenty-six states made use of the Fifth Edition, including Alaska, Arizona, California, Delaware, Georgia, Hawaii, Idaho, Indiana, Iowa, Kentucky, Louisiana, Massachusetts, Montana, Nevada, New Hampshire, New Mexico, North



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Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Utah, Vermont, Washington and Wyoming. The Sixth Edition represents a continued evolution in impairment evaluation.

Many states require the use of the “most recent Edition” of the *Guides* either by statute or code; therefore, states that are expected to implement the Sixth Edition immediately include Alaska, Hawaii, Kentucky, Louisiana, Mississippi, Montana, New Hampshire, New Mexico, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Vermont and Wyoming¹¹. The most recent edition is also expected to remain the standard for automobile casualty and personal injury cases, both domestically and internationally. Some of the countries abroad that use the *Guides* include Australia, Canada, Hong Kong, Korea, New Zealand, and South Africa.

The Sixth Edition will also be the immediate new standard for Federal Longshore and Harbor Workers’ Act (LHWCA). Federal workers’ compensation laws cover all federal employees (including postal workers) and citizens of Washington, DC. Federal systems include Federal Employees’ Compensation Act (FECA), Energy Employees Occupational Illness Compensation Program Act, and Longshore and Harbor Workers’ Compensation Act (LHWCA). Under the Federal Employees’ Compensation Act (FECA 5 USC 8107) benefit is given for permanent impairment to specific body parts including extremities, hearing, vision, and loss of specific organs. Under the Longshore and Harbor Workers’ Compensation Act ratings are performed for “scheduled injuries” (eg, a scheduled member of the body defined by section 8(c)(1)-(20) of the LHWCA).¹² Scheduled injuries include upper extremity injuries (with the exception of the shoulder), lower extremity injuries, and hearing loss.

The *Guides* are often used to quantify the extent of injuries resulting from an automobile casualty or personal injury. Insurers may use an impairment rating as one of the factors in determining the reserve or settlement value of a claim. Insurers and attorneys may also use this as a factor to be considered in quantifying the impact of an injury and the associated case value. In some states, suits under no-fault automobile insurance are limited to cases where a specific defined impairment threshold has been met; in states such as these the *Guides* play an important role in providing numerical data to indicate that the threshold has indeed been met. In Florida, as an insured’s claims for pain and suffering (as a basis for recovery) are subject to limits outside the automobile no-fault system, the *Guides* are used to define permanent loss.

The *Guides* impairment ratings are applied in a variety of ways, depending on the type of case and the jurisdiction. Although impairment is a different concept than disability, some jurisdictions use impairment as a proxy for the latter (the *Guides* does not recommend this approach), while others use the impairment rating value in a formula that results in a disability rating. Still other jurisdictions are similar to motor vehicle insurers in using the impairment value as a threshold indicator for a more serious injury or illness.

It is anticipated that, because of the multiple settings in which the *Guides* are used, the Sixth Edition will significantly impact many stakeholders.

Challenges and Criticisms of Prior Editions

There are many challenges associated with the use of the *Guides*, including criticisms of the *Guides* themselves, the use of impairment rating numbers, and a high error rate.^{13, 14, 15, 16, 17, 18, 19, 20} Previous criticisms include:

- Failure to provide a comprehensive, valid, reliable, unbiased, and evidence-based rating system.
- Impairment ratings do not adequately or accurately reflect loss of function.
- Numerical ratings are more the representation of “legal fiction than medical reality.”

In response to these criticisms, the following changes were recommended:

- Standardize assessment of Activities of Daily Living (ADL) limitations associated with physical impairments.
- Apply functional assessment tools to validate impairment rating scales.
- Include measures of functional loss in the impairment rating.
- Improve overall intrarater and interrater reliability and internal consistency.

Studies have demonstrated poor interrater reliability and revealed that many impairment ratings are incorrect, and more often rated significantly higher than is appropriate.²¹ Treating physicians, who by definition are advocates for their patients, have been particularly prone to overrate impairment. Physicians who have not been adequately trained in the use of the Guides also commonly provide erroneous ratings, more commonly overrating impairment than underrating it.

Sixth Edition Approaches and Developmental Process

The *Guides* defines the process for evaluating impairment. Clinical discussions among physician colleagues regarding potential severity of an illness or injury typically involve four basic points of consideration:

- 1) What is the problem (diagnosis)?
- 2) What symptoms and resulting functional difficulty does the patient report?
- 3) What are the physical findings pertaining to the problem?
- 4) What are the results of clinical studies?

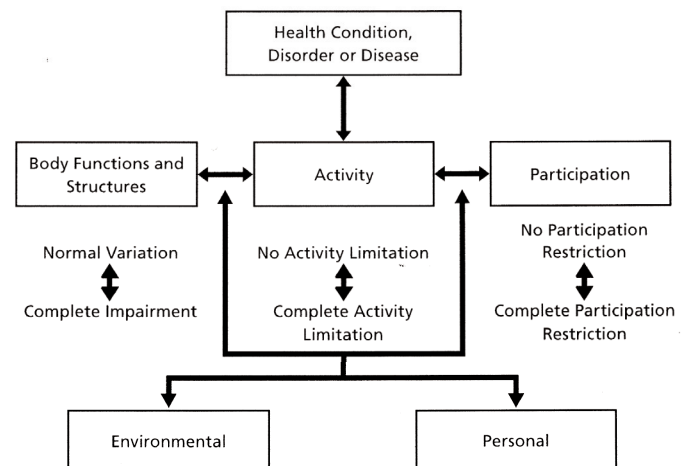
In a similar manner, these same basic considerations are used by the physicians to evaluate and communicate about impairment. Ratings are often used as the basis for monetary awards, and therefore, physicians must recognize the importance of consistency among subjective and other objectively nonquantifiable aspects of the clinical presentation, the diagnosis and the patient's objective findings. The Sixth Edition expands the spectrum of diagnoses recognized in impairment rating, considers functional consequences of the impairment as a part of each physician's detailed history, and clarifies significant physical examination findings and clinical testing.

International Classification of Functioning, Disability and Health

The Sixth Edition uses the framework based upon the International Classification of Functioning, Disability and Health (ICF), a comprehensive model of disablement developed by the World Health Organization. This framework, illustrated in Figure 1 (Figure 1-1, 6th ed, 3), is intended for describing and measuring health and disabili-

ty at the individual and population levels. The ICF is a classification of health and health-related domains that describe body functions and structures, activities and participation. The domains are classified from body, individual, and societal perspectives. The ICF systematically groups different domains for a person in a given health condition (eg, what a person with a disease or disorder does do or can do). "Functioning" is an umbrella term encompassing all body functions, activities, and participations; similarly, "disability" serves as an umbrella term for impairments, activity limitations or participation restrictions. Since an individual's functioning and disability occurs in a context, the ICF also includes a list of environmental factors.

Figure 1. ICF Model of Disablement



The following definitions are used in the ICF to facilitate communications and standardization:

- **Body functions:** physiological functions of body systems (including psychological functions).
- **Body structures:** anatomic parts of the body such as organs, limbs, and their components.
- **Activity:** execution of a task or action by an individual.
- **Participation:** involvement in a life situation.
- **Impairments:** problems in body function or structure such as a significant deviation or loss.
- **Activity limitations:** difficulties an individual may have in executing activities.
- **Participation restrictions:** problems an individual may experience in involvement in life situations.

The ICF model reflects the dynamic interactions between an individual with a given health condition, the environment, and personal factors. Impairment, activity limitations, and limitations in participation are not synonymous; an individual may have impairment and significant limitations in most activities but be able to participate in a specific life situation of relevance, have minor impairment and activity limitations with inability to participate in a specific life situation, or have any permutation of these three factors.

Use of the ICF model does not indicate that the *Guides* will now be assessing disability rather than impairment. Rather, the incorporation of certain aspects of the ICF model into the impairment rating process reflects efforts to place the impairment rating into a structure that promotes integration with the ICF constructs for activity limitations and limitations in participation. This effort is intended to enhance applicability of the ICF model to situations in which the impairment rating is one component of the “disability evaluation process.”

Impairment Classes and Diagnosis-based Grids

The ICF classification uses five impairment classes and permits rating of patients who range from having no problems to having significant problems. In the Sixth Edition “diagnosis-based grids” were developed for each organ system. These grids use commonly accepted consensus-based criteria to classify most diagnoses relevant to a particular organ or body part into five classes of impairment severity ranging from Class 0 (normal), to Class 5 (very severe). The final impairment is determined by adjusting the initial impairment rating by factors that may include physical findings, the results of clinical tests, and functional reports by the patient. The basic template of the diagnosis-based grid is common to each organ system and chapter. Although there is variation in the ancillary factors used to develop the impairment rating (depending on the body part), there is greater internal consistency between chapters than was formerly seen.

