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POSTER VIEWING II

BHPR: AUDIT AND CLINICAL EVALUATION

103. DENTAL HEALTH IN CHILDREN AND YOUNG ADULTS WITH INFLAMMATORY ARTHRITIS: ACCESS TO DENTAL CARE

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Background: Children and young adults with JIA have increased levels of poor oral hygiene and dental decay [1]. Periodontitis and types of arthritis are linked by similar components of blood cytokine profiles. Good dental health can be directly affected in JIA patients due to physical limitations in upper limb movements making brushing and flossing teeth difficult. An important factor in oral care is good dental hygiene and access to dental health practitioners. NHS advice is that all children should be reviewed by a dentist annually and be offered both sealant of their teeth and fluoride varnish at the appropriate time. Our aim was to establish if our patients had any barriers to accessing dental care.
Methods: All patients (age 18 and under) diagnosed with JIA in the paediatric rheumatology clinic over a period of 3 months were asked to complete a dental care questionnaire. Parents completed the questionnaire for their children if necessary. Data were analysed using Excel.
Results: 30 questionnaires were completed. Demographics were M:F 1:1.3, all children were diagnosed with JIA, average age 10.5 years with range 2–18. 27 children were registered with an NHS dentist with the exception of one child with a private dentist. 26 children had seen a dentist at least annually and one child in the past 2 years. 2 children, one aged 16, were not registered with a dentist because their parents didn't think it was important. 11 children had 25 fillings in total, 9 of these children were not supervised during dental hygiene. 13 children admitted to drinking sugary drinks daily and had 16 dental fillings. None of the children admitted to smoking.
Conclusions: Whilst our audit showed that most children were registered with a dentist and were reviewed annually, only 1 child had been offered sealant and fluoride varnish. The NHS advises that children with chronic medical conditions can be seen either by their NHS dentist or by the local Community specialist dental service which can be accessed by referral from their rheumatology department or NHS dentist. None of the children were seen by the specialist dental service. We have developed an information leaflet informing parents and children with JIA of the importance of dental health explaining the benefits of both sealant and fluoride for teeth.

TABLE 1. Results from dental health questionnaire

$n = 30$	Yes	No	No answer
Registered with a dentist	28	2	0
Review with a hygienist	2	25	3
Problem gripping toothbrush	5	25	0
Used an electric toothbrush	11	19	0
Problems opening mouth fully	6	24	0
Admitted to neck problems	7	23	0
Has had dental fillings	11	16	3
Has had teeth removed due to decay	4	24	2
Offered sealant or fluoride varnish to teeth	1	26	3
Supervised whilst cleaning teeth	13	17	0

Disclosures: The authors have declared no conflicts of interest.

Reference

1. Welbury RR, Thomason JM, Fitzgerald JL *et al.* Increased prevalence of dental caries and poor oral hygiene in juvenile idiopathic arthritis. Rheumatology 2003;42:1445–51.

104. PATIENT PREFERENCES FOR ROUTE OF ADMINISTRATION OF BIOLOGIC THERAPIES

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Background: Route of administration has implications to cost, convenience and patient acceptance of biologic therapy and there is a drive to develop subcutaneous preparations of existing intravenous therapies (tocilizumab or abatacept). Oral agents, are not yet available, but potentially offer more convenience for patients and health professionals and a familiarity of route of administration. Although subcutaneous injections initially seem off-putting to patients, these are broadly well accepted with appropriate support. This survey examined attitudes of rheumatology patients established on a subcutaneous biologic: would they prefer one of the three routes of administration should they need to switch, and how strong is the desire for monotherapy.
Methods: All 72 patients who started their first TNF agent between June 2011 and 2012 were surveyed by postal and telephone questionnaires. They rated (0–10) how keen they would be on each method of administration and the importance of effectiveness as monotherapy.
Results: 57 responded (79%) with mean age 51 years (range of 21–78), 56% adalimumab, 21% etanercept, 19% golimumab and 4% certolizumab. 64% were female and 58% Caucasian. Responders did not differ significantly from non-responders in ethnicity, age, sex, diagnosis or biologic agent (chi-square) or age (*t*-test). There were significant differences in the ratings given to the three methods of administration (Friedman test sig.000, $n = 53$). Subcutaneous injection was the most favoured and iv infusions the least (see Table 1). Monotherapy without need of concomitant DMARDs or steroids was rated highly important with a median score of 10 (mean 8.13, $n = 56$).
Conclusions: Patient preference for subcut administration of biologic therapy by pen suggests that with support and well-designed models a high level of satisfaction with this route of administration can be achieved. The majority would be familiar with the pros and cons of an oral agent so it noteworthy that oral administration was not highly rated whilst effectiveness as monotherapy was considered very important.

TABLE 1. If you ever had to switch to another biologic treatment how keen would you be for it to be given by: (0-not at all keen to 10-very keen)

	Mean	Q1	Q2	Q3
i.v. drip (lasting 30–60 min) in a hospital day unit once every 4 weeks	3.7	0	3.5	6.75
Tablets twice a day	5.6	3	5	8.75
Injections using a pen once every 1 to 4 weeks	8.3	7	9	10

53 patients who answered all 3 questions.

Disclosures: The authors have declared no conflicts of interest.

105. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS: EDUCATION AND REVIEW, ARE WE DOING ENOUGH?

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Background: Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used in patients with RA. Due to the potential for gastrointestinal, renal and cardiovascular side effects, current NICE recommendations are to use the lowest dose for the shortest possible time. Patients require education regarding the benefits and potential risks of NSAIDs and to know when it is appropriate to either reduce the dose or try without them. Clinicians should review the need for continued NSAID use during outpatient review to minimize the risks of NSAID treatment.

The objective of this clinical evaluation survey was to identify patient knowledge and use of NSAIDs in patients with RA.
Methods: A questionnaire was designed by a rheumatology consultant, nurse consultant and members of a patient panel to identify whether patients:

(i) Received drug information prior to commencing a NSAID
(ii) Understood the purpose of their NSAID
(iii) Were taking their NSAID safely
(iv) Stopped their NSAIDs when their arthritis was less troublesome.

The questionnaire was distributed by a clinical support worker to all patients with RA taking a NSAID attending a follow up over a 3 week period in June 2012.

Results: Of the 95 patients with RA attending for follow up, 74 were being prescribed NSAIDs and these patients were invited to participate. 74 questionnaires were distributed and 68 questionnaires were completed. 28 respondents were aged over 65 years, 20 respondents were aged 25–40 years and 20 respondents were aged 41–61 years. The commonest NSAIDs prescribed were Ibuprofen ($n = 28$) and Naproxen ($n = 20$). All respondents had been taking a NSAID for over a year and 24 respondents had been on a NSAID for over 5 years. The majority of respondents took stomach protection in the form of PPIs ($n = 60$), felt their NSAIDs were effective (52 responses ranged from 'helpful-to extremely helpful) and were aware that NSAIDs could reduce pain ($n = 44$).

48 respondents could either not remember or recalled having received no information about their NSAID. 24 respondents identified that NSAIDs are used to reduce swelling and 20 respondents took their NSAID with water only and not food.

36 respondents had never had a break from their NSAID and 32 respondents continued to take their NSAID even when their arthritis was less troublesome. Only 8 participants had been advised to have a break from taking a NSAID during their rheumatology medical review.
Conclusions: The majority of patients were taking NSAIDs. Patients may be less well informed about the indications and usage of NSAIDs in comparison with DMARDs. Patients may be unaware that they can stop their NSAID when their RA is controlled. We need to educate patients on the use of NSAIDs and review whether NSAIDs are still required at follow up appointments.
Disclosures: The authors have declared no conflicts of interest.

106. ARE MULTIDISCIPLINARY INPATIENT REHABILITATION PROGRAMMES EFFECTIVE FOR CHRONIC MUSCULOSKELETAL CONDITIONS? A SERVICE EVALUATION

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Background: Chronic musculoskeletal (MSK) conditions impair health and function. Clinical guidelines recommend a multidisciplinary team (MDT) approach for the optimum management of chronic MSK conditions. The efficacy of inpatient MDT care on the health and disease status of people with chronic musculoskeletal conditions is unclear. This service evaluation investigates the efficacy of an inpatient MDT service.
Methods: Patients with RA, OA, mechanical low back pain (LBP) and chronic widespread pain (CWP) admitted for inpatient MDT rehabilitation to a rheumatology unit in a UK primary care hospital completed the Multi-Dimensional Health Assessment Questionnaire (MDHAQ), visual analogue scale (VAS 0–10 cm) for pain and for global wellbeing on admission and discharge. The rehabilitation programme consisted of a personalized regime of exercise including hydrotherapy and MDT input. RAPID3 scores (Routine Assessment of Patient Index Data) were calculated by totalling MDHAQ, pain and global wellbeing VAS and analysed using descriptive statistics and paired sample *t*-tests. A 20% improvement in RAPID3 was considered a clinically significant change.
Results: 183 patients (Mean Age 62 [Range 18–97], 145 females) were admitted for MDT inpatient rehabilitation [median length of stay 10 days (range 5–15)] between January 2010 and September 2011. Overall there was a 28% improvement in RAPID3 (mean difference 5.01, 95% CI 4.3, 5.8, $P < 0.05$) on discharge. Clinically significant changes were noted in people with RA (32%), OA (35%), CWP (25%) and LBP (22%) (all $P < 0.05$, Table 1).
Conclusions: This inpatient MDT rehabilitation programme improved self reported disease status and function in patients with RA, OA, LBP and CWP. The long term efficacy and cost effectiveness of inpatient MDT care in people with chronic MSK conditions requires further investigation.
Disclosures: The authors have declared no conflicts of interest.

