



Methodology for the Update of the *Occupational Medicine Practice Guidelines, 2nd Edition*

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I. Introduction

The American College of Occupational and Environmental Medicine (ACOEM) first published its *Occupational Medicine Practice Guidelines (Guidelines)* for common health complaints of workers in 1997.¹ In 2004, the College released the second edition of its *Guidelines*, based on an updated search and evaluation of the literature.² The methodology used for these editions was described in the introduction to each volume, and further described in several other publications.^{3,4}

In early 2006, the President of the College announced a schedule to produce updates of the *Guidelines* and the formation of new Guideline development groups, including the Evidence-Based Practice Committee (EBPC), the Guideline Methodology Committee (GMC), and the Evidence-Based Practice Panels (EBPPs). The GMC was asked to update and describe in depth the methodology to be used for all ACOEM evidence-based products. This document describes the elements of the updated methodology that the GMC developed. This document was approved by the ACOEM Board of Directors on November 13, 2006.

II. Purpose and Scope⁵

A. Purpose

The purpose of the *Guidelines* is to define evidence-based best practices for key areas of occupational medical care and disability management in order to:

- Improve the efficiency and accuracy with which the diagnostic process is conducted;
- Improve the effectiveness of individual treatments and treatment plans in relieving symptoms and achieving functional improvement and return to work;
- Improve or restore the health of workers with occupationally related illnesses or injuries; and
- Improve the quality of occupational medical care and disability management.

B. Scope

The *Guidelines* address the key domains of occupational medicine practice including:

- Diagnosis of health problems likely to be work-related;
- Determining work-relatedness individually and collectively;
- Managing medical care;
- Treating work-related health problems efficiently and effectively;
- Managing associated disability and work loss;
- Preventing work-related health problems; and
- Promoting health.

¹ Harris JS, Blais BB, Brigham CR, Kuhn A, Wolens D (eds.). *Occupational Medicine Practice Guidelines: Evaluation and Management of Common Health Problems and Functional Recovery in Workers*. Beverly Farms, MA: OEM Health Information Press, 1997.

² Glass LS, Blais BB, Genovese E, Goertz M, Harris JS, Hoffman H, et al (eds.). *Occupational Medicine Practice Guidelines: Evaluation and Management of Common Health Problems and Functional Recovery in Workers, 2nd Edition*. Beverly Farms, MA: OEM Health Information Press, 2004.

³ Harris JS. The ACOEM Occupational Medicine Practice Guidelines. In Harris JS, Loeppke RR (eds.). *Integrated Health Management: The Key Role of Occupational Medicine in Managed Care, Disability Management and Integrated Delivery Systems*. Beverly Farms, MA: OEM Press, 1998, pp. 179-183.

⁴ Harris JS, Glass LS, Genovese E, Mueller KL. Evidence-Based Occupational Medicine: Updating the ACOEM Occupational Medicine Practice Guidelines. *Clinics in Occupational Medicine*. 2004;4:341-360.

⁵ AGREE Domain I, a (see Table F). The AGREE Collaboration. Appraisal of Guidelines for Research and Evaluation (AGREE) Instrument and Instrument Training Manual. London: St. George's Hospital Medical School, 2001. Available at www.agreecollaboration.org.

Examples of the broad clinical questions⁶ that the *Guidelines* may address in these areas are listed in Attachment 1.

The Second Edition of the *Guidelines* consisted of two parts – “Foundations of Occupational Medicine Practice” and “Presenting Complaints.” “Foundations” reviewed prevention; initial assessment and documentation; initial approaches to treatment; work-relatedness; disability prevention/management; pain, suffering, and restoration of function; and independent medical exams/consultations. “Presenting Complaints” included the neck and upper back; shoulder; elbow; forearm, wrist, and hand; low back; knee; ankle and foot; eye; and stress-related conditions.⁷ Section I (“Foundations”) will be updated by identifying questions that should be addressed regarding best practices for general management of clinical conditions, disability, and medico-legal matters. Section II (“Presenting Complaints”) is being updated by identifying clinical questions to address for each clinical entity or diagnostic group. These questions will be framed in PICO format⁸ (population of interest, intervention, comparison group, intervention, and outcome). The questions for etiology, diagnosis, and prognosis will be framed in a modified PICO format, emphasizing such factors as specific exposures for etiology, natural history for prognosis, and the reproducibility and performance of diagnostic tests against accepted reference standards for clinical assessment. (See Attachment 2 for criteria that will be considered when forming the questions to address for the updates to the *Guidelines*.)

C. Patient Population⁹

The *Guidelines* apply to working age adults with medical conditions related to work or that affect the ability to work. In general, the age range under consideration is 18 to 65.

D. Target Audience¹⁰

The target users of the *Guidelines* are:

- Physicians and other health care providers;
- Healthcare organizations;
- Patients and consumers;
- Clinical case managers;
- Insurers and third party administrators;
- Insurance claims managers and utilization reviewers;
- Attorneys and judges;
- Workers’ compensation regulators and policy makers; and
- All others with responsibility for or involvement in worker health and workers’ compensation systems.

III. Organizational Structure¹¹

The ACOEM Board of Directors has adopted the organizational structure and methods for the development of recommendations for evidence-based practice contained in this update. The Board will also review all evidence-based practice products prior to publication as official ACOEM recommendations or interpretations. Below are the function, responsibility, and objective (FRO) statements for the committees and panels involved with ACOEM’s Guideline related activities (see Attachment 3 for a detailed description on the selection and training of *Guidelines* development groups described below).

⁶ AGREE Domain I, b (see Table F).

⁷ Additional topics may be included in the update of the *Guidelines*.

⁸ Verbeek J, van Dijk F (eds.). *A Practical Guide for the Use of Research Information to Improve the Quality of Occupational Health Practice*. Geneva: World Health Organisation, 2006.

⁹ AGREE Domain I, c (see Table F).

¹⁰ AGREE Domain II, c (see Table F).

¹¹ AGREE Domain II, a (see Table F).

A. **Candidate Selection Committee**

The Candidate Selection Committee is responsible for choosing individuals to serve on the Guideline development groups. The Candidate Selection Committee:

1. Reviews the applications and curriculum vitas of individuals interested in participating on one of the Guideline development groups.
2. Appoints individuals to serve on each of the committees/panels involved in the updating process [Evidence-based Practice Committee (EBPC), Guideline Methodology Committee (GMC), and Evidence-based Practice Panels (Panels)].

B. **Evidence-based Practice Committee (EBPC)**

The EBPC is charged with the planning and organization of the review, revision and update of the ACOEM evidence-based practice recommendations and *Guidelines*. The EBPC:

1. Ensures that the *Guidelines* are consistent and logical internally and with other ACOEM evidence-based products, training, and services.
2. Assists with panel selection to insure balance and interdisciplinary involvement.
3. Assists with determining the priority and timetable for review of guideline topics and coordinates this timetable with other evidence-based products and services.
4. Assists with identification of additional chapters or topics to be considered in the *Guidelines*.
5. Oversees the work of the Panels.

C. **Guideline Methodology Committee (GMC)**

The GMC establishes the methodology and quality review process for the development and revision of the *Guidelines* and all evidence-based products endorsed by the College. The GMC:

1. Develops the methodology for the development and revision of the *Guidelines* and other evidence-based products and services.
2. Refines, clarifies, and improves the methodology based on current state-of-the-art methods.
3. Ensures adherence to these state-of-the-art methods.
4. Trains the EBPC, Panels, and Utilization Management Knowledgebase (UMK) Development Team and *APG Insights* members in the methodology and process.
5. Ensures that the Panels, UMK Development Team, and the *APG Insights* Editorial Board adhere to the established methodology.
6. Publishes documents that describe and explain the methodology used for ACOEM evidence-based materials and products.
7. Works with the Council on Education to ensure consideration and evaluation of evidence in ACOEM educational offerings.

D. **Evidence-based Practice Panels (EBPPs or “Panels”)**

The Panels are appointed to develop or update evidence-based practice recommendations. Separate panels are appointed for each body part, system, or skill area covered by the *Guidelines*.¹² The Panels:

1. Review critical analyses of the literature based on approved methodology.
2. Develop, review or update evidence-based recommendations for clinical practice, care management, and disability management.

IV. **Process for Development and Revision of the *Guidelines* and other ACOEM Evidence-based Products**

A. **Background and Introduction**

The process for development of ACOEM *Guidelines* and evidence-based products was developed by the GMC and includes participation of the EBPC, review and formulation of recommendations by the Panels, stakeholder input, external peer review, and review by the ACOEM Board of Directors. Members of the

¹² Currently, these areas are respiratory, spine, hand, elbow/shoulder, hip/knee, foot/ankle, mental health, vision, and disability prevention/management, pain management, and application of the *Guidelines*.

Guideline development groups were selected from applications from ACOEM members and nominees from relevant interest groups and professional organizations. All members of the Guideline development groups will be required to complete training and an examination to receive a certificate of completion in ACOEM's evidence-based medicine methodology. For further discussion of the selection of participants in the Guideline development groups and the training in the ACOEM methodology, see Attachment 3. Disclosure of potential conflicts of interest of all Guideline development members will be recorded in a table (Attachment 6).

B. Oversight by the Evidence-based Practice Committee (EBPC)

The Board of Directors appoints one physician to chair the entire updating process and act as Editor in Chief of the *Guideline* revisions. This physician serves as chair of the EBPC. The other members of the EBPC are chosen by the Candidate Selection Committee. The Committee is comprised of the chairs of each of the Panels and others who have been involved with previous ACOEM Guideline activities (e.g., the Editor of *APG Insights*, the Chair of ACOEM's Ergonomics Committee and similar individuals).

