Chapter 7

Does reporting to follow a guideline imply that this guideline is really applied in clinical practice? The International Recommendation Implementation Study (IRIS)

E. Gvozdenović, C.F. Allaart, D. van der Heijde, G. Ferraccioli, J. S. Smolen, T.W.J. Huizinga, R. Landewé.

Submitted

ABSTRACT

Objective

To investigate if rheumatologists that report to follow up guidelines really do this by monitoring practice performance in clinical practice.

Methods

Data of the International Recommendation Implementation Study (IRIS) is used, which included 132 participating rheumatologists from 14 countries. Participants received a questionnaire measuring their awareness/commitment with the EULAR/T2T recommendations, followed by an educational program. They were asked to include and monitor 5-10 new-onset RA patients in the IRIS database for a period of 1-2 years.

Results

In total, 72 of the 132 participants have added 378 patients in the database. Of these participants 70 (98%) agreed that DMARD-therapy should be started as soon as possible after diagnosis in every patient and 69 (96%) agreed that methotrexate should be part of the first treatment strategy. Treatment changes according to these recommendations were reported in 253 (67%) and 225 (60%) of the recorded patients, respectively. Of the participants 60 (83%) agreed that composite measures should be recorded regularly, while in 134 (54%) of the patients composite scores were recorded in ≥50% of patient visits.

Conclusion

Reporting to follow EULAR recommendations and T2T principles after an educational programme does not mean actual compliance with this guidance in clinical practice.

INTRODUCTION

During the last decades, many guidelines and recommendations have been formulated with the aim to improve the quality of care.[1-5] In rheumatology, international recommendations for the management of patients with rheumatoid arthritis (RA) focus on treatment decisions including the choice of initial therapy and subsequent alternatives, on monitoring disease activity as a measure of treatment success and on reasons for treatment adjustments. Besides, they emphasise shared decision making, patient education, how to deal with comorbidities and the role of specialized nurses in the treatment care of RA.

These recommendations include concepts of 'treating-to-target' (further referred to as T2T) and 'tight control'. The treat-to-target approach requires that patients will receive medication, and if necessary intensification or adjustment of therapy, until a predefined treatment goal (a certain level of disease activity, often clinical remission or low disease activity) is achieved. The 'tight control' concept requires frequent assessments of disease activity in order to check if the treatment goal has been achieved and to avoid delays in optimal treatment. It is recommended that monitoring disease activity should be done by composite measures (DAS, DAS28, SDAI and CDAI).[6-8]

In many surveys rheumatologists report that they follow the recommendations for RA in clinical practice.[9-11]Although, some studies suggest that recommendations are not practiced yet outside of clinical trials.[12,13] These studies indicate that there is a discrepancy between reporting agreement with recommendations and actual performance in clinical practice (implementation). Only a few studies have shown a successful implementation of recommendations, such as treat to target, and suggestions to improve DAS steered therapy in clinical practice.[14,15] Many obstacles may postpone a successful implementation, such as a lack of awareness and lack of agreement,[16-18] or lack of treatment-protocols.[15] A previous study has shown that educational programs may effectively help to implement clinical guidelines in practice.[19]

In order to test the efficacy of such an implementation initiative, the International Recommendation Implementation Study (IRIS) was initiated. As part of this study we have investigated whether rheumatologists that report to follow the European League Against Rheumatism (EULAR) recommendations on the management of RA and the T2T recommendations really do this in clinical practice. In order to increase the chance of successful implementation, we have provided them a web-delivered educational program.

METHODS

Study participants

IRIS is a 2-year follow-up implementation study in which rheumatologists received a questionnaire on their awareness of-, agreement with- and adherence to the EULAR/T2T recommendations formulated in 2010 (see attachment I and II).[6,8]
The questionnaire started with general questions about whether participating rheumatologists were aware of the recommendations and whether they follow them in clinical practice. Then, we asked per recommendation whether they follow it in clinical practice. Participants were able to choose three options for answering the questions: 'yes', 'for some patients/sometimes' or 'no'. The answers on whether the participants were applying the following four EULAR and Treat to target recommendations in clinical practice were used in this study:

- *'Treatment with synthetic DMARDs should be started as soon as the diagnosis of RA is made'*
- *'MTX is part of the first treatment strategy'*
- *'When MTX contraindications (or intolerance) are present, the following DMARDs should be used: Leflunomide, sulfasalazine or injectable gold'*
- *'Measures of disease activity must be obtained and documented regularly as frequently as monthly for patients with high/moderate disease activity or less frequently (such as every 3–6 months) for patients in sustained low disease activity or remission'*

After completing the questionnaire, participating rheumatologists took part in a short education programme on these recommendations, consisting of reading two articles on the EULAR recommendations for the management of RA and the T2T recommendations and watching an online video in which the principles of the recommendations and the aims of IRIS were explained by expert rheumatologists and researchers. It was also optional to follow an online training to get familiar with the Measurement of efficacy of Treatment in the Era of Outcome of Rheumatology (METEOR) registration tool. After this, they were required to record data on disease monitoring and adjustment of treatment in 5-10 patients with newly diagnosed RA per rheumatologist. Registration took place in METEOR,[20,21] which is a large online database developed for rheumatologists providing an online tool to register data from RA patients and monitor them in daily practice. The patients were followed for 1-2 years. During this follow-up period participating rheumatologists received every month one of the EULAR/T2T

recommendation per email to remind them on the study and to encourage them to follow all the recommendations in clinical practice.

We compared the proportion of rheumatologists that agreed with the EULAR and T2T recommendations with the proportion of their patients who were actually treated according to these recommendations in clinical practice.

From December 2011 rheumatologists worldwide were approached via their national RA societies to participate in IRIS. 132 rheumatologists from the following 14 countries agreed to participate in this study: Bosnia, Brazil, Croatia, Cyprus, Greece, Italy, Malta, the Netherlands, Nigeria, Poland, Portugal, Russia, Spain, and Turkey. The first rheumatologist started with the educational program in March 2012 and the final participant started in February 2014.The database is still ongoing and will close 2 years after the last participant added the last patient (February 2016).

The participants have received a payment of 250 euro per included patient to compensate for the work in this study.

Outcome variables

We compared how often rheumatologists agreed with the following four recommendations with how the proportion of their patients actually treated according to these recommendations:

- EULAR recommendation 1: *'Treatment with synthetic DMARDs should be started as soon as the diagnosis of RA is made'*. We determined the proportion of patients in whom the time interval between the date of diagnosis and the date of start of a DMARD (disease-modifying anti rheumatic drug) was <= 4 weeks.
- EULAR recommendation 2: *'MTX is part of the first treatment strategy in patients with active RA'*. We determined the proportion of RA patients in whom MTX was (part of) the first treatment strategy.
- EULAR recommendation 3: *'When MTX contraindications (or intolerance) are present, the following DMARDs should be used: Leflunomide, sulfasalazine or injectable gold'*. We determined the proportion of patients that did not start with MTX in whom leflunomide, sulfasalazine or injectable gold was prescribed.
- Treat to Target recommendation 5: *'Measures of disease activity must be obtained and documented regularly as frequently as monthly for patients with high/moderate disease activity or less frequently (such as every 3–6 months) for patients in sustained low disease activity or remission'*. We created three categories: 'T2T always' represents the

number of patients for whom a composite score (DAS, DAS28, CDAI or SDAI) was reported at least every 2 months during moderate or high disease activity (DAS>2.4, DAS28>3.6 CDAI>10, SDAI>11) and at least every 7 months for low disease activity in 100% of the visits. A patient was categorized as 'T2T sometimes/never' when this was found in some or none of the visits, with an estimation of the percentage of visits in which the recommendation was followed. A category 'not reported' reflects patients in whom composite scores were missing in all of the visits.

RESULTS

Of the 132 participating rheumatologist who agreed participation in the IRIS, 122 (92%) completed the questionnaire, finished the web-based educational program and were followed for 1-2 years. During the follow-up period 72 (55%) of the participating rheumatologists have recorded 1155 visits from 378 newly diagnosed patients in the database prospectively. The remaining participants dropped out (n=44) or were lost to follow-up (n=6) before including patients in the METEOR database (Figure 1).

Reasons for dropping out of the study where lack of time to participate or withdrawn consent with regard to participation in the study. The remaining 72 rheumatologists were from the following countries: Bosnia, Cyprus, Greece, Italy, the Netherlands, Nigeria, Russia and Spain. We compared the results of the questionnaire from 72 rheumatologists who entered patients in the database with the 50 rheumatologists who did not, and found that agreement was similar between the two groups (Attachment I and II).

