INTRODUCTION
The field of rheumatology has witnessed a dramatic shift in the management paradigm for rheumatoid arthritis (RA) over the past 2 decades. The current armamentarium of antirheumatic therapies, including conventional and biologic disease-modifying antirheumatic drugs (DMARDs), has established disease remission as a realistic goal for many patients [5]. In addition, standardized scales and composite indices to quantify RA disease activity have been developed to facilitate the establishment of therapeutic targets and guide the clinical decision-making process [11, 3].

Various new guidelines and consensus statements have been introduced to rheumatologists to promote the implementation of recent insights and new medications into management schema for RA, with the ultimate goal of improving patient outcomes via achievement of remission or low disease activity:

- American College of Rheumatology (ACR)/European League Against Rheumatism (EULAR) classification criteria for RA [1]
- International task force recommendations for treating RA to target [11]
- ACR White Paper on quality measurement in rheumatology [9]
- ACR and EULAR recommendations on the use of DMARDs and biologic agents in the management of RA [12, 10]
- ACR recommendations for the use of RA disease activity measures in clinical practice [3].
It is unclear, however, to what degree US rheumatologists, particularly those in community practice, are aware of these new guidelines and recommendations and how well clinicians have adopted them into clinical practice. A recent survey of Canadian rheumatologists [7] that addressed the treat-to-target recommendations [11] found resistance to specific aspects. Indeed, anecdotes suggest that some US rheumatologists, particularly those in private practice, view aspects of these guidelines and consensus statements as impractical or too time-consuming.

To address these areas of uncertainty, we undertook the first formal and systematic survey of US rheumatologists to quantitate their awareness, knowledge, and adoption of the treat-to-target and other recent recommendations in RA and to identify gaps in both knowledge and competence.

METHODS
As part of a larger continuing medical education (CME) initiative, a 22-question online needs assessment survey was conducted among US rheumatologists in May 2012 with the goal of assessing their attitudes toward, knowledge of, and clinical use of updated RA guidelines and consensus statements [1, 11, 12, 9, 3, 10]. Several of the questions in the survey had multiple subparts. An invitation to participate in the online survey was emailed to 4000 validated, practicing US-based rheumatologists. The primary qualification was that the respondent was an actively practicing rheumatologist currently involved in the management of patients with RA. Survey completion took 20-30 minutes, and respondents received a $50 honorarium for their participation. To ensure a representative sample, an invitation to participate in the online survey was emailed to 4000 validated, practicing US rheumatologists. Approximately half of respondents practiced in suburban areas; 41% practiced in urban areas.

The survey featured several question types, including: (a) multiple choice; (b) agreement ratings; (c) attitudinal and frequency of use ratings of different tools, guidelines, and clinical practice strategies; (d) open-ended inquiries on current challenges and barriers; and (e) ratings of statements based on current/desired level of knowledge/competence and the importance to clinical practice. Some of the multiple-choice questions were based on 2 hypothetical case descriptions of patients with suspected early RA (one involving a 32-year-old female and the other a 43-year-old male). Changes in levels of agreement, familiarity, usefulness, importance, adoption/implementation, and frequency of use were measured using 7-point Likert rating scales, in which 1 was the lowest level. The changes in adoption/implementation or frequency of use assessed changes in competence based on an adapted “commitment to change” methodology [4].

Information regarding demographics, barriers, and other challenges related to implementation of the guidelines and recommendations (e.g., treat-to-target [11] and clinical use of RA quality indicators [9]) were also collected.

Educational gaps were identified using 2 methodologies: open-ended responses to questions on issues, challenges, or problems currently faced by rheumatologists in the assessment/monitoring of patients with RA and ratings of related statements based on rheumatologists’ current and desired levels of knowledge and the importance of each item to their clinical practice. For each specific topic, rheumatologists rated their current level of knowledge, their desired level of knowledge, and the importance of knowledge to their practice. In the analysis, respondents were compared to themselves. The Wilcoxon Signed-Ranks test was used to perform statistical comparisons between the mean current and desired ratings to identify educational gaps. Alpha was set at .05, and P values of ≤.05 were considered to demonstrate statistically significant differences. Margins of error were calculated using a widely available on-line calculator (http://americanresearchgroup.com/moe.html).

