Pain, Function, and RAPID Scores
Vital Signs in Chronic Diseases, Analogous to Pulse and Temperature in Acute Diseases and Blood Pressure and Cholesterol in Long-Term Health

Theodore Pincus, M.D.

Abstract
Quantitative clinical assessment measures and indices have been developed for many rheumatic diseases. However, these measures and indices generally are used only in clinical trials and other clinical research, as they are too complex for collection and calculation at a usual clinical visit. The only quantitative measures available in most rheumatology patient care are laboratory tests, which often give false positive and false negative results and may not be available at the time of a patient visit. The most feasible method to collect quantitative data in routine care involves patient self-report questionnaires, completed while waiting to see the physician and reviewed by the clinician at the time of the visit. A multidimensional health assessment questionnaire (MDHAQ) provides a useful one-page questionnaire to assess the three self-report Data Set measures—physical function, pain, patient global estimate, as well as review of systems, recent medical history, fatigue, and demographic data. An index of the three Core Data Set measures, routine assessment of patient index data (RAPID3), can be used to guide “tight control” of inflammation, analogous to a disease activity score (DAS28). RAPID3 can be scored in fewer than 10 seconds and is informative in patients with all rheumatic diseases. It is suggested that the infrastructure of all rheumatology care settings include a patient questionnaire for each patient, with all diagnoses, at each visit to improve quantitative guidance of clinical decisions, documentation of status and improvements, and patient outcomes.

Quantitative measurement has been advanced since a seminal conference in 1982 in many rheumatic diseases, including rheumatoid arthritis (RA), osteoarthritis (OA), fibromyalgia, systemic lupus erythematosus (SLE), ankylosing spondylitis (AS), and vasculitis. However, most rheumatology patient care remains conducted largely without quantitative measures other than laboratory tests, which may not be available at the time of a patient visit and often give false positive and false negative results. Therefore, any possible benefits of advances in clinical rheumatology measurement are applied to only a small minority of patients with RA, OA, fibromyalgia, SLE, AS, vasculitis, or any rheumatic diseases, generally only in clinical trials and other clinical research studies. Quantitative assessment of rheumatic diseases requires a pooled index of several measures, as no single measure can serve as a “gold standard” in all individual patients. The most widely used indices in RA are the Core Data Set, disease activity score (DAS), and clinical disease activity index (CDAI). All of these indices require a formal, quantitative swollen and tender joint count, which is not performed at most visits to most rheumatologists, although a careful nonquantitative joint examination generally is included. Therefore, care of most patients with RA is guided largely by nonquantitative “gestalt” impressions rather than quantitative measures.

These considerations suggest that a quantitative index that does not require a formal joint count might provide a valuable advance for usual RA care. A multidimensional health assessment questionnaire (MDHAQ) (Fig. 1) has been adapted from the health assessment questionnaire (HAQ) for usual care. All three patient-reported outcome measures from the RA Core Data Set (physical function, pain, and patient global estimate; scored 0 to 10) appear on one side of one page, with visual analogue scale (VAS) for pain, and global estimate as 21 numbered circles, rather than a 10

Table 1

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cm horizontal line, and scoring templates for function and RAPID3 (routine assessment of patient index data) scores.

RAPID3, an index of the three patient-reported outcome measures in the RA Core Data Set, physical function, pain, and patient global estimate, can be calculated from an MDHAQ in fewer than 10 seconds, without a ruler, calculator, computer, or web site. RAPID3 measures and scores may serve as “vital signs” in patients with chronic rheumatic diseases and possibly all chronic diseases, analogous to pulse and temperature in acute diseases and blood pressure and cholesterol in long-term health. This essay presents a rationale and strategy to collect RAPID3 at every visit of every patient with any rheumatic problem, to assess, monitor, establish a prognosis, document changes in status and outcomes, and improve the quality of rheumatology care.