C. Prioritization of Topics for Review and Recommendation

To identify and guide the work of the Panel for each topic or part of the body or body system, the Editor-in-Chief and the research staff, in collaboration with the EBPC, and the chair of each of the Panels, identify important clinical questions about common, expensive, controversial or questionable work-related diagnoses, tests and procedures. Frequently, topics are also forwarded from panel members, external stakeholders and others. The following procedures are followed:

1. ACOEM collects data to identify and prioritize the most common occupational health problems, tests and treatments in terms of frequency, cost, time off work, apparent benefits, apparent harms, and rapid increases in utilization.¹³
2. The diagnoses are grouped into homogeneous diagnostic groups. Tests and treatments are identified as groups if similar or individually if the criteria for use and evidence of effectiveness are likely to be relatively unique.
3. Panels solicit comments on areas to include/examine, including identification of controversial, commonly used or rapidly increasing but unsupported diagnoses, work linkages, tests or procedures from Panel members and other stakeholders.

D. Review and Formulation of Recommendations by the Evidence-based Practice Panels

The Panels, with assistance from ACOEM staff and other researchers, perform study reviews and formulate recommendations for guidelines in the following manner:

1. Literature Evaluation: Literature Search and Study Selection¹⁴

Research staff carries out a literature review for each guideline topic assigned to the Panel. In order to identify all high quality original research studies, the literature search will be broad and comprehensive. In some cases, other professional guidelines may be reviewed to understand the evidence and process used.¹⁵ In general, articles reporting studies with the most robust relevant designs will be selected for critical appraisal and quality grading (see Attachment 7). In some cases, articles of studies with lower grades of evidence may be selected to examine current practice patterns or for other reasons. Search strategies and methods (including specific databases, search terms, and dates searched) will be documented. See Attachment 8 for an example of a bibliographic search criteria table and Attachment 9 for a list of the databases that are searched. In order to ensure that all relevant studies are identified, researchers also perform hand searches of reference lists in related articles.

¹³ At present, diagnosis- and procedure-specific data are available from workers' compensation claims. Representative data may be available from large workers' compensation carriers, large self-insured employers, or existing research organizations that aggregate insurance claim data such as the Workers' Compensation Research Institute or the California Workers' Compensation Institute.

¹⁴ AGREE Domain III, a and b (see Table F).

¹⁵ The entire body of evidence will be reviewed for each topic.

First, researchers review the abstracts of all citations found in the bibliographic search and identify articles relevant to the topic that might possibly meet the inclusion criteria (e.g., in English, a randomized controlled trial to address treatment questions) as adequate evidence and that could be used as the basis for evidence-based guideline statements. Researchers then retrieve the full-text of these articles and perform a second article screening process to determine which studies meet the inclusion criteria to be considered as adequate evidence for these purposes (as shown in Table A-1 and Table A-2). As part of the second screening process, reviewers will grade each article using the numerical quality score (designating high, moderate or low quality) in Table B (Quality Scoring of Treatment Studies) and report the scoring in the combined quality assessment table (see Attachment 10). Articles that do not meet the inclusion criteria as adequate evidence will be coded based on the reasons for rejection. ACOEM will keep a list of all articles screened, the secondary article screening results (included or rejected), and the specific reasons an article was excluded. For those articles accepted as providing adequate evidence, the individual article quality ratings will be included in the evidence tables (see Attachment 10).

2. Literature Evaluation: Critical Review of Articles¹⁶

Research assistants conduct the literature reviews and review in detail each article that meets the inclusion criteria. They will then summarize important information from each article into an evidence table (see Attachment 10). As mentioned above, evidence is limited to primary studies; in some cases other professional guidelines are reviewed for comparison). The relative ranking of study designs for theoretical robustness is shown in Attachment 7.

After research assistants complete the evidence tables, researchers (e.g., Master's, PhDs, MDs) critique the articles, conduct quality checks, grade the body of evidence and draft initial recommendations. The Panels may also perform an additional quality check.

3. Development of Guidelines and Recommendation Statements¹⁷

The Panels review and modify recommendations formulated by the research staff using the following process. Panels are often subdivided into areas of practice or research interest at the discretion of the Panel Chair in discussion with the Editor in Chief (e.g., medical management, surgical management, therapies) particularly when the Panel has a large scope of work (e.g., low back pain or chronic pain). The Panels (and/or sub-Panels) review the evidence tables, evidence summaries, draft recommendations, and the original studies if needed. After review, the Panels will conduct discussions and agree on the strength of evidence ratings for each topic (Table C) and finalize recommendations for all clinical questions. If sub-Panels are employed, the recommendations of the sub-Panel are forwarded to the entire Panel in aggregate for additional discussion. Each recommendation will be clearly labeled as “strongly recommended,” “moderately recommended,” “recommended,” “insufficient-recommended,” “insufficient-no recommendation,” “insufficient-not recommended,” “not recommended,” “moderately not recommended,” and “strongly not recommended” (Table D). Pursuit of panel unanimity is sought, and failing unanimity, consensus for all content and recommendations in the *Guidelines*. There may be multiple communications (e.g., teleconferences, e-mail, in-person meetings) utilized to reach a unanimous opinion (or consensus) on both the recommendation and the wording of the recommendation for any individual topic. When consensus is not possible, a majority vote will be taken (see Attachment 11 for an example of a voting process).

The health benefits, side effects, risks and relative costs of each recommendation will be explicitly considered and discussed in formulating the recommendations.¹⁸ Benefits should significantly

¹⁶ AGREE Domain III, b (see Table F).

¹⁷ AGREE Domain III, c (see Table F).

¹⁸ AGREE Domain III, d (see Table F).

exceed risks. Each recommendation will specify what clinical problem formulation it relates to. For tests and treatment recommendations, the recommendations will state the:

- Diagnoses or problems for which the test or treatment is indicated;
- Specific indications for the test or treatment;
- Prior similar treatments or tests;
- Point in the time course of the problem for which it is appropriate;
- Prior conservative treatment that should be tried first;
- Concurrent treatments;
- Relative and absolute contraindications to the test or procedure;
- Number of tests or procedures that are appropriate at a given time in the time course of the problem;
- Potential benefits of the test or procedure;
- Potential harms, including effects on disability and return to work; and
- Relative costs (low, medium, or high).

As funding/sponsorship of pharmaceuticals and devices or appliances is almost universally commercial, there will be a statement to that effect in the guideline, rather than repeating it for all such studies.

The “**first principles**” of clinical logic that should be observed in formulating guidelines and clinical recommendations are:

Application: Ethics

- Clinicians should adhere to ACOEM’s Code of Ethics.
- Clinicians should disclose any conflicts of interest (including ownership or other financial arrangements) they may have with any of the testing or treatment methods.

Application: Diagnostic Testing

- Tests should be performed when the results affect the course of treatment.
- Imaging or testing should generally be done to confirm a clinical impression prior to surgery or other major, invasive treatment.

Application: Treatment

Relative Effectiveness

- Treatments should improve on the natural history of the disorder, which in many cases is recovery without treatment.
- When there are options for testing or treatment available, the clinician should choose the option supported by clinical and statistical significance.
- Treatment should be in accordance with evidence-based practice as described in the methodology, particularly with respect to prioritization of treatment modalities.

Use of High Quality Evidence

- Recommendations should be evidence-based with evidence of efficacy balanced with evidence of benefits and harms.

Management

- Invasive treatment should in almost all cases be preceded by adequate conservative treatment.
- Treatment should have specific, objective goals and should be monitored for achievement of those goals within a reasonable time.
- Failure to achieve a goal does not change the risk/benefit calculation for a subsequent treatment.

Invasive Treatment

- Invasive treatment may be performed if conservative treatment does not improve the health problem and there is evidence of effectiveness for a specific diagnosis, indication, and situation.
- The more invasive and permanent, the more caution should be exercised in considering invasive tests or treatments and the stronger the evidence of efficacy should be.

Application: Disability Management

- Treatment should not create dependence or functional disability.

Application: Shared Decision Making

- Testing and treatment decisions should be the result of collaboration between the clinician and the patient with full disclosure of benefits and risks.
- The best treatment strategy should be recommended.
- In cases where the patient cedes that judgment to the clinician, the clinician's judgment as to the best treatment strategy should be implemented.

Application: Cost-effectiveness

- The more costly the test or intervention, the more caution should be generally exercised prior to ordering the test or treatment and the stronger the evidence of efficacy should be.
- When two treatment methods appear equivalent, the most cost-effective method is preferred.

There is an explicit link between the recommendations and the supporting evidence. Each recommendation includes a list of references.¹⁹ Each recommendation has an accompanying paragraph that describes the Panel's conclusion about the evidence found on that question and the rationale for the specific recommendation. These paragraphs explain how the Panel interpreted and weighed the evidence and how they balanced this against other considerations such as potential harms and costs in formulating the recommendations. For example, if the Level I evidence found was inconsistent, then the Panel comments on how they interpreted and weighed the evidence in a logical and fair way and adhered to the "first principles" listed above.²⁰ The final recommendations are drafted and approved. See Table E for characteristics of the recommendations.

Attachment 12 summarizes the process described above (the literature search, review of studies, and development of recommendations) and which individuals are responsible for each task.