RESULTS

Demographics
Ninety-six US-based practicing rheumatologists from 29 different states completed the survey: 44% self-reported treating 25 to 49 patients with RA during a typical week; another 20% treated 50-75 patients with RA in a typical week. Seventy-seven percent practiced in a “community-based” clinical setting, and 21% practiced in an “academic” setting. Approximately half of respondents practiced in suburban areas; 41% practiced in urban areas.

At a 95% level of confidence, our survey results have a margin of error of ±9.9% when projected to the approximately 4000 currently practicing US rheumatologists. Using the same online calculator and assuming approximately 390 practicing Canadian rheumatologists, we calculated a margin of error of ±9.9% for a recently published and related survey of 78 Canadian rheumatologists [7].

Diagnosing RA and Primary Goal of Therapy
Based on a hypothetical clinical case scenario involving a 32-year-old woman with clinical features consistent with early RA, 51% of rheumatologists correctly identified the characteristics associated with a patient with definite RA based on the 2010 ACR/EULAR Classification Criteria for RA [1]. Rheumatologists reported almost always (mean rating of ≥6 on the 7-point scale) using the number and location of swollen or tender joints, serology (rheumatoid factor [RF] / anticitrullinated protein antibodies [ACPA]), acute-phase reactants (erythrocyte sedimentation rate [ESR]/C-reactive protein [CRP]), symptom duration, and x-rays to confirm a diagnosis of RA (Table 1). The frequency of using the 2010 ACR/EULAR Classification Criteria for RA [1] was “sometimes” (4.43 on a 7-point scale). Twenty-one percent (20/96) of the rheumatologists indicated that they routinely use the 2010 ACR/EULAR Classification Criteria for RA in practice to confirm a
diagnosis of RA. Fifty-three percent of rheumatologists (51/96) indicated that they routinely use all 4 components of these same classification criteria (number and location of swollen or tender joints, symptom duration, serology—RF or ACPA, abnormal ESR or ESR); 17 of these 51 respondents also routinely used the 2010 ACR/EULAR Classification Criteria for RA.

Eighty percent of respondents selected remission as their primary goal of therapy.

**Disease Activity Measures Used to Assess Initial Severity of RA**

Rheumatologists were asked how they would initially assess the severity of disease activity in two hypothetical patients with early RA. The most frequently selected tools included the 28-point Disease Activity Score (DAS28) (46%), the Health Assessment Questionnaire (HAQ) (32%), Routine Assessment of Patient Index Data 3 (RAPID-3) (29%), and the Clinical Disease Activity Index (CDAI) (23%) (Table 2). In addition, nearly half (48%) of the respondents stated that they would use the Physician Global Assessment (PGA) to initially assess RA disease activity in the above-mentioned hypothetical case of a 32-year-old woman with early RA.

Two survey questions assessed rheumatologists’ self-reported clinical use of tools to quantify RA disease activity and patient status (Table 2). The frequency of using all activity measures in clinical practice was less than “sometimes use” (<4 on a 7-point scale, with 1 being “never use”); however, consistent with results from the clinical case scenarios, respondents reported using DAS28, HAQ, and RAPID-3 most frequently.

**Timing of Subsequent Disease Activity and Structural Assessments**

Eighty-nine percent of rheumatologists judged that reassessment of disease activity should occur within 1 month of initiation of treatment in a hypothetical case of a 32-year-old woman with early RA.
Ninety-three percent judged that subsequent assessments following improvement may be spaced every 1-3 months.