This uniform diagnosis-based approach is a significant change from the anatomical approach that was applied in many previous musculoskeletal assessments. However, there are similarities to other approaches used in the Fourth and Fifth Editions. For example, as mentioned previously, spinal impairment assessments have typically been based on the Diagnosis-Related Estimates Method, with specific findings or diagnoses used to assign the patient to a category. In the Fifth Edition the patient is assigned to one of five categories, with the first category having no ratable impairment and the other four categories having four possible impairment values. A patient with a lumbar radiculopathy would be assigned to a DRE Lumbar Category III associated with a whole person impairment (WPI) rating in the range of 10-13%. The examiner assigned an impairment value within this range, based on a judgment regarding limitations in activities of daily living (ADLs) as a result of the impairment. Although the Fourth Edition also used the DRE system, there was no allowance for the impact of a given diagnosis upon ADLs and the rating for Category III was fixed at 10% WPI. Likewise, although lower extremity impairments are based on thirteen possi-

ble approaches in the Fifth Edition, the most commonly used approach is the Diagnosis-Based Estimates where specific impairment values are provided for diagnoses. For example, a patient with a partial medial meniscectomy is assigned 1% whole person permanent impairment. Rating systems previously used for the lower extremity did not provide for adjustments based on functional difficulties, physical examination findings, or the results of clinical studies.

The Preface to the Sixth Edition states that the features of the new edition include²²:

- A standardized approach across organ systems and chapters.
- The most contemporary evidence-based concepts and terminology of disablement from the ICF.
- The latest scientific research and evolving medical opinions provided by nationally and internationally recognized experts.
- Unified methodology that helps physicians calculate impairment ratings through a grid construct and promotes consistent scoring of impairment ratings.
- A more comprehensive and expanded diagnostic approach.
- Precise documentation of functional outcomes, physical findings, and clinical test results, as modifiers of impairment severity.
- Increased transparency and precision of the impairment ratings.
- Improved physician interrater reliability.

The Sixth Edition reflects movement toward these features; however, these changes are not all immediately achievable. This new edition should be considered a step in the evolution of the *Guides* rather than as an end point.

Development Process

The process of writing the Sixth Edition involved many participants – including physicians who use the *Guides* and the staff of the AMA, all of whom were asked to develop the Sixth Edition in the context of the aforementioned principles. The process was guided by an Editorial Panel and an Advisory Committee, and featured an open, well-defined, and tiered, peer review process. The Editorial Panel was established to include a Medical Editor (Robert Rondinelli, MD, PhD), five Section Editors (Elizabeth Genovese, MD, Richard Katz, MD, Kathryn Mueller, MD, Mohammed Ranavaya, MD, and Tom Mayer, MD), and four core physician experts. The editorial process used an evidence-based foundation when possible, primarily as the basis for determining diagnostic criteria, and a Delphi panel approach to consensus building regarding the impairment ratings themselves. When there

was no compelling rationale to alter impairment ratings from what they had been previously, ratings provided in prior editions were the default. The Section Editors led a group of 53 specialty-specific, expert contributors in developing the chapters and in conjunction with the Senior Contributing Editor wrote considerable portions of the revised chapters. The review process involved over 140 physicians, attorneys and other professionals.

An Advisory Committee was developed to provide ongoing discussion of items of mutual concern and current issues in impairment and disability. The group was comprised of representatives from medical specialty societies and experts from certification and teaching organizations and workers' compensation systems. The primary objectives of the Advisory Committee were to:

- Serve as a resource to the *Guides* Editorial Panel by giving advice on impairment rating as relevant to the member's specialty.
- Provide documentation to staff and the Editorial Panel regarding the medical appropriateness of changes under consideration for inclusion in the *Guides*.
- Assist in the review and further development of relevant impairment-related issues and in the preparation of technical education material and articles pertaining to the *Guides*.
- Promote and educate professionals performing impairment ratings on the use and benefits of the *Guides*.

Sixth Edition Structure

The Sixth Edition is 634 pages in length (the Fifth Edition is 613 pages) and is comprised of 17 chapters. Chapter 1, Conceptual Foundations and Philosophy and Chapter 2, Practical Applications of the Guides, define the overall approaches to assessing impairment. Most impairment ratings are performed for musculoskeletal painful conditions; therefore the most commonly used chapters will be Chapter 15, The Upper Extremities; Chapter 16, The Lower Extremities and Chapter 17, The Spine and Pelvis. Chapter 3, Pain-Related Impairment; Chapter 13, The Central and Peripheral Nervous System and Chapter 14, Mental and Behavioral Disorders will also be frequently referenced. Chapters 4 to 12 focus on the remaining organ systems and structures. A comparison of chapters and length is presented in Table 1.

The most significant change with the Sixth Edition is the development of Impairment Classification Grids based on the ICF model. The first two chapters of the *Guides* provide the structure to the other fifteen chapters. Chapter 3 defines the current *Guides* approach to pain, an issue dealt with in many impairment ratings and referred to in many chapters.

Table 1. Comparison of AMA Guides Chapters: Fourth, Fifth and Sixth Editions

Sixth ed.		Fifth ed.		Fourth ed.	
Chapter	Title	Chapter	Length	Chapter	Length
1	Conceptual Foundations and Philosophy	1	15	1	6
2	Practical Application of the Guides	2	8	2	6
3	Pain – Related Impairment	18	28	15	12
4	The Cardiovascular System	3, 4	62	6	32
5	The Pulmonary System	5	30	5	16
6	The Digestive System	6	26	10	14
7	The Urinary and Reproductive System	7	30	11	14
8	The Skin	8	18	13	14
9	The Hematopoietic System	9	22	7	8
10	The Endocrine System	10	34	12	14
11	Ear, Nose, Throat, and Related Structures	11	32	9	12
12	The Visual System	12	28	8	14
13	The Central and Peripheral Nervous System	13	52	4	14
14	Mental and Behavioral Disorders	14	16	14	12
15	The Upper Extremities	16	90	3.1	60
16	The Lower Extremities	17	42	3.2	19
17	The Spine and Pelvis	15	60		42
Total Pages		593		309	

Chapter 1 Conceptual Foundations and Philosophy

The Sixth Edition commences with Section 1.1 History of the *Guides* (6th ed, 1–2) describing a history of compensation for personal injury and disability that dates to antiquity. Section 1.2 New Direction for the Sixth Edition (6th ed, 2-3), presents previous criticisms of the *Guides* and five new axioms of the Sixth Edition, as noted in Table 2.

Table 2. Five New Axioms of the Sixth Edition

1. The *Guides* adopts the terminology and conceptual framework of disablement as put forward by the International Classification of Functioning, Disability, and Health (ICF).
2. The *Guides* becomes more diagnosis based with these diagnoses being evidence-based when possible.
3. Simplicity, ease-of-application, and following precedent, where applicable, are given high priority, with the goal of optimizing interrater and intrarater reliability.
4. Rating percentages derived according to the *Guides* are functionally based, to the fullest practical extent possible.
5. The *Guides* stresses conceptual and methodological congruity within and between organ system ratings.

The contemporary model of disablement adopted by the Sixth Edition is the International Classification of Functioning, Disability, and Health (ICF), as explained in Sec-

Sixth Edition: the New Standard (continued)

tion 1.3, The International Classification of Functioning, Disability, and Health (ICF): A Contemporary Model of Disablement (6th ed, 3-6). The traditional model of disablement previously relied upon, the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) presented by the World Health Organization more than a quarter century ago, is characterized as a simplistic model providing a unidirectional depiction of the relationship among pathology, impairment, disability and handicap. This model did not acknowledge the dynamic relationships among these factors nor the role of important personal and environmental modifiers.

The Sixth Edition defines impairment as “a significant deviation, loss, or loss of use of any body structure or body function in an individual with a health condition, disorder, or disease.” (6th ed, 5) This is more refined than the definition in the Fifth Edition which was “a loss, loss of use, or derangement of any body part, organ system, or organ function.” (5th ed, 601); the Sixth Edition includes the term “significant” and then adds the phrase “in an individual with a health condition, disorder, or disease.” Disability is defined as “activity limitations and/or participation restrictions in an individual with a health condition, disorder, or disease” (6th ed, 5) reflective of the ICF terminology. The Fifth Edition definition of disability was “alteration of an individual’s capacity to meet personal, social, or occupational demands, or statutory or regulatory requirements because of an impairment.” (5th ed, 600)

Impairment rating is a physician-provided process that attempts to link impairment with functional loss and continues to be defined as a “consensus-derived percentage estimate of loss of activity reflecting severity for a given health condition, and the degree of associated limitations in terms of activities of daily living (ADLs).” (6th ed, 5) The Sixth Edition differs in stressing the importance of causation assessment in performing a rating, as it is first necessary to determine if the health condition is related to an allegedly causal event or exposure. This represents a concerted attempt to prevent, or at least reduce, the common error of including factors that are not causally related to an injury in the rating (for example rating spinal degenerative disease not caused by an injury).