E. External Peer Review²¹

ACOEM will conduct external peer review of the *Guidelines* to: 1) assure that all relevant high quality scientific literature related to the topics has been found; 2) assure that the important evidence from the scientific literature relevant to the *Guidelines* has been accurately interpreted; 3) solicit opinions on whether the findings and recommendation statements are appropriate and consistent with the evidence; and 4) obtain general information on the *Guidelines'* conclusions and presentation from external topic experts. A more detailed explanation of the external peer review process is included in Attachment 13. These experts review the methodology used as well as summaries of the critically appraised evidence and the recommendations in each area. The *Guidelines* list the names of all peer reviewers, along with their affiliations for those not desiring anonymity. The Panels review the comments received from the external peer reviewers and make any final modifications to the *Guidelines*.

¹⁹ AGREE Domain III, e (see Table F).

²⁰ AGREE Domain III, c (see Table F).

²¹ AGREE Domain III, f (see Table F).

F. **Stakeholder Input**²²

In order to understand the needs and preferences of those individuals and organizations who use or are affected by the use of clinical practice guidelines in workplace settings and in the workers' compensation system, ACOEM solicits input from the following stakeholders: clinicians, health-care systems, workers/patients, employers, utilization reviewers, case managers, insurers and third party administrators, attorneys, regulators and policy makers. ACOEM solicits input from these stakeholders by various formal and informal mechanisms on an ongoing basis during the *Guidelines* development and implementation process. Specific processes and formats for soliciting input from stakeholders is further described in Attachment 15.

G. **Pilot Testing**²³

The *Guidelines* are pilot tested by having clinicians, utilization review managers, case managers, state workers' compensation systems, etc., use or comment on use of the *Guidelines* in their daily practice or management activities to determine if they are clear, easy to use and generally useful. Pilot testers will not be asked if they think the recommendations or process for development were appropriate. The *Guidelines* may be modified based on the feedback received from pilot testing, if the suggestions increase usability.

H. **Review by the GMC and the ACOEM Board of Directors**

During the entire evidence-based product development process, the GMC will work with the Panels, editors and research staff to ensure that the evidence-based product methodology is being followed, both in the literature evaluation process and development of conclusion and recommendation statements. The Board of Directors has an opportunity to comment on the *Guidelines* during the external review period. Their comments are reviewed by the Panel and any necessary changes are made to the *Guidelines*.

V. **Updating Process**²⁴

ACOEM reviews the literature periodically to identify any major changes in the evidence-base by content area. Subsequent updates of the *Guidelines* will be a full review of previous recommendations. The Panels will review new evidence and revise recommendations at least every 3 years.

VI. **Applicability**²⁵

- A. The ACOEM *Guidelines* are supported by several tools for application²⁷ These include the Utilization Management Knowledgebase™ (UMK) and *APG Insights*. The UMK is intended to summarize the evidence and actionable recommendations for utilization and case managers (Attachment 16). *APG Insights* interprets the *Guidelines* and, in concert with the Panels, may perform interim literature reviews and analysis using the methods described in Attachment 17.

One area that may be addressed in the update of the *Guidelines* is an entirely new chapter dedicated to suggested use of the *Guidelines* by agencies, institutions, and organizations. Other tools will be described in the chapter under development described below.

- B. The potential organizational barriers and cost implications in applying the recommendations will be discussed in a *Guidelines* chapter presently under development. It will use data from pilot testing but will also be a detailed operational examination of these factors.

²² AGREE Domain II, b (see Table F).

²³ AGREE Domain II, d (see Table F).

²⁴ AGREE Domain III, g (see Table F).

²⁵ AGREE Domain V, a, b, c (see Table F).

²⁷ AGREE Domain IV, d (see Table F).

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Table A: Criteria for Accepting Studies as Containing Adequate Evidence (Article Inclusion Criteria)

Table A-1: Criteria for Adequate Evidence for Studies of Clinical Assessment Methods

General criteria for all clinical studies

1. Be published in English in a peer-reviewed scientific publication.
2. Evaluate a clinical method currently available to providers in North America and Europe (and the clinical method that is not obsolete or experimental).
3. Provide original data about efficacy (accuracy) of the clinical method for the condition of interest.
4. Provide an adequate description of the clinical method (or provide a reference where this information can be found).
5. Evaluate subjects similar to the target population of interest (in this case, the general population of working age adults), generally with the number of subjects in each arm of the study to achieve acceptable statistical power.
6. Be rated as high or intermediate quality, using the quality rating process.

Additional specific criteria for studies of clinical assessment methods

7. Evaluate the efficacy (i.e., clinical accuracy) of the assessment method (i.e., the “test”) in a group that contains subjects both with and without the condition the test is intended to assess.
8. Compare the findings of the assessment method (test) to an adequate reference standard for all subjects (not just subjects who tested positive).*
9. Assure that results of the test (assessment method) are interpreted blinded to (that is, without knowledge of) the results of the reference standard, and that the results of the reference standard are interpreted blinded to the test results.
10. Provide enough data to allow calculation of, at minimum, sensitivity, specificity and positive predictive value(s), of the assessment method compared to the reference standard.

*Definition of an “acceptable reference standard” will vary depending on the clinical topic.

Table A: Criteria for Accepting Studies as Containing Adequate Evidence (Article Inclusion Criteria)

Table A-2: Criteria for Adequate Evidence for Studies of Clinical *Treatment* Methods

General criteria for all clinical studies

1. Be published in English in a peer-reviewed scientific publication.
2. Evaluate a clinical method currently available to providers in North America and Europe (and the clinical method that is not obsolete or experimental).
3. Provide original data about the accuracy of the clinical method for the condition of interest.
4. Provide an adequate description of the clinical method (or provide a reference where this information can be found).
5. Evaluate subjects similar to the target population of interest (in this case, the general population of working age adults) generally the number of subjects in each arm of the study to achieve acceptable statistical power.
6. Be rated as high or intermediate quality, using the quality rating process shown in Table B.

Additional specific criteria for studies of clinical treatment methods

7. Evaluate a group of subjects with a representative spectrum of the clinical condition of interest.
8. Be a randomized controlled trial (RCT)** evaluating clinical outcomes in a group receiving the intervention compared to a comparison group receiving either no intervention and/or a different intervention.
9. Evaluate functional outcomes that are important to a patient's overall health or well-being, or are important to society.
10. Use the same methods for measuring baseline subject characteristics and for assessing clinical outcomes for all groups studied.
11. Provide appropriate statistical comparison of study results.

**Or be a prospective clinical trial where subjects are assigned to treatment groups using a method that does not introduce systematic bias into the study and assures that groups are similar in relevant baseline characteristics.

Table B: Quality Scoring of Treatment Studies

Studies are rated using the following 11 criteria. Each criterion is rated 0, 0.5, or 1.0, thus the overall ratings range from 0-11. A study is considered low quality if the composite rating was 3.5 or less, moderate quality if rated 4-7.5, and high quality if rated 8-11.

Criteria	Rating Explanation
<p>Randomization: Assessment of the degree that randomization was both reported to have been performed and successfully* achieved through analyses of comparisons of variables between the two groups.</p>	<p>Rating is “0” if the study is not randomized or reports that it was and subsequent analyses of the data/tables suggest it either was not randomized or was unsuccessful.</p> <p>Rating is “0.5” if there is mention of randomization and it appears as if it was performed, however there are no data on the success of randomization, it appears incomplete, or other questions about randomization cannot be adequately addressed.</p> <p>Rating is “1.0” if randomization is specifically stated and data reported on subgroups suggests that the study did achieve successful randomization.</p>
<p>Treatment Allocation Concealed: Concealment of the allocation scheme from all involved, not just the patient.</p>	<p>Rating is “0” if there is no description of how members of the research team or subjects would have not been able to know how they were going to receive a particular treatment, or the process used would not be concealed.</p> <p>Rating is “0.5” if the article mentions how allocation was concealed, but the concealment was either partial involving only some of those involved or other questions about it are unable to be completely addressed.</p> <p>Rating is “1.0” if there is a concealment process described that would conceal the treatment allocation to all those involved.</p>
<p>Baseline Comparability: Measures how well the baseline groups are comparable (e.g., age, gender, prior treatment).</p>	<p>Rating is “0” if analyses show that the groups were dissimilar at baseline or it cannot be assessed.</p> <p>Rating is “0.5” if there is general comparability, though one variable may not be comparable.</p> <p>Rating is “1.0” if there is good comparability for all variables between the groups at baseline.</p>
<p>Patient Blinded</p>	<p>Rating is “0” if there is no mention of blinding of the patient.</p> <p>Rating is “0.5” if it mentions blinding, but the methods are unclear.</p> <p>Rating is “1.0” if the study reports blinding, describes how that was carried out, and would plausibly blind the patient.</p>
<p>Provider Blinded</p>	<p>Rating is “0” if there is no mention of blinding of the provider.</p> <p>Rating is “0.5” if it mentions blinding, but the methods are unclear.</p> <p>Rating is “1.0” if the study reports blinding, describes how that was carried out and would plausibly blind the provider.</p>
<p>Assessor Blinded</p>	<p>Rating is “0” if there is no mention of blinding of the assessor.</p> <p>Rating is “0.5” if it mentions blinding, but the methods are unclear.</p> <p>Rating is “1.0” if the study reports blinding, describes how that was carried out and would plausibly blind the assessor.</p>