107. RESPONDING TO A METHOTREXATE NEVER EVENT: REDUCING RISKS AND RAISING AWARENESS

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Background: Methotrexate is a commonly used drug in rheumatology departments. The Department of Health lists its inappropriate daily administration as a 'never event'. The need to address safe prescribing of MTX was highlighted when an inpatient received three consecutive days of MTX. In evaluating the events that led to this incident a poor understanding of MTX appeared fundamental. We ran a teaching session and, as a further measure, designed MTX alert cards for patients to keep with them. We hoped the cards would prevent harm whilst being acceptable to both patients and healthcare professionals.
Methods: In August 2012 we designed credit card sized MTX alert cards highlighting the essential information necessary for a doctor or nurse treating a patient on MTX. We sent these cards to a randomized list of 144 patients on MTX asking them to carry the card with them at all times. A month after the cards were distributed a survey was sent out asking six questions on the usefulness and practicability of the cards. At the same time, a survey was sent out to junior doctors within the trust asking them whether they had learnt anything from the cards and whether they felt that these cards would prevent harm.
Results: Of the 144 patients who received alert cards and were surveyed, the overwhelming majority felt that these cards were practical and they would remember to show them to health professionals. Twenty-five junior doctors replied to the survey. 60% had learnt something from reading the card, including its interactions and that MTX should be omitted if intercurrent infection was suspected. 90% of junior doctors felt that the cards would be helpful when admitting patients and 84% felt that instituting these cards would prevent harm.
Conclusions: Methotrexate alert cards are a simple and effective method of preventing prescribing errors in patients taking MTX. As a direct result of this project we are routinely using alert cards for all existing and new patients on MTX.
Disclosures: The authors have declared no conflicts of interest.

108. AN OVERVIEW OF RITUXIMAB-RELATED HYPOGAMMAGLOBULINAEMIA AT LOCAL PRACTICE

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Background: Rituximab is an anti-CD20 antibody and has relatively good safety profile in treating RA after the failure of anti-tumour

TABLE 1. Disease outcomes of people with chronic musculoskeletal conditions following inpatient multidisciplinary team rehabilitation

		MDHAQ	PAIN VAS	GLOBAL WELLBEING VAS	RAPID3
RA, $n = 72$, age 63 (17.1)	Baseline	4.75 (1.78)	7.09 (2.16)	6.06 (2.31)	17.89 (5.24)
	Discharge	4.05 (1.72)	4.67 (2.73)	3.43 (2.17)	12.22 (5.36)
	Mean change (95% CI)	0.7 (0.4, 1.0)*	2.4 (1.8, 3.0)*	2.6 (2.0, 3.3)*	5.7 (4.4, 6.9)*
OA, $n = 23$, age 75 (8.5)	Baseline	4.33 (1.62)	7.20 (2.52)	5.84 (2.70)	17.36 (5.67)
	Discharge	3.53 (1.61)	4.68 (2.38)	3.09 (2.34)	11.29 (5.24)
	Mean change (95% CI)	0.8 (0.2, 1.4) $P = 0.007$	2.5 (1.1, 3.9) $P = 0.001$	2.8 (1.5, 4.0) $P < 0.05$	6.1 (3.4, 8.7) $P < 0.05$
LBP, $n = 55$, age 59 (16.4)	Baseline	4.37 (1.25)	7.57 (2.03)	6.27 (2.25)	18.08 (4.39)
	Discharge	3.75 (1.35)	5.91 (2.24)	4.44 (2.26)	14.10 (4.66)
	Mean change (95% CI)	0.6 (0.3, 0.9)*	1.7 (1.1, 2.3)*	1.8 (1.2, 2.4)*	4.0 (2.8, 5.2)*
CWP, $n = 33$, age 53 (15.5)	Baseline	4.70 (1.96)	7.23 (2.20)	6.35 (2.26)	18.29 (5.50)
	Discharge	3.74 (1.88)	6.08 (2.56)	3.87 (2.15)	13.65 (5.29)
	Mean change (95% CI)	1.0 (0.4, 1.5)**	1.2 (0.2, 2.1)*	2.5 (1.6, 3.3)*	4.6 (2.7, 6.6)*

All results mean (S.D.) unless otherwise stated. *$P < 0.05$; **$P < 0.001$.

necrosis factor therapy. There has been increasing concern that rituximab may have an effect on immunoglobulin (Ig). NICE guideline on rituximab published in 2007 did not comment on immunoglobulin. Serum IgG levels were shown to decrease with repeated rituximab infusion in clinical trials due to subsequent B-cell depletion. In 2011, the British Society for Rheumatology (BSR) recommended Ig monitoring before and after rituximab infusion in RA patients. However, there are few published data on the effect of rituximab on Ig. We reviewed the data on serum Ig level in patients treated with rituximab at Trafford General Hospital.

Methods: We undertook a retrospective audit of immunoglobulin monitoring on patients treated with rituximab. Patients were identified from departmental list of patients who were on biologics therapy.

Results: 34 patients who had rituximab treatment were identified including 4 patients with non-RA conditions. 62% of the patients had serum Ig level measured at any time. Four categories were evaluated. 8 (38%) patients had Ig level monitored before and after rituximab infusion, 2 (10%) had Ig level monitored before treatment but not after infusion, 2 (10%) had Ig level monitored at 6 months or less after infusion, and 9 (43%) had Ig level measured more than 6 months after infusion. The mean serum Ig level was calculated with IgG of 8.14 g/l, IgA of 2.09 g/l and IgM of 0.87 g/l.

29% of patients with Ig monitoring found to have Ig level below normal limit at any time. Most of these patients had decreased Ig level after treatment. Two patients had low IgG level prior to treatment. Two patients had low IgG level (<6 g/l) after 1 and 3 cycles respectively. One patient had low IgM level (<0.5 g/l) after first cycle of treatment. Two patients with both IgG and IgM level depressed after 2 and 4 cycles respectively. 83% of patients with hypogammaglobulinaemia received Octagam infusion promptly. One patient developed cellulitis and septicaemia following hypogammaglobulinaemia. For patients who had DAS28 calculated prior to infusion and after 16 to 24 weeks of treatment, 100% showed improvement in DAS28 ≥1.2 with treatment.

Conclusions: Our finding showed almost one third of patients treated with rituximab developed hypogammaglobulinaemia. Repeated courses of rituximab may lead to further depressed immunoglobulin levels. Since the publication of BSR guidelines, all our patients on rituximab have immunoglobulin level monitored before and after treatment. Although rituximab is an effective anti-TNF for active RA, long-term safety of rituximab remains questionable. Immunoglobulin monitoring before and after rituximab treatment in RA patients is crucial. It is strongly recommended that immunoglobulin level below normal limit should be replaced promptly to prevent life-threatening infections.

Disclosures: The authors have declared no conflicts of interest.

109. TIGHT CONTROL WITH REGULAR REVIEW FOR RHEUMATOID ARTHRITIS IN A DGH REDUCES THE USE OF BIOLOGIC THERAPY ACCORDING TO NICE GUIDELINES EVEN IF MODERATE DISEASE ACTIVITY WAS TREATED

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Background: NICE CG 79 states that newly diagnosed patients should be offered combination disease modifying therapy (DMARDs) within 3 months of persistent symptom onset and be monitored using a composite score monthly until their disease is under control. We instigated a rapid access early inflammatory arthritis clinic followed by monthly review clinic in March 2010 for patients with new RA. An audit against the NICE CG79 was undertaken to ensure compliance and numbers of patients who continue to have moderate disease activity with 3 or more swollen and tender joints.

Methods: All patients with RA of under 2 years duration attending the monthly review clinic were included in the audit. The NICE CG79 audit tool was used to set the standards and criteria. All patients were deemed diagnosed with RA according to the American College of Rheumatology criteria 2010. Disease Activity Scores (DAS28) were used to set the level of disease activity.

Results: 106 patients with RA had been monitored through the monthly review clinic. Demographics were M:F 1:1.3, mean age 60 years, Rh Factor +ve 62%and anti-CCP +ve 63%. Average age of onset 59.8, average time from symptom onset to GP appointment 11 weeks. All patients had been offered written information about their disease and medication, 95% patients had their DAS28 measured 4–6/52 until disease stable. 90% patients were commenced on either MTX monotherapy or combination with plaquenil according to protocol. At 2 years 57% patients were on combination DMARDs, 41% patients were on MTX (oral or s/c) monotherapy due to good disease control. 6 patients were on biologic therapy. 8 patients currently not on biologic therapy met the BSR definition of moderate disease activity with 3 or more swollen and tender joints. All patients with high disease activity at 1 year, 18 months and 2 years were either on biologic therapy or had been offered biologic therapy.

Conclusions: Data are limited to 65 patients at 2 years due to lack of disease duration however, 72% patients were in remission or low disease activity. Only 6 patients are treated with biologic therapy due to active disease and during the 2 year period only 8 patients met the BSR guidelines with moderate disease activity with 3 or more swollen and tender joints. Introduction of this tight disease control monthly review clinic for early RA was highly effective, enabled tight control for the majority of patients whilst not increasing biologic therapy prescribing and at no extra staffing costs.