Rationale for RAPID3 at all Visits of all Patients with any Rheumatic Disease

The rationale for distributing, collecting, and scoring RAPID3 (Table 1) includes the following:
Quantitative Data are Required to Document Patient Improvement, Results and Quality of Rheumatology Care

Most rheumatology patient visits do not include quantitative data beyond laboratory tests to document results and quality of care. Obviously, patients and their physicians have a “gestalt” sense of improvement or worsening over time, without quantitative data. However, quantitative data are needed for persons other than the patient and physician—including payers and judges of quality—to recognize benefit (or worsening). The author believes that rheumatologists may offer as much benefit as any type of physician in contemporary medical care. Quantitative data, rather than gestalt impressions in a medical record, can distinguish a genuine improvement in patient status from a simple impression on the part of an optimistic physician or patient who desires to please the treating physician that improvement has occurred.

Physicians Underestimate Severity of the Patient Pain and Functional Disability, and Patient Self-Report Data Appear as Sensitive as Physician- or Assessor-Reported Data to Recognize Clinical Improvement

Many studies indicate that physicians underestimate the severity of patient pain and functional disability. A care-
ful joint examination is clearly required for diagnosis and to contribute to treatment decisions. However, identification of an incomplete response to therapy and of a need to adjust treatment appears more likely to be recognized according to data from a patient than from a physician. Furthermore, patient self-report data appear as sensitive or more sensitive than physician- or assessor-reported data sensitive to improvement in clinical trials of nonsteroidal antiinflammatory drugs (NSAIDs) and disease-modifying antirheumatic drugs (DMARDs).

1. Quantitative data are required to document patient improvement, i.e., results and quality of rheumatology care.
3. RAPID3 performs as well as American College of Rheumatology (ACR) criteria or disease activity score (DAS28) to distinguish active from control treatment in clinical trials.
4. RAPID3 can be calculated in fewer than 10 seconds compared to 90 seconds for a swollen and tender joint count and 2 minutes for a CDAI or DAS28.
5. Most rheumatologists do not perform quantitative joints at most visits.
6. The joint count has many limitations.
7. Treatment guided by quantitative data results in better patient status than usual non-quantitative clinical care.
8. RAPID3 includes physical function, the best predictor of long-term outcomes of RA including work disability and mortality, for which patient data are far more informative than radiographic or laboratory data.
9. Definitive documentation that any therapy improves mortality outcomes of RA will require data concerning physical function scores.
10. A RAPID3 score is useful in all rheumatic diseases.

### RAPID3 Performs as well as the American College of Rheumatology (ACR) Criteria or the Disease Activity Score (DAS28) to Distinguish Active from Control Treatments in Clinical Trials

As noted above, the relative efficiencies of the three patient-reported outcome measures in the Core Data Set (physical function, pain, and global estimate), to distinguish active from control group treatment responses, are as great as the swollen or tender joint count. Indices of these three measures distinguish active from control treatments as effectively as DAS28 or ACR20/50/70 percent criteria in clinical trials of leflunomide, methotrexate, adalimumab, and abatacept and also are correlated significantly with DAS and CDAI in clinical trials and usual clinical care. Therefore, while joint counts constitute the most specific measure to assess RA; their sensitivity to detect treatment effects is generally no greater, and often lesser, than patient self-report measures.

The author does not advocate exclusive use of RAPID3 in clinical trials, as inclusion of a careful quantitative joint count adds valuable specificity in this setting. Rheumatology sites at which clinical trials are conducted are compensated for performance of formal joint counts far more than for a usual rheumatology visit in the United States, reflecting the effort involved. However, RAPID3 can serve as a healthcare tool to assess, monitor, and document clinical status in a busy clinical setting.

### RAPID3 can be Calculated in Fewer than 10 Seconds, Compared to 90 Seconds for a Swollen and Tender Joint Count and 2 Minutes for a CDAI or DAS28

As noted, a RAPID3 score can be calculated in fewer than 10 seconds. By contrast, performance of a swollen and tender 28-joint count requires about 90 seconds. Calculation of a DAS28 or CDAI requires at least 2 minutes (including the joint counts), even when all the data are readily available. Quantitative measures and indices for RA and rheumatic diseases have been analyzed extensively for validity and reliability. However, relatively little attention has been directed to feasibility and acceptability to patients and health professionals in busy clinical settings. Many research measures and indices appear too complex for collection and calculation at a usual clinical visit. A difference of 10 seconds for a RAPID3 score versus 2 minutes per patient for a DAS or CDAI can be important to a rheumatologist who sees 20 or more patients a day.