<p>Controlled for Co-interventions: The degree to which the study design controlled for multiple interventions (e.g., a combination of stretching exercises and anti-inflammatory medication or mention of not using other treatments during the study).</p>	<p>Rating is “0” if there are multiple interventions or no description of how this was avoided.</p> <p>Rating is “0.5” if there is brief mention of this potential problem.</p> <p>Rating is “1.0” if there is a clear description of how co-interventions were avoided.</p>
<p>Compliance Acceptable: Measures the degree of non-compliance.</p>	<p>Rating is “0” if there is no mention of non-compliance.</p> <p>Rating is “0.5” if non-compliance is briefly addressed and the description suggests that there was compliance, but a complete assessment is not possible.</p> <p>Rating is “1.0” if there are specific data and the non-compliance rate is less than 20%.</p>
<p>Dropout Rate: Measures the drop-out rate.</p>	<p>Rating is “0” if there is no mention of drop-outs or it cannot be inferred from the data presented.</p> <p>Rating is “0.5” if the drop-out issue is briefly addressed and the description suggests that there were few drop-outs, but a complete assessment is not possible.</p> <p>Rating is “1.0” if there are specific data and the drop-out rate is under 20%.</p>
<p>Timing of Assessments: Timing rates the timeframe for the assessments between the study groups.</p>	<p>Rating is “0” if the timing of the evaluations is different between the groups.</p> <p>Rating is “0.5” if the timing is nearly identical (e.g., one day apart).</p> <p>Rating is “1.0” if the timing of the assessments between the groups is identical.</p>
<p>Analyzed by Intention to Treat: This rating is for whether the study was analyzed with an intent-to-treat analysis.</p>	<p>Rating is “0” if it was not analyzed by intent to treat.</p> <p>Rating is “0.5” if there is not mention of intent to treat analysis, but the results would not have been different (e.g., there was nearly 100% compliance and no drop-outs).</p> <p>Rating is “1.0” if the study specifies analyses by intention to treat.</p>
<p>Lack of Bias: This rating does not enter into the overall rating of an article. This is an overall indication of the degree to which biases are felt to be present in the study.</p>	<p>Rating is “0” if there are felt to be significant biases that are uncontrolled in the study and may have influenced the study’s results.</p> <p>Rating is “0.5” if there are felt to be some biases present, but the results are less likely to have been influenced by those biases.</p> <p>Rating is “1.0” if there are few biases, or those are well controlled and unlikely to have influenced the study’s results.</p>

*Simply allocating individuals to groups does not constitute sufficient grounds to assess the success of randomization. The groups must be comparable; otherwise, the randomization was unsuccessful.

Table C: Strength of Evidence Ratings

Note: Strength of Evidence Ratings are used to designate the quality and amount of evidence that supports a specific guideline recommendation, when taking into account the entire body of relevant evidence found in the literature search. The body of evidence on a topic consists of all studies found that were relevant to the specific clinical question and of acceptable quality. In general, the highest quality of evidence found should be used by the Panel as the basis for the guideline recommendation, unless other factors, such as the potential for harm, are an overriding consideration. When multiple studies of similar quality and relevance are found on a topic, these studies should be evaluated as a group; if results are generally consistent would be considered either Strong Evidence (for high quality studies) or Moderate Evidence (for moderate quality studies). In all cases, the rationale for each recommendation and scientific studies used as evidence, should be documented by the Panel.

A	Strong evidence-base: Two or more high-quality studies. ²⁶
B	Moderate evidence-base: At least one high-quality study or multiple moderate-quality studies ²⁷ relevant to the topic and the working population.
C	Limited evidence-base: At least one study of moderate quality.
I	Insufficient Evidence: Evidence is insufficient or irreconcilable.

*For treatment, the criteria used by evidence reviewers to categorize the quality of individual randomized controlled trials as high, moderate, or low quality are: adequate randomization, concealed treatment allocation, baseline cohort comparability, patient blinded, provider blinded, assessor blinded, controlled for co-interventions, compliance acceptable, dropout rate acceptable, timing of assessments equivalent, data analyzed by intention to treat, and lack of bias.²⁸ Each criterion receives a score of 0, 0.5, or 1. See Table B for a definition of each criterion and scoring level. Studies are considered of low quality if they are rated 3.5 or less, moderate quality if they are rated 4-7.5, and high quality if they are rated 8-11.

²⁶ For therapy and prevention, randomized controlled trials (RCTs) with narrow confidence intervals and minimal heterogeneity.

For diagnosis and screening, cross sectional studies using independent gold standards.

For prognosis, etiology or harms, prospective cohort studies with minimal heterogeneity.

²⁷ For therapy and prevention, a well-conducted review of cohort studies. For prognosis, etiology or harms, a well-conducted review of retrospective cohort studies or untreated control arms of RCTs.

²⁸ van Tulder M, Furlan A, Bombardier C, Bouter L. Updated method guidelines for systematic reviews in the Cochrane Collaboration back review group. *Spine*. 2003;28(12):1290-9.

Table D: Evidence-Based Recommendations

Recommendation Category	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate ²⁹ patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-Based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately Recommended	B	The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on moderate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and essentially no potential for harm.* The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, and/or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.
Insufficient- No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient – NOT Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs/high potential for harm to the patient.
NOT Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least moderate evidence that harms and costs exceed benefits based on limited evidence.
Moderately NOT Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least moderate evidence that harms and costs outweigh benefits.
Strongly NOT Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits.

²⁹ “Appropriate” means meeting screening or preventive method entry criteria without contraindications, or having the appropriate diagnosis, indication, time frame, prior conservative testing or treatment, and lack of contraindications for the specific test or treatment.

*For example, would include acetaminophen, and self-administered cold or heat treatments. Excludes all interventional treatments, manual adjustment, and prescriptions medications. Aggregate and individual harms and costs are considered.

Table E: Characteristics of ACOEM Evidence-based Recommendations

The ACOEM evidence-based methodology will result in clinical practice and management recommendations with the following attributes^{30, 31}:

- **Validity:** The recommendation should produce similar clinical outcomes in similar cases.
- **Reliability/reproducibility:** A different panel of experts experienced with evidence-based methodology would come to the same recommendation given the same evidence base and decision making matrix (e.g., pain physicians might a priori define a minor change in a pain scale rating in the treatment group was more important than objective functional changes.)
- **Clinical applicability:** The recommendation is applicable to a broad population. The recommendation states to which population it applies.
- **Clinical flexibility:** The recommendation identifies known or generally expected exceptions to its use (e.g., comorbidities affecting biological response, genetic differences, psychosocial factors affecting functional recovery, etc.).
- **Clarity:** The recommendation is clearly framed and understandable to clinicians and care managers using it.
- **Multidisciplinary process:** The recommendation is developed with input from relevant disciplines using common methods of evidence analysis and structured consensus development about the strength of the evidence and the likely benefits, harms, and costs of the recommendation.
- **Scheduled review:** The recommendation contains a recommended schedule for future review to assure currency.
- **Documentation:** All steps, evidence analysis, critical discussions and decisions in the evidence-based practice process will be documented and archived.
- **Transparency:** Records of deliberation that affect the evidence-based practice process and any revisions to analysis, recommendations, and conclusions will be available.
- **Board Review:** ACOEM's Board of Directors will review the recommendations as being high quality guidelines relevant to occupational and environmental medicine.

³⁰ Field MJ, Lohr KN. *Clinical Practice Guidelines: Directions for a New Program*. Washington, DC: National Academy Press, 1990, p. 59.

³¹ Harris JS. Clinical practice guidelines: development, use and evaluation. *J Occup Environ Med*. 1997;39(1):23-34.

Table F: AGREE Guideline Assessment Domains and Questions^{32,33}

- I. **Scope and Purpose**
 - a. The overall objectives of the guidelines are specifically documented.
 - b. The clinical questions covered by the guidelines are specifically described [PICO format – differs for etiology, diagnosis, prognosis, testing, treatment, functional recovery.]
 - c. The patients to whom the guideline is meant to apply are specifically described. [Age range, gender, clinical description, co-morbidity, etc.]
- II. **Stakeholder Involvement**
 - a. The guideline development group includes individuals from all relevant professional groups. [Professionals involved at some stage of the development process].
 - b. The patients' views and preferences have been sought. [Development group representatives, literature review, survey research]
 - c. The target users of the guidelines are clearly defined.
 - d. The guidelines have been piloted among target users.
- III. **Rigor of Development**
 - a. Systematic methods were used to search for evidence. [Search terms, sources, dates]
 - b. The criteria for selecting the evidence are clearly described.
 - c. The methods used for formulating the recommendations are clearly described.
 - d. The health benefits, side effects and risks have been considered in formulating the recommendations.
 - e. There is an explicit link between the recommendations and the supporting evidence. [Each recommendation linked to a list of references, and preferably, an evidence table and confidence interval diagram]
 - f. The guideline has been externally reviewed by experts prior to its publication. [Persons not involved in development; methodology for review presented; affiliations and support listed]
 - g. A procedure for updating the guidelines is provided.
- IV. **Clarity and Presentation**
 - a. The recommendations are specific and unambiguous.
 - b. Different options for management of the condition are clearly presented.
 - c. Key recommendations are easily identifiable.
 - d. The guideline is supported by tools for application.
- V. **Applicability**
 - a. The potential organizational barriers in applying the recommendations have been discussed.
 - b. The potential cost implications of applying the recommendation have been considered.
 - c. The guideline presents key review criteria for monitoring and/or audit purposes.
- VI. **Editorial Independence**

The guideline is editorially independent from the funding body.

 - a. Conflicts of interest of guideline development members have been recorded.

³² Development and Validation of an International Appraisal Instrument for Assessing the Quality of Clinical Practice Guidelines: The AGREE Project. *Quali Safety Health Care* 2003; 12: 18-23.

³³ The AGREE Collaboration. Appraisal of Guidelines for Research and Evaluation (AGREE) Instrument and Instrument Training Manual. London: St. George's Hospital Medical School, 2001. Available at www.agreecollaboration.org.