TABLE 1. Results treat-to-target monthly review 2 year data

	DAS28 <2.6	DAS28 2.61–3.2	DAS28 3.21–5.1	DAS28 >5.1	Unknown
Baseline DAS28, *n* = 106, *n* (%)	10 (9)	10 (9)	43 (41)	25 (24%)	18 (17)
6 month DAS28, *n* = 106, *n* (%)	34 (32)	26 (24)	30 (29)	13 (12%)	3 (3)
1 year DAS28, *n* = 106, *n* (%)	52 (49)	18 (17)	30 (28)	5 (5%)	1 (1)
18 month DAS28, *n* = 106, *n* (%)	46 (42)	16 (11)	22 (23)	5 (5%)	17 (19)
2 years DAS28, *n* = 65, *n* (%)	36 (55)	11 (17)	17 (26)	1 (2%)	0

Disclosures: The authors have declared no conflicts of interest.

110. IMPLEMENTING COMMISSIONING FOR QUALITY IN RHEUMATOID ARTHRITIS OUTCOME METRICS IN A NEW ONSET RA COHORT IN PRIMARY CARE

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Background: The recent National Audit Office report on RA and the NHS Alliance Quality and Productivity in RA publications recommend the following to improve health outcome and care of people with RA:

(i) Addressing delays in diagnosis and access to treatment;
(ii) Improved integration between primary and secondary care;
(iii) Configuration of services providing for local need;
(iv) Holistic approaches to enable better patient self management.

In response, an integrated community rheumatology service was developed in Birmingham incorporating an information system to report on health outcomes against treat to target principles for RA patients. Supported by academic rheumatologists from Birmingham University Department for Immunity and Infection and Sandwell and West Birmingham Hospitals NHS Trust patients referred with suspected RA are rapidly assessed. Once the diagnosis of RA is confirmed patients are immediately case managed by a nurse specialist.

Methods: A web based clinical database was purchased from Egton Medical Information Systems. EMIS web© collects read-coded data within a read and write system as clinical care is delivered and outcome reports are generated via a population manager. The rheumatology nurse specialists and IT manager created 3 EMIS templates to collect commissioning for quality in RA (CQRA) health outcome metrics.

Results: The rheumatology template comprises: time from symptom onset to diagnosis; diagnoses; DAS, DMARD, titration, cessation indication and adverse events; comorbidity; treatment pathways: 1 step-up monotherapy and 2 combination therapy.

The biologics template comprises: progress to biologics; contra-indications; cautions; pre-treatment screening; DAS at baseline and 3 and 6 months post treatment.

The annual review template comprises: DAS; employment; smoking; function; extra-articular manifestations; cardiovascular risk; bone health; seasonal influenza vaccination; financial and social wellbeing; depression.

Population manager on 20 November 2012 reports 105 seropositive, 54 seronegative RA and 8 palindromic rheumatism patients. All but one are pathway 1. 298 remaining inflammatory arthritis patients registered as a historical cohort will soon be templated.

A patient satisfaction survey will provide anonymous feedback via the website or if chosen via ipad following a clinic visit.

Conclusions: Most UK rheumatology units lack able information systems relying on outdated metrics based on cost and activity alone. Our integrated holistic care model exploits primary care IT to begin to demonstrate quality of care and improvement in health outcome in an inception RA cohort against CQRA. This also enables recruitment to clinical studies. Commissioning of rheumatology care in 2013 will demand key health improvement outcomes in patient populations

therefore it is essential that rheumatology clinicians respond to secure quality services for RA patients.
Disclosures: D.H., Pfizer—Educational Grant. All other authors have declared no conflicts of interest.

111. DOES OCCUPATIONAL THERAPY/PHYSIOTHERAPY STILL HAVE A ROLE IN THE MANAGEMENT OF INFLAMMATORY ARTHRITIS WITH THE EMERGENCE OF BIOLOGICS AND TREAT–TO-TARGET PROTOCOLS?

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Background: The primary goal of treating the patient with inflammatory arthritis (IA) is to maximize long-term health-related quality of life through control of symptoms, prevention of structural damage, normalization of function, and social participation. The emergence of treat to target protocols and biologics has greatly improved disease control for patients with IA. Occupational therapy/physiotherapy (therapies) aims to maximize functional independence and enable individuals to live life their way. In response to improved medical management, has the role of therapies diminished or changed in accordance with medical management?
Methods: 127 patients with IA currently receiving treatment in therapies at the Royal Liverpool and Broadgreen University Hospitals NHS Trust were grouped in relation to their major medication: pain relief only, DMARDs or Biologics. Data were collated based on problems identified using Problem Orientated Medical Records and treatment plans.
Results: Patients receiving biologics were younger (mean age 50) with mean disease duration of 15 years. They required less therapy intervention to address difficulties with mobility/transfers, Domestic Activities of Daily Living (DADL), work issues and orthotics but were more likely to require preoperative hand assessment and childcare advice. They were significantly less at risk of falls than patients on pain relief or the DMARDs group and required less provision of mobility aids. They required less strengthening, reconditioning or gait and posture education. Patients on pain relief alone were older (mean age 62) with the longest mean disease duration of 19 years. They required the most therapy intervention to address difficulties with mobility/transfers, Personal Activities of Daily Living (PADL), fall prevention and emotional issues as well as the most therapist administered treatments, including hydrotherapy and acupuncture and greatest provision of mobility aids/orthoses. They had the highest need for exercise prescription. Patients on DMARDs had a mean age of 58 years and shortest disease duration of 10 years but required the most therapy intervention to address difficulties with DADL and work issues, gait dysfunction and deconditioning. They received the most self-management education.
Conclusions: It is recognized that remission should be a clear target in the management of IA, however, low disease activity is considered acceptable. The 127 patients referred to therapies all required intervention. The medication regime, age of the patient, disease duration and social situation all influenced the treatment required. Despite improved medical management, all the patients referred still had ongoing functional problems, requiring therapy intervention to assist them to maximize their independence. This cross sectional review demonstrates that therapies are responsive to the individual and continue to have a key role in the effective management of IA.
Disclosures: The authors have declared no conflicts of interest.

112. RITUXUMAB IN THE TREATMENT OF RHEUMATOID ARTHRITIS: AN ALL-WALES AUDIT

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Background: Rituximab (RTX) is licensed for the treatment of RA. We undertook an audit across all of the rheumatology centres in Wales to assess adherence to NICE guidance (Ref: TA195).
Methods: Data were collected from each Welsh rheumatology centre on RA patients treated with RTX. The NICE criteria defining RTX use included:

1. Use in combination with MTX
2. Previous inadequate response to, or intolerance of, other DMARDs, including at least one anti-TNFα agent
3. Pre-RTX DAS28 > 5.1
4. Repeat DAS28 6 months post-RTX
5. Re-treatment interval no less than 6 months
6. Re-treatment only if improvement in DAS28 ≥ 1.2

Results: Data were collected for a total of 231 patients (174 female and 57 male). Mean age was 58.7 years.

1. 57% patients were taking MTX in combination with RTX.
2. 80% patients had tried one or more anti-TNFα agents before being treated with RTX.
3. Pre-treatment DAS28 was undertaken in 76% of patients. 90% of these patients had DAS28 score of more than 5.1.
4. Only 56% patients had post treatment DAS28 checked. In 80% of patients, with documented post treatment DAS28, the score was reduced by 1.2.
5. None of the patients had RTX at less than 6 monthly intervals.
6. 67% of the patients who responded to the 1st RTX cycle, had a 2nd cycle. 90% of those who did not respond to the 1st cycle still had a 2nd RTX cycle. 39% of those patients who did not have DAS following the 1st cycle still had 2nd RTX cycle.

Conclusions: In this large national audit of 231 patients, we identified some shortcomings in our RTX prescription and monitoring practice. The reasons for not prescribing concurrent MTX were adverse events (53.4%) or intolerance (18.7%). Prior treatment with anti-TNFα was omitted in 20% of the cohort because of a previous history of malignancies or interstitial lung disease. The main deficiency identified by this audit was the undertaking and recording of post-treatment DAS28. In the 44% who had no post-treatment DAS28, subjective improvements in symptoms were commented on in the medical notes and clinic letters, but this was not evidenced in terms of DAS scores. The majority of patients had 2nd course of treatment after 6 months despite showing no improvement in DAS scores. This reflects the common practice of automatically retreating with RTX as efficacy is commonly seen after the 2nd course. Recording of DAS need to become part of the routine assessment of RA patients. Biologic clinics may help achieve these requirements and many units are now establishing these. We aim to re-audit in 2 years to assess the response of implementing these changes.
Disclosures: The authors have declared no conflicts of interest.

113. RITUXIMAB USED ON AN ON-DEMAND BASIS FOR RHEUMATOID ARTHRITIS PATIENTS: A COST-SAVINGS ANALYSIS

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Background: Currently NICE recommend a minimum treatment interval of 6 months for rituximab cycles. There is some reluctance to do this, particularly in younger patients, or when patients remain asymptomatic beyond this time. As a result centres are infusing on demand when patients flare. This analysis aims to determine whether there is a statistically significant difference between the number of cycles compared with a 6 monthly cycle, as well as the savings produced
Methods: Data were collected from the local database on patients with RA currently being treated with rituximab. Calculations were performed using Microsoft Excel to determine the average interval between treatments and a Wilcoxon Signed Ranks Test performed using SPSS.
Results: There were a total of 106 patients on rituximab. Two patients were excluded due to infection and infusion reaction respectively. Of the remaining 104 patients: 32 had not received a 2nd cycle, in 15 patients the duration on rituximab was < 6 months; in the other 17 there was a mean duration of 333 days (range: 188–662 days). The remaining 72 patients had received more than 2 cycles, mean duration between cycles of 336 days (range: 173–1178 days). The average of mean duration between cycles per patient was 342 days (range: 160–828 days).

