difference in future therapy was seen for RF and MTX treatment in Jyvaskyla, where 69% of patients with positive RF tests were treated with MTX versus 54% of patients with negative tests ($p < 0.001$). MTX treatment was begun in only 5% more patients in Nashville who were RF-positive vs negative (67 vs 62%, NS). Patients with abnormal values at baseline for ESR and CRP were only marginally (<5%) more likely to be treated with MTX than patients with normal values (Table). No differences were seen in likelihood of future treatment with biological agents according to baseline ESR, CRP, or RF status at any time, in either locale (Table).

Percentage of patients with RA treated with MTX or anti-TNF agent during follow-up, according to high or low baseline values for ESR, CRP, and life-time RF in Jyvaskyla, Finland and Nashville, TN.

		Jyvaskyla, Finland					Nashville, TN				
Measure	**Treatment**	**n**	**Total**	**Normal**	**High**	**p**	**n**	**Total**	**Normal**	**High**	**p**
ESR				**<28mm/h**	**≥28mm/h**				**<28mm/h**	**≥28mm/h**	
	MTX	1892	63%	62%	64%	0.41	478	64%	64%	65%	0.76
	Anti-TNF	1892	4.3%	5.2%	3.6%	0.10	478	8.4%	8.4%	8.3%	0.98
CRP				**<10 mg/L**	**≥10 mg/L**				**<10 mg/L**	**≥10 mg/L**	
	MTX	1744	62%	61%	63%	0.41	175	85%	83%	88%	0.43
	Anti-TNF	1744	4.2%	4.7%	3.9%	0.41	175	20%	19%	22%	0.59
RF				**Neg**	**Pos**				**Neg**	**Pos**	
	MTX	1874	63%	54%	69%	<0.001	292	65%	62%	67%	0.36
	Anti-TNF	1874	4.4%	4.4%	4.4%	0.99	292	14%	15%	14%	0.83

Conclusion: Baseline laboratory values for ESR, CRP, and RF have only marginal impact on the likelihood of treatment with MTX or biological agents. At least 30% of patients with RA have a normal ESR or CRP, or negative RF test. A traditional view that an abnormal laboratory test generally is associated with more severe clinical status and higher likelihood of aggressive treatment has not been studied extensively with an evidence-based approach, although insufficient data are available for ACPA (anti-CCP) in this study. Additional data from usual care at other sites could provide further information toward possible reassessment of laboratory tests in usual care of patients with RA.

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Invasive Fungal Infections in Seniors with Rheumatoid Arthritis: A Population-Based Study from the Ontario Biologics Research Initiative. Jessica Widdifield[7], Sasha R. Bernatsky[3], J. Michael Paterson[1], Nadia Gunraj[2], Janet E. Pope[6], J. Carter Thorne[5], Alfred A. Cividino[4] and Claire Bombardier[7]. [1]Institute for Clinical Evaluative Science, Canada, [2]Institute for Clinical Evaluative Science, [3]McGill UHC/RVH, Montreal, QC, Canada, [4]McMaster University, Hamilton, ON, Canada, [5]Southlake Regional Health Care, Newmarket, ON, Canada, [6]St Joseph Health Care London, London, ON, Canada, [7]University of Toronto

Purpose: An increased risk of invasive fungal infections has been suggested in rheumatoid arthritis (RA). The Ontario Biologics Research Initiative (OBRI) is an innovative undertaking to promote real-world rheumatic drug surveillance, based in part on Ontario's comprehensive administrative healthcare databases. Our objective was to assess the risk of serious fungal infections in seniors with RA.

Methods: An RA cohort was assembled from Ontario billing and hospitalization data, 1992–2009. Analyses were limited to subjects aged > 65 who filled ≥ 1 prescription for an oral glucocorticoid, disease-modifying agent (DMARD) or biologic. We studied cases of invasive fungal infections (Aspergillosis, Coccidioidomycosis, Histoplasmosis, Blastomycosis, Paracoccidioidomycosis, systemic Candidiasis) identified from the diagnoses most responsible for hospitalizations and/or emergency room visits over 1998–2009. Cases of infection were matched (on age, sex, and date of cohort entry) to up to 5 controls from the same RA cohort. Multivariate conditional logistic regression analyses assessed the independent effects of demographics, comorbidity, medications, and markers of RA severity (number of rheumatology visits, extra-articular RA features, joint replacement).