Attachment 1

Clinical Questions in the Key Domains of Occupational Medicine Practice

The *Guidelines* may answer the following clinical questions about variably diagnosed or treated, disabling, costly (individually or in the aggregate), controversial or common conditions:

Diagnosis

- What are the unique diagnostic criteria for a given condition?
 - What is the diagnostic test performance (+/- predictive value, likelihood ratios)?
- What are the most effective methods and approaches for the (early) identification or diagnosis of the condition?
 - At what time in the course of the disorder are the methods and approaches appropriate? Why?
 - What is the relationship, if any, between a patient's age, gender, socioeconomic status and/or racial or ethnic grouping and specific treatment outcomes for the condition?

Treatment

- What are the most effective methods and approaches for treating the condition that improve on the untreated/natural course of recovery?
 - At what time in the course of the disorder are the methods or approaches most effective? Why?
 - Are there contraindications to the methods or approaches?
- What are the specific diagnoses and indications, if any, for surgery as a means of treating the condition?
 - What prior conservative treatment is appropriate?
 - At what time in the course of the disorder is surgery appropriate and effective, with benefits exceeding harms? Why?
 - What are the relative and absolute contraindications for surgical procedures?
 - What are the relative benefits and harms of the various surgical and non-surgical interventions that may be used to treat the condition?

Attachment 2 Problem Formulation Example

Clinical Question	What are the most appropriate, necessary, efficient and effective [etiologic analyses] [tests/methods] [treatments] to ...
Intended Use of Guideline	To assist clinicians with the management of ...
Population	Workers
Health Problem	[Symptom] [Diagnosis, defined by...]
Health Intervention[s]	History Risks Physical exam Tests Medications Physical medicine Procedures
Practitioners	Occupational health nurses, occupational medicine physicians, chiropractors, physical therapists, etc.
Setting	Outpatient? Inpatient?
Intermediate biological or statistical outcomes	Health service use Sensitivity, specificity, FP, FN, predictive value, OR, NNT Iatrogenic problems, NNH Symptom frequency and severity Time loss Reduced work capacity
Important health and economic outcomes	Function Disability, productivity/work capacity, and time lost from work Impairment Quality of work or personal life Costs of prevention or treatment vs. benefits Health service use, efficiency

Attachment 3

Procedures for the Selection and Training of *Guidelines* Development Groups

1. Selection of Guidelines' Development Groups

In early 2006, ACOEM's President announced the formation of new Guideline development groups and invited all ACOEM members to apply for one or more of the committees and panels created to update the *Guidelines* (i.e., the EBPC, GMC or Panels). Interested individuals were asked to submit a copy of their curriculum vitae (CV) along with a completed application specifying their qualifications (see Attachment 4 for application). Applications were reviewed for a minimum level of acceptability (i.e., the application or CV demonstrated evidence of one or more skills appropriate for the project).

The applications were reviewed by the Candidate Selection Committee appointed by ACOEM's President, and composed of representatives of appropriate ACOEM Board of Directors, Councils and Committees. The committee held conference calls to review the applications and assigned interested individuals to the appropriate committee/panel. Appointments were made based on the expressed interest of the applicant, education and on their qualifications and strengths. Individuals were informed that applicants might not be appointed to the committees or panels they expressed interest in. Letters were also sent by ACOEM's President to selected medical specialty societies asking them to nominate an individual to serve as a member of the GMC.

Initially, committee and panel members will serve for one three year revision cycle unless reappointed using the procedures below. ACOEM maintains documentation of these applications, invitations to external organizations, qualifications, selection, acceptances and membership for committees, panels and external reviewers. In practice, the original criteria for appointment were considered by many Panel members to be both too stringent and too lax. Clinicians with vested interests in promoting their clinical practice patterns were identified as also having potential conflicts of interest and individuals with experience in workers' compensation claims administration have significant value in identifying potential topics, difficulties with guidelines interpretations, etc. Thus, the membership of these panels has been broadened to incorporate greater diversity and thus strengthen the processes.

Ongoing Selection Process

As committee and panel members finish their terms or leave the committees or panels for other reasons, the ACOEM President or his or her designee will invite all ACOEM members to apply for one or more of the committees and panels described above. Interested individuals will submit a current CV, bibliography and a completed application (Attachment 4) and applications will be reviewed for a minimum level of acceptability. Again, a Candidate Selection Committee appointed by the ACOEM President will review the applications and assign interested individuals to the appropriate committee/panel. Appointments will be based on the expressed interest of the applicant, education, and experience in evidence-based medicine. The ACOEM President will also invite selected medical specialty societies to nominate individuals to serve on appropriate committees or panels.

ACOEM will make efforts to solicit members of other relevant clinical specialties to serve as members of the *Guidelines* development panels. Nominations will be sought from relevant clinical specialty organizations, as well as from other sources. All individuals interested in serving as a Panel member will follow the same application process as ACOEM members (i.e., submitting a CV and application, which will be reviewed by the Candidate Selection Committee). ACOEM will inform the professional societies that their nominees may or may not be selected for a particular Panel. The intent of the Candidate Selection Committee is to assure that all Panels have adequate representation from the appropriate medical and non-medical specialties relevant to the topic. However, selected Panel members will serve as individuals bringing the perspective of their discipline, and not as formal representatives of their professional societies. All applicants that are not selected as Panel members will be invited to participate in the external peer review process.

In order to achieve stability in the Panels and transfer institutional memory, the initial Panel members may serve extended terms to achieve a stagger to achieve approximately one quarter of the panel members rotating off the panel in any given year.

2. Training Guideline Development Groups

The GMC trains the EBPC, Panels, the UMK Development Team, and the *APG Insights* Editorial Board on the approved methodology as described herein. A sample training curriculum is presented in Attachment 5. Training will initially take place at in-person meetings of the EBPC/Panels.³⁴ The training will also be available online so that Panel members can download and view the training material at their convenience. All members involved in the update of the *Guidelines* and the production of other evidence-based products and educational efforts will be required to either attend or view the training and complete an examination to receive a certificate of completion in ACOEM's evidence-based medicine methodology. CME will be made available for this training.

³⁴ At SOTAC 2006 in New York and AOHC 2007 in New Orleans, and subsequently.

Attachment 4
ACOEM Evidence-based Practice Committee Appointments
Application Form

I (please print your name here) would like to be considered for membership on the (please check all that apply):

- The **Methodology Committee** which is charged with developing, maintaining, and ensuring adherence to state-of-the-art methods.
- The **Evidence-based Practice Committee (EBPC)** which is charged with acquiring and evaluating evidence, and bringing forth evidence-based practice recommendations. Kurt Hegmann, MD, will chair this Committee.
- An **Evidence-based Practice Panel** which is a subgroup of the EBPC and will focus on developing body part/system specific evidence-based guideline recommendations. As there will be multiple subgroups appointed, please specify the body part or specific system that you are most interested in (e.g., shoulder, hand, mental health, respiratory, etc.).

Body Part/System _____

To assist ACOEM in evaluating your committee preference(s), please provide the following information. (Be concise and attach any additional supporting information as necessary.)

1) ABMS certification(s) you hold (check all that apply):

- Occupational Medicine
- Preventive Medicine (e.g., General Preventive Medicine or Aerospace Medicine)
- Orthopedic Surgery
- Physical Medicine & Rehabilitation
- Family Medicine
- Internal Medicine
- Other (please specify): _____

2) Graduate degrees you hold (check all that apply):

- MD DO PhD MPH/MSPH MS
- DrPH DC Other _____

3) Describe your formal training in clinical epidemiology and biostatistics. (List schools and degrees and/or courses, and any training received in non-degree programs.)

Number of graduate credits you have had in:

Epidemiology: ____ credits Biostatistics: ____ credits

4) Briefly describe your experience in conducting formal reviews of the medical literature. (For example, for which journals have you provided review services and how often? How many reviews have you conducted to date? What other types of reviews have you performed?)

- 5) Describe any contributions you have made, especially to the medical literature, and identify the subject. (For example, how many epidemiological research articles have you published? How many clinical research articles? How many meta-analyses/structured review papers? How many other systematic reviews have you completed, including technical reports, and on what subjects?)
- 6) Describe any experience you have had in serving on guideline creation panels and/or consensus panels.
- 7) What relevant national, regional, or local committees have you served on?
- 8) What are your primary reasons for wanting to participate on the committee/panel you selected?
- 9) What do you see as your primary strengths?
- 10) What biases might you bring to the process (and we all have some)?
- 11) Do you have any potential financial or non-financial conflicts of interest? Are you currently involved in developing treatment guidelines for other organizations? If yes, please explain.
- 12) Is there any particular clinical expertise that you bring to this project? If so, please elaborate?
- 13) Is there any particular technical expertise (e.g., statistics, analyzing the medical literature, or creating guidelines) that you bring to this project? If so, please explain?