Since impairment ratings may be used inappropriately as a direct correlate of disability, the Sixth Edition addresses this issue by explaining:

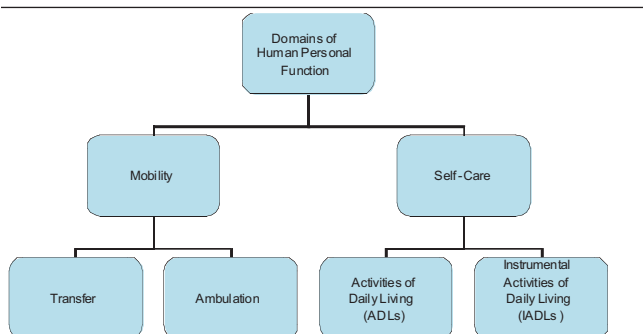
“The relationship between impairment and disability remains both complex and difficult, if not impossible, to predict. In some conditions there is a strong association between level of injury and the degree of functional loss expected in one’s personal sphere of activity (mobility and ADLs). The same level of injury is in no way predictive of

an affected individual’s ability to participate in major life functions (including work) when appropriate motivation, technology, and sufficient accommodations are available. Disability may be influenced by physical, psychological, and psychosocial factors that can change over time.” (6th ed, 5-6)

The Sixth edition specifically states, as did prior editions, “the *Guides* is not intended to be used for direct estimates of work participation restrictions. Impairment percentages derived according to the *Guides*’ criteria do not directly measure work participation restrictions.” (6th ed, 6) The intent of the *Guides* is to develop standardized impairment ratings which involves defining the diagnosis and associated loss at maximum medical improvement, enabling a patient with an impairment rating to exit from a system of temporary disablement, and provide diagnosis and taxonomic classification of impairment as a segue into other systems of long-term disability. The process of assigning an impairment rating requires the evaluator to clearly delineate the diagnostic criteria (based on the history, including prior clinical course), physical examination findings, current and prior diagnostic test results, and functional status that places the patient in a given impairment class and warrants assignment of a specific number within the options for that class, with the understanding that the provision of an impairment rating does not directly equate to a permanent disability rating.

Assessment of the functional ramifications of a given diagnosis is used in assigning (or modifying) impairment ratings, and the Sixth Edition facilitates consideration of relevant factors by defining two domains of human personal function: mobility and self-care (illustrated in Figure 2). This definition is new to the *Guides*.

Figure 2. Domains of Personal Function



Mobility involves transfer (movement of one’s body position while remaining at the same point in space) and ambulation (movement of one’s body from one point in space to another). The Sixth Edition differentiates activities of daily living that relate to self-care performed in one personal sphere: bathing and showering, bowel and blad-

der management, dressing, eating, feeding, functional mobility, personal device care, personal hygiene and grooming, sexual activity, sleep/rest, and toilet (hygiene) and “instrumented” ADLs that are complex self-care activities (eg, financial management, medications, meal preparation) which may be delegated to others. Mobility and self-care activities may be performed independently or may require adaptive aids or helper assistance. The highest level of independence with which a given activity is consistently and safely performed is considered the functional level for that individual. This concept is critically important since function is a modifier of impairment in the Sixth Edition, and it is therefore important that raters be more precise in asking questions (or using questionnaires) in order to assess the ability to perform activities relevant to an overall assessment of function.

Measurement issues are important factors in defining impairment and are discussed in Section 1.4, Measurement Issues (6th ed, 6-8). Previous studies examining the validity of musculoskeletal impairment ratings have revealed equivocal results between impairment rating and functional losses. The *Guides* attempt to balance science and clinical judgment, as explained in Section 1.5, Balancing Science and Critical Judgement (6th ed, 8-9). Impairment ratings continue to be based largely on consensus and expert opinion since there is not yet adequate methodology or data to relate these ratings to functional loss. The validity of impairment percentages defined in the Sixth Edition must await further empirical testing. As much as possible the approaches in the Sixth Edition focused on simplicity and brevity (Section 1.6 The Case for Simplification and Ease of Application, 6th ed, 9), although finding an appropriate balance between these goals and providing the information (often complex) required to increase the accuracy and reliability remains difficult.

The Sixth Edition provides greater weight to functional assessment than prior Editions. The full impact of this approach is yet to be determined. Section 1.7, The Application of Functional Assessment (6th ed, 9-11), discusses earlier approaches that have worked well (such as the New York Heart Association classification). Guidance is then provided on the use of self-report assessment tools and the need for empirical validation through in-office applications. The rating physician is to consider all available information; however, there is a clear mandate to evaluate the reliability of the information presented, noting that patients may under-report or over-report their difficulties.

The *Guides* are often used in workers’ compensation cases and other litigation as the basis for monetary awards, and patients and/or treating physicians may be inclined to

overstate the severity of conditions or functional losses. Therefore, the Sixth Edition states that “examiners must exercise their ability to observe the patient perform certain functional tasks to help determine if self-report is accurate,” (6th ed, 10). If the examinee reports loss of certain abilities on a self-assessment questionnaire or during the clinical interview, the examiner should observe the patient to see if these losses are consistent with the physical examination, diagnostic tests, historical data and/or functional limitations that are “usually” associated with a given disorder; inconsistent and invalid data should not be used to define impairment. The use of functional assessment tools varies by chapter.

Section 1.8, The Need for Internal Consistency and a Uniform Template (6th ed, 11-16), explains the process used to develop a generic template for impairment grids that could be used across various organ systems to enhance uniformity and consistency. The Five Scale ICF Taxonomy (6th ed, 11) used by the *Guides* is provided in Table 3.

Table 3. Five Scale ICF Taxonomy

ICF Codes and Functional Levels
xxx.0 NO problem (none, absent, negligible ...)
xxx.1 MILD problem (slight, low ...)
xxx.2 MODERATE problem (medium, fair ...)
xxx.3 SEVERE problem (high, extreme ...)
xxx.4 COMPLETE problem (total ...)

Impairment percentage ranges are provided for each class; the impairment values are dependent on the organ system and structure. Diagnosis and other historical or clinical information typically serve as the key factor used to place a patient within a specific class, although there are some exceptions. Each class is associated with a corresponding range of impairment ratings, typically divided into five impairment grades (A to E), with the mid-range grade (C) serving as the default value. The grade may be modified by non-key findings, which may include functional history, physical examination findings, and the results of clinical studies.

The structure of a typical diagnosis-based grid is presented in Figure 3 (based on Figure 1-5, 6th ed, 13). The grid used for the extremities (which differs in several ways) is presented in Figure 4. Not all chapters use the same key factors, and some chapters use information other than the physical examination, test results, and functional limitations in assigning a specific rating (eg, the endocrine chapter considers burden of treatment compliance). Nonetheless, the system used in the Sixth edition represents a dramatic change from prior editions. The non-

musculoskeletal chapters in previous editions included classes with ranges of impairment ratings and little or no specific guidance regarding how to choose a discreet numerical value to reflect a patient's impairment. This significantly contributed to the lack of interrater (and even intrarater) reliability. Use of the new method should considerably reduce this problem. The generic system used as the basis for most of the non-musculoskeletal chapters, and modified for use in rating the extremities and spine, is as follows:

Figure 3. Diagnosis-Based Grid Template

Diagnostic Criteria	Class 0	Class 1	Class 2	Class 3	Class 4
RANGES	0%	Minimal%	Moderate%	Severe%	Very Severe%
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
History	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Physical Findings	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Test Results	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem

Once the history is used to place a patient into a given impairment class (at the default level of Grade C), the modifiers for other relevant factors (which will differ between body parts and/or organ systems) will be used to shift the rating to a higher or lower grade. The degree to which this occurs will ordinarily be based on the number of classes by which the additional factor represents a higher or lower impairment than the key factor. For example, if the history is the key factor and places an individual in Class 2, Class 1 physical findings (one below the originally assigned class) will shift the rating down to grade B, and then with Class 4 test results (two above the original class), a net change of + 1 (-1 + 2) results in a final rating in Class 2 – Grade D.

The system used for the spine and extremities differs in that initial placement in the grid used to refine the impairment rating is based upon the diagnosis alone, and then modified based upon the results obtained from matching the patient's clinical presentation to information in additional adjustment grids.

Figure 4. Diagnosis-Based Grid Structure for Extremities

Diagnostic Criteria	Class 0	Class 1	Class 2	Class 3	Class 4
RANGES	0%	1%–13%	14%–25%	26%–49%	50%–100%
GRADE		A B C D E	A B C D E	A B C D E	A B C D E
Soft Tissue					
(Diagnosis description-general)	No significant objective findings	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)
(Diagnosis description-general)	No significant objective findings	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)
Muscle/Tendon					
(Diagnosis description-general)	No significant objective findings	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)
(Diagnosis description-general)	No significant objective findings	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)
Ligament/Bone/Joint					
(Diagnosis description-general)	No significant objective findings	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)	##### (Diagnosis-specific definition)

For each of the non-key factors there are definitions of the severity of the findings which reflect the grade modifier (class equivalent) of these findings. This is reflected in a summary in Adjustment Grid: Summary (Figure 5) and tables providing specific definitions for defining the grade modifier values for functional history, physical examination, and clinical findings.

Figure 5. Adjustment Grid: Summary

Non-Key Factor	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
Functional History	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Physical Exam	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Clinical Studies	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem

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The grade may be adjusted by comparing the relative difference between the class assigned by the key factor and the classes assigned by the non-key factors. Unreliable non-key factors are not used to modify the rating and in the musculoskeletal chapters only the most significant diagnosis for an extremity or spine is modified by functional history. If the grade modifier for the non-key factors is the same as the class number assigned by diagnosis, the default impairment value associated with Grade C is used to define the impairment. It is probable that some workers' compensation jurisdictions will modify the approach to functional adjustment, either requiring all diagnoses to be modified or prohibiting functional adjustments.