### Most Rheumatologists do not Perform Quantitative Joints at most Visits

The 90 seconds required to perform a quantitative formal joint count or 2 minutes to calculate a DAS may represent 5% to 15% of an office visit, time that might be more productively spent in a discussion of patient concerns. A careful, nonquantitative joint examination without quantitative data is not as effective as quantitative data to improve patient status or to document improvement or worsening from one visit to the next. RAPID3 provides the most feasible method to assess and monitor patients with RA, according to quantitative data.

### The Joint Count has Many Limitations

Although a careful joint examination clearly is required for diagnosis, a formal tender and swollen joint count has many limitations that generally are overlooked in the rheumatology literature. Joint counts are poorly reproducible in formal

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an approach based on “eminence” or beliefs, rather than physical function scores on a HAQ or MDHAQ, reflects factor or erythrocyte sedimentation rate (ESR), but not outcomes of RA. However, the collection of rheumatoid are related to pathogenic mechanisms, in the prognosis and emphasize radiographs and laboratory tests, which clearly are far more significant predictor of severe, long-term outcomes of RA, including work disability, costs, joint replacement surgery, and death (all outcomes except radiographic damage), than a baseline radiograph or laboratory test. Nonetheless, the rheumatology community continues to emphasize radiographs and laboratory tests, which clearly are related to pathogenic mechanisms, in the prognosis and outcomes of RA. However, the collection of rheumatoid factor or erythrocyte sedimentation rate (ESR), but not physical function scores on a HAQ or MDHAQ, reflects an approach based on “eminence” or beliefs, rather than “evidence” or scientific data. It appears appropriate that rheumatologists collect physical function scores as the most valuable prognostic data for long-term outcomes in order to document improved outcomes.

**Definitive Documentation that any Therapy Improves Mortality Outcomes of RA will Require Data Concerning Physical Function Scores**

The ultimate rationale for aggressive treatment of individuals with chronic conditions, such as hypertension and hyperlipidemia, is based on documentation that such treatment reduces premature mortality associated with these conditions. Definitive documentation of reduction in RA mortality rates cannot be accomplished on the basis of clinical trials, as seen for hypertension or hyperlipidemia, for ethical, logistical, and budgetary reasons. Documentation of improved mortality outcomes in RA will require evidence from usual clinical care rather than from clinical trials.

Some evidence has been reported that treatment of RA reduces mortality rates, but further documentation appears required for acceptance by the medical community, general public, and payers for medical services. Such documentation could be greatly enhanced with evidence that therapies that lead to reduction in physical function scores or RAPID3 scores are associated with improved survival. Recognition that rheumatology care for RA reduces mortality rates could provide a substantial advance for rheumatologists and RA patients.

**A RAPID3 Score is Useful in all Rheumatic Diseases**

As noted, many valuable disease-specific questionnaires and indices have been developed over the last two decades for rheumatic diseases other than RA, such as the Western Ontario McMaster osteoarthritis scale (WOMAC), fibromyalgia impact questionnaire, systemic lupus erythematosus disease activity index (SLEDAI), British Isles lupus activity score (BILAG), systemic lupus activities measurement (SLAM), lupus activity index (LAI), European Consensus Lupus Activity Measurement (ECLAM), Bath ankylosing spondylitis functional index (BASFI), Bath ankylosing spondylitis disease activity index (BASDAI), Modified Stoke ankylosing spondylitis spinal score (mSASSS), Bath ankylosing spondylitis Metrology index (BASMID), Dougados functional index (DFI) in ankylosing spondylitis, Birmingham vasculitis activity score (BVAS), vasculitis activity index (VAI), and BVAS-derived Wegener’s Granulomasosis Activity Index in vasculitis. However, as with the DAS or CDAI in RA, few patients with OA, fibromyalgia, RA, SLE, AS, or vasculitis are monitored according to any of these measures and indices.