Attachment 5

Draft Training Curriculum

Introduction to Evidence-Based Medicine (15 minutes)

- Historical background
 - Practice variance
 - Cost escalation without outcome improvement
 - Role of clinical expertise and judgment
- Dimensions of EBM in Occupational Medicine
 - Diagnosis and testing
 - Work-relatedness
 - Treatment
 - Pain management
 - Disability management and return to work
 - Often independent from medical care
 - Impairment evaluation
- Improving consistency /reducing variance, improving value and quality
 - Evidence
 - Thought process
 - First principles

ACOEM Clinical Practice Guidelines Process (15 minutes)

- Definition of clinical practice guidelines
- Stakeholders
- Purpose
- Committee Structure and roles
- Steps in the process

Asking Answerable Clinically Relevant Questions (10 minutes)

- Posing answerable clinical questions
- PICO

Key Principles and Levels of Evidence (30 minutes)

- Could the effect be due to chance?
- Harms and benefits
- Randomized Controlled Trials (RCTs)
- Cohort studies
- Case-control studies
- Case series
- Retrospective population studies – claims data analyses
- Cross-system studies
- Causation analysis
- Crossover studies and trials of one
- Evidence rating schemes

Evidence Searches (15 minutes)

- Databases
- Search terms and MESH headings
- Focusing the search
- Full text searches
- Related articles and authors
- Documentation (search criteria and search results)

Studying a Study (30 minutes)

- Study design
 - Entry/enrollment criteria
 - Definition and standardization of testing or treatment
 - Blinding
 - Allocation
 - Outcomes
 - Dropout rates, non-responders
- Basic statistics
 - Sensitivity and specificity (positive and negative predictive values, likelihood ratios, ROC curves)
 - Confidence intervals and meta-analysis
 - Tests of significance
 - Power calculations, sample size, etc.
 - Number needed to treat

Small Group Exercise

Issues in Musculoskeletal Research – the State of the Art (10 minutes)

- Entry criteria
 - Definition
 - Severity levels
- Blinding – dimensions
- Sample and sample size
- Standardizing the intervention
- Multiple simultaneous interventions
- Outcomes under study
 - Pain
- Confounders
 - Litigation
 - Compensability

Systematic Reviews and Meta-Analysis (15 minutes)

- Process
- Homogeneity
- Strengths and Weaknesses

Small Group Exercise

Recommendations (30 minutes)

- First principles
- Formulation – what a good recommendation looks like
- Process
- Documentation
- Levels and classification schemes (AHRQ, CEBM, other schemes)
- Clarity and explicitness
- Usability

Small Group Exercise

Support tools and audit

- Utilization Review
- Application of Rules

Attachment 6
Disclosure of Conflicts of Interest Statement

Member	Employment	Research Grants	Other Research Support	Speakers' Bureau/Honoraria	Ownership Interest	Consultant/Advisory Board	Other
Member 1							
Member 2							
Member 3							

Attachment 7

Evidence Ranking by Type of Clinical Question^{35, 36, 37, 38, 39}

Clinical Assessment Methods (Diagnosis and Testing)

- 1a. Clinical practice guidelines validated on a test set
- 1b. Independent blind comparison of patients from an appropriate spectrum of patients, all undergoing the diagnostic test and a good reference standard
- 1c. Absolute SpPins and SnNouts

2. Independent blind or objective comparison
Study of non-consecutive patients, or narrow spectrum, all undergoing the diagnostic test and a good reference standard
Diagnostic CPG not validated in a test set

3. Independent or blind comparison of an appropriate spectrum but the reference standard was not applied to all patients or was of poor quality

Clinical Treatment Methods

1. Individual high-quality randomized controlled trial with narrow confidence interval
1. All or none studies

2. High quality individual cohort studies or low quality RCTs (e.g. < 80% follow up)

- 3a. High quality individual case-control studies
- 3b. High quality retrospective cohort studies

Harms

1. Individual high-quality RCTs with narrow confidence intervals

- 2a. High quality prospective cohort studies
- 2b. Low quality RCTs

- 3a. High quality retrospective cohort studies
- 3b. High quality individual case control studies

Symptom and Prevalence Studies

- 1a. Prospective cohort studies with sufficient follow up
- 1b. All or none case series

³⁵ Phillips R, Ball C, Sackett D, Badenoch D, Straus S, Haynes B, Dawes M. *Levels of Evidence and Grades of Recommendation*. Oxford Centre for Evidence-Based Medicine Levels of Evidence (www.cebm.org)

³⁶ Verbeek J, van Dijk F (eds.). *A Practical Guide for the Use of Research Information to Improve the Quality of Occupational Health Practice*. Geneva: World Health Organisation, 2006.

³⁷ Verbeek J, Malmivaara A, Varonen H, Olsen O, Schaafsma F, Laamanen I et al. *The Evidence-Based Approach for Occupational Health Practitioners: How to Use Research Information to Improve the Quality of Occupational Health Practice*. Kuopio, FIN: NIVA/NORDEN, May 2006

³⁸ Heneghan C, Badenoch D. *Evidence-based Medicine Toolkit, 2nd Edition*. Malden, Mass.: Blackwell Publishing, 2006.

³⁹ Straus SE, Richardson WS, Glasziou P, Haynes RB. *Evidence-Based Medicine: How to Practice and Teach EBM, 3rd Edition*. Edinburgh: Elsevier Churchill Livingstone, 2005. Includes CD, laminated cards and supporting web site.

- 2. High quality ecological studies
- 3a. Non-consecutive cohort studies or very limited populations
- 3b. Retrospective cohort studies or poor follow-up

Disability Management

- 1a. Individual randomized controlled trial with narrow confidence interval
- 1b. All or none studies
- 2. High quality individual cohort studies or low quality RCTs (e.g. < 80% follow up)
- 3a. High quality individual case-control studies
- 3b. High quality retrospective cohort studies

Notes:

Homogeneity means a systematic review that has minimization of worrisome variations (heterogeneity) in the directions and degrees of results between individual studies. Not all systematic reviews with statistically significant heterogeneity need be worrisome, and not all worrisome heterogeneity need be statistically significant. As noted above, studies displaying worrisome heterogeneity should be tagged with a "-" at the end of their designated level.

Clinical decision rules are algorithms or scoring systems which lead to a prognostic estimation or a diagnostic category.

A **high quality randomized controlled trial (RCT)** should have the following criteria: adequate randomization; concealed treatment allocation; baseline similarity of groups; patient, provider, and assessor blinding; avoided co-interventions; compliance that is acceptable in all groups; an acceptable description for drop out rates; timing outcome assessment; intention to treat analysis; and low risk of bias.

A **high quality cohort study** is one that clearly defined comparison groups and measured exposures and outcomes in the same (preferably blinded), objective way in both exposed and non-exposed individuals and identified or appropriately controlled known confounders, and carried out a sufficiently long and complete follow-up of patients.

A **poor quality cohort study** is one that failed to clearly define comparison groups and/or failed to measure exposures and outcomes in the same (preferably blinded), objective way in both exposed and non-exposed individuals and/or failed to identify or appropriately control known confounders and/or failed to carry out a sufficiently long and complete follow-up of patients.

A **high quality case-control study** is one that clearly defined comparison groups and measured exposures and outcomes in the same (preferably blinded), objective way in both cases and controls and identified or appropriately controlled known confounders.

A **poor quality case-control study** is one that failed to clearly define comparison groups and/or failed to measure exposures and outcomes in the same (preferably blinded), objective way in both cases and controls and/or failed to identify or appropriately control known confounders.

Split-sample validation is achieved by collecting all the information in a single tranche, then artificially dividing this into "derivation" and "validation" samples.

An “**Absolute SpPin**” is a diagnostic finding whose Specificity is so high that a Positive result rules-in the diagnosis.

An “**Absolute SnNout**” is a diagnostic finding whose Sensitivity is so high that a Negative result rules-out the diagnosis.

Good, better, bad and worse refer to the comparisons between treatments in terms of their clinical risks and benefits.

Good reference standards are independent of the test, and applied blindly or objectively to applied to all patients.

Poor reference standards are haphazardly applied, but still independent of the test. Use of a non-independent reference standard (where the 'test' is included in the 'reference', or where the 'testing' affects the 'reference') implies a level 4 study.

Better-value treatments are clearly as good but less costly, or better at the same or reduced cost.

Worse-value treatments are as good and more expensive, or worse and the equally or more expensive.

Validating studies test the quality of a specific diagnostic test, based on prior evidence.

An **exploratory study** collects information and trawls the data (e.g. using a regression analysis) to find which factors are “significant.”

A **poor quality prognostic cohort study** is one in which sampling was biased in favor of patients who already had the target outcome, or the measurement of outcomes was accomplished in <80% of study patients, or outcomes were determined in an unblinded, non-objective way, or there was no correction for confounding factors.

Good follow-up in a differential diagnosis study is >80%, with adequate time for alternative diagnoses to emerge (e.g., 1-6 months acute, 1-5 years chronic)

Attachment 8
Example of Search Criteria Table

DATABASE	TERMS	ARTICLE TYPE AND LIMITS	TIME FRAME	# FOUND	REVIEWED IN DETAIL	# INCLUDED

Attachment 9

Databases to be Searched

ACOEM searches the following databases for primary sources of original research. It may also search other databases likely to contain references to high quality medical literature. Additional literature may be reviewed brought to the committee's attention from interested parties.

1. The National Library of Medicine's MEDLARS database (Medline) (www.nlm.nih.gov)
2. EBM Online (www.bmjournals.com)
3. The Cochrane Central Register of Controlled Trials (<http://www.cochrane.org/reviews/clibintro.htm>)
4. TRIP Database (www.tripdatabase.com)
5. CINAHL (Nursing, allied health, physical therapy, occupational therapy, social services:
<http://www.cinahl.com/cdirect/cdirect.htm>)
6. EMBASE (<http://www.embase.com/>)
7. PEDro (<http://www.pedro.fhs.usyd.edu.au/>)

Attachment 10
Summary Table for Individual Intervention Studies

Study Design													
Study Citation													
Research Question	Does [treatment] result in improved outcomes for [condition]?												
Population	Inclusion criteria												
	Exclusion criteria												
	Study population characteristics												
	Generalizability to working patients												
Methods													
Statistical Methods													
Quality Assessment	Score*	1	2	3	4	5	6	7	8	9	10	11	12
Relevant Outcomes Assessed													
Results													
Author Comments													
Reviewer Comments													

*Quality Assessment Questions (scoring scale = 0, 0.5, 1): 1 = Randomization, 2 = Treatment allocation concealed, 3 = Baseline Comparability, 4 = Patient blinded, 5 = Provider blinded, 6 = Assessor blinded, 7 = Controlled for co-interventions, 8 = Compliance acceptable, 9 = Dropout rate, 10 = Timing of Assessments, 11 = Analyzed by intention to treat, 12 = Lack of bias (not included in scoring).