Based on the hypothetical case of a 43-year-old man with an initial DAS28 score of 6.53 who was treated with methotrexate and corticosteroids (DAS28 score of 3.14 after 3 months of treatment), respondents differed in their opinions of when a structural evaluation should be performed after initiation of methotrexate: 3 months (40%), 6 months (21%), or 1 year (37%).

### Treatment Strategies Used in Clinical Practice

Based on the hypothetical case of the 32-year-old female with early RA, 64% of respondents stated that they would begin treatment with glucocorticoids plus a DMARD; 25% recommended treatment with a single DMARD.

### Frequency of Clinical Utilization of Guidelines

Rheumatologists indicated that they “sometimes use”—with scores of between 4.06 and 4.54 on a 7-point scale (1 = never use to 7 = routinely use)—6 evidence-based guidelines when managing patients with RA (Table 3). The highest frequency of use (4.54) was for the 2012 Update of the 2008 American College of Rheumatology Recommendations for the Use of Disease-Modifying Antirheumatic Drugs and Biologic Agents in the Treatment of Rheumatoid Arthritis [10], whereas the 2010 EULAR Recommendations for the Management of Rheumatoid Arthritis with Synthetic and Biological Disease-Modifying Antirheumatic Drugs [12] received the lowest frequency-of-use rating (4.06).

### RA Treat-to-Target Recommendations: Usefulness and Application

The mean rating for the usefulness of the treat-to-target recommendations [11] to improve patient outcomes in RA was 5.16 (greater than “somewhat useful”) on a 7-point scale (1 = not useful at all; 7 = extremely useful). Rheumatologists indicated that the degree to which they apply these recommendations in their clinical practices was 5.11 (1 increment greater than “sometimes apply”) on a 7-point scale (1 = never apply to 7 = always apply) (Table 4).

The 5 most frequency cited barriers to implementation of the treat-to-target recommendations were:

- Tools to measure RA disease activity are too time-consuming (60%)
- Tools to measure RA disease activity are not easy to use (48%)
- Lack of supporting staff prevents frequent patient evaluations (45%)
- The reliability and validity of tools to measure RA disease activity (versus personal clinical experience) have not been adequately proven (32%)
- Selection of the appropriate tool to measure RA disease activity is too complicated (30%).
ACR Quality Indicators: Implementation and Barriers

The mean rating scores on a 7-point scale (1 = never implement to 7 = always implement in clinical practice) for implementing the 7 RA quality indicators in clinical practice ranged from 5.34 (1 increment above “sometimes”) for “perform a functional status assessment at least once within 12 months in patients 18 years and older with a diagnosis of RA” to 6.53 (1 increment below “always”) for “IF a patient has an established diagnosis of RA, THEN the patient should be treated with a DMARD unless contraindication to DMARD, inactive disease, or patient refusal is documented” (Table 5). Nearly 20% of rheumatologists (18/96) indicated that they always implement all 7 of the quality indicators, versus 7% who indicated that they never implement any of the quality barriers (Table 6). The mean number of quality indicators always used by rheumatologists was 3.96 ± 2.26 out of a possible 7.

The 5 most frequently reported barriers to the optimal implementation of the RA quality indicators in clinical practice were:

- Lack of health insurance coverage and/or out-of-pocket patient costs (67%)
- Time constraints (49%)
- Unsure of appropriate selection of instruments to assess RA disease activity (24%)
- Unsure of appropriate clinical use of instruments to assess RA disease activity (20%)
- Unsure of the difference between functional status assessment and disease activity measurement (7%)

The proportions of rheumatologists selecting 1, 2, 3, 4, 5, 6, 7, or 8 out of a possible 8 barriers were 36.5%, 31.3%, 25.0%, 3.1%, 1.0%, 2.1%, and 1.0%, respectively. The mean number of barriers selected by respondents was 2.11 ± 1.20 out of a possible 8.