Most patients with any rheumatic disease may experience problems in physical function, pain, or global status, quantified by RAPID3 scores, as well as morning stiffness and fatigue, as assessed on the MDHAQ. In osteoarthritis clinical
One side of the MDHAQ (Fig. 1A) includes 10 activities and a 21-circle VAS format facilitate quick “eyeball” review of arthritis disease activity index (RADAI) self-report joint of daily living, three items to assess psychological distress, in fewer than 10 seconds, the MDHAQ exceptions), in usual care by most rheumatologists (with a few notable

HAQ, while easily completed by patients in 5 to 10 minutes, Even the most widely available questionnaire for RA, the RAPID3 in clinical care is briefly summarized here (Table 2), adapted from previous reports, reviews, and editorials (in particular, see reference 93).

**Use a Questionnaire Designed for Standard Care, not for Research, Although the Information may be Quite Useful for Research**

Patient questionnaires designed for research may be long and tedious, and they are not designed for an “eyeball” review by the clinician to obtain relevant information. Indeed, research questionnaires are sent to a data center for analysis and may add a burden to a clinical care site without adding a benefit to patient care.\(^94\) By contrast, simple patient questionnaires designed for usual care are short, can save time for the clinician, and may improve the quality of patient visits.\(^94\) Even the most widely available questionnaire for RA, the HAQ, while easily completed by patients in 5 to 10 minutes, involves two sides of a page, is difficult to review (“eyeball”) in usual care by most rheumatologists (with a few notable exceptions), and requires 40 seconds to score. By contrast, the MDHAQ\(^33,34\) facilitates scoring of RAPID3 in usual care in fewer than 10 seconds, as noted above.

One side of the MDHAQ (Fig. 1A) includes 10 activities of daily living, three items to assess psychological distress, VAS for pain and global status estimate, and a rheumatoid arthritis disease activity index (RADAI) self-report joint count\(^8\) (not included in RAPID3 score). Scoring templates and a 21-circle VAS format facilitate quick “eyeball” review and scoring by the clinician.\(^8\) The reverse side (Fig. 1B) includes a review-of-systems symptom checklist on an MDHAQ, distinguish these patients from those with RA as effectively as ESR.\(^85\) \(^86\) These data provide evidence that an MDHAQ is useful in patients with all rheumatic diseases.\(^89\)

**Implementation of RAPID3 in Routine Clinical Care**

Implementation of collection, scoring, and management of RAPID3 in clinical care is briefly summarized here (Table 2), adapted from previous reports, reviews, and editorials (in particular, see reference 93).\(^33,38,90-95\)

**Table 2** Strategy for Implementation of RAPID3 in a Physician’s Office

| 1. Use a questionnaire designed for standard care, not for research, although the information may be quite useful for research. |
| 2. Orient the staff regarding the importance of patient questionnaires in patient care. |
| 3. The questionnaire should be part of the office infrastructure and should be completed by every patient with any diagnosis at every visit, as the only efficient distribution system. |
| 4. The questionnaire should be completed before the visit, ideally in the waiting room rather than the examination room, and not after the visit. |
| 5. Let the patient do the work; the office staff should do as little as possible. |
| 6. Scoring templates on the MDHAQ add to its utility in usual care. |
| 7. The clinician should review the questionnaire with the patient. |
| 8. Flow sheets are very desirable. |

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Orient the Staff Regarding the Importance of Patient Questionnaires in Patient Care

The use of patient questionnaires requires a change in office procedure, which can appear to add complexity and engender resistance to change. However, a patient questionnaire can streamline the flow of information from patient to physician with quantitative data. If office staff members see the rheumatologist reviewing a questionnaire in clinical care, they are likely to respond positively. However, if questionnaires are presented to the patient in an uncaring manner or their use explained as for research, documentation, reimbursement, collaboration with colleagues, or any reason other than better care of the individual patient, staff members and patients lose interest and resent the apparent extra work.