Attachment 11 Sample Voting Process

When possible, consensus among panel members is sought when developing guideline findings and recommendations statements, including those based on relevant evidence and those based on panel consensus. When full consensus among a panel is not possible, then a process for voting will be used. An example of such a process is described below. The Guideline Methodology Committee may modify or refine this procedure, based on feedback about its usefulness and other factors.

Example of possible voting process when consensus is not found

Voting on guideline recommendations will be conducted using a modification of the nominal group technique (NGT), a method previously used in guideline development⁴⁰. Briefly each member of the guideline Work Group ranks his or her agreement with a guideline recommendation or performance measure on a scale ranging from 1 to 9 (where 1 is “extremely inappropriate” and 9 is “extremely appropriate”). Consensus is obtained if the number of individuals who do not rate a measure as 7, 8, or 9 is statistically non-significant (as determined using the binomial distribution). Because the number of Work Group members who are allowed to dissent with the recommendation depends on statistical significance, the number of permissible dissenters varies with the size of the work group. The number of permissible dissenters for several work group sizes is given in the table below:

Work Group Size	Number of Permissible Dissenters
≤ 3	Not allowed. Statistical significance cannot be obtained
4-5	0
6-8	1
≥ 9	2

The NGT is conducted by first having members vote on a given recommendation/performance measure without discussion. If the number of dissenters is “permissible,” the recommendation/measure is adopted without further discussion. If the number of dissenters is not permissible, there is further discussion to see whether the disagreement(s) can be resolved. Three rounds of voting are held to attempt to resolve disagreements. If disagreements are not resolved after three voting rounds, no recommendation/measure is adopted.

⁴⁰ Murphy MK, Black LA, Lamping, DL, et al. Consensus development methods, and their use in clinical guideline development. *Health Technol Assessment*. 1998;2(3).

Attachment 12
ACOEM Guideline Development/Revision Process Summary

Step	Purpose	Individual(s) Responsible	Educational Credentials
Pose Answerable Clinical Questions	- Direct search, following format in Attachment 9.	Editor, EBPPs	MD, DO
Literature Search	-Comprehensive search of the literature focusing on highest level of evidence in Attachment 7. -Pull articles using inclusion criteria shown in Table A.	Research Assistant(s)	Undergrad/ MS/MPH/MD (resident)
Article Abstraction/ Preliminary Development of Evidence tables	-Read articles -Initial construction of evidence tables for topic, for example Attachment 10.	Research Assistant(s) Study Coordinator(s)	MS/MPH/PhD
Article Abstraction/ Semi-Final Development of Evidence Tables	-Read articles -Semi-final construction of evidence tables for topic, including critiquing of study design and data.	Study Coordinator(s), Research Associate	MS/MPH/PhD
Evidence Table Review and Finalization	-Over-read evidence tables to ensure that all important aspects of articles are included. -QA/QC	Physician(s)	MD/DO with MPH (or equivalent)
Rate Articles	-Rate the articles based on defined criteria, for example Table B for RCTs	Physician(s)	MD/DO with MPH (or equivalent)
Rate Strength of Evidence	-Determine strength of evidence rating for topic based on the quality of the articles as shown in Table C.	Physician(s)	MD/DO with MPH (or equivalent)
Draft Summaries	-Draft text summaries of the evidence on each topic citing design, results and quality.	Physician(s)	MD/DO with MPH (or equivalent)
Draft Recommendations	-Draft recommendations	Physician(s)	MD/DO with MPH (or equivalent)
Panel Process	-Review evidence tables and strength of evidence ratings. -Revise recommendations based on discussion, application of clinical judgment and first principles or new evidence.	Multi-disciplinary health professionals	MD/DO/MPH, MS, PT, etc.
Guideline Review	-Review/oversight of final guidelines to ensure consistency with methodology and other related guidelines. -QA/QC	Physician	MD/DO
External Review	-Review guideline for consistency with evidence and conservative expert clinical practice as well as methodology and usability.	Physicians, physical therapists, occupational therapists, pharmacists, psychologists, other health professionals	MD, DO, PhD, DC, RPT/PhD, DrPh, etc.

Stakeholder input	-Review guideline for usability and applicability.	Physicians, attorneys, claims professionals, UR nurses, case managers	MD, DO, JD, RN, DC, RPT, PhD, certified claims managers
Pilot testing	-Use guideline, assess usability and applicability.	Physicians, UR nurses, case managers, physical therapists	MD, DO, RN, RPT
Revision	-Revisions based on internal and external review comments and evidence.	Physician	MD, DO
Approval	-Approve guideline based on content, methodology and quality assurance.	ACOEM Board of Directors	MD, DO w/MPH or equivalent

Attachment 13

External Peer Review Process

Names of potential peer reviewers can be submitted by many sources (e.g., the Panels or committees, the ACOEM Board or leadership, and other professional organizations and stakeholder groups). ACOEM asks other professional organizations to provide nominations for individual peer reviewers for guideline products (see Attachment 14 for list of organizations that will be invited). ACOEM sends a letter to the President or Executive Director of the professional organizations inviting them to nominate at least one individual peer reviewer for each of the updates when they are developed. Individuals invited to be external peer reviewers are required to sign a confidentiality agreement indicating that they will not disclose or discuss contents of the *Guidelines* until after it is formally released. The *Guidelines* list the names of all peer reviewers, along with their affiliations for those not desiring anonymity.

Each peer reviewer receives a final draft of the *Guidelines* and asked to comment on the completeness of the scientific literature evaluation in their topic area, the clarity and technical accuracy of the *Guidelines* evaluation and summary of the evidence, and the appropriateness of the *Guidelines*' findings and recommendation statements. Any other comments or suggestions relating to the *Guidelines* are also welcomed. Peer reviewers are asked to provide comments on the following questions.

1. Is the methodology and process appropriate?
2. Does the guideline show that it adhered to the methodology?
3. Is the literature evaluated comprehensive and appropriate?
4. Does the best evidence appear to have been found?
5. Is the rationale for each of the guideline's findings and recommendations clearly stated and does it logically flow from the evidence presented?
6. Based on your independent knowledge of the topic, do you agree with the Panel's evaluation of the literature and the guideline recommendations?
7. Any other comments or suggestions about the clarity of presentation or usability of the guideline?

All comments received are sent back to the appropriate Panels for review.

Attachment 14
Professional and Patient Organizations to be Invited to Review the
Updates to the *Guidelines*

**Other organizations could be added to this list throughout the Guideline development process.*

- Academy of Organizational & Occupational Psychiatry
- American Academy of Medical Acupuncture
- American Academy of Dermatology
- American Academy of Disability Evaluating Physicians
- American Academy of Family Physicians
- American Academy of Neurology
- American Academy of Ophthalmology
- American Academy of Orthopaedic Surgeons
- American Academy of Pain Management
- American Academy of Pain Medicine
- American Academy of Physician Assistants
- American Academy of Physical Medicine and Rehabilitation
- American Association for Hand Surgery
- American Association of Occupational Health Nurses
- American Association of Neurological Surgeons
- American Association of Neuromuscular and Electrodiagnostic Medicine
- American Association of Vascular Surgery/
Society for Vascular Surgery
- American Board of Independent Medical Examiners
- American Board of Preventive Medicine
- American Chiropractic Association
- The American Chronic Pain Association
- American College of Allergy, Asthma & Immunology
- American College of Chest Physicians
- American College of Emergency Physicians
- American College of Foot and Ankle Surgeons
- American College of Radiology
- American College of Rheumatology
- American College of Physicians-American Society of Internal Medicine
- American College of Preventive Medicine
- American College of Sports Medicine
- American College of Surgeons
- American Industrial Hygiene Association
- American Massage Therapy Association
- American Medical Association
- American Neurological Association
- American Occupational Therapy Association
- American Optometric Association
- American Osteopathic Association
- American Pain Foundation
- American Pain Society
- American Physical Therapy Association
- American Podiatric Medical Association
- American Public Health Association—
Chiropractic Health Care Section
- American Psychiatric Association
- American Psychological Association
- American Society of Interventional Pain Physicians
- American Society of Anesthesiologists
- American Society of Plastic Surgeons
- American Thoracic Society
- Association for Applied Psychophysiology and Biofeedback
- Association of Rheumatology Health Professionals
- Canadian Neurological Society
- Chronic Pain Association of Canada
- Commission on Accreditation of Rehabilitation Facilities
- Congress of Neurological Surgeons
- Institute of Work and Health
- International Association for the Study of Pain
- The National Pain Foundation
- North American Neuromodulation Society
- North American Spine Society
- Society of Acupuncture Research
- Society of Behavioral Medicine
- Society of Cardiovascular and Interventional Radiology
- Society for Industrial and Organizational Psychology

Attachment 15

Stakeholder Involvement

In order to insure editorial independence in the *Guidelines* development process, the stakeholder groups are asked for input about the *Guidelines*, but are not informed of Panel deliberations or shown drafts of the *Guidelines* prior to the formal release of the documents. In some cases, specific members of the stakeholder groups may serve as members of the Panels, or participate in peer review or pilot testing. However, all individuals involved in the development of the *Guidelines*, peer review and pilot testing will be asked to keep all information about the Panels' deliberations and conclusions confidential until the *Guidelines* are formally released.