### Table 5. Implementation of RA Quality Indicators in Clinical Practice

<table>
<thead>
<tr>
<th>Quality Indicator</th>
<th>Frequency of Use, Mean ± SD*</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF a patient has an established diagnosis of RA, THEN the patient should be treated with a DMARD unless contraindication to DMARD, inactive disease, or patient refusal is documented.</td>
<td>6.53 ± .94</td>
</tr>
<tr>
<td>Perform a tuberculosis (TB) screening and interpret results within 6 months prior to receiving a first course of therapy using a DMARD in patients 18 years and older with a diagnosis of RA.</td>
<td>6.44 ± 1.23</td>
</tr>
<tr>
<td>IF a patient has RA and is being treated with a DMARD and there is evidence of increased disease activity or there is evidence of progression of RA bony damage over a 6-month period of time, THEN one of the following should be done: change DMARD dose or route of administration, change DMARD, add an additional DMARD, start or increase dose of glucocorticoids, or provide local glucocorticoid injection(s), unless the patient refuses or all of the above are contraindicated.</td>
<td>6.33 ± 1.08</td>
</tr>
<tr>
<td>Assess for glucocorticoid use and, for those on prolonged doses of prednisone &gt;10 mg daily (or equivalent) with improvement or no change in disease activity, document glucocorticoid management plan within 12 months in patients 18 years and older with a diagnosis of RA.</td>
<td>6.18 ± 1.23</td>
</tr>
<tr>
<td>Assess and classify disease activity at least once within 12 months in patients 18 years and older with a diagnosis of RA.</td>
<td>6.10 ± 1.31</td>
</tr>
<tr>
<td>Assess and classify disease prognosis at least once within 12 months in patients 18 years and older with a diagnosis of RA.</td>
<td>5.55 ± 1.54</td>
</tr>
<tr>
<td>Perform a functional status assessment at least once within 12 months in patients 18 years and older with a diagnosis of RA.</td>
<td>5.34 ± 1.76</td>
</tr>
</tbody>
</table>

*Based on a 7-point scale: 1 = never implement, 7 = always implement in clinical practice.

### Level of Agreement with Statements Regarding Pay for Performance in Rheumatology

Agreement ratings (1 = strongly disagree to 7 = strongly agree) for statements on pay for performance ranged from 3.63 (1 increment lower than “neutral”) for “I support public reporting of quality scores” to 5.51 for “I am concerned that a proliferation of performance measures might lead to an emphasis on treatments that can be readily reduced to numerical scores, crowding out those that cannot be as easily measured” (Table 7).

Agreement with the statement “treat to target and tight control will become standards against which I am measured” was 5.40.

### Knowledge Gaps and Their Relative Importance to Clinical Practice

Knowledge gaps of ≥0.50 units (mean rating for desired level of knowledge minus mean rating for current level of knowledge) that were statistically significant and rated as ≥5.00 in level of importance to clinical practice on a 7-point scale (1 = not important at all to 7 = extremely important) comprised the following 4 areas (Table 8):

- The concept of “treating to target”
- Tools to assess disease severity/progression
- Safety/efficacy of emerging therapeutic options
- Vaccination recommendations.
Current Issues, Challenges, or Problems Associated with Assessment/Monitoring of Patients with RA

Rheumatologists provided 95 open-ended responses to the question “What issues, challenges, or problems do you or your colleagues currently face in the assessment/monitoring of patients with RA that you would like to see addressed in future educational activities?” These responses were organized into 11 categories (Table 9). The 2 categories with the most open-ended responses were “assessment of appropriate use of tools to measure RA disease activity” and “cost/reimbursement/managed care issues.”

**DISCUSSION**

Using rigorous methodology, our survey, which was supported by an independent CME grant and not undertaken as part of a mandated requirement by third-party payers, quantifies for the first time what many US rheumatologists—particularly those in private practice—may have intuitively assumed: US rheumatologists are generally familiar with recently introduced guidelines, quality measures, and consensus statements focused on improving outcomes in patients with RA. There are, however, important gaps in the knowledge, adoption, and frequency of use of recommended practice strategies.