In the Diagnosis-Based Impairment method, appropriate Class assignment is the critical factor; Class assignment is made solely by the diagnosis and associated clinical information. Non-key factors may only be used to modify the grade within a Class and will not result in impairment ratings lower or higher than the values associated with the particular diagnosis and Class. With the Fourth and Fifth Editions, it appears that some patients and raters attempt to inflate ratings by reporting findings that result in higher ratable impairment, (eg, more restricted joint motion or less strength than actually exists). With the Sixth Edition it is more likely that controversies will result from the interpretation of diagnoses and clinical information that results in Class assignment since this will have more dramatic impact on the impairment values. For example, with spinal impairment assessments it will be important to determine the clinical significance of disk herniations and radiculopathy, two of the critical factors that define the impairment class.

Chapter 2 Practical Application of the Guides

Chapter 2 outlines the key concepts, principles, and rationale underlying the application of the *Guides*, therefore it is essential that all participants understand this content. With prior Editions, erroneous ratings often occur as a result of physicians failing to follow rules defined in Chapter 2. Fourteen fundamental principles are defined and many of these principles have a significant impact on the rating process. These principles are summarized in Table 4.

Table 4. Summary of Fundamental Principles (based on Table 2-1 Fundamental Principles of the Guides, 6th ed, 20)

1. Chapter 2 preempts everything in subsequent chapters that conflicts with or compromises the principles.
2. No impairment may exceed 100% whole person permanent impairment nor may impairment exceed the maximum assigned to an organ or extremity.
3. All regional impairments are combined at the same level first and then regional impairments are combined at the whole person level.
4. Impairments must be rated per the chapter relevant to the organ or system where the injury primarily arose or where the greatest dysfunction remains.
5. Only permanent impairment may be rated and only after maximum medical improvement is certified.
6. A licensed physician must perform impairment evaluations and chiropractic doctors should restrict ratings to the spine.
7. Valid impairment evaluation reports must contain the three step approach of clinical evaluation, analysis of findings, and discussion of how the impairment rating was calculated.
8. The evaluating physician must use knowledge, skill, and ability generally accepted by the medical scientific community when evaluating an individual, to arrive at the correct impairment rating.
9. The *Guides* are based on objective criteria and if findings conflict with established medical principles they cannot be used to justify an impairment rating.
10. Motion and strength determinations should be assessed carefully for self-inhibition.
11. Ratings of future impairment are not provided.
12. If there is more than one method to define impairment, the method producing the higher rating must be used.
13. Subjective complaints alone are generally not ratable.
14. Impairment ratings are rounded to the nearest whole number.

The wide use of the *Guides* in workers' compensation and other disability systems is discussed in Section 2.1, Use of the *Guides* in Worker's Compensation and Other Disability Systems (6th ed, 20-21). Section 2.2, Organ System and Whole Body Approach to Impairment Ratings (6th ed, 21-23) explains the concept of the whole body approach to impairment ratings. Although most ratings are provided as whole person permanent impairments, some jurisdictions require regional impairment values, and these are provided in order to serve the needs of these jurisdictions. The hierarchical relationship of extremity ratings to whole person ratings remains, with total loss of the upper

extremity equaling 60% whole person permanent impairment and total loss of the lower extremity equaling 40% whole person permanent impairment. The approach to combining impairment values using the Combined Values Chart remains the same; however, specific guidance is now provided for circumstances when multiple impairments are combined; the largest values must be combined first. This is consistent with the approach used in the California Permanent Disability Rating Schedule, however, it is a change from directives provided in the Fifth Edition in Chapter 16, The Upper Extremities, in Section 16.1c Combining Impairment Ratings (5th ed, 438). Duplication and/or inflation of a rating by combining ratings that rely on a similar underlying factor is not permissible and is avoided by careful consideration of the underlying pathophysiology.

The use of the *Guides* is explained in Section 2.3 (6th ed, 23-24). As noted previously, the most important element is the physician's accurate diagnosis, particularly since this defines the class of impairment. In the absence of a diagnosis that captures a particular condition, a similar diagnosis may be used, only if there is no other method for rating objectively identifiable impairment. Although impairment ratings are performed by physicians, nonphysician evaluators may analyze an impairment evaluation to determine if it was performed appropriately. The physician's role is to provide an independent, unbiased assessment. Treating physicians are not totally independent and may not have received adequate training in the use of the *Guides*. Therefore, assessments by treating physicians may be subject to greater scrutiny than those provided by independent physicians or those with extensive training in the use of the *Guides*. Impairment ratings are only performed at maximum medical improvement.

The rules of application for the *Guides* presented in Section 2.4, Rules of Application for the *Guides* (6th ed, 24-25) are similar to those in prior Editions and essentially reiterate the fundamental principles and the need to base ratings on consistent objective criteria. Impairment values may be rounded, and impairment ratings in the body organ system chapters make allowance for most of the functional losses accompanying the use of prosthetic and similar devices. The Sixth Edition explicitly advises the physician to assess if an individual must regularly use a prosthesis, orthosis or other assistive device; the organ system should be tested and evaluated with that device. If the device is easily removed the physician does have the option of reporting findings with and without the device.

Section 2.5, Concepts Important to the Independent Medical Examiner (6th ed, 25-27) presents concepts important to the independent medical examiner, includ-

ing definitions of medical possibility versus probability, causation, exacerbation, aggravation and apportionment. The process of apportionment is the same as previous editions in which the examiner determines the current total impairment rating (all-inclusive) and subtracts the baseline rating reflecting pre-existing impairment. Apportionment requires careful analysis of the alleged causative factors and may be challenging when ratings have been performed using different Editions. This may be particularly challenging with the Sixth Edition since the approaches used to define impairment may differ from earlier editions. If impairment was defined previously and there has been further injury of the same region, it may be appropriate to subtract that previous impairment number from the current rating by the Sixth Edition. In most circumstances the most appropriate method is to rate both the current total impairment and the pre-existing impairment (using clinical information about that condition prior to the more recent injury) by the Sixth Edition. If there is insufficient information to appropriately modify the previous rating and accurately determine the grade within a class, the default value (C) for that diagnosis is used for the previous impairment rating.

In this edition, maximum medical improvement (MMI) refers to "a status where patients are as good as they are going to be from the medical and surgical treatment available to them. It can also be conceptualized as a date from which further recovery or deterioration is not anticipated, although over time (beyond 12 months) there may be some expected change." (6th ed, 26). Rating prematurely typically inflates ratings, and the Fifth Edition allowed for ratings to be performed after the benefits of treatment had accrued. With the Sixth Edition, diagnoses may be modified by the time the patient is at MMI, therefore, it is necessary to assure the patient is at MMI prior to rating, and that the correct diagnosis is being rated. The *Guides* does not permit the rating of future impairment. This edition presents a brief new discussion of the significance of cultural differences that may impact the evaluation process.

An impairment evaluation is a form of expert testimony, as explained in Section 2.6, Impairment Evaluation and the Law (6th ed, 27-28). Therefore, ratings must be fully supportable. If findings or impairment ratings based on these findings conflict with established medical principles, they cannot be used to justify an impairment rating.

The standards for reports are provided in Section 2.7, Preparing Reports, (6th ed, 28-29), including clinical evaluation, analysis of findings, and discussion of how the impairment rating was calculated. This continues to serve as an excellent basis to determine the quality of an impairment evaluation report.

Chapter 3 Pain-Related Impairment

Chapter 3, Pain-Related Impairment (6th, 31-46) discusses the challenges and controversies associated with assessing pain. If pain accompanies objective findings of injury or illness that permits rating using another chapter in the Guides, than pain-related impairments are not used as “add-ons.” The clear language to this effect should reduce a common problem of double-dipping seen with the Fifth Edition, ie, rating for a musculoskeletal condition and then providing further impairment for pain. It is probable that impairment ratings for pain will be less frequent with the Sixth Edition.

Pain not accompanied by objective ratable findings may be ratable resulting in a maximum of 3% whole person permanent impairment, the same limit assigned in the Fifth Edition. The actual impairment is based on the patient’s self-reports on a Pain Disability Questionnaire (PDQ) with a lowering of the impairment if the examiner questions the credibility of the patient. Due to the subjective nature of pain and differing philosophies, this chapter was one of the most controversial. Although there was discussion of modifying the magnitude of the impairment due to pain, there was no new or compelling information to support a change from the precedent established in the Fifth Edition; the maximum rating of 3% remains. It is probable that the approach to pain-related impairment will continue to evolve with the Seventh Edition.

Conclusion

It is probable that it will be several months before physicians, claims professionals, attorneys and fact-finders become familiar with the significant differences in assessing impairment using the Sixth Edition. This learning curve is shortened by training and developing understanding of the evolving methodology. It is hoped that the Sixth Edition will benefit all stakeholders by minimizing conflict and improving decision making. The process of defining impairment or the complexities of human function is not perfect; however, the Sixth Edition approach was designed with the intent to simplify the rating process, improve accuracy and provide a solid basis for future editions of the *Guides*.