Stakeholders are asked for comments about their experience in using existing clinical practice guidelines and related products and suggestions for future improvements. They are also asked for input on the use of clinical practice guidelines in clinical care, case management, claim administration, claim adjudication, and in the development of policies and regulations. Some specific questions that ACOEM asks the stakeholders include:

1. What aspects of the current ACOEM *Guidelines* are, or are not, easy to understand and to use in your work (e.g., clinical care, case management or adjudication)?
2. What aspects of the current ACOEM *Guidelines* are, or are not, useful in helping you to make and justify the types of decisions needed in your job (whether in clinical care, case management or adjudication)?
3. How can clinical practice guidelines be improved in order to better meet your needs?
4. What are your perceptions of the environment where guidelines are being used?
5. What positive or negative statements have you heard about the use of guidelines?
6. What are your thoughts about the future trends in this area?

As documentation, ACOEM keeps a list of stakeholders that were formally asked for input and a list of those stakeholders who responded by providing feedback or suggestions. Comments and suggestions are also archived. The specific comments of stakeholders may sometimes be given anonymously in various *Guidelines* documents; however, these comments are not attributed to a specific group or individual, unless the stakeholder gives permission for such disclosure.

Attachment 16

Methodology for Utilization Management Knowledgebase™ (UMK)⁴¹

Structure Development Elements

The specific elements included in the Utilization Management Knowledgebase (UMK) have been developed in a way to facilitate efficient identification, determination and use of the appropriate management of a particular condition based on the duration of symptoms and effectiveness of prior treatment. At the highest level, the major elements in the UMK include the following:

1. ACOEM Utilization Management Code (AUC): a 5 to 6 character alphanumeric code to facilitate electronic record keeping and data collection.

The code is particularly important in that it provides a consistent reference to a particular clinical pathway. The intent in creating this numbering system is that UMK users share a common language when using this product, with a clear understanding of the specific clinical management details and criteria associated with each AUC.

2. Clinical Vignette—a description of a typical clinical scenario and examination findings with which the physician may be presented through a patient encounter. These descriptions consider elements that may not be captured by traditional diagnosis reporting: the duration of symptoms and special circumstances that may be meaningful in the occupational setting.
3. Clinical Pathway—consistent with the *ACOEM Practice Guidelines*, 2nd Edition, an abbreviated, short-hand, articulation of the evaluation, management, diagnostic and treatment planning associated with the vignette and corresponding level of care. The Clinical Pathway is a description of the clinical services that are recommended or optional. It does not include those services that are “not recommended.”
4. Utilization Case Management Statements—parameters for physician services, diagnostic testing, and ancillary services to guide care and help evaluate the degree to which services actually provided are consistent with the Clinical Vignette and the Clinical Pathway. A utilization management criteria field exists for every identifiable service described in the clinical pathway. These parameters are drawn from the *ACOEM Practice Guidelines*, 2nd Edition. Each utilization management criterion posted includes a specific source reference cited by page number(s), table number(s) and/or algorithm(s).

The “APG2” abbreviates the book title, and the “258” refers to the page that details the evaluation approach. At times, the ACOEM newsletter, *APG Insights*, is also referenced.

The Utilization Case Management Statements explicitly list diagnostic and/or treatment options that are contraindicated. These are included as “Not indicated” in the corresponding service as described in the clinical pathway.

At a more granular level, the structure for each of the UMK pathways was derived from the summary tables included within each body part-specific chapter in the *Occupational Medicine Practice Guidelines*, 2nd edition. In the *Practice Guidelines*, these tables include a list of Clinical Measures, each of which represents a unique diagnostic or treatment approach (as shown in the first column of the table, below). These Clinical Measures have been similarly incorporated into the UMK to facilitate review of diagnosis and treatment options. Minor enhancements have been made in the UMK to improve the ease of product

⁴¹ From Bruce Sherman, MD.

use, including the addition of a process flow structure to streamline the review of diagnostic and treatment interventions. Additionally, a more detailed breakdown of relevant Clinical Measures is included in the UMK to further enhance the ease of use of this product.

Content Development

Data from the tables and text in each chapter is included in each of the category and sub-category entries in a concise form that, to best efforts, reflects the intent of the text as stated in the *Practice Guidelines*. Where necessary for clarification, questions were submitted to the guidelines developers, with responses published in APG Insights. This information was then included in the UMK.

The table below and on the following page includes both the *Practice Guidelines* Clinical Measure elements and the corresponding UMK entries:

<i>Practice Guidelines Clinical Measure Entry</i>	<i>Corresponding UMK Category Pathway Entry</i>	<i>UMK Utilization Case Management Subcategory Entries*</i>
History and physical exam	[Pertinent findings included in case vignette]	
Patient education	Patient education and counseling	<ul style="list-style-type: none"> • Patient education and counseling
Medication	Medications	<ul style="list-style-type: none"> • Over-the-counter • Prescriptions • Injections
Physical treatment methods	Physical treatments	<ul style="list-style-type: none"> • Physical therapy visits • Physical and Occupational therapy modalities • Manipulation • Eye irrigation • Foreign body removal • Aspiration • Radiofrequency neurotomy
Aspirations and injections	[Aspirations included in Physical treatments; Injections included in Medications]	
Rest and immobilization	[Combined with Activity and exercise, below]	
Activity and exercise	Activity limitations	<ul style="list-style-type: none"> • Rest • Work restrictions
Detection of physiologic abnormalities	[Included in Imaging, Adjunctive testing and Special testing, below]	
Detection of neurologic abnormalities	Electrodiagnostics	<ul style="list-style-type: none"> • Electrodiagnostic studies • Nerve conduction studies
Radiography	Imaging studies	<ul style="list-style-type: none"> • X-ray • CT • MRI • Ultrasound • Bone scan • Arthrography
Other imaging procedures	[Included in Imaging studies, above]	
Surgical considerations	Surgery [Specific indications are also included in additional vignette text in Aggressive pathway]	<ul style="list-style-type: none"> • Surgery

Psychosocial factors	Yellow flags	<ul style="list-style-type: none"> • Yellow flags
	Adjunctive testing	<ul style="list-style-type: none"> • Goniometry
	Special testing	<ul style="list-style-type: none"> • Diskography
	Pain management	<ul style="list-style-type: none"> • Pain management
	Complementary therapies	<ul style="list-style-type: none"> • Acupuncture • Biofeedback • Relaxation techniques • Electromagnetic therapy
	Equipment & appliances	<ul style="list-style-type: none"> • Splints • Tennis elbow band • Eye patch • Sling • Crutches • Foot support • Padding • Neck collar • Wrist splint • Shoe insoles • Back corset
	Treatment options - other	<ul style="list-style-type: none"> • Ergonomic evaluation
	Referrals	<ul style="list-style-type: none"> • Hand surgeon • Neurosurgeon • Orthopedic surgeon • Psychiatrist • Physiatrist • Ophthalmologist
	Follow-up	<ul style="list-style-type: none"> • Office visits

*Note: if subcategory entry is the same as category entry, no subcategories exist within the category.

Data entry

Pathways: For each topic, the specific pathways were then selected, reflecting the management approach as outlined in the *Practice Guidelines*. Pathways not selected were inactivated, ensuring that data would not inadvertently appear.

Clinical measures: For each pathway, Clinical Measures were included as appropriate, with free text added in concise format, consistent with the statements in the *Practice Guidelines*. For consistency, capability was provided to enable verbatim copying of phrases from one pathway to another within a topic, as well as from one topic to another, as appropriate.

Utilization case management statements (UCMS): For each Clinical Measure selected in the pathway, a parallel Clinical Measure was automatically created in the UCMS. This facilitated data entry by “flagging” Clinical Measures in the UCMS where data had been already entered in the corresponding pathway. For consistency, capability was provided to enable verbatim copying of a UCMS from one pathway to another within a topic, as well as from one topic to another, as appropriate. References were included with the *Practice Guidelines* text, as described above.

APG Insights: Data from this quarterly publication was reviewed, and additions to the UMK made where refinements or clarifications were necessary, using the approach as described above.

Content review

Once data was entered into the database, a series of data reviews was performed in order to verify the accuracy of the data, identify typographical errors, and ensure consistency in content style. Each of these steps was completed by different individuals or groups of individuals with the relevant expertise.

Attachment 17

Methodology for APG Insights⁴²

APG Insights was developed to provide clarification of topics covered in ACOEM's *Occupational Medicine Practice Guidelines, 2nd Edition*. This may include a review of relevant *Guidelines* material and/or an updated systematic review of the literature. In order to achieve the latter, relevant keywords are used to search Medline and relevant databases for articles written since 2000. Systematic reviews, meta-analyses, clinical trials, cohort studies, and case-control studies may be obtained. If studies have been addressed in a systematic review or meta-analysis, they are generally not reviewed separately. Historical references are included when they explain the theoretical basis for an intervention, summarize prior systematic reviews regarding efficacy, or provide other useful background information.

In *Insights*, the literature review section of each article ends with conclusions that are evidence-based and the "recommendations" (sometimes a separate article) incorporate information from the literature with feedback obtained from a multidisciplinary review panel. There are approximately 25 core panel members; others are added to address specific issues. For example, physical and occupational therapists as well as chiropractic physicians were added to the base panel in order to review the recent group of articles relevant to their fields. They will be replaced, in part, by other health care providers when *Insights* addresses areas peripheral to their scope of practice.

The review and approval process for *Insights* should be similar to the process for the *Guidelines* since the conclusions and recommendations included in *Insights* are being represented as official updates of the *Guidelines*.

⁴² Adapted from Genovese E. *Insights* and the ACOEM *Practice Guidelines*. *APG Insights*. Fall 2005; p. 1.