Results: In 85,458 seniors with RA (contributing 614,915.5 person-years), 57 invasive fungal infections occurred (9.3 events per 100,000 person-years). Cases were more likely than controls (n=285) to be rural (42.1% of cases vs. 19.6% of controls) and to have more co-morbidities especially lung (43.9% vs 24.6%) and renal disease (12.3% vs 4.2%). Cases also had more extra-articular RA features (33.3% vs 21.4%) and more rheumatology visits. Biologic exposures were rare in our cohort, and at the time of infection, no cases were exposed to a biologic agent. In both cases and controls, the most common DMARDs were methotrexate (11.7%) and hydroxychloroquine (6.7%). In contrast, prednisone exposure > 10mg/d occurred in 17.5% of cases, versus 7.0% of controls. Multivariable models demonstrated that risk of invasive fungal infections was higher among rural-versus-urban residents (HR 14.47, 95% CI 4.46, 46.98) and in subjects with more co-morbidities (as assessed by number of distinct drugs used in the year prior, HR 1.24 95% CI 1.12, 1.37). There was a notable trend for greater risk of invasive fungal infection with prednisone doses > 20 mg/d (adjusted HR 6.10 95% CI 0.96, 38.83 (p=0.0556).

Conclusions: Rural residence and greater co-morbidity were associated with increased risk for invasive fungal infections in seniors with RA. Steroids were suggested as an independent risk factor in this population-based sample. Potential limitations of our study include relatively low drug exposure rates, the possibility of incomplete ascertainment of biologic exposures (for individuals receiving drugs through private insurance) and channelling bias (where persons at highest risk for infections may not be prescribed biologics).

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Is DAS28 Remission Good Enough? Disease Activity and Functionality in Rheumatoid Arthritis, Results of the DREAM Remission Induction Cohort. Marloes Vermeer[3], Ina H. Kuper[3], Monique Hoekstra[1], Hein J. Bernelot Moens[4], Piet L. C. M. van Riel[2] and Mart A. F. J. van de Laar[3]. [1]Isala Klinieken, Zwolle, The Netherlands, [2]Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands, [3]University of Twente and Medisch Spectrum Twente, Enschede, The Netherlands, [4]Ziekenhuisgroep Twente, Almelo/Hengelo, The Netherlands

Background: Remission is the goal of treatment in rheumatoid arthritis (RA). In general, remission is associated with improved functionality. However, it is unclear whether remission according to the Disease Activity Score in 28 joints (DAS28) criteria is good enough to prevent functional disability. The objective of this study was to assess the relation between DAS28 and functionality after 1 year follow-up in very early RA.

Methods: Data of the Dutch Rheumatoid Arthritis Monitoring (DREAM) remission induction cohort were used (1). Disease activity was indexed as remission (DAS28 < 2.6), low (2.6 ≥ DAS28 ≤ 3.2), moderate (3.2 < DAS28 ≤ 5.1) and high (DAS28 > 5.1). Functionality was measured with the Health Assessment Questionnaire Disability Index (HAQ; scale 0 (best) to 3 (worst)) as well as with the SF-36 Physical Functioning Scale (PF-10; scale 0 (worst) to 100 (best)). HAQ ≤ 0.5 was regarded as HAQ remission (2). Primary outcomes after one year were: median HAQ and PF-10 values and percentages of patients reaching a HAQ ≤ 0.5 stratified by DAS28 level and the association between DAS28 and functionality (HAQ, PF-10).

Results: One year data were available for 239 patients. After one year, mean (SD) DAS28 was 2.59 (1.05) and observed DAS28 levels were 56.9% (136/239) remission, 16.3% (39/239) low, 24.3% (58/239) moderate and 2.5% (6/239) high. One year median (IQR) values of HAQ and PF-10 were 0.38 (0.00–0.86) and 75.0 (55.0–90.0) respectively. Median HAQ increased as median PF-10 decreased in parallel to increasing DAS28 levels (Kruskal-Wallis Test, both p<0.001) (Table 1). Higher percentages of HAQ ≤ 0.5 were found in the lowest disease activity groups (Table 1). Percentages of HAQ ≤ 0.5 were similar for age groups (< 55 yrs and ≥ 55 yrs) and gender. Overall, DAS28 correlated with HAQ (Spearman's rho 0.41, p<0.001) and PF-10 (rho −0.32, p<0.001). In patients who were in remission after one year (n=136), DAS28 still correlated with HAQ (rho 0.22, p=0.010) and PF-10 (rho −0.19, p=0.027).

Table 1. DAS28 levels and functionality scores after one year.

