synovial hyperplasia and PD synovitis, and qualitative scoring systems (0/1) for tenosynovitis/peritendinitis.

Results: The median age of 258 enrolled patients were 51.4 years with 82.9% females. Their median disease duration was 55 months, and median disease activity score based on 28 joint count were 4.6. In a total of 5676 joints assessed, 968 joints (17.1%) were swollen and 1296 joints (22.8%) were tender, while on ultrasonography GS synovial hyperplasia was present in 801 (14.1%) joints, PD synovitis in 476 (8.4%) joints and tenosynovitis/peritendinitis in 108 (1.9%) joints. The general agreement between clinical signs and ultrasound-determined joint inflammation in all joints was fair ($\kappa=0.365$, $p<0.01$). In wrists, joint tenderness showed higher κ coefficient ($\kappa=0.329$, $p<0.01$) with ultrasound-determined joint inflammation than swelling ($\kappa=0.263$, $p<0.01$), while on the contrary, swelling showed higher κ coefficient ($\kappa=0.156-0.536$, $p<0.01$) with ultrasound-determined joint inflammation than tenderness ($\kappa=0.061-0.355$, $p<0.05$) in MCP and PIP joints. Both synovial hyperplasia and synovitis detected by ultrasound had consistently higher agreement with tenderness/swelling than tenosynovitis/peritendinitis. Joint tenderness and swelling had the highest κ coefficient with GS ≥ 1 synovial hyperplasia in most MCP and PIP joints, while with GS ≥ 2 synovial hyperplasia in wrists. For all 22 joints, PD ≥ 1 synovitis had the highest κ coefficient with clinical tenderness and swelling.

Conclusions: Synovitis had better agreement with clinical signs than tenosynovitis/peritendinitis. Joint swelling showed better agreement with these ultrasonographic changes than tenderness for MCP and PIP joints, while the opposite for wrists. The minimal requirements of synovial hyperplasia/synovitis which correspond to clinical signs are GS ≥ 1 for MCP and PIP joints, GS ≥ 2 for wrists, but PD > 1 for any joint.

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imaging is applied for various clinical settings. A combined approach using both nCS and TG could improve the differentiation between pRP and sRP.

Objectives: The aim of this pilot study was to determine which technique (TG versus nCS) allows the best discrimination amongst older patients with pRP and sRP.

Methods: Thirty patients with RP (pRP, n=21; sRP, n=9) underwent nCS (Olympus SZ51) and TG (Flirb B 620). Nailfold morphologic features were measured and scored on capillary density, giant capillaries, ramification and hemorrhages. The patients were divided into three categories: normal, slightly abnormal (slightly enlarged capillaries) and severely abnormal (destruction of capillary structure and hemorrhages).

TG of the hand was performed before, directly after and 10 min after a cold challenge test with cold manchetts of 3°C. Rewarming and reperfusion were monitored and baseline images and rewarming curves were analysed.

Results: Capillary abnormalities with nCS were found in all patients with sRP (9/9) and in 52% (11/21) of patients with pRP. Out of 11 pRP patients with altered capillary morphology, 7 (63%) had a cardiovascular disease.

TG demonstrated a lower average temperature at baseline in the pRP group compared to the sRP group (d 1.68°C, $p<0.01$). In patients with pRP temperature decreased after cold induction (-2.34°C , $p=0.01$), whereas in sRP patient temperature stayed consistent ($+0.07^{\circ}\text{C}$, $p=0.46$) (table 1). In both groups temperature increased ten minutes after cold induction (pRP $+2.62^{\circ}\text{C}$, $p<0.01$; sRP $+1.57^{\circ}\text{C}$, $p<0.01$).

The gradient of the rewarming curve was significantly lower in patients with sRP compared to the pRP group (median 0.16 vs. 0.26 °C/min; $p=0.015$).