Impairment Rating Values

The Sixth Edition reflects very substantial change, a change more significant than any prior Edition change. With the Sixth Edition the impairment values for the most frequently used impairments and diagnoses are similar to the Fifth. However, some adjustments were required, with certain ratings being lower and others higher. There are conditions that did not

receive ratable impairment in the past (such as lateral epicondylitis and non-specific spinal pain) which in certain circumstances may now be ratable as Class 1 (mild) impairments. Sixth Edition ratings are based more on the end-result and the impact on the patient, rather than what types of treatments or surgeries have been performed. Therefore, other ratings (such as spinal fusions) will receive lower ratings.

In assessing the impact of the Sixth Edition it is important to consider whether original or expert ratings are being considered as the baseline. Many impairment ratings performed by the Fourth and Fifth Editions have been shown to be erroneous when these original ratings are reviewed by experts in the use of the *AMA Guides*. Therefore in comparing differences is important to determine the relative change from observed ratings and those that are consistent with the *Guides*.

The full impact of changes in ratings will not be available until a large number of cases have been rated or comparative studies are performed where cases are rated by both the Fifth and Sixth Editions. It is critically important to understand this impact on the systems that make use of the *Guides*.

Comparative studies of ratings performed by the Third Edition, Revised, Fourth Edition and Fifth Edition concluded that the Fourth and Fifth Editions are more complex than the Third Edition, Revised, and, in general, require more effort by rating physicians and result in lower ratings.²³

Erroneous ratings with prior editions often occurred because unreliable examination findings were used to define impairment. With the Sixth Edition it is probable that the errors will result more from inaccurate diagnoses and misclassification of the Class of Impairment. The definition of the Class of Impairment is the most significant factor in defining the extent of impairment.

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AMA GuidesTM Newsletter

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January/February 2010

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Comparative Analysis of AMA Guides Ratings by the Fourth, Fifth, and Sixth Editions*

By Christopher R. Brigham, MD, Craig Uejo, MD, MPH, Aimee McEntire, and Leslie Dilbeck

Background

The *AMA Guides to the Evaluation of Permanent Impairment (Guides)* is the recognized standard for quantifying the medical loss associated with an injury or illness. In December 2007, the American Medical Association published the most recent edition, the Sixth Edition.¹ The Fourth Edition² was published in 1993 and the Fifth Edition³ in 2000. As with other areas of medicine, concepts and approaches are improved with time; for example, in medicine, 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. With the change in impairment methodology, there will also be changes in impairment values associated with specific conditions. As clinical medicine evolves and there is increased efficacy of treatment, it is hoped that improved outcomes will reduce impairment previously associated with injury and illness.

The Sixth Edition introduces a new approach to rating impairment. An innovative methodology is used to enhance the relevance of impairment ratings, improve internal consistency, promote greater precision, and simplify the rating process. The approach is based on an adaptation of the conceptual framework of the International Classification of Functioning, Disability, and Health,⁴ although many of the fundamental principles underlying the *Guides* remain unchanged.

There have been challenges associated with the use of the *Guides*, including criticisms of the *Guides* itself.⁵⁻¹² Previous criticisms include the following:

- The method fails to provide a comprehensive, valid, reliable, unbiased, and evidence-based rating system.
- Impairment ratings do not adequately or accurately reflect loss of function.
- Numerical ratings are more the representation of “legal fiction than medical reality.”

In response to these criticisms, the following changes were recommended with the Sixth Edition:

- Standardize assessment of activities of daily living limitations associated with physical impairments.
- Apply functional assessment tools to validate impairment rating scales.
- Include measures of functional loss in the impairment rating.
- Improve overall intrarater and interrater reliability and internal consistency.



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Some changes in the Sixth Edition have impacted impairment ratings. For example, impairment ratings are now included for conditions that may result in functional loss, but previously did not result in ratable impairment (such as nonspecific spinal pain and certain soft-tissue conditions). Additional impairment is typically not provided for surgical interventions, reflecting an underlying concept that treatment is designed to improve function and decrease impairment, with a focus on final outcome. Impairments associated with some diagnoses (eg, total knee replacements, carpal tunnel release, and cervical spine fusion) were revised to more accurately reflect treatment outcomes.

The Sixth Edition states in Chapter 2, Practical Applications of the *Guides* “There is increased use of the *Guides* to translate objective clinical findings into a percentage of the whole person. Typically this number is used to measure the residual deficit, a loss—a number that is then converted to a monetary award to the injured party” (6th ed, 20). In that the *Guides* is used by many workers’ compensation systems to define permanent disability awards, it is appropriate to determine whether changes in editions result in different impairment ratings and different permanent disability awards.

Study

To determine the impact of changes in editions, a study was performed to determine the impairment ratings resulting from use the Fourth, Fifth, and Sixth Editions for various conditions. Two hundred cases were assessed, and the clinical data were used to determine the resulting whole person permanent impairment according to each of these 3 editions. If the case reflected more than 1 diagnosis, each diagnosis was rated, and if both extremities were involved (eg, a bilateral carpal tunnel syndrome), each was rated as a separate diagnosis since each would be associated with a separate impairment. The cases analyzed were referred by 3 clients who refer all impairment ratings to determine their accuracy (2 based in California and 1 in Hawaii) in 2009 to Impairment Resources, LLC. It is probable that these cases reflect typical cases resulting in impairment rating, since the cases were not selectively referred, ie, the referring client did not refer the case because it was atypical or there was a concern about the rating.

Sixty-seven percent of the cases (134 cases) were from California, 28.5% (57 cases) were from Hawaii, and 4.5% (9 cases) were from Nevada. All cases had been originally rated by the Fifth Edition. Each case was independently analyzed by a professional rater experienced in the use of the Fourth, Fifth, and Sixth Editions, using the clinical data provided. Fourteen cases were excluded because the information was insufficient to permit a rating by the three editions, and these cases were replaced to provide a total sample of 200 cases. To ensure reliability, 15% (30) of these cases were blindly reviewed by an independent reviewer; all 30 ratings had interrater agreement within 1% whole person permanent impairment with the exception of one. In that case, there was a 5–percentage point difference between raters in whole person permanent impairment for the Fifth Edition rating because of differing interpretations of the appropriate spinal impairment (using the diagnosis-related estimates approach). There was agreement within 1% whole person permanent impairment for all Sixth Edition ratings.

Results

Two hundred seventy-nine diagnoses were associated with these cases; 48 of the cases had more than one ratable diagnosis. Forty-one percent of these diagnoses (114) involved surgery. The average age of the patients was 45.2 years (range, 22–79 years), and the majority were male (65%). The average time between the date of injury and date of the original impairment evaluation was 23 months (range, 3 months to 12 years).

Seventy-three percent of the Sixth Edition ratings (204 of 279) were based on the diagnosis-based impairment (DBI) approach (including entrapment), 22% of the ratings were based on range of motion (35% of the extremity cases), and 5% involved other approaches. Of the DBI ratings, most (81%) were class 1 (mild problem), with 6% class 0

Comparative Analysis (continued)

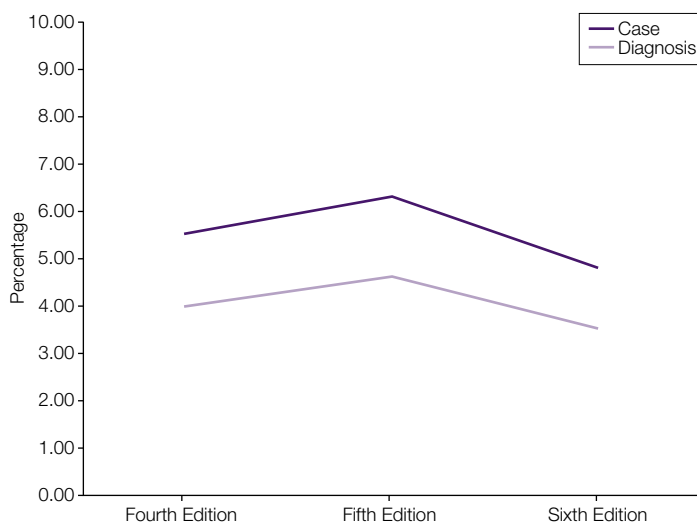
(no problem), 8% class 2 (moderate problem), 5% class 3 (severe problem) and 0% class 4 (very severe problem). The average ratable class was 1.2, with average grade modifiers for functional history adjustment of 1.2; physical examination adjustment, 0.6; and clinical studies, 0.8. Grade A was the most common assignment (34% of the time), followed by grade B (28%), grade C (21%), grade D (21%), and grade E (6%).

The average whole person permanent impairment (WPI) per case was 4.82% WPI per the Sixth Edition, 6.33% WPI per the Fifth Edition, and 5.5% WPI per the Fourth Edition. The overall average whole person permanent impairment for each diagnosis was 3.53% WPI per the Sixth Edition, 4.59% WPI per the Fifth Edition, and 4.00% WPI per the Fourth Edition. This is reflected in Figure 1. The difference between average whole person impairment ratings was tested using a paired sample t-test analysis, with an alpha level set at the .05 level of significance. This analysis revealed a statistically significant difference between average whole person impairment ratings when comparing the Sixth Edition with the Fifth Edition, but not when comparing the Sixth Edition results with those of the Fourth Edition.