Of the 72 participating rheumatologists 70 (98%) had reported to be compliant with the recommendation '*Treatment with synthetic DMARDs should be started as soon as the diagnosis of RA is made'* (table 1). In 253 of the 378 (67%) patients that were recorded in the database, they had indeed prescribed a DMARD within four weeks after the diagnosis.

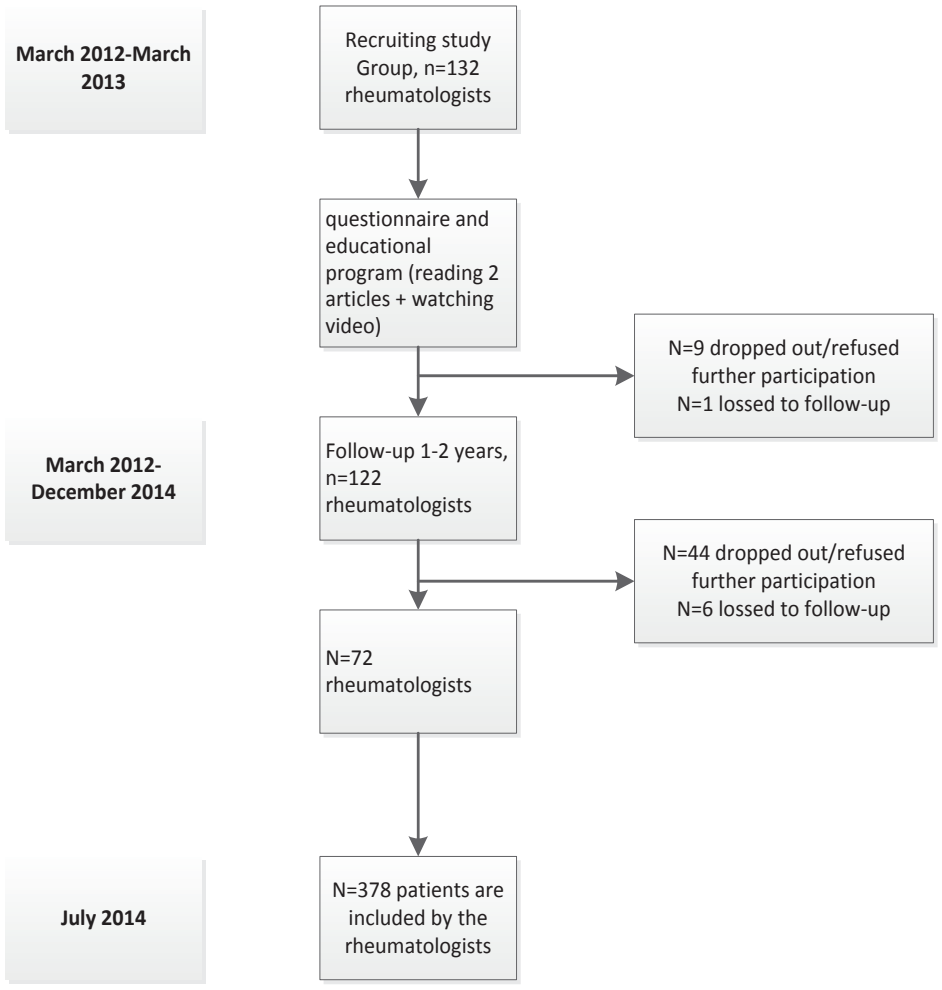

Figure 1. Flow-chart International Recommendation Implementation Study (IRIS).