Abstract FRI0599 – Table 1

Average temperature of the fingers before the immersion in cold water (in °C)	Average temperature of the fingers just after the immersion test (in °C)	Average temperature of the fingers 10 min after removing the hand from cold water (in °C)	Average temperature recovery speed (in °C/min)
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Primary Raynaud Phenomenon	29.49	27.15	29.77	0.26	Secondary Raynaud Phenomenon	31.17	31.24	32.81	0.16	Capillaroscopy abnormalities	25.80	25.60	27.92	0.23	Secondary Raynaud phenomenon and Capillaroscopy abnormalities	27.99	28.15	31.52	0.34
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Conclusions: Nailfold capillaroscopy and thermography can reliably be used to measure microvascular damage and dysfunction. TG is better suitable to differentiate between older patients with pRP and sRP.

Furthermore, in presence of cardiovascular disease, TG appears to be a more reliable technique than nCS for differentiating between patients with pRP and sRP.

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Public health, health services research and health economics

FRI0600 METHODS FOR THE ANALYSIS OF ADHERENCE DATA FROM A MEDICATION EVENT MONITORING SYSTEM (MEMS): A SYSTEMATIC REVIEW

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Background: Medication adherence can be measured with several methods: medication bottles with an electronic cap are regarded as the gold standard. The cap contains an electronic device which records the date and time of each

FRI0599

THE RELEVANCE OF THERMOGRAPHY AND NAILFOLD CAPILLAROSCOPY IN OLDER PATIENTS WITH PRIMARY AND SECONDARY RAYNAUD'S PHENOMENON

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Background: Raynaud's phenomenon (RP) is defined as episodic attacks of artery and arteriole vasoconstriction. To differentiate between the benign RP (pRP) and the form associated with connective tissue diseases (sRP) the capillary morphology can be studied using nailfold capillaroscopy (nCS). However, abnormal morphology can also be caused due to age-related changes and has been described in patients with diabetes and cardiovascular disease. In addition, this technique cannot provide functional information.

Thermal imaging (thermography; TG) is a non-invasive technique which enables quantification of cutaneous blood vessel function. In veterinary medicine, thermal

opening and closing of the bottle. This is termed Medication Event Monitoring System (MEMS). To our knowledge, there is no standard method to summarise and analyse the adherence data from MEMS.

Methods: A literature search was conducted in July 2017 in the databases PubMed, Embase and Cochrane. Search terms were related to the following MESH search terms: medication (non)adherence/compliance, medication persistence, chronic disease/illness, chronically ill, medical electronics, treatment, (drug) therapy, data analysis, statistical study.

Results: We identified 1493 articles, and immediately excluded 1127 off-topic articles and 48 double entries after screening of title and abstract. In the end, 207 articles were included.

The mean age of the patients in the studies was 52 (SD 46) years. A total of 62 different health conditions were studied. Most patients had HIV (29%) or heart failure (10%). The MEMS cap was used for a median of 3 months (IQR: 4; range: 1 week-24 months).

Outcome measures: Most studies computed an adherence score, expressed as the percentage of days on which the correct dose of medication was taken. The threshold to mark people as adherent was most frequently (38 studies) set at 80% (range 67%–95%). Timing compliance (i.e. the percentage of doses taken at the appropriate time) and dose compliance (i.e. the percentage of correct doses taken on each day) were also calculated in several studies (in 14% and 23%, respectively). In addition, a few studies (4%) calculated 'drug holidays', i.e. periods of a certain number of days on which the medication bottle was not opened, followed by a bottle opening.

Statistical analyses: Multilevel modelling and slopes in combination with one-sample t-tests were used to examine adherence patterns over time.

Ten studies assessed an intervention to improve adherence. Generalised Estimating Equation (GEE) model (n=4), ANOVA, McNemar's exact test, multilevel modelling, a summary analysis (details not reported), T-test or Wilcoxon test were used to compare the differences in adherence before and after an intervention.

Conclusions: Apart from the adherence score threshold, often set at 80% of days with correct medication dosing, we found that many different outcome measures and methods were used for the analysis of MEMS data, pointing to a lack of standardisation. Apparently, there is no consensus on the best outcome measures and a lack of validation studies that compare different methods to analyse MEMS data.