With the Sixth Edition there were meaningful changes in impairment ratings as a result of not providing additional impairment for surgical (therapeutic) spine procedures, improved outcomes with surgical release for carpal tunnel syndrome, and improved outcomes with total knee and hip replacement. Excluding the cases that were not impacted by these changes, the overall average whole person permanent impairment for each diagnosis was 3.40% WPI per the Sixth Edition, 3.61% WPI per the Fifth Edition, and 3.16% WPI per the Fourth Edition.

Upper extremity impairments were most common, reflecting 45% of the ratable diagnoses, as shown in Table 1.

Figure 1. Comparison of Average Whole Person Permanent Impairment Ratings by Edition



The average WPI ratings for cases and diagnoses are given in Figure 2.

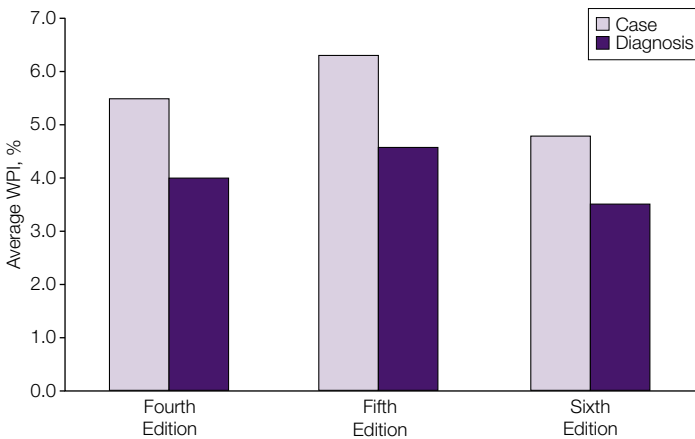
The difference between impairment ratings for diagnoses, grouped as nonsurgical and surgical, was tested using a paired sample t-test analysis, with an alpha level set at the .05 level of significance. There was no meaningful difference in the rating values seen for the 165 nonsurgical diagnoses with the Sixth Edition compared with the Fourth Edition (both averaging 2.9% WPI) nor with the Fifth Edition (averaging 3.2% WPI). The most meaningful differences were observed with surgical diagnoses, with the Sixth Edition averaging 4.5% WPI, the Fifth Edition 6.6% WPI, and the Fourth Edition 5.6% WPI. This analysis revealed a statistically significant difference between impairment ratings for surgical diagnoses

Table 1. Comparison of Average Whole Person Permanent Impairment Ratings by Sixth Edition Chapters

Chapter	Title	WPI, %			No. (%) of Diagnoses
		Fourth Edition	Fifth Edition	Sixth Edition	
6	The Digestive System	2.0	2.0	3.0	1 (0.4)
5	The Pulmonary System	25.0	25.0	24.0	1 (0.4)
7	The Urinary and Reproductive Systems	5.0	5.0	5.0	1 (0.4)
12	The Visual System	5.0	5.0	5.0	1 (0.4)
4	The Cardiovascular System	4.0	4.0	3.0	2 (0.7)
11	Ear, Nose, Throat, and Related Structures	1.5	1.5	1.5	2 (0.7)
8	The Skin	1.0	1.0	1.0	2 (0.7)
16	The Lower Extremities	4.0	4.0	3.2	57 (20.4)
17	The Spine and Pelvis	5.2	6.7	4.1	86 (30.8)
15	The Upper Extremities	3.1	3.4	3.2	126 (45.2)
	Total				279 (100.0)

Comparative Analysis (continued)

Figure 2. Comparison of Average Whole Person Permanent Impairment Ratings by Edition



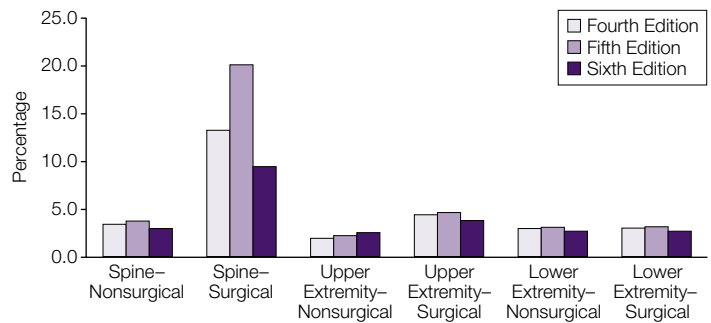
when comparing the Sixth Edition with the Fifth Edition, but not when comparing the Sixth Edition results with those of the Fourth Edition. This finding was expected, given that the Sixth Edition typically does not give additional impairment for surgical (therapeutic) interventions. The most meaningful change in impairment values was for spine-related diagnoses, particularly those that resulted in surgery; the results for musculoskeletal impairments are given in Table 2 and Figure 3.

Twenty-one percent (58) of the 279 diagnosis-based ratings resulted in no ratable impairment per the Fifth Edition; however, of these 0 ratings, 41 (71%) had ratable impairment by the Sixth Edition, with the average impairment

Table 2. Comparison of Average Whole Person Permanent Impairment Musculoskeletal Ratings by Category, Nonsurgical vs Surgical Intervention, and Edition

Category	No.	WPI, %		
		Fourth Edition	Fifth Edition	Sixth Edition
All				
Spine	86	5.2%	6.7%	4.1%
Upper extremity	126	3.1%	3.4%	3.2%
Lower extremity	57	4.0%	4.0%	3.2%
Nonsurgical				
Spine	71	3.5%	3.8%	3.0%
Upper extremity	66	2.0%	2.2%	2.6%
Lower extremity	20	3.0%	3.2%	2.7%
Surgical				
Spine	15	13.3%	20.1%	9.5%
Upper extremity	60	4.4%	4.7%	3.8%
Lower extremity	37	4.6%	4.5%	3.4%

Figure 3. Comparison of Average Whole Person Permanent Impairment Ratings by Category, Nonsurgical vs Surgical Intervention, and Edition



being 1% WPI (66% of these cases involved nonspecific spinal pain and most of the other cases involved soft-tissue injury). Twenty-seven percent (76) of the ratings that resulted in no ratable impairment by the Fourth Edition resulted in an average of 1% WPI when rated with the Sixth Edition.

In analyzing impairments categorized by the value obtained by rating with the Fourth and Fifth Editions, the most meaningful differences were seen with higher-rated impairments. Of the Fifth Edition ratings, 68% (189 diagnoses) were within the range of 1% to 9% WPI. For these cases, the average rating by the Sixth Edition was 3.2% WPI, the Fifth Edition 3.8% WPI, and the Fourth Edition 3.4% WPI. For impairments of 10% WPI and greater by the Fifth Edition, the average rating by the Sixth Edition was 10.2% WPI, the Fifth Edition 16.8% WPI, and the Fourth Edition 14.1% WPI.

Figure 4. Comparison of Average Whole Person Permanent Impairment Ratings Based on Fourth Edition Rating Categorization

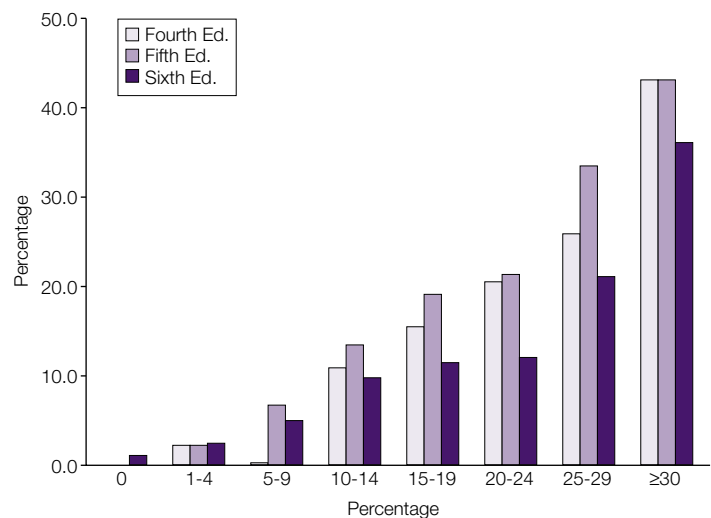
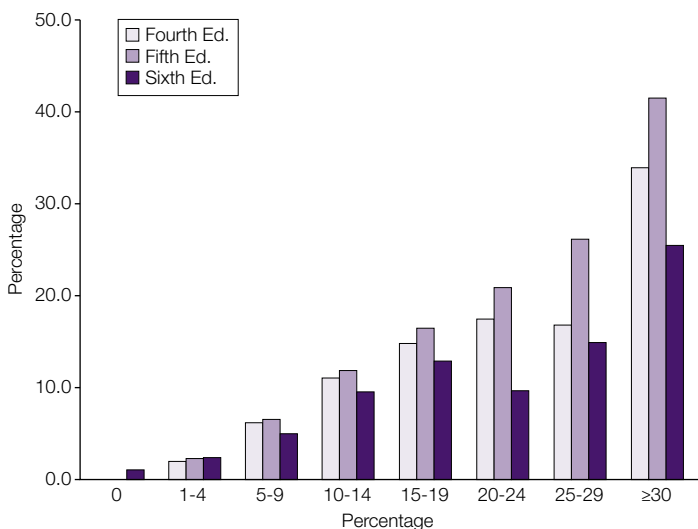


Figure 5. Comparison of Average Whole Person Permanent Impairment Ratings Based on Fifth Edition Rating Categorization



The relative changes in impairment values per case based on categorization by the Fourth and Fifth Edition ratings are illustrated in Figures 4 and 5.