DAS28 level	Median (IQR) HAQ	HAQ ≤0.5, n (%)	Median (IQR) PF-10
Remission (n = 136)	0.25 (0.00–0.50)	104 (76.5)	80.0 (65.0–95.0)
Low (n = 39)	0.38 (0.00–0.75)	25 (64.1)	75.0 (55.0–90.0)
Moderate (n = 58)	0.69 (0.25–1.16)	23 (39.7)	65.0 (40.0–80.0)
High (n = 6)	1.33 (0.94–1.91)	1 (16.7)	40.0 (22.5–60.0)

Conclusion: A lower disease activity is related to better functionality in patients with very early RA. Below the DAS28 remission threshold (DAS28 < 2.6), a lower DAS28 is still associated with better functionality scores. The DAS28 is a composite score and the HAQ and PF-10 are patient reported outcomes. Our results emphasize that aiming for remission is

important but aiming at the lowest possible DAS28 is even better as it results in improved functionality, which is relevant for patients.

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1. Kuper et al. Ann Rheum Dis 2008;67(Suppl II):48.
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Disclosure: M. Vermeer: None; **I. H. Kuper:** None; **M. Hoekstra:** None; **H. J. Bernelot Moens:** None; **P. L. C. M. van Riel:** None; **M. A. F. J. van de Laar:** None.

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Low Rate of Rheumatoid Arthritis Remission in Real Life: Might Predictive Factors Explain? Elodie Loppin[2], Ronan Garlantezec[1] and Elisabeth Solau-Gervais[2]. [1]Public Heatlh Department, University Hospital Brest, France, [2]Rheumatology Department University Hospital Poitiers, France

Objective: Remission constitutes the best achievable state in patients with rheumatoid arthritis (RA). Remission rates in usual clinical care are much more lower than the one in randomized clinical trials (1). The objective of the study was to define remission factors in "real life".

Methods: Remission has been assessed retrospectively for records of 364 patients with rheumatoid arthritis receiving usual care. These patients were out and in patients followed in an university hospital with at least one visit in year 2008. Disease activity was evaluated on records according to DAS 28 criteria. Remission was defined by a DAS28 < 2.6.Statistical analysis used Chi-2 and multivariate analysis with the software SAS9.

Results: The evaluation of disease activity was available for 328 patients (90 %). Mean age of the patients was 63 years (+/−13,7) and mean duration of the disease was 13,6 (+/−10,7). Rheumatoid factor and anti-CCP was positive respectively in 79.3% and 73.8 %. Eighty five percent had an erosive disease. The rate of global remission was 28 %. Factors associated statistically with remission in multivariate analyse were (Ors 95% confidence intervals): male sex (0,2-0,8), younger age (0,2-0,9), rheumatoid factor-positive (1,2–6,5) and the absence of concomitant prednisolone treatment (0,3-0,9). Younger age and rheumatoid factor-positive represents more a population with a "higher therapeutic objective" and female sex and older age patients have more a difference in the evaluation of the disease, rather than true differences in RA activity. Moreover, the remission rate was significantly different according to the treatment: 15% without DMARDs or biotherapy, 24% with DMARDs and 47% with anti-TNF alpha treatment. As regards to the three anti-TNF alpha, the remission rate was the lowest for infliximab (18%), than etanercept (43%). Patients treated with adalimumab had the highest rate of remission with 64%. The difference was significant between infliximab and adalimumab (OR: 1.2–101) and between infliximab and etanercept (OR: 1,1–30,15) but not between etanercept and adalimumab.

Conclusion: Male sex, younger age, rheumatoid factor-positive and corticoids free are associated with remission. Assessing remission in clinical practice is possible, and etanercept and adalimumab treatments are associated with higher rate of remission.

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Disclosure: E. Loppin: None; **R. Garlantezec:** None; **E. Solau-Gervais:** None.

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Lymphocytopenia and Infection Risk in Rheumatoid Arthritis: A Population Based Analysis. Deana D. Hoganson[2], Eric L. Matteson[1], Patrick D. Fitz-Gibbon[3] and Cynthia S. Crowson[3]. [1]Mayo Clinic, Rochester, MN, [2]Mayo Clinic Rochester, Rochester, MN, [3]Mayo Clinic Rochester

Background: There is an increased susceptibility for infections in patients with rheumatoid arthritis (RA) which contributes to increased mortality. Lymphocytopenia is prevalent in RA patients and may contribute to increased infection risk. The purpose of this study was to examine the association between lymphocytopenia and infection in RA patients during the pre-biologic era and develop a risk score for infections.