Table 1. Comparison between agreement with the EULAR and Treat to Target recommendations and managing patients in clinical practice

	Rheumatologists opinion about adherence (measured in 72 Rheumatologists)*			**Rheumatologists performance in daily practice (Measured in 378 patients)****		
	Always, n (%)	(Some)times/ Never, n (%)	Missing, n (%)	Always, n (%)	(Some)times/ Never, n (%)	Not reported, n (%)
EU 1. 'Treatment with synthetic DMARDs should be started as soon as the diagnosis of RA is made'.	70 (98)	1 (1)	1 (1)	253 (67)	65 (17)	60 (16)
EU 3. 'MTX is part of the first treatment strategy'.	69 (96)	2 (3)	1 (1)	225(60)	93 (24)	60 (16)
EU 4. 'When MTX contraindications (or intolerance) are present, the following DMARDs should be used: Leflunomide, sulfasalazine of injectable gold'.	59 (82)	12 (17)	1 (1)	15 (19)	78 (81)	
T2T 'Measures of disease activity must be obtained and documented regularly'***	60 (83)	10 (14)	2 (3)	68 (27)	125 (51) 23 in ≥75% 45 in ≥50% 27 in <50 % 30 in 0 of the visits	54 (22)

* Always = rheumatologists report to follow this recommendation, sometimes/never= rheumatologist report to follow this recommendation sometimes or not, missing = no answer was filled in **Always = rheumatologists follow this recommendation, sometimes/never = rheumatologist follow this recommendation sometimes or not. Not reported= no information present on whether the recommendation is followed by the rheumatologist. *** As frequently as monthly for patients with high/moderate disease activity or less frequently (such as every 3–6 months) for patients in sustained low disease activity or remission. EU=EULAR recommendation. T2T=treat-to-target recommendation, MTX=methotrexate, DMARD=disease-modifying anti rheumatic drug.

In 50 of the 378 patients (13%) a DMARD was not started within 4 weeks, but after a median (interquartile range) period of 13 (7 to 57) weeks (table 2). For 60 of the 378 patients (1%) essential information was missing (date of diagnosis/ or date of start first DMARD).

Table 2. Average time from diagnosis (weeks) until a patient received a first DMARD in those patients in whom a DMARD was NOT started within 4 weeks after diagnosis

	Patients (n=65) (n, %)	Average time to start per therapy (median, IQR)
Methotrexate	41 (82)	13 (7 to 57)
Hydroxychloroquine	6 (12)	12 (1 to 606)
Sulfasalazine	1 (2)	10
Leflunomide	2 (4)	189 resp 245 weeks
No DMARD started	15 (23)	-

IQR= interquartile range

Of the 72 participating rheumatologists, 69 (96%) had reported that they are compliant with the recommendation *'MTX is part of the first treatment strategy'*. In 225 of the 378 patients (60%) MTX has indeed been prescribed as (part of) the first treatment. Of the 93 patients (26%) who did not start with MTX 15 (19%) have received leflunomide, sulfasalazine or injectable gold as first treatment, but 78 patients (81%) have started with other medications (table 3). Of the participating 72 rheumatologists, 60 (83%) had reported that they are compliant with the recommendation: '*Measures of disease activity must be obtained and documented regularly as frequently as monthly for patients with high/moderate disease activity or less frequently (such as every 3–6 months) for patients in sustained low disease activity or remission*'. Of the 378 patients 131 had less than 2 visits. For those patients with more than one visit recorded (247) we could check whether patients were monitored according to this recommendation. Of these 247 patients 68 (27%) had been monitored in full accordance with this recommendation, and were in the 'T2T always' group.

Another 23 (9%) patients had been monitored in partial accordance with this recommendation (75-100% of the visits) and were in the 'T2T sometimes' group. 45 (18%) patients had been monitored but insufficiently (in 50-75% of the visits) and also assigned to the 'sometimes' group (table 1).

Table 3. Medication prescribed as initial treatment and average time in weeks from diagnosis until start, in patients in whom MTX, leflunomide, Sulfasalazine or injectable gold was NOT started as first DMARD

	Patients (n total=78) (N, %)	Average time in weeks to start per therapy (median, IQR)
Hydroxychloroquine (+/- NSAID)	12 (15)	0 (0 to 0)
Parental corticosteroid (+/- HCQ)	28 (36)	0 (0 to 0)
Oral corticosteroid (+/- HCQ)	28 (36)	0 (0 to 3)
NSAID/analgetics	3 (4)	0 (0 to 0)
Ciclosporin	1 (1)	0 (0 to 0)
Biologic DMARD	6 (8)	64 (4 to 245)

IQR = interquartile range, NSAID=nonsteroidal anti-inflammatory drug, HCQ= Hydroxychloroquine, DMARD=disease-modifying anti rheumatic drug

27 (11%) patients were poorly monitored (<50% of the visits) and also in the 'sometimes' group (table 1). Finally 30 (13%) of the patients were in the 'T2T never' group where monitoring in none of the visits was done according to the recommendation.