In analyzing the differences for musculoskeletal disorders, the most meaningful changes were for the spine, as reflected in Table 3. There was slight increase in ratings for the shoulder, wrist, and ankle/foot. (Table 3 includes only regions where there were 5 or more ratable diagnoses.) The differences for musculoskeletal regions are illustrated in Figures 6, 7, and 8.

The most common diagnosis (based on assignment by International Classification of Diseases, Ninth Revision [ICD-9]) was shoulder region disease not elsewhere classified (NEC) (726.2), followed by backache not otherwise specified (NOS) (847.2) and carpal tunnel syndrome (354). The impairment values associated with these diagnoses are shown in Table 4.

Summary

There is a statistically significant difference between average whole person impairment ratings when comparing the Sixth Edition with the Fifth Edition, but not when comparing the Sixth Edition results with those of the Fourth Edition. Average values had increased from the Fourth Edition to the Fifth Edition, yet without clear scientific rationale. The average impairment rating in this sample of cases, per the Sixth Edition, was 4.82% WPI, with an average impairment rating per diagnosis of 3.53% WPI. The impact for a patient based on his or her actual diagnostic impairment is small, with a greater difference seen for the Fifth Edition (4.59% WPI, a 1.06–percentage point WPI decrease) than the Fourth Edition (4.00%, a

Figure 6. WPI Comparison for Upper Extremity Diagnoses

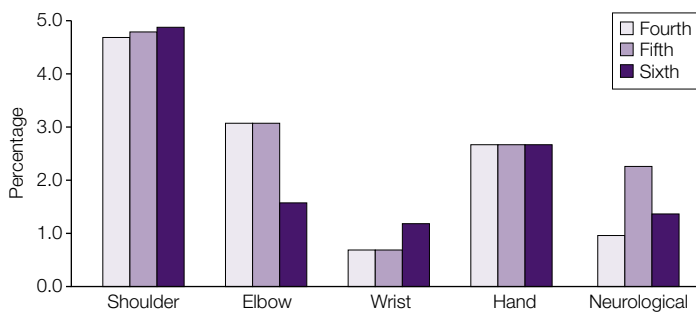


Figure 7. WPI Comparison for Lower Extremity Diagnoses

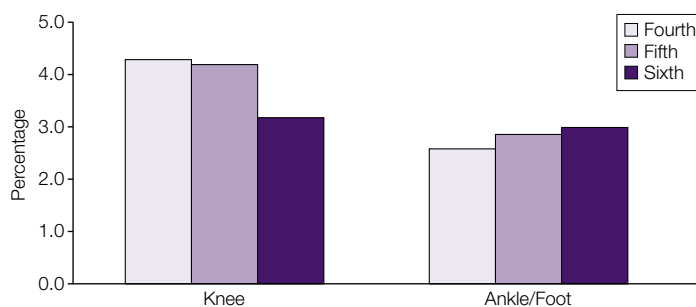
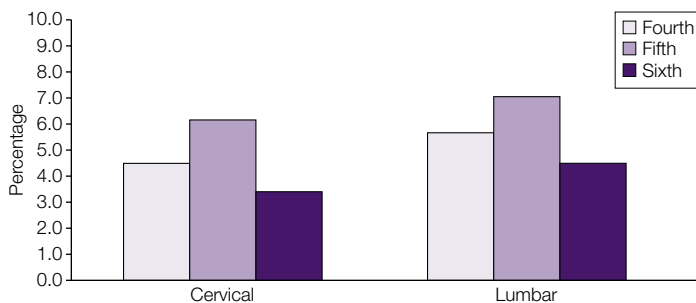


Figure 8. WPI Comparison for Spine Diagnoses



0.47–percentage point WPI decrease). Many of the more meaningful changes were for spine-related diagnoses that resulted in surgery, reflecting the Sixth Edition approach, which bases impairment ratings on the condition and outcome rather than therapeutic interventions including surgery. However, with the Sixth Edition, a substantial percentage of cases that were rated as zero impairment in previous editions will have some ratable impairment.

The observed modest changes in values with the Sixth Edition were expected and primarily due to the recognition that (1) surgery and all therapeutic endeavors should improve function and therefore should not routinely increase impairment, (2) there are improved functional outcomes for

Comparative Analysis (continued)

Table 3. Comparison of Average Whole Person Permanent Impairment Ratings by Region and Edition

Problem	No. of Diagnoses	WPI, %			Difference, Sixth vs Fifth Edition, Percentage Points
		Fourth Edition	Fifth Edition	Sixth Edition	
Upper extremity–shoulder	48	4.7	4.8	4.9	+0.1
Upper extremity–elbow	7	3.1	3.1	1.6	-1.5
Upper extremity–wrist	6	0.7	0.7	1.2	+0.5
Upper extremity–hand	30	2.7	2.7	2.7	0
Upper extremity–neurological	26	1.0	2.3	1.4	-0.9
Lower extremity–knee	31	4.3	4.2	3.2	-1.0
Lower extremity–ankle/foot	13	2.6	2.9	3.0	+0.1
Spine–cervical	33	4.5	6.2	3.4	-2.8
Spine–lumbar	50	5.7	7.1	4.5	-2.6

Table 4. Comparison of Whole Person Permanent Impairment Ratings for Common Diagnoses

Diagnosis	ICD-9 Code	WPI, %			No. (%) of Diagnoses
		Fourth Edition	Fifth Edition	Sixth Edition	
Shoulder region NOS	726.2	4.6	4.6	4.8	36 (12.9)
Backache NOS	724.5	2.9	3.6	2.0	29 (10.4)
Carpal tunnel syndrome	354.0	0.9	2.4	1.3	22 (7.9)
Derangement meniscus NEC	717.5	2.1	2.1	1.8	18 (6.5)
Cervicalgia	723.1	0.9	1.1	0.7	17 (6.1)
Disc disease NEC/NOS–lumbar	722.93	9.4	11.3	7.6	16 (5.7)
Sprain of hand NOS	842.10	1.8	1.8	1.8	13 (4.7)
Disc disease NEC/NOS–cervical	722.91	7.1	9.3	5.8	12 (4.3)
Osteoarthritis, Unspecified–leg	715.96	4.9	4.9	3.6	7 (2.5)
Rotator cuff syndrome NOS	726.10	7.8	7.8	6.7	6 (2.2)
Sprain of ankle NOS	845.00	1.8	2.5	2.3	6 (2.2)
Finger injury NOS	959.5	2.0	2.2	1.8	6 (2.2)
Internal derangement knee NOS	717.9	3.2	3.2	3.0	5 (1.8)
Fracture ankle NOS–closed	824.8	3.8	3.8	4.0	5 (1.8)
Trigger finger	727.03	2.5	2.5	2.0	4 (1.4)
Fracture forearm NOS–closed	813.80	5.8	5.8	4.8	4 (1.4)
Sprain elbow/forearm NOS	841.9	1.5	1.5	1.0	4 (1.4)
Ulnar nerve lesion	354.2	2.0	2.0	2.0	3 (1.1)
Biceps tendon rupture	727.62	1.3	2.0	2.3	3 (1.1)
Fracture lumbar vertebra	805.4	10.0	12.3	9.7	3 (1.1)
Joint replaced knee	V43.65	20.0	20.0	13.3	3 (1.1)

carpal tunnel syndrome and total joint replacement, and (3) certain common conditions that resulted in functional deficits but no ratable impairment in previous editions should be ratable. Excellent interrater reliability with Sixth Edition ratings was demonstrated; this is consistent with one of the goals of the Sixth Edition, to improve the validity and reliability of impairment ratings.

Acknowledgments

The authors appreciate the assistance provided in statistical analysis by Steve Leclair, PhD, Leclair Behavioral Health of Gray, Maine, and Frank Neuhauser, Project Director, Survey Research Center/UC Data Archive, University of California, Berkeley.

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*This comparative study was commissioned by the American Medical Association and performed by Impairment Resources, LLC.

Guides Question and Answer

Question: In the absence of a compensable hearing loss, can impairment be assigned for tinnitus? Our state makes use of the Fourth Edition, however I am also interested in how this is dealt with in other editions.

Answer: The AMA *Guides* hearing impairment section has changed little from the First to the Sixth Edition.

In the first 2 editions of the *Guides*, tinnitus is not discussed.

In the Third Edition, pages 165-166, it states that tinnitus is a symptom and is not measurable, and thus impairment should be based on tinnitus severity, and the rating should be consistent with other established values (meaning a rating of similar magnitude to other conditions that have established ratings).

In the Fourth Edition, page 224, left column, paragraph 2 it says that tinnitus may impair speech discrimination and thus a rating of up to 5% may be added to the rating for hearing loss. Problems with this section are that it does not state whether the “up to 5%” is monaural impairment, binaural impairment, or whole person impairment (WPI); and it does not specifically say what to do if hearing is normal (ie, can you add 5% for tinnitus to 0% for hearing impairment?). Organizations that teach the *Guides* have traditionally taught that the key is the speech discrimination score on the

audiogram report. If speech discrimination is about what’s expected by the decibels of loss on the audiogram, there is no additional tinnitus impairment, but, if the speech discrimination score is worse than expected based on the audiogram, then the examiner may use the 1%, 2%, 3%, 4%, or 5% increase in the binaural impairment, but this is not explicitly stated in the Fourth Edition.