A Wilcoxon Signed Ranks Test compared the number of cycles given to all patients to the number received had they been treated 6-monthly. There was a significant difference between numbers of cycles when applied to all patients ($Z = -7.729$, $P < 0.01$ 2-tailed) and when those who had not had a 2nd cycle were excluded ($Z = -6.825$, $P < 0.01$ 2-tailed). This significant difference was still present when the on-demand basis was compared with rituximab every 10 months ($Z = -4.619$, $P < 0.01$ 2-tailed).

The total of the difference between the number of cycles given and the number they would have received if treated 6-monthly, resulted in saving 204 cycles, if all the patients were included. If the patients who had not had a 2nd cycle were excluded, 179 cycles were saved. At a total cost per cycle (drug and hospital expenses) of £5,049, a saving of £1,029,996 resulted if including all patients or £903,771 if those who had not had a 2nd cycle were excluded. This is the equivalent to saving £5151.25 or £5027.30 per year of treatment per patient, respectively.
Conclusions: This analysis shows considerable cost savings which will be of interest in particular to commissioners. We recognize that further work is needed to analyse the patient DASs to ensure that patients are treated at an appropriate and effective time interval. We conclude that the optimum time to treat patients may be longer than 6 months and would result in cost savings.
Disclosures: K.G., Roche, Pfizer, MSD, Abbott, UCB—Honoraria, Consultation Fees. All other authors have declared no conflicts of interest.

BHPR RESEARCH: QUALITATIVE

114. 'IT'S LIKE A JUGGLING ACT': RA PATIENTS EXPERIENCE A LIFE OF FLUCTUATING BALANCES

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Background: Life with RA has been described as unpredictable and full of uncertainty. However, this issue has not previously been explored in depth on current treatment regimes.
Methods: Study 1: Semi-structured interviews to discuss the experience of daily life and flare with RA. These data were analysed using Thematic Analysis.

Study 2: Q-Methodology: A different set of RA patients sorted 39 statements about daily life with RA and 23 statements about their motivations for seeking help for their RA flares (generated by the Study 1 interviews) across a forced distribution, in ranked order of agreement. Data were analysed using centroid factor analysis with varimax rotation (i.e. the participants and not the items are the variables). Demographic and clinical data were collected and patients completed comments booklets about their rationale for sorting the statements.

The findings from these two studies were combined to produce an explanatory model of RA patients' experiences of daily life and flare.
Results: Study 1: 15 patients: 12 female, mean age 51 years (S.D. 11.8), dis dur 14.8 years (S.D. 8.6), HAQ 1.3 (S.D. 1.0)

Study 2: 30 patients: 22 female, mean age 56 years (S.D. 24.0), dis dur 13.2 (S.D. 8.6), HAQ 1.4 (S.D. 1.7).

Overall findings: Patients experiences of life with RA, suggests they are constantly trying to maintain an optimum balance of Living with RA in the background, RA moving into the foreground and Dealing with RA in the foreground, along a continuum

Living with RA in the background: Involves patients mediating both the physical and emotional impact of RA on their lives: *'it's not going to get the better of me'* and redefining their identity to incorporate their RA: *'you just accept it as normal'*.

RA moving into the foreground: Characterized by unwelcome reminders of RA due to its unpredictable nature: *'I never know what I'm going to feel like when I wake up'* and trying to make sense of fluctuations, which are shrouded in uncertainty (*'It's not clear enough whether I'm fighting something off…or my body's fighting itself'*) and at this stage patients avoid medical help: *'It might go away'*.

Dealing with RA in the foreground: Involves an attempt to regain control of RA through crisis management: *'I just try anything'* and social withdrawal (*hibernation mode*). Some patients will spend a long time trying to manage alone before seeking help. However, patients feel they have lost control of their RA when they are no longer able to manage, when the pain becomes too intense and when the flare has gone on longer than expected (*'It's like a Game-Over'*) and will consider seeking help at this point: *'I was in agony and I couldn't do anything'*
Conclusions: Patients with RA experience a continual fluctuating balance between living with their RA in the background and dealing with it in the foreground. Clinicians could use the Fluctuating Balances model as a tool to inform or facilitate treatment discussions and to improve their understanding of life with RA
Disclosures: The authors have declared no conflicts of interest.

115. LIVING WITH RHEUMATOID ARTHRITIS AND FIBROMYALGIA: THE PATIENT EXPERIENCE

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Background: Rheumatoid arthritis (RA) and fibromyalgia (FMS) are routinely managed in rheumatology clinics, usually as primary diagnoses; however FMS can often present as a secondary diagnosis in patients with RA. The effects of either of these conditions individually on a person are well documented, however less is known about the impact of having the conditions together. The primary objective of this study was to explore the experiences of patients living with both RA and fibromyalgia (RA/FMS).
Methods: A qualitative research method using a phenomenological philosophical model was used. Bracketing was employed by the researcher in order to put aside any pre-conceived thoughts or beliefs about the research topic. Semi-structured interviews were conducted by the researcher, with six purposively sampled participants diagnosed with stable RA/FMS. The interviews were transcribed verbatim and analysed using Colaizzi's Procedural Steps (1978), a phenomenological research analysis tool.
Results: Five main themes emerged: 1: Pain, primarily from FMS was a significant and persistent factor for all participants with clear differences expressed in the types of pain they experienced from each diagnosis. 2: Sleep disturbance was familiar to all interviewees, sleep pattern was described as spasmodic. All described overwhelming tiredness throughout the day. 3: Impact on daily living—any increase in activity had a significant impact on participants. A cycle of good days and bad days was described with 'pacing' of activities evident throughout. Social interaction and activity had been compromised. 4: Coping Strategies—physiotherapy and hydrotherapy offered only short term symptom relief and none of the participants undertook any regular exercise programmes. 5: All participants felt understood and supported by family members, however acknowledgement of FMS and its impact by healthcare professionals was felt to be lacking and often ignored. This was attributed to a lack of knowledge and poor understanding of the benefits offered by management pathways.

Low mood and stress did not emerge as strong themes.

The narratives revealed that 5 out of 6 of the participants felt they were clearly able to distinguish pain due to RA from pain due to FMS, and the other themes were influenced by the level of pain from FMS.
Conclusions: FMS alongside RA can be overwhelming and impact on many aspects of patients' lives. Pain from FMS was a key factor in the experiences described and inter-connected many of the themes identified. Our research suggests that professional acknowledgement and management of the FMS component of RA/FMS may have a positive impact on the patient experience. Further training of healthcare professionals may support patient self-management.
Disclosures: The authors have declared no conflicts of interest.

116. MANAGING SCIATICA IN THE PHYSIOTHERAPY CONSULTATION: A QUALITATIVE OBSERVATION AND INTERVIEW STUDY

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Background: There is limited evidence on prognostic factors for low back-related leg pain including the group with nerve root pain. It is unclear at present whether the prognostic indicators relevant to outcome in patients with leg pain are similar to those for LBP alone. Clinical characteristics and indexes of risk however, are not the only variables affecting outcome. The effect of interaction style (level of patient participation, engagement of the clinician with patient concerns, elicitation of patient preferences, and reassurance) on patient health outcomes has received limited attention in the literature. However, research has shown that the approach adopted by clinicians in the consultation may affect health outcomes. Consequently, there is a need to understand the different dimensions of the physiotherapist-patient interaction, in order to identify the relationship between the specific approach to the consultation and outcomes.
Methods: The observation and interview study is part of the larger ATLAS study investigating prognosis for LBP and leg pain in primary care. The study (currently ongoing) aimed to investigate the effect of physiotherapists' approach to clinical assessment and treatment

negotiation with patients (with and without nerve root involvement) on outcomes such as a) perceived recovery from pain, b) disability and c) adherence to treatment advice. In total 56 consultations at two clinics in the UK were observed and digitally recorded, with supplementary field notes made immediately following each observed episode. Of these, 36 have been transcribed for analysis. These described the communication 'style' of the physiotherapist, the language used to explain the clinical assessment findings to patients, and post-consultation 'debrief' discussions between the researcher and physiotherapist. Subsequently, 21 interviews were conducted with patients attending the clinics (similar proportions diagnosed with and without 'nerve root involvement'). The consultation and interview data have been coded and analysed thematically in search of common themes and differences.
Results: Analyses of the observations and interviews are ongoing, but early indications suggest that physiotherapists' overall 'approach' to the interaction, advice giving, and disclosure of the clinical findings, alongside the matching of treatments with prognostic profile, affected patients' self-management of their leg pain symptoms. The giving of reassurance and treatment advice appeared to increase patients' understanding of their leg pain, improved their adaptation to their symptoms, and reduced re-consultation to primary care services.
Conclusions: The study highlights the importance of the specific approach to the consultation adopted by physiotherapists, alongside the matching of appropriate treatments with patients' prognostic profile, in order to fully understand the mediators of outcome.
Disclosures: The authors have declared no conflicts of interest.