DISCUSSION

The main conclusion of this study conducted in rheumatologists practicing in different parts of the world is that reporting to follow four EULAR/T2T recommendations does not mean that these recommendations are actually applied in daily clinical practice. We have found discrepancies between what rheumatologists report to do versus how they actually treat patients in clinical practice.

In our study less than 60% of the recruited rheumatologists that agreed to participate, expectedly the more dedicated rheumatologists, finished both the educational program and included patients in the METEOR database, which is rather disappointing. Yet even after participating in a dedicated educational program, in which those rheumatologists were actively stimulated to follow recommendations, which proved in many previous studies to have a positive effect on actually implementing recommendations,[19,22-24] rheumatologists still seem to be reluctant to follow up that recommendation. In fact, they report that they follow up recommendations, but act differently in clinical practice. What could potentially explain this

discrepancy? First, trivial logistic explanations may account. For instance, a patient may not show up for a visit, which in turn could lead to missing disease activity data within the recommended time period. Furthermore, there might be a time gap in obtaining knowledge on recommendations and actually implementing them. Rheumatologists might agree with recommendations and feel stimulated by an educational program to follow them, but time is too short to actually change practice (1-2 years follow- up). In the study by Forsetlund et al. physicians that were actively stimulated to treat patients according to evidence-based practice were compared with physicians that only received access to evidence based libraries, but no significant differences between the groups in behaviour of decision making was found. Their follow-up was 1.5 year, which was argued not to be long enough to change decision-making among physicians.[25] A Dutch study also showed discrepancies between compliance with- and actual application of recommendations about mental health in practice. However, in this study no educational program was used to encourage physicians to follow the recommendations.[26] An important strength of this study is that we have used study participants stemming from all over the world which increases generalizability. There are also limitations of this study. First of all, we investigated the agreement and adherence to the EULAR recommendations of 2010, which were new at the time of study initiation but have been updated since then (online publication in October 2013, while inclusion and instruction in the current study was finished in March 2013). However, the updated recommendations did not differ much with respect to the 4 recommendations studied. The only difference that is relevant for the interpretation of this study is that injectable gold is not recommended anymore when MTX is contraindicated. Another limitation is that we miss information about characteristics of the participating rheumatologists, due to privacy reasons. While rheumatologists from all over the world have participated in the study, we are still uncertain whether the study is fully generalizable to all rheumatologists. A more technical explanation for not following the recommendations in clinical practice is that we based our verdict about whether the recommendations were followed on the registration of rheumatologists' actions in the METEOR database. It is possible that recommendations were followed more often than was recorded. However, all rheumatologists were informed of this procedure when they agreed to participate in this study, were instructed to register their performance in the METEOR database and have been offered a training program to optimally use that database. We are not sure whether the participating rheumatologists have actually completed the educational program, so it is difficult to conclude that the program has influenced the behaviour of the rheumatologists. We did sent out monthly emails with a recommendation in order to remind the rheumatologist on the project, which has

been shown to be an effective tool in previous implementation studies.[27] Furthermore, we have offered the educational program via the internet, while a more effective approach could have been telephone interviews or educational visits to the physician. Some reviews have suggested that multifaceted strategies, such as educational meetings, educational resources and support from colleagues, are more successful strategies to assist in implementation of recommendations,[28-31] although another review suggested that it is not clear yet which implementation strategies are best.[32] A reluctance to record daily practice in the METEOR database, which is user-friendly[20] may explain why only 72 (55%) of the rheumatologists finished the educational program and included patients. When we compared the agreement with the recommendations between the rheumatologists that dropped out after the educational program (n=50) with the 72 participants that effectively included patients, the responses were similar. Technical or other problems with data entry in the METEOR database may also have led to incompleteness of data. In 16-22% of patient data information was not reported on the 4 studied recommendations. We do not know if these patients are randomly missing, and if entered data are inconsistent. In addition, we can only speculate about the reasons for not complying with recommendations, as additional data on treatment steps, contraindications for medication, side effects and comorbidities are not recorded.