Methods: We utilized a population based cohort of patients with incident RA ascertained between 1955 and 1994 that were followed longitudinally through their complete medical records until 1/1/2000. The outcome measures included all objectively confirmed infections (by microbiology or radiology) and serious infections (requiring hospitalization or IV antibiotics). Data were collected on smoking status, leukopenia, lymphocytopenia, comorbidities (alcoholism, diabetes mellitus (DM), chronic lung disease, cardiovascular disease (CVD)), RA disease characteristics (erosions, extra-articular manifestations (ExRA), rheumatoid factor (RF), nodules, erythrocyte sedimentation rate (ESR)) and medication use. Potential predictors were examined using multivariable Andersen-Gill models (a variation of Cox modeling allowing multiple infections per patient) with time-dependent covariates.

Results: Among the 584 RA patients (mean age 58 years; 72% female; median followup 9.9 years), 277 had ≥1 objectively confirmed infection (706 total infections), and 252 had ≥1 serious infection (646 total infections). Significant predictors of both outcomes included age, male sex, leukopenia, lymphocytopenia, alcoholism, DM, chronic lung disease, CVD, ExRA, RF positivity, nodules, ESR and glucocorticoid use. Lymphocytopenia was significantly associated with objectively confirmed (HR=1.7, 95% CI=1.3–2.2; p<0.001) and serious (HR=1.6, 95% CI=1.2–2.2; p<0.001) infections after adjustment for the other risk factors. Using these models, infection risk scores were developed for each outcome. The score discriminated patients with low (5 year risk 13% ± 4.1%), medium (5 year risk 23% ± 7.4%), and high infection risk (5 year risk 40% ± 8.5%) (figure).

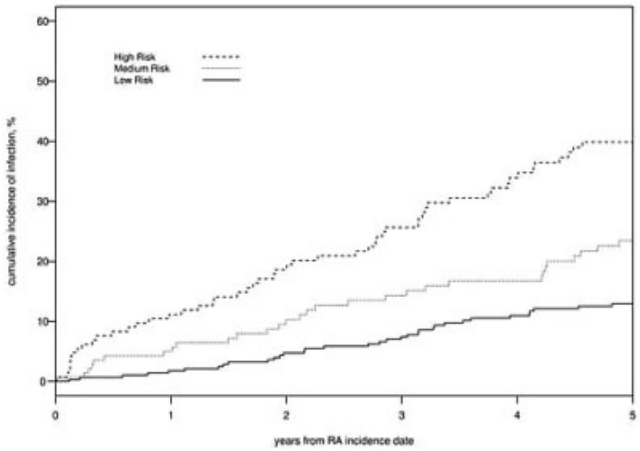

Figure. Cumulative incidence of objectively confirmed infections in RA patients based on risk score.

Conclusions: This study reveals that lymphocytopenia is an independent risk factor for infection in RA patients. A risk score may alert clinicians to the potential occurrence of infection in their RA patients. Further research is needed to examine whether this score accurately estimates the infection risk in patients treated with biologics.

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Measures of Disease Activity Provide Various Clinical Decisions in Individual Patients. P. H. P. de Jong[1], J. M. W. Hazes[2], J. J. Luime[2] and A. E. A. M. Weel[3]. [1]Department of Rheumatology, ErasmusMC, Rotterdam, The Netherlands, [2]Department of Rheumatology, ErasmusMC, Rotterdam, [3]Department of Rheumatology, Maasstad Hospital, Rotterdam

Background: Disease Activity Score (DAS) and its modified versions, Simplified Disease Activity Index (SDAI) and Clinical Disease Activity Index (CDAI) are indices used to measure disease activity. Provided thresholds for activity states to adjust therapy on were solely based on rheumatologists' decisions. To achieve disease remission, treatment adjustments based on tight controlled indices is recommended in individual patients, but no preferred index is defined. Moreover, data on reflection of disease state with clinical remission are missing.

Purpose: To investigate the interchangeability of measures of disease activity to base treatment decisions on. To compare remission thresholds of indices with predefined clinical remission.

Methods: For this study data are used of a currently ongoing clinical trial in patients 18 years or older with recent-onset arthritis (tREACH). Treatment decisions to step up or step down are performed every 3 months and based upon the DAS thresholds >2.4 and <1.6. For the present study DAS indices are recalculated, namely DAS 3 variables (no patient Global), DAS-CRP, DAS-CRP 3 variables, same combinations for 28 joints and SDAI and CDAI. Thresholds for remission and active disease for DAS28, SDAI and CDAI are respectively <2.6 and >3.2, <3.30 and >11, and <2.80 and >10. Clinical remission is defined as having: (1) less than 2 swollen joints, (2) no swollen