117. THE THOUGHTS AND FEELINGS HELD BY CLINICIANS ABOUT THE DELIVERY OF A PLACEBO INTERVENTION IN AN OSTEOARTHRITIS REHABILITATION TRIAL

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Background: The OTTER (OsTeoarthritis Thumb ThERapy) pilot randomized controlled trial, has been funded by Arthritis Research UK to compare three intervention arms for basal thumb joint OA. These are optimal occupational therapy (OT) intervention; optimal OT intervention plus thumb base splint and optimal OT intervention plus placebo splint. The use of a placebo splint in OA is novel and it may help identify specific and non-specific effects of splinting as current efficacy is unknown. It is recognized that clinicians' attitudes, feelings and beliefs about a treatment and the therapeutic interaction can impact on patient experience and outcomes. This study aimed to explore the thoughts and feelings of the collaborating OTTER clinicians who would be delivering the trial placebo splint to understand their perspective and to identify how these feelings may affect them personally, professionally and practically. The results informed support and training for the trial clinicians.
Methods: Three senior occupational therapists selected from a purposive sample of OTTER collaborators participated in a focus group interview. Three designs of placebo splint developed for this trial were available for the group to consider. Structured questions were used to elicit debate and discussion, after which clinicians were debriefed by an expert in placebo research to discuss any conflict in their feelings and thoughts. The audio recorded focus group lasted 60 min and was transcribed verbatim and validated by member checking. Transcript data were analysed thematically using coding to inductively identify emergent concepts. Codes were developed into semantic and latent themes using a bottom-up approach.
Results: Four main themes were identified as central to the clinicians about the successful delivery of a placebo splint in the OTTER pilot: justification of placebo splint use in this research, anxiety about causing of harm, preconceptions about splint activity, and the practicalities of convincing placebo splint delivery. This last theme was broken down into three sub-themes: anxiety about selling the splint, the therapeutic relationship in splint delivery, and training requirements for splint delivery.
Conclusions: Designing placebo controlled trials is not without challenges. Research clinicians play a vital role in the scientific rigor of such trials and unlike medical trials cannot be blinded to placebo delivery. This inevitably raises important ethical and professional issues for clinicians in delivering sham treatment. It is vital to ensure specific training and support address these anxieties about the ethical acceptability of research and practical concerns regarding placebo delivery. Failure to do so may result in unresolved personal and professional internal conflict which could impact the clinician's ability to deliver intervention in a rigorous, unbiased manner.
Disclosures: The authors have declared no conflicts of interest.

118. FACTORS AFFECTING ADHERENCE TO THE SARAH TRIAL HAND EXERCISE PROGRAMME FOR RHEUMATOID ARTHRITIS: AN INTERVIEW STUDY

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Background: Getting people to adhere to long term exercise programmes can be challenging. This qualitative study explored the barriers and motivators to adhering to a hand exercise programme for RA within a randomized controlled trial (RCT).
Methods: Fourteen people enrolled in the RCT took part in semi-structured interviews following participation in the exercise programme. We interviewed participants who had benefited from the exercise programme and those who had not. Twenty-seven interviews took place at home or place of work, 14 at 4 months post-randomization and 13 at 12 months. Interview data were analysed using Interpretative Phenomenological Analysis.
Results: Establishing a routine was the key to successfully carrying out the hand exercise programme over time. Participants described the challenges and successes of fitting exercises into their lives, modifications that helped them to exercise regularly and how exercises could become a habit. They described four factors which had an effect on establishing a routine—the therapeutic encounter, their perception of benefit, their attitude of mind, and the unpredictability of their symptoms. Within the therapeutic encounter, therapists provided motivation and reassurance, often tailoring the exercises to the individual to address changing symptoms or competing life priorities. Therapists also facilitated adherence to the exercise programme by collaborative problem solving, identifying motivators and barriers to establishing a routine. Participants' perceptions of the potential benefit of exercising also influenced adherence to the programme. Participants who thought that the exercises would help them were more motivated to keep on exercising; those who didn't expect any benefit were less likely to continue. Participants spoke of the importance of a positive attitude of mind, of being motivated and committed to continuing with the programme. Unpredictable symptom changes such as flare-ups, were the most common barrier to establishing a routine. After a routine had been established, some spoke of the exercises becoming a habit which helped them to continue to exercise independently.
Conclusions: A flexible, individualized programme promotes adherence by making it possible for patients to establish a routine which can accommodate fluctuations in symptoms and changing life priorities. Therapists have an important role to play in promoting adherence by helping patients to identify and address motivations as well as possible barriers to engaging in exercise. Once a routine has been established it is more likely to become a habit and become part of peoples' lives.
Disclosures: The authors have declared no conflicts of interest.

119. EXPLORING THE NATURE AND EVOLVING PROCESSES OF ONLINE SUPPORT IN A NEWLY DEVELOPED FORUM FOR PEOPLE WITH COMPLEX REGIONAL PAIN SYNDROME

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Background: Research has shown that patient participation in online forums is potentially beneficial in terms of psychological support processes, especially by fostering the development of a positive group identity and self-validation. This is particularly relevant to patients with chronic pain conditions, such as complex regional pain syndrome (CRPS), who often experience a 'loss of identity' associated with the negative changes to their daily activities and social life [1].
Methods: This paper derives from a larger research project exploring the nature and evolving processes of online support in a newly developed forum for people with CRPS set up for the purposes of this study. Following the work of Schwämmlein and Wodziecki (2012) [2], we set out to explore the elements of their identity that participants consider both relevant and appropriate to share when joining the forum. Introductory posts from the first 3 months of the new forum were thematically analysed [3].
Results: A standard format was quickly established by users as a means of introducing themselves: real name, age and journey to diagnosis. Indeed, journey to diagnosis was a key theme, involving onset of symptoms, the quest for medical explanations, misdiagnoses,

misunderstandings and multiple attempts at treatment, all of which contributed to a sense of frustration and exhaustion. The presentation of this journey served both to legitimize their right to membership and to speak on the site. Four other key themes included: treatment, where they shared their experiences of different medications, and physical and psychological therapies; contact with health professionals, where they detailed both positive and negative experiences of interactions with the health care community; looking for the positives, where they explicitly reframed their experiences in order to find the positives, and in doing so shape the tone of the forum; and hobbies, which detailed both loss in terms of activities they could no longer perform, and gain in terms of finding a means of engaging in these activities albeit in modified form.
Conclusions: The fact that these five elements of identity were of greatest relevance in introductory posts has implications for people with CRPS as well as to clinicians. CRPS is a condition diagnosed by exclusion which can be a lengthy process. Clinicians need to be aware of the impact of the journey to diagnosis and the frustration that this engenders. This is particularly important in light of work by Dow *et al.* (2012) [4], which demonstrated that frustration can impede engagement with therapy. Forum posts indicate that forum users feel that their experiences were not heard by health care professionals. Therefore, encouraging health care professionals to actively listen to patients' experiences, rather than medicalizing the frustration, will foster a more productive partnership.
Disclosures: The authors have declared no conflicts of interest.

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120. THE ILLNESS NARRATIVES OF INDIVIDUALS NEWLY DIAGNOSED WITH FIBROMYALGIA

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Background: Fibromyalgia syndrome (FMS) is a condition for which there is limited evidence of treatment efficacy in the medium to long term and controversy surrounding aetiology and diagnosis. The prognosis is poor and qualitative research, predominantly conducted in Europe and North America, has identified issues surrounding: diagnosis, identity, stigma, coping, adaptation, relationships, employment and struggle. These studies did not investigate the experiences of those newly diagnosed and whilst the narrative method has been employed there has been little evidence of the development of narrative theory. The aim of this study was to investigate the experiences of individuals newly diagnosed with FMS over a 2-year period and how they make sense of their experience using illness narratives.
Methods: A theoretical sampling strategy was used to identify 23 patients (22 female, 1 male) with a first diagnosis of FMS by a consultant rheumatologist, within a UK hospital setting. Qualitative in-depth semi-structured interviews were used to explore experiences of diagnosis and living with FMS. Up to 3 interviews were conducted over a 24 month period. Participants were given a choice of interview venue. The study design was iterative and emergent and underpinned by methodological perspectives drawn from pragmatism and critical reflection. Interviews were digitally recorded and transcribed verbatim. Data were analysed using narrative thematic analysis.
Results: Three core narratives, consistent with those described by Frank (1995) [1] as 'quest, chaos and restitution', were identified. The restitution narrative of yesterday I was well, today I am ill, tomorrow I will be better dominated the initial period of symptom onset and search for a diagnosis, as well emerging temporarily when diagnosis was established. The chaos narrative, characterized by a lack of control and repeated consultations with medical practitioners, was evident during the period of diagnostic uncertainty. For a minority of participants it became the core narrative once diagnosis was made with control over their bodies and lives never re-established. The majority of participants presented quest narratives characterized by finding alternative ways of being ill. This study challenges Franks' quest narrative as one which is functionally enabling, developing the model to propose sub-categories of active engagement and disengagement with treatment and their lives.
Conclusions: It is not suggested that it is possible to homogenise the illness experience of patients with FMS: heterogeneity is evident as patients recount their unique stories. However, their narratives may contain unifying storylines that can help clinicians to understand how they are interpreting and making sense of their illness experience. Further research is needed to explore how this might affect management choices and outcomes for patients with FMS.
Disclosures: The authors have declared no conflicts of interest.