In conclusion, the results of this study show that there is a discrepancy between agreeing with well-known and broadly accepted recommendations on treating-to-target, timing and choice of initial treatment as well as tight control in the management of patients with rheumatoid arthritis on one hand, and the actual performance in clinical practice when measured. A dedicated internet-based educational program might be insufficient to change the attitude of the rheumatologists. This observation has implications for the broadly advocated recommendation to implement quality-control initiatives in order to make practice performance more transparent: It looks as if the development and publication of evidence and consensus-based treatment recommendations do not suffice to change practice performance in rheumatology. Since these recommendations are usually a trade-off between best evidence and cost-effectiveness, it can be argued if nowadays patients with RA are indeed optimally treated in clinical practice. Further studies should focus on factors that explain the reluctance of rheumatologists to follow evidence based treatment recommendations, in particular reluctance of MTX prescription in patients with co-morbidities, and on strategies to overcome this reluctance. In addition, future studies should focus on investigating what type of education is most effective for implementing guidelines in clinical practice.

REFERENCE LIST

1 Grimshaw JM, Russell IT. Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations. *Lancet.* 1993;342:1317-1322.

2 Woolf SH, Grol R, Hutchinson A, et al. Clinical guidelines: potential benefits, limitations, and harms of clinical guidelines. *BMJ.* 1999;318:527-530.

3 Amiel SA, Pursey N, Higgins B, et al. Diagnosis and management of type 1 diabetes in adults: summary of updated NICE guidance. *BMJ*. 2015;351:h4188.

4 Gruffydd-Jones K, Jones MM. NICE guidelines for chronic obstructive pulmonary disease: implications for primary care. *Br J Gen Pract*. 2011;61:91-92.

5 Cressy DS, DeBoisblanc BP. Diagnosis and management of asthma: a summary of the National Asthma Education and Prevention Program guidelines. National Institutes of Health. *J La State Med Soc*. 1998;150:611-617.

6 Smolen JS, Landewe R, Breedveld FC, et al. EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs. *Ann Rheum Dis*. 2010;69:964-975.

7 Smolen JS, Landewe R, Breedveld FC, et al. EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs: 2013 update. *Ann Rheum Dis.* 2014;73:492-509.

8 Smolen JS, Aletaha D, Bijlsma JW, et al. Treating rheumatoid arthritis to target: recommendations of an international task force. *Ann Rheum Dis.* 2010;69:631-637.

9 Haraoui B, Bensen W, Bessette L, et al. Treating rheumatoid arthritis to target: a Canadian physician survey. *J Rheumatol*. 2012;39:949-953.

10 Park YB, Koh EM, Kim HY, et al. Treating rheumatoid arthritis to target: recommendations assessment questionnaire in Korea. *Clin Rheumatol*. 2013;32:1791-1797.

11 Schoels M, Aletaha D, Smolen JS, et al. Follow-up standards and treatment targets in rheumatoid arthritis: results of a questionnaire at the EULAR 2008. *Ann Rheum Dis*. 2010;69:575-578.

12 Kruger K, Karberg K. [Treat-to-target from the perspective of office-based rheumatology]. *Z Rheumatol.* 2011;70:664-669.

13 Littlejohn G, Roberts L, Arnold M, et al. A multi-center, observational study shows high proportion of Australian rheumatoid arthritis patients have inadequate disease control. *Int J Rheum Dis.* 2013;16:532-538.

14 Vermeer M, Kuper HH, Hoekstra M, et al. Implementation of a treat-to-target strategy in very early rheumatoid arthritis: results of the Dutch Rheumatoid Arthritis Monitoring remission induction cohort study. *Arthritis Rheum*. 2011;63:2865-2872.

15 van Hulst LT, Creemers MC, Fransen J, et al. How to improve DAS28 use in daily clinical practice?--a pilot study of a nurse-led

intervention. *Rheumatology (Oxford)*. 2010;49:741-748.

16 Michie S. Changing behavior: theoretical development needs protocol adherence. *Health Psychol.* 2005;24:439.

17 Rashidian A, Eccles MP, Russell I. Falling on stony ground? A qualitative study of implementation of clinical guidelines' prescribing recommendations in primary care. *Health Policy*. 2008;85:148-161.