Results from our survey demonstrated that US rheumatologists only sometimes use the 2010 ACR/EULAR Classification Criteria for RA [1] in their clinical practice. It is of note, however, that although about half of the survey rheumatologists indicated that they routinely used all 4 components of these same classification criteria, only about one-fifth indicated that they routinely use the 2010 ACR/EULAR Classification Criteria for RA.

The disease activity measures recommended by the ACR [3] for assessing disease activity (CDAI, DAS28 [ESR or CRP], Patient Activity Scale [PAS], PAS-II, RAPID-3, and SDAI) were not commonly selected by US rheumatologists for evaluating the severity of 2 hypothetical cases of suspected RA. In addition, US rheumatologists indicated that they only sometimes

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**Table 6. Frequency of Using RA Quality Indicators in Clinical Practice***

<table>
<thead>
<tr>
<th>Number of RA Quality Indicators</th>
<th>Proportion of Respondents, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7.3</td>
</tr>
<tr>
<td>1</td>
<td>8.3</td>
</tr>
<tr>
<td>2</td>
<td>17.7</td>
</tr>
<tr>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td>4</td>
<td>15.6</td>
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<tr>
<td>5</td>
<td>10.4</td>
</tr>
<tr>
<td>6</td>
<td>13.5</td>
</tr>
<tr>
<td>7</td>
<td>18.8</td>
</tr>
</tbody>
</table>

* n = 96

**Table 7. Level of Agreement with Statements Regarding Pay for Performance in Rheumatology***

<table>
<thead>
<tr>
<th>Pay-for-Performance Statement</th>
<th>Level of Agreement, Mean ± SD†</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am concerned that a proliferation of performance measures might lead to an emphasis on treatments that can be readily reduced to numerical scores, crowding out those that cannot be as easily measured.</td>
<td>5.51 ± 1.27</td>
</tr>
<tr>
<td>I believe that treating to target and tight control will become standards against which I am measured.</td>
<td>5.40 ± 1.20</td>
</tr>
<tr>
<td>If I am judged on patient outcomes, I might be penalized because I treat more challenging patients.</td>
<td>5.19 ± 1.50</td>
</tr>
<tr>
<td>I am concerned that implementation of “Pay-for-Performance” programs in the field of rheumatology will lead to negative impacts on me in terms of reimbursement.</td>
<td>5.08 ± 1.49</td>
</tr>
<tr>
<td>I believe that treating to target and tight control should be standards against which I am measured.</td>
<td>4.68 ± 1.65</td>
</tr>
<tr>
<td>I support financial incentives for quality.</td>
<td>4.61 ± 1.63</td>
</tr>
<tr>
<td>I have experienced changes in my practice related to payers’ increased focus on outcome-driven care.</td>
<td>4.16 ± 1.69</td>
</tr>
<tr>
<td>Treating to target and tight control are currently standards against which I am measured.</td>
<td>4.08 ± 1.61</td>
</tr>
<tr>
<td>I support public reporting of quality scores.</td>
<td>3.63 ± 1.74</td>
</tr>
</tbody>
</table>

* n = 96 for each statement.
† Based on a 7-point scale: 1 = strongly disagree to 7 = strongly agree.
use the measures in clinical practice. The disease activity measure selected for use by the highest proportion of rheumatologists in our survey was the DAS28, but it was selected by slightly less than half of respondents. A different disease activity measure not recommended by the ACR, the PGA, was selected by a comparable proportion of rheumatologists. The variability of disease activity measures selected by the rheumatologists in our survey—some ACR recommended, some not—highlights yet another knowledge gap in this audience.

The performance and knowledge gaps among US rheumatologists elucidated by the survey results help explain the disparities in the use of disease activity measures between this audience and recommendations from the ACR. Respondents ranked tools for assessing disease activity and progression as important to their practices and self-identified a critical gap in their knowledge and use of such measures. The challenges faced by rheumatologists in assessing and monitoring RA disease activity included a multitude of open-ended comments on finding better and easier to use office measures that are less time-consuming. Although qualitative, these barriers support the more quantitative education gaps and should be areas of focus for future educational activities.