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121. FIBROMYALGIA PATIENTS' EXPERIENCES OF THE MANAGEMENT OF THEIR CONDITION

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Background: This small scale study aimed to gain insight into the experiences of people with fibromyalgia of managing the symptoms of their condition. The complex nature of fibromyalgia with varying symptoms including fatigue and psychological distress can create difficulty for health professionals (HPs) managing this condition in conjunction with their patients [1,2]. In research by Hunt and Bogg (2010) [3] participants with fibromyalgia expressed the need for ongoing support. It has also been estimated that the incidence of long term conditions may double by 2030 and the public have expressed more support needed for self-care (Department of Health (DH) 2005) [4]. Evidence suggests that supporting self-care in long term conditions may lead to a decrease in the use of hospital resources, prevent flare-ups and the development of other conditions (DH 2005) [4].
Methods: Five participants with fibromyalgia took part in a one to one semi-structured interview using open ended questions; the results were analysed using thematic content analysis [5]. All participants were people with fibromyalgia that attended the support group in the south east of England. Semi-structured interviews were used as they are a flexible method where a strong relationship between participant and researcher can help to access true thoughts about the management of this complex condition [6].
Results: After analysis of the data three themes were developed: Learning to live again, Treatment *vs* management and Relationships with others. The findings demonstrated that participants went through a journey from getting and accepting a diagnosis, looking for relief, making lifestyle changes and learning how to manage. The relief of having serious pathologies ruled out and the importance of confirmation that pathology was present were expressed. Participants expressed how pacing was beneficial to prevent flare up's and so they could continue with some of their regular activities. Throughout the journey of their management many positive and negative experiences with HPs were expressed and participants explained the role of family within their management Participants also discussed the importance of pain management programmes and support groups.
Conclusions: Due to the limited effects of treatments participants had learnt how to manage their symptoms by using self management strategies and making lifestyle changes. Support groups and pain management programmes were important to help participants with their management, however further research should focus on developing these. This research looked at the experiences of managing the symptoms of fibromyalgia and the findings are supported by previous research by Traska *et al.* (2011) [7]. Overall findings may help HPs to advise and encourage self management strategies, referral to pain management and acknowledging social support for people with this condition.
Disclosures: The authors have declared no conflicts of interest.

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122. IDENTITY IN MEN WITH CHRONIC LOW BACK PAIN

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Background: Low back pain is a common condition that will affect 80% of the population at some point in their lives. For the majority of people the pain and associated disability will be resolved and they will resume normal activities. For a small proportion of this group however, the condition will remain unresolved resulting in chronic low back pain (CLBP), with significant physical and emotional cost to the individual. While the biopsychosocial approach to the management of CLBP is recognized and flagged (red, orange, yellow, blue and black), issues of self-concept and identity appear to have received limited attention. Osborn and Smith (2006: 220) [1] however suggest that the contradiction between the painful body and the preferred self could represent an important obstacle to therapeutic rehabilitation if not acknowledged or resolved. The aim of this biographical study was to explore the narratives of men living with CLBP in order to elucidate the impact of long term back pain on their individual lives and identities. A better understanding of the lives of men's with CLBP will enable more effective management of this condition in the future.
Methods: This study employed a biographical approach with the aim of understanding the impact on the lives and identities of men living with CLBP. Five men with CLBP were recruited and in-depth interviews were undertaken, their narratives were audio-recorded, transcribed verbatim and analysed thematically.
Results: The identity of all the participants in the study had been affected by CLBP. Clear themes emerged that included feeling defined by their CLBP, experiencing feelings of frustration and anger, the inability to retain their masculine role, the impact on fatherhood, public and private identities, physicality and feeling a liability or burden to others. The participant's ability to manage their condition was significantly influenced by their understanding of their individual pathology, being prescribed appropriate exercises and the support of significant others.
Conclusions: The biopsychosocial approach needs to be revised to address issues of self-concept and identity. Education, exercise and support were highlighted as key aspects in the management of this condition. CLBP and the associated disability will not be eradicated from society; men therefore need to be offered an alternative, masculine narrative that will enable them to function in society.
Disclosures: The authors have declared no conflicts of interest.

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123. 'I THINK HAVING A PROGRAMME LIKE THAT FOR PEOPLE WHO HAVE GOT RHEUMATOID ARTHRITIS IS WELL WORTH DOING': EXPERIENCES OF AN UPPER LIMB EDUCATION, SELF-MANAGEMENT AND EXERCISE PROGRAMME AMONG PEOPLE WITH EARLY RHEUMATOID ARTHRITIS

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Background: Exercise is a complex, burdensome health behaviour, and non-adherence to exercise is common. To be effective, interventions need to be socially, educationally, and culturally appropriate, and accommodate the strengths and skills of the target population. A global upper limb Education, self-management, and eXercise Training programme for people with early Rheumatoid Arthritis (RA) (the EXTRA programme) which incorporates an upper limb home exercise regimen supplemented with 4 supervised group education, self-management and exercise sessions improves upper limb disability, function, and strength. This qualitative study evaluates participants' experiences of the EXTRA programme.
Methods: 12 participants who completed the EXTRA programme were purposively selected for age (range 32 to 87 years), upper limb disability (range 8 to 70 'Disabilities of the Arm, Shoulder, and Hand Questionnaire'), and arthritis self-efficacy (range 96 to 272 'Arthritis Self-Efficacy Scale'). Participants completed semi-structured interviews conducted by a single moderator according to a semi-structured interview guide. Interviews were audio-recorded and transcribed verbatim. Transcripts were read, coded, analysed and themes generated, using interpretive phenomenological analysis.
Results: Five superordinate themes reflecting participants' experiences of the EXTRA programme were identified: 1) The EXTRA programme improves disease status and provides a self-management strategy, 2) Individual needs and lifestyle factors influence acceptability, 3) Others facilitate learning, confidence, and enjoyment, 4) Seminars and written materials increase knowledge and autonomy, and 5) Socio-environmental, self-regulatory, and self-belief factors influence uptake and maintenance. Participants perceived that the programme improved their function, health, and disease status, and provided them with an effective self-management strategy. Individual needs and lifestyle factors, such as disability and employment status, influenced the acceptability of the programme. Support and guidance received from the physiotherapist, group members, and significant others were integral to participants' learning, confidence, and overall satisfaction with the programme. Seminars supported by written materials increased participants' knowledge of exercise and self-management, and facilitated autonomy. Socio-environmental factors (e.g. loyalty toward the physiotherapist, competing responsibilities), self-regulatory factors (e.g. the adaptability of the regimen, exercise diary), and self-perceptions (e.g. disease status, need, ability) influenced participants' uptake and maintenance of the EXTRA programme.
Conclusions: The EXTRA programme was an acceptable, positive experience for people with early RA.
Disclosures: The authors have declared no conflicts of interest.

124. PRAGMATIST, EMOTION-FOCUSED FIGHTER, PROBLEM-FOCUSED FIGHTER OR MINIMIZER? POSSIBLE TRAJECTORIES OF NEWLY DIAGNOSED PATIENTS

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Background: Little is known about the journeys patients with inflammatory arthritis (IA) take from pre-diagnosis towards adjustment and acceptance, which are crucial to successful self-management, a key treatment aim. This study explored the journeys of patients over the first 12 months.
Methods: 15 patients were interviewed 2 weeks before the initial consultation, 2 weeks after, then 6 and 12 months. Validated questionnaires captured clinical status, beliefs and adjustment. Individual journey transcripts were read and re-read (JT) with a subset independently analysed (MM, ED, SH). Thematic analysis and framework-facilitated the identification of journey types (trajectories).
Results: 15 patients (7F); aged 29–80 years; 8 working full time, 4 retired, 1 housewife and 2 long-term sick at first visit. All had moderate symptoms at baseline, but took different trajectories toward adjustment.

Pragmatists: 'Doesn't stop me doing anything I want to do'. These 6 patients took their diagnosis as matter-of-fact, to be dealt with. They were willing to ask for help, took medication as prescribed, and were supported by family and friends. By 12 months they considered they had adjusted to arthritis as part of life.

Emotion-focused Fighters: 'I'm going to be nice to myself as that has become important'. These 4 patients struggled to manage, were tearful and used emotion-focused strategies. Initially this involved social withdrawal 'I lie on the settee, all day if I want to—I just don't

want to see anyone', moving gradually toward emotional self-care 'my friends have to accept me for who I am now and I need to be nice to myself'

Problem-focused Fighters: 'I've learnt to stop when I need to'. These 4 patients, with slightly worse self-efficacy and anxiety also struggled to manage, but tackled it by making practical changes. For example a carpenter unable to use his tools and thus unable to work, carefully adapted tasks at home and work so that 'I can fit things in with my arthritis'. At 12 months both groups of Fighters reported still moving towards adjustment.

Minimizers: 'I'm fine thank you'. This patient coped by minimizing his symptoms and declining medications, with an active disregard for the long term implications. His family's response to IA was anger, perhaps fuelling his minimizing approach. At 12 months he and his family had negotiated a way of managing his life, but he continued to decline medication.

Conclusions: These novel data suggest that even with initially similar symptoms, patients take different trajectories and use differing coping mechanisms. Supporting these different needs requires the team to understand their perspectives. Some patients (Fighters) may need support with emotional or practical ways of coping, while others (Minimizers) may need a different approach to support decision making. Longitudinal interviews are needed to explore coping with flares or life events.