18 Cabana MD, Rand CS, Powe NR, et al.Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA* 1999;282:1458-1465.

19 Zwerver F, Schellart AJ, Knol DL, et al. An implementation strategy to improve the guideline adherence of insurance physicians: an experiment in a controlled setting. *Implement Sci*. 2011;6:131.

20 Koevoets R, Allaart CF, van der Heijde DM, et al. Disease activity monitoring in rheumatoid arthritis in daily practice: experiences with METEOR, a free online tool. *J Rheumatol.* 2010;37:2632-2633.

21 Gvozdenovic E, Koevoets R, Wolterbeek R, et al. Assessment of global disease activity in RA patients monitored in the METEOR database: the patient's versus the rheumatologist's opinion. *Clin Rheumatol.* 2014;33:461-466.

22 Sanci LA, Coffey CM, Veit FC, et al. Effects of an educational intervention for general practitioners in adolescent health care principles: a randomized controlled study. *West J Med*. 2000;172:157-163.

23 Davis D, O'Brien MA, Freemantle N, et al. Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *JAMA* 1999;282:867-874.

24 Smits PB, Verbeek JH, van Dijk FJ, et al. Evaluation of a postgraduate educational programme for occupational physicians on work rehabilitation guidelines for patients with low back pain. *Occup Environ Med.* 2000;57:645-646.

25 Forsetlund L, Bradley P, Forsen L, et al. Randomised controlled trial of a theoretically grounded tailored intervention to diffuse evidence-based public health practice [ISRCTN23257060]. *BMC Med Educ*. 2003;3:2.

26 Rebergen D, Hoenen J, Heinemans A, et al. Adherence to mental health guidelines by Dutch occupational physicians. *Occup Med (Lond)*. 2006;56:461-468.

27 Prior M, Guerin M, Grimmer-Somers K. The effectiveness of clinical guideline implementation strategies--a synthesis of systematic review findings. *J Eval Clin Pract*. 2008;14:888-897.

28 Grimshaw JM, Thomas RE, MacLennan G, et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess*. 2004;8:iii-72.

29 Hadely KA, Power E, O'Halloran R. Speech pathologists' experiences with stroke clinical practice guidelines and the barriers and facilitators influencing their use: a national descriptive study. *BMC Health Serv Res.* 2014;14:110.

30 Medves J, Godfrey C, Turner C, Paterson M, Harrison M, MacKenzie L, Durando P: Systematic review of practice guideline dissemination and implementation strategies

for healthcare teams and team-based practice. *Int J Evid Based Healthc* 2010;8:79-89.

31 Prior M, Guerin M, Grimmer-Somers K. The effectiveness of clinical guideline implementation strategies--a synthesis of systematic review findings. *J Eval Clin Pract*. 2008;14:888-897.

32 Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet* 2003;362:1225-1230.

Attachment I. EULAR recommendations for the management of RA, differences between participating rheumatologists and rheumatologists that stopped or were lost to follow-up during the study.