Although most rheumatologists were aggressive and consistent in assessing the initial response to therapy and identified remission as the primary goal of therapy, there was less consistency in the follow-up of RA patients achieving low disease activity (monthly versus every 3 months).
Of note, almost two-thirds of survey respondents recommended treatment initiation with glucocorticoids and a DMARD in a hypothetical patient with early RA and features of poor prognosis. Although not consistent with current ACR guidelines [10], this treatment strategy is included in EULAR guidance [12]. The selection of combination glucocorticoid/DMARD therapy may actually reflect practice habits in the US. However, this practice is unexplained. Survey respondents indicated that they consult current ACR guidelines more frequently than EULAR treatment recommendations.

A large proportion of survey respondents found that the recommended tools for measuring RA disease activity [12] are too time-consuming and were not easy to use and that resources were lacking to undertake frequent evaluations of patients. These barriers were consistent with the challenges listed by rheumatologists in assessing and monitoring RA patients. The findings of a survey of 78 Canadian rheumatologists on level of agreement and application of the treat-to-target recommendations were mostly consistent with those from our survey [7]. On a 10-point scale, the mean level of agreement with the individual recommendations ranged from 6.92 for the frequency of measuring disease activity to 9.10 for patient involvement in treatment target and strategy. However, unlike US rheumatologists, a majority of the Canadian rheumatologists reported applying the treat-to-target recommendations in their clinical practice.

Rheumatologists in our survey appeared to frequently implement 1 or more of the 7 ACR-endorsed RA quality measures [9] in clinical practice; however, the measures involving assessment/classification of disease activity/prognosis and performance of functional status assessments were the least frequently employed. Less than one-fifth of rheumatologists indicated that they always implemented all 7 RA quality indicators in clinical practice. Consistent with what was found for the treat-to-target recommendations, a high proportion of survey respondents identified time constraints as an important barrier to greater implementation of these measures; “lack of health insurance coverage and/or out-of-pocket patient costs” was also noted as a significant barrier to implementation of ACR-endorsed RA quality indicators. About half of the rheumatologists identified 2-3 barriers.

The agreement ratings of survey respondents on statements related to pay for performance in rheumatology [6] generally reflected an absence of support. Those surveyed did not support the public reporting of quality scores but appeared resigned to the likely possibility that treating to target and tight control will become standards against which they are measured. The concern for the public reporting of quality scores appeared to stem from a concern that patients whose treatments could not be reduced to numeric scores would be crowded out and that pay for performance will lead to less reimbursement.

The results of our survey were somewhat limited by our sample size. There exists the possibility that respondents, who were self-selected, were not representative of the larger population of US rheumatologists. We have controlled for this by calculating a margin of error for our sample size (±9.9%), which was modest. Our margin of error was identical to that calculated for a recently published survey of Canadian rheumatologists [7]. There was consistency between the demographic characteristics (geographic distribution, type of clinical practice, and number of RA patients seen) of the rheumatologists in our sample and previous surveys of rheumatologists in the US [2,8]. Respondents participating in these surveys were also self-selected.

CONCLUSIONS
The quantitative and qualitative results of this survey point to several knowledge and competence gaps, as well as barriers and challenges, regarding the assessment and monitoring of RA patients according to contemporary practice guidelines and treatment paradigms. There is a lack of knowledge, confidence, and routine use surrounding RA disease activity measures, including the appropriate use of measures recommended by the ACR. As management paradigms in RA, and the healthcare system in general, continue to change and new therapeutic agents become available, future educational initiatives must further emphasize effective strategies to achieve remission, prevent/control joint damage, avoid further disease progression and loss of joint function, and improve patient quality of life.

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REFERENCES