Disclosures: The authors have declared no conflicts of interest.

125. ADHERENCE TO EXERCISE AND PHYSICAL ACTIVITY IN OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS

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Background: One of the main barriers to the effectiveness of conservative interventions in arthritis is poor adherence. Adherence is reported to be the most important modifiable factor that compromises potential treatment outcome. Exercise and/or physical activity is an effective treatment for arthritis related pain and disability, with clinical guidelines recommending it as a 'first choice conservative treatment'. Exercise as a prescription has grown in popularity over recent years, yet encouraging adults to remain physically active is difficult. The aim of this thematic synthesis was to advance knowledge and understanding into the complex nature of adherence to exercise and/or physical activity in adults with OA and RA.

Methods: A thematic analysis of qualitative studies was conducted to identify: 1. common barriers and facilitators of exercise and/or physical activity; 2. common beliefs about the role of exercise; and 3. the role of the patient and clinician in decision-making. Electronic databases were searched for relevant papers published between 1991 and July 2012. Thematic synthesis was applied to extract data and develop themes.

Results: From the 321 identified references, 6 studies were included in the analysis. Three analytical themes emerged: 1. Pain, as a barrier and facilitator; 2. Influence of knowledge and previous experience on beliefs and perceptions of exercise; and 3. Role of the clinician. Fear of experiencing pain was cited as the largest barrier to exercise. There was a general agreement amongst the studies of reducing activities that caused pain. Exercise history and adherence showed a strong linear relationship. Those whom exercised showed more willingness to adapt daily routines to include physical activity and/or exercise. Further, they perceived the role of exercise to be important for symptom management and maintaining independence. Experience of exercise influenced participants' perception of their ability and expected outcomes from exercise. Participants that linked active lifestyles as a predisposition to the onset of arthritis were less likely to be adherent, with a commonly held belief that too much activity causes 'wear and tear' to the joints. The perceived role of the clinician varied within the results. There appeared to be a clear division between the role of the clinician and the patient with no shared responsibility of disease management.

Conclusions: The results suggest that in order to improve adherence to exercise or a physically active lifestyle, patients' beliefs and perceptions about pain and the role of exercise need to be acknowledged and taken into consideration. Adherence could be facilitated by clinicians highlighting the role of exercise in pain management and in delivering educational support as to why exercise could be beneficial. Adherence was also facilitated where clinicians provided clear well-informed information about exercise for people with arthritis.

Disclosures: The authors have declared no conflicts of interest.

BHPR RESEARCH: QUANTITATIVE

126. AN EXAMINATION OF SELF-REPORT PHYSICAL ACTIVITY AND ITS RELATIONSHIP WITH PSYCHOLOGICAL FACTORS IN INFLAMMATORY ARTHRITIS

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Background: Inflammatory arthritis (IA) is the term given to a group of chronic inflammatory rheumatic diseases that primarily include RA and PsA. Physical activity (PA), defined as any bodily movement produced by skeletal muscles that results in energy expenditure (EE), is important for everyone, including people with IA. Despite the importance of including PA in the management of these two inflammatory conditions decreased levels of PA have been reported for people with RA. In order to develop interventions aimed at increasing PA in IA determination of the factors associated with PA participation in this population is warranted. The aim of this study was to establish a self-report PA profile of the RA and PsA populations and also to establish the correlates of PA for these populations

Methods: Initially a systematic review of the literature was conducted, examining the correlates of PA in the RA and PsA populations. The review found that there are a number of correlates relating to PA in people with RA; however none have been definitively determined. Secondly a cross-sectional study of 102 people with IA, recruited from rheumatology outpatient clinics, was conducted to explore the self-report levels of PA and EE within the IA population. Levels of PA were examined using the Yale Physical Activity Survey (YPAS), a self-report measure of PA. Socio-demographic variables were recorded, in addition to self-efficacy, beliefs about PA, illness perception and general health perceptions. Statistical analysis consisted of descriptive statistics to establish the profiles of PA, EE and other variables, and correlational and hierarchical regression analysis to explore the statistical relationships between PA, EE and the independent variables.

Results: Total PA level over the past week for males was 21.7 h and for females was 24.6 h. Levels of self-report PA and EE in the IA population were low and were similar to those reported in other arthritis populations. Age was the only socio-demographic variable to correlate with PA over the past month ($P = 0.04$). Physical health perception was associated with PA levels ($P = 0.02$) and EE over the past week ($P = 0.01$). Beliefs about PA were shown to correlate with levels of PA and EE, and remained significant when age ($P = 0.03$) and physical health perception ($P = 0.02$) were controlled for.

Conclusions: Levels of PA in this population were low. Age was the only significant socio-demographic correlate of PA. Beliefs about PA and physical health perception influenced levels of PA and EE in the group. Future research should explore the impact of an intervention aimed at altering beliefs about PA and health perceptions and the influence of this intervention on levels of PA in the IA population. Additionally PA, self-efficacy, beliefs about PA, illness perception and health perception should be examined in a larger sample of the PsA population.

Disclosures: The authors have declared no conflicts of interest.

127. EFFECT OF BODY MASS INDEX ON CLINICAL RESPONSE TO ANTI-TNF THERAPIES IN RHEUMATOID ARTHRITIS: A RETROSPECTIVE STUDY

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Background: Adipose Tissue and adipocytokines play an important role in immunomodulation in RA. Obesity also has important pharmacodynamic effect on drugs like TNF Inhibitors. In this study, we aim to determine whether BMI affects the clinical response to anti-TNF drugs in RA patients, and whether there is a difference in clinical response to infliximab *vs* other subcutaneously injected anti-TNFs in obese RA patients.

Methods: In this retrospective study, we included 145 RA patients on different anti-TNF drugs. Baseline data on demographics, BMI, Rheumatoid Factor, Anti-CCP antibodies, DAS28 score, Hospital

Anxiety and Depression Scores, and Health Assessment Questionnaire were collected. A change in DAS28 score at 6 month was calculated and a DAS responder status allocated to those with a change in DAS score of 1.2 or above. DAS response was studied for Infliximab group *vs* the other subcutaneous anti-TNF group. Pearson's chi-squared test and logistic regression analysis was used for statistical analysis and to build a prediction model of factors associated with response to anti-TNF drugs in RA.
Results: We found a poorer response to infliximab at 6 months in clinically obese RA patients, compared with non-obese individuals in the same group (P-value = 0.036). However there was no statistical difference in the response rates in the two BMI groups in subcutaneous anti-TNF group. Multivariate analysis showed that a higher baseline DAS28 score was associated with better DAS response at 6 months (OR = 3.53, $P = 0.001$). Our study also showed that a higher baseline Depression score is associated with a poorer response to anti-TNF drugs at 6 months (OR = 0.79, P-value = 0.001).
Conclusions: Our study provides evidence that high BMI is associated with poorer response to Infliximab at 6 months in RA patients, which is consistent with other recently published data. Higher baseline DAS28 score is associated with better response while high baseline depression score is associated poorer response to anti-TNF drugs at 6 months. These findings however need to be confirmed in larger prospective studies.
Disclosures: The authors have declared no conflicts of interest.

128. RA FLARES: INFLAMMATION OR AVALANCHE?

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Background: Previous research has not addressed how RA patients' symptoms change daily. The aim of this research was to explore symptom patterns during daily life and flare
Methods: RA patients completed self-reported VAS (0–10) of pain, fatigue, swollen joints, stiffness, anger, frustration, worry and flare status (yes/no) daily for 3 months either on paper or online. This was an exploratory study and therefore not powered for statistical significance. Data were analysed for descriptive statistics and visually analysed with the use of graphs to identify symptom patterns
Results: 28 patients agreed to take part: 5 withdrew, 6 had missing data for >10/91 days. The 17 patients included in the analysis were 15 female, with mean age: 62.9 years, disease duration: 18.6 years and HAQ: 1.86. On plotting the symptoms onto graphs, 3 patients reported constant flare for 91 days (constant flare group), 6 patients self-reported ≥1 flare with periods of non-flare (intermittent flare group) and 8 patients did not report being in a flare (daily life group). As expected, the group means of the individual symptoms were highest in the constant flare group and lowest in the daily life group. In the daily life group, patients' individual mean pain scores ranged from 0.2 to 5.8, whereas in the intermittent flare group patients' individual mean pain scores ranged from 2.5 to 7.0 and in the constant flare group patients' individual mean pain scores ranged from 2.4 to 9.3. Thus some individual patients reported lower mean pain in flare than other patients reported on non-flare days, this was also the case with the other self-reported measures (see Table 1). Further 5/6 patients in the intermittent flare group rated their symptoms as more severe on non-flare days than on days in flare. Thus patients may be using different criteria other than symptoms to decide whether they are in a flare. Whilst many patients reported traditional inflammatory flare of symptoms, others may be reporting flare based on experiencing overall loss of control in their lives and thus defining their overall disease activity as more severe (in flare) despite individual symptoms being less severe. The term avalanche flare is proposed for this cascading effect of life.
Conclusions: Definitions of flare vary within and between patients and may not be defined by symptom severity alone. Clinicians need to be aware that patients use flare to explain a range of experiences. Understanding the terminology is necessary to improve communication and inform treatment decisions.
Disclosures: The authors have declared no conflicts of interest.