	Participants (n=72)		Drop outs/LF (n=50)	
	Yes	(Some)times /No	Yes	(Some)times /No
Are you aware of the recommendations? N, %	72 (100)	-	50 (100)	-
Are you following the recommendations?	58 (81)	14 (19)	38 (76)	12 (24)
1. Treatment with synthetic DMARDs should be started as soon as the diagnosis of RA is made	70 (99)	1 (1)	48 (96)	2 (4)
2. Treatment should be aimed at reaching a target of remission or low disease activity as soon as possible in every patient; as long as the target has not been reached, treatment should be adjusted by frequent (every 1–3 months) and strict monitoring.	64 (90)	7 (10)	47 (94)	3 (6)
3. MTX should be part of the first treatment strategy in patients with active RA	69 (97)	2 (3)	47 (94)	3 (6)
4. When MTX contraindications (or intolerance) are present, the following DMARDs should be considered as part of the (first) treatment strategy: leflunomide, SSZ or injectable gold.	59 (83)	12 (17)	42 (84)	8 (16)
5. In DMARD naïve patients, irrespective of the addition of GCs, synthetic DMARD monotherapy rather than combination therapy of synthetic DMARDs may be applied.	56 (79)	15 (21)	41 (82)	9 (18)
6. GCs added at low to moderately high doses to synthetic DMARD monotherapy (or combinations of synthetic DMARDs) provide benefit as initial short-term treatment, but should be tapered as rapidly as clinically feasible.	64 (90)	7 (10)	43 (86)	6 (14)
7. If the treatment target is not achieved with the first DMARD strategy, addition of a biological DMARD should be considered when poor prognostic factors are present; in the absence of poor prognostic factors, switching to another synthetic DMARD strategy should be considered	60 (85)	11 (15)	39 (78)	11 (22)
8. In patients responding insufficiently to MTX and/or other synthetic DMARDs with or without GCs, biological DMARDs should be started; current practice would be to start a TNF inhibitor (adalimumab, certolizumab, etanercept, golimumab, infliximab) which should be combined with MTX	61 (86)	10 (14)	41 (82)	9 (18)
9. Patients with RA for whom a first TNF inhibitor has failed, should receive another TNF inhibitor, abatacept, rituximab or tocilizumab	67 (94)	4 (65)	45 (90)	5 (10)
10. In cases of refractory severe RA or contraindications to biological agents or the previously mentioned synthetic DMARDs, the following synthetic DMARDs might be also considered, as monotherapy or in combination with some of the above: azathioprine, ciclosporin A (or exceptionally, cyclophosphamide)	49 (69)	22 (31)	32 (64)	18 (36)
11. Intensive medication strategies should be considered in every patient, although patients with poor prognostic factors have more to gain.	67 (94)	4 (6)	42 (86)	7 (14)
12. If a patient is in persistent remission, after having tapered GCs, one can consider tapering biological DMARDs, especially if this treatment is combined with a synthetic DMARD	54 (76)	17 (24)	37 (76)	12 (24)
13. In cases of sustained long-term remission, cautious titration of synthetic DMARD dose could be considered, as a shared decision between patient and doctor	61 (86)	10 (14)	43 (88)	6 (12)
14. DMARD naïve patients with poor prognostic markers might be considered for combination therapy of MTX plus a biological agent	47 (86)	10 (14)	31 (63)	18 (37)
15. When adjusting treatment, factors apart from disease activity, such as progression of structural damage, comorbidities and safety concerns should be taken into account	69 (97)	2 (3)	47 (96)	2 (4)

Attachment II. Treat to target, differences between participating rheumatologists and rheumatologists that stopped during the study.

	participants		Drop outs/LF	
	Yes	(Some)times /No	Yes	(Some)times /No
Are you aware of the recommendations? N, %	70 (97)	2 (3)	47 (96)	2 (4)
Are you following the recommendations?	55 (79)	15 (21)	31 (66)	16 (34)
1. **The primary target for treatment of rheumatoid arthritis should be a state of clinical remission.**	65 (93)	5 (7)	41 (93)	3 (7)
2. **Clinical remission is defined as the absence of signs and symptoms of significant inflammatory disease activity.**	68 (97)	2 (3)	39 (89)	5 (11)
3. **While remission should be a clear target, based on available evidence low disease activity may be an acceptable alternative**	67 (96)	3 (4)	42 (95)	2 (5)
4. **Until the desired treatment target is reached, drug therapy should be adjusted at least every 3 months.**	65 (93)	5 (7)	37 (84)	7 (16)
5. **Measures of disease activity must be obtained and documented regularly, as frequently as monthly for patients with high/moderate disease activity or less frequently (such as every 3–6 months) for patients in sustained low disease activity or remission**	60 (86)	10 (14)	31 (70)	13 (30)
6. **The use of validated composite measures of disease activity, which include joint assessments, is needed in routine clinical practice to guide treatment decisions.**	65 (93)	5 (7)	39 (89)	5 (11)
7. **Structural changes and functional impairment should be considered when making clinical decisions, in addition to assessing**	64 (91)	6 (9)	41 (93)	3 (7)
8. **The desired treatment target should be maintained throughout the remaining course of the disease.**	65 (93)	5 (7)	37 (84)	7 (16)
9. **The choice of the (composite) measure of disease activity and the level of the target value may be influenced by consideration of co-morbidities, patient factors and drug-related risks.**	67 (96)	3 (4)	38 (86)	6 (14)
10. **The patient has to be appropriately informed about the treatment target and the strategy planned to reach this target under the supervision of the rheumatologist.**	65 (93)	5 (7)	41 (93)	3(7)