The Questionnaire Should be Part of the Office Infrastructure and Should be Completed by Every Patient with any Diagnosis at Every Visit, as the Only Efficient Distribution System

Many rheumatologists suggest that patient questionnaires might be used only for certain patients, such as those with RA, or at certain intervals, such as every 6 months. This approach generally fails in standard care, as it is virtually impossible for the staff to organize distribution of questionnaires selectively. As noted above, an MDHAQ is useful for all people with all rheumatic diseases. If there is a reason for a visit, there is a reason for a questionnaire.

The Questionnaire Should be Completed Before the Visit, Ideally in the Waiting Room and, Preferably, not in the Examination Room or After the Visit

Most patients spend at least 10 minutes in the waiting room before seeing a rheumatologist, and often much longer. This is the time period in which it is most feasible and desirable for a patient to complete a questionnaire. The questionnaire may, of course, be completed in the examination room, or even after the visit. However, completion before the encoun-
Let the Patient do the Work—The Office Staff Should do as Little as Possible

Many health professionals feel that data collected by them is more accurate and informative than patient self-report data. Indeed, some data, such as diagnoses, are ascertained more accurately by health professionals than by patients.\(^9\) However, most data concerning physical function, pain, fatigue, and global status are ascertained more accurately by patient self-report than by health professionals.\(^3\)

When a patient completes a questionnaire, there is only a single observer. If a health professional is included in generating the data, there are two observers. Introduction of a second observer reduces, rather than enhances, reproducibility of the data. About 20% of patients need help from...
office staff or a family member to complete a questionnaire, which is provided willingly. Nonetheless, the more the questionnaire is completed by the patient, the more accurate and reproducible it is likely to be, and the less staff time is involved.

Scoring Templates on the MDHAQ Add to Its Utility in Usual Care
All current MDHAQ versions include scoring templates to facilitate a RAPID3 score from the three Core Data Set measures of physical function, pain, and global estimate (0 to 10 score) without a ruler, calculator, computer, or web site. The 10 activities of daily living can be quickly totaled using the 0 to 10 scoring template. The VAS is presented as 21 numbered circles, rather than a traditional 10 cm scale, to facilitate scoring without a ruler. The total RAPID3 score may be 0 to 30, or divided by three for a 0 to 10 score.

The Clinician Should Review the Questionnaire with the Patient
As noted above, “eyeball” review of the MDHAQ, generally with the patient, can improve the quality and efficiency of a patient visit. The 5 seconds for such a review gains information that would often involve 2 to 5 minutes of query, and greater efficiency is inevitable.

Flow Sheets are Very Desirable
Convenient entry onto a flow sheet (Fig. 2), along with selected laboratory tests and medications, organizes information to track scores serially on one page. This information provides an overview at a glance of the patient’s course, a cost-effective procedure. It is not necessary to use a computer-automated device or system to develop flow sheets to monitor individual patients. Computerization obviously is necessary for analyses and reports of patients in groups. Automation of data should be pursued to the level of comfort of the rheumatologist and staff.

Conclusion
It has been proposed that “80% of the data in 100% of the patients may be preferable to 100% of the data in 5% of the patients” (or fewer) who might be included in clinical research. Therefore, a less comprehensive measure, which is feasible and applicable in usual clinical care, appears preferable to no quantitative measure at all. However, a RAPID3 score may provide more than “80%”—and, indeed, may be as informative as a DAS or CDAI for patient assessment, reflecting patient and physician goals of treatment as accurately as the number of swollen and tender joints.

RAPID3 scores, based on self-report patient questionnaire scores, provide informative quantitative data for patient status from one visit to the next. If quantitative data are recorded, an opportunity for documentation and more rational monitoring is gained, along with enhanced efficiency of patient care. If no data are recorded, this opportunity is lost and can never be replaced. It is suggested that all rheumatologists would find it valuable to ask all patients to complete a MDHAQ and to score a RAPID3 (themselves or by a staff member) at all visits of all patients in usual care.

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Reference List