The Fifth Edition (page 246, right column, last paragraph) adds the comment that the “up to 5%” rating can be added, but only added to the “measurable hearing impairment,” finally clarifying that there must be measurable hearing loss (an impairment) before the tinnitus could be rated.

The Sixth Edition (page 249) adds multiple paragraphs and devotes an entire section to tinnitus (section 11b). This adds the clarification that the “up to 5%” is binaural impairment.

Thus the questions left unanswered in the Fourth Edition are finally clarified in the Fifth and Sixth Editions. Because the methodology and the numbers (“up to 5%”) have not changed, the clarifications from the later editions should logically guide those who administratively must use the Fourth Edition.

James B. Talmage MD



AMA Guides™ Newsletter

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

**March/April
2010**

In this issue

Observations Based on Review of 6000 Cases

Causes of Erroneous Fifth Edition Ratings

In upcoming issues

Spinal Cord Injury and the *Guides*

Lower Extremity Impairment Questions and Answers

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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

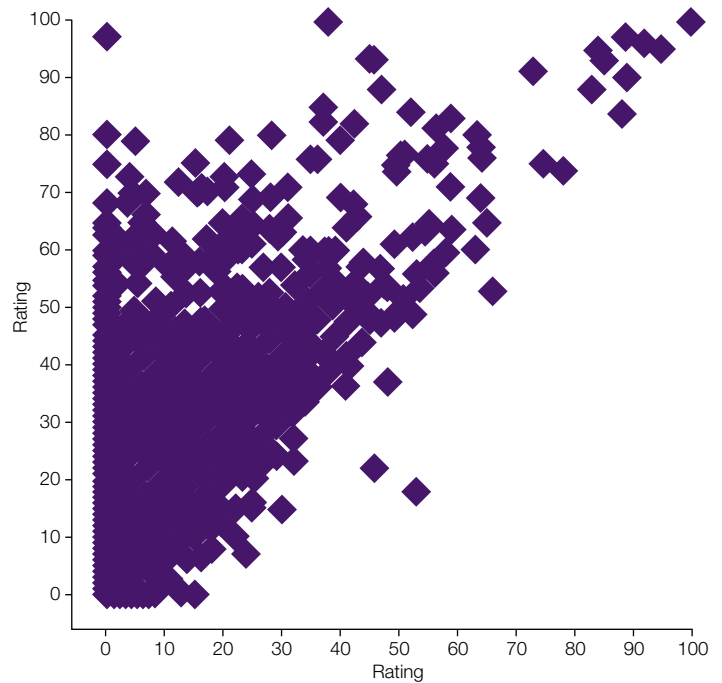
Differences were observed in the location, role, and professional training of the rater.

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

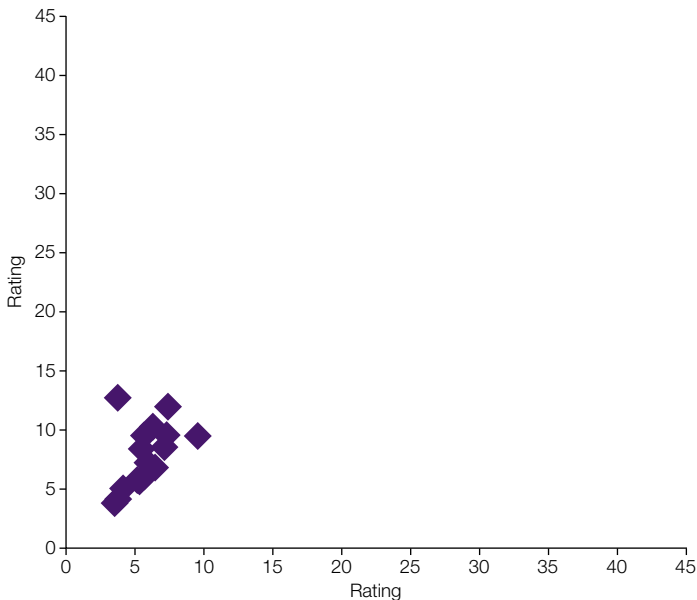
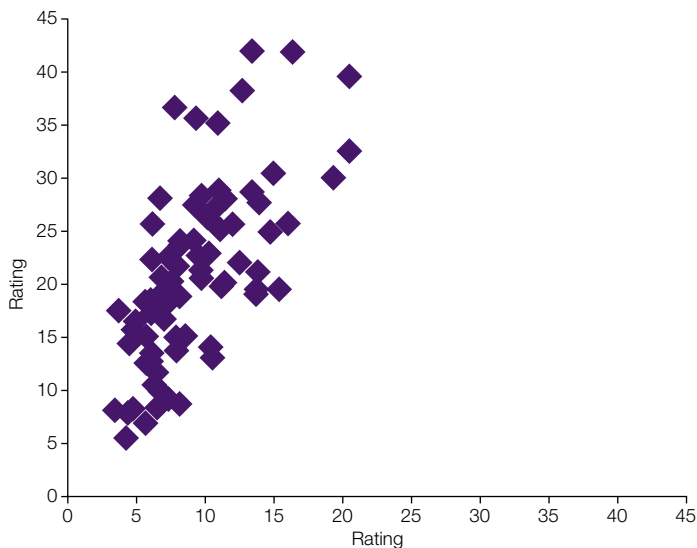


Figure 3. California Physician Ratings, Average Original WPI Rating vs Average Revised Rating



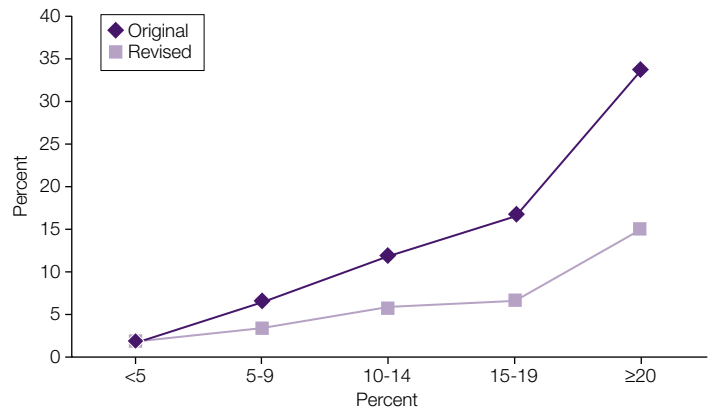
Excludes one physician who averaged original rating of 58% WPI.

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

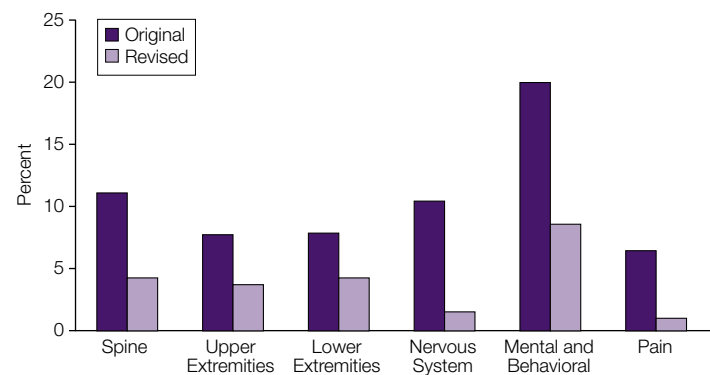
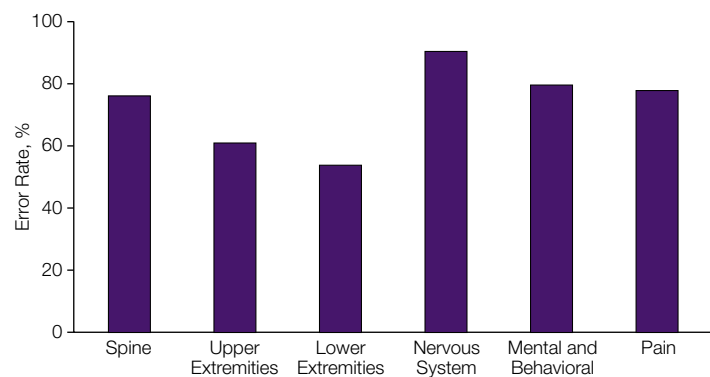


Figure 6. Fifth Edition WPI Error Rates by Most Common Chapters



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 over-reliance 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
ACOEM	American Academy of Occupational and Environmental Medicine (www.acoem.org)	847-818-1800
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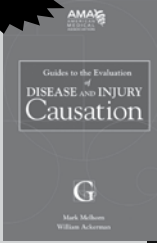
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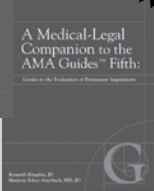


Lower Extremities

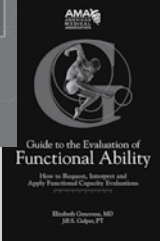
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