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FRI0601 THE NATURE AND EXTENT OF DATA ITEMS COLLECTED ACROSS EUROPEAN PREGNANCY REGISTERS – FIRST RESULTS OF THE EUROPEAN NETWORK OF PREGNANCY REGISTERS IN RHEUMATOLOGY (EUNEP)

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Background: There is a high unmet need of robust data on the outcomes of pregnancies and drug safety in various inflammatory rheumatic diseases (IRD). The aims of the European Network of Pregnancy Registers in Rheumatology (EuNeP) are to bring together experts who run pregnancy registers, to define a core data set and to perform concerted data analyses.

Objectives: To describe data items collected in existing multicentre European pregnancy registers in rheumatology.

Methods: A comprehensive survey on details of the registers was performed encompassing patient enrolment, inclusion criteria, demographics, disease specific and general outcomes, medical treatment, course and outcome of pregnancy and outcomes of the child. Free text answers were possible for all questions. Questionnaires were sent to the principle investigator(s) of the participating studies. The completed questionnaires were reviewed, and responses were evaluated descriptively. Only data items collected during pregnancy are shown.

Results: The following registers are involved in the collaboration: EGR2 (France), RePreg (Switzerland), REVNATUS (Norway) and Rhekiss (Germany). All registers collect data prospectively and nationwide. Patients can be included before pregnancy (child wish) or during pregnancy in all registers, and in RePreg also up

to week 8 postpartal. Enrolment during pregnancy is possible up to gestation week 12 or thereafter in some specific cases (EGR2), week 20 (Rhekiss) or during complete pregnancy (RePreg and REVNATUS). All registers capture data via IT-based systems, REVNATUS documented on paper until 2016. During pregnancy, data is reported once every trimester by physicians and patients. Current figures, baseline characteristics and included IRD are presented in the table. Most of the data items that are independent of the underlying IRD are collected by all registers (figure 1). However, there are differences in the way data is collected and in the level of details.

	EGR2	RePreg	REVNATUS	Rhekiss
No. of enrolled patients	879	64	513*	777
No. of observed pregnancies	780	32	287	595
No. of completed pregnancies	446	6	266	344
No. of participating units	66	16	13	91
Year of register start	2014	2017	2006 ^{IT} 2016	2015
Patient age (yrs), mean (SD)	32.1 (4.8)	33.6 (4.0)	30.8 (4.8)	32.4 (4.2)
Patient disease duration (yrs), mean (SD)	7.3 (6.1)	11.0 (7.4)	6.5 (6.8)	11.2 (81.7)
Diagnoses, N (%)				
RA	60 (6.9)	23 (35.9)	139 (27.1)	225 (29.0)
PsA	0**	11 (17.2)	44 (8.6)	66 (8.5)
SpA	55 (6.3)	24 (37.5)	107 (20.9)	101 (13.0)
JIA	-	-	78 (15.2)	43 (5.5)
Systemic lupus erythematosus	238 (27.4)	-	67 (13.1)	162 (20.8)
Other connective tissue diseases	371 (42.6)	-	36 (7.0)	129 (16.6)
Other IRDs	146 (16.8)	6 (9.4)	42 (8.2)	51 (6.6)

*Only patients enrolled in the IT-System are considered. ** PsA patients are included as peripheral SpA.

Figures in the bars represent the numbers of reporting registers. *Only for selected diseases in one register. Abbreviations: (m)HAQ, (modified) Health Assessment Questionnaire; IRD, Inflammatory Rheumatic Disease; PRO, Patient Reported Outcomes.

Abstract FRI0601 – Figure 1. Figures in the bars represent the numbers of reporting registers.

Conclusions: Although the registers in this collaboration have similar designs, we found considerable differences in data items collected. In particular, the level of details of documented data and the information on disease-specific characteristics varied. Harmonisation of data collected in pregnancy registers would facilitate collaborative analysis.

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