129. ADHERENCE TO DISEASE MODIFYING ANTI-RHEUMATIC DRUGS AMONGST SOUTH ASIAN AND WHITE BRITISH PATIENTS WITH RHEUMATOID ARTHRITIS: A CROSS-SECTIONAL STUDY

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Background: DMARDs represent the cornerstone of the management of RA. Ensuring patient adherence, a key determinant of the chance of treatment success, is a challenging task for health professionals. In the context of RA there is a dearth of data on adherence to DMARDs amongst minority ethnic groups. This study investigated beliefs about medication and adherence to DMARDs in RA patients of South Asian (SA) and White British (WB) origin to inform interventions to address determinants of poor adherence in these populations.
Methods: 180 patients of WB and SA origin with RA were consecutively recruited from secondary care. Data were collected via questionnaires on: (i) self reported adherence (MARS questionnaire) (ii) beliefs about medicines (BMQ) (iii) illness perception (IPQ) and (iv) patients' satisfaction with information about DMARDs (SIMS). In addition, clinical and demographic data were collected.
Results: The mean age of WB patients was 57.74 (S.D. 12.74). The mean age of SA was 52.46 (S.D. 12.94) ($P = 0.006$). Patients of SA origin were younger ($P = 0.006$). The SA group had more females than the WB group ($P = 0.024$). There was a higher adherence level in the WB compared with SA patients ($P = 0.013$) (Mann–Whitney). In addition, the Necessity Concern Differential score ($P < 0.001$) (Mann–Whitney) was significantly higher in the WB patients (necessity of treatment outweighing concerns). The concern ($P = < 0.001$), overuse ($P = < 0.001$), and harm ($P = <0.001$) scores were significantly higher in the SA patients compared with WB patients. The IPQ domains, timeline (patients' view of disease as acute/chronic) ($P = <0.001$), illness coherence (patients' understanding of RA) ($P = 0.041$), were higher in the WB patients. The timeline cyclical (fluctuant disease) ($P = 0.017$) and emotional representation (emotions generated by patients) ($P = 0.004$) were higher in the SA patients. The multivariate analysis showed that poor adherence to DMARDs in SA patients was associated with dissatisfaction with information about DMARDs.
Conclusions: The study suggests that satisfaction with information about DMARDs influences adherence in the SA patients. In addition, adherent WB patients had a higher Necessity Concern Differential score where their beliefs about the necessity of medication outweigh their concerns about the potential adverse effects, viewed RA to be long term disease and had a better understanding of RA. Further work is required to examine the reasons underlying good and poor adherence.
Disclosures: The authors have declared no conflicts of interest.

130. THE STABILITY OF ILLNESS BELIEFS IN RHEUMATOID ARTHRITIS: A PILOT FOLLOW-UP STUDY

Anna M. Ferguson[1,2], Fowzia Ibrahim[2], David L. Scott[2] and Heidi Lempp[2]

TABLE 1. Results

		Pain	Fatigue	Stiffness	Swollen joints	Frustration	Anger	Worry
Constant flare group	Group mean (S.D.)	4.3 (2.7)	4.7 (2.7)	3.6 (2.6)	3.9 (2.6)	3.7 (2.9)	3.1 (3.3)	3.7 (3.1)
	Lowest individual patient mean	2.4 (1.3)	4.4 (2.1)	2.3 (1.5)	2.2 (1.4)	1.1 (1.3)	0.7 (0.9)	0.6 (0.9)
	Highest individual patient mean	9.3 (0.8)	9.3 (0.7)	9.5 (0.8)	9.5 (0.7)	9.0 (0.7)	8.9 (0.7)	8.9 (0.7)
Intermittent flare group	Group mean	4.8 (2.3)	4.9 (2.0)	4.0 (2.1)	4.4 (2.1)	4.1 (2.2)	3.1 (2.6)	4.3 (2.4)
	Lowest individual patient mean	2.5 (1.2)	2.7 (1.2)	1.7 (0.7)	2.3 (0.8)	2.1 (0.7)	0.0 (0.1)	1.9 (0.8)
	Highest individual patient mean	7.0 (0.6)	7.4 (1.0)	6.2 (1.1)	6.5 (0.9)	6.3 (1.2)	5.7 (1.3)	7.8 (1.2)
Daily life group	Group mean	3.1 (2.3)	3.6 (2.6)	2.4 (1.5)	2.7 (1.9)	2.8 (2.9)	2.2 (3.3)	2.7 (3.1)
	Lowest individual patient mean	0.2 (0.5)	0.4 (0.9)	0.3 (0.7)	0.5 (0.9)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Highest individual patient mean	5.8 (2.2)	7.6 (2.0)	4.8 (1.6)	6.5 (1.6)	8.7 (0.7)	9.2 (0.7)	9.4 (0.6)

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Background: Little is known about whether illness beliefs in RA remain stable over time or whether they impact/predict health status/outcomes. The aim of this pilot study was to compare illness and treatment beliefs after 2 years in patients with RA. This study follows up a cohort of patients in a study by Graves, Scott, Lempp and Weinman (2010) [1].
Methods: In the original study 125 returned questionnaires assessing their illness beliefs, disability and quality of life. We then followed-up and approached the same cohort in 2010, which allowed us to compare the same data at two time points. A paired *t*-test was used to compare the mean illness beliefs between time points 1 and 2.
Results: Sixty-four of the 125 (51%) completed the follow up measures. Sixty-nine per cent of patients were female and all lived in London or Greater London. No significant differences were found between time-point 1 and time-point 2 for demographic information. At time-point 2 on the Illness Perception Questionnaire (IPQ) Personal Control and Treatment Control were significantly lower than at time-point 1. On the Beliefs about Medicines Questionnaire (BMQ) Specificity Necessity and General Harm were significantly lower than at time-point 1.
Conclusions: Patients' perceptions appeared to shift at time-point 2, which suggests that patients' beliefs about illness and treatment are not stable over time. However, due to the limited number of patients in the second cohort it is vital that further research is carried out. This pilot is the basis for a larger longitudinal study.

TABLE 1. Comparison of mean illness and treatment beliefs over time

	Time-point 1		Time-point 2		
Measures	Mean	S.D.	Mean	S.D.	*P*-value*
IPQ Personal Control	19.6	5.01	18.4	4.14	0.0286
IPQ Treatment Control	17.1	3.1	15.5	3.79	0.0001
Beliefs about Medication Questionnaire Specific Necessity	20.8	4.76	19.2	4.24	0.0171
Beliefs about Medication Questionnaire General Harm	9.62	3.14	8.65	2.56	0.0504

**P*-values are from paired *t*-test; highlighted rows are statistically significant at 5% level.

Disclosures: The authors have declared no conflicts of interest.

Reference

1. Graves, Scott, Lempp and Weinman (2010).

131. COMPARISON OF ENERGY EXPENDITURE LEVELS BETWEEN RA SUBJECTS AND CONTROLS

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Background: Individuals with RA have increased mortality compared with the general population, mainly attributable to cardiovascular causes. Regular physical activity is associated with improved cardiovascular health. Energy expenditure is proposed to provide an accurate representation of physical activity due to its ability to account for both upper and lower limb activities. The symptoms of RA are postulated to act as barriers to physical activity in this population; however it is not definitively clear how levels of physical activity compare between the RA population and controls. The aim of this study is to compare the energy expended in total (TEE) and related to physical activity (PAEE) and resting energy expenditure (REE) between the RA population and a non-physically disabled patient control population.
Methods: Fifty-nine (41 female, 18 male) individuals with RA recruited from a rheumatology outpatient clinic and 19 (10 female, 9 male) controls recruited from a dermatology outpatient clinic were enrolled in this study. There were no statistically significant differences between the baseline characteristics of the two groups. All subjects wore a SenseWear Armband for 7 days. This tool has been validated to measure energy expenditure in the RA and general populations. This tool provided data on TEE and from this, PAEE was calculated for both population groups. Independent samples *t*-tests were used to compare the two groups, for the total sample and the male and female subsamples. All analysis was conducted using SPSS v.18.0.
Results: There were no statistically significant differences between the two groups in terms of TEE for the total sample or male or female subsamples. For PAEE, no statistically significant differences were noted for the total or male samples. However, in the female subsample, a statistically significant difference ($P = 0.003$) was found, with the controls expending higher levels. For REE, no statistically significant differences were noted for the total or male samples. However, in the female subsample, a statistically significant difference ($P = 0.002$) was found, with the RA subjects expending higher levels.
Conclusions: There were no significant differences in TEE between the RA population and the non-physically disabled patient controls. Although individuals with RA have similar TEE levels to controls, the components which make up this total value differ. PAEE and REE showed statistical significant differences in females. This highlights that female RA subjects are less active than their peers and could benefit from increasing levels to benefit from the benefits that physical activity has to offer. This study also highlights the importance of not solely assessing TEE in this population as it does not provide an accurate representation of physical activity due to the metabolic abnormalities indicative of this group. PAEE should be investigated in order to accurately assess the level of physical activity accurately.
Disclosures: M.T., Irish Research Council, Central Remedial Council, Intel Ireland—Scholarships. All other authors have declared no conflicts of interest.

132. DEFINING OPTIMAL NHS OCCUPATIONAL THERAPY TREATMENT, INDIVIDUALIZED SPLINT AND PLACEBO SPLINT FOR PATIENTS WITH THUMB BASE OA: A DELPHI STUDY

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Background: The OTTER (OsTeoarthritis Thumb ThERapy) trial is a 2-year development study for a full RCT into the clinical and cost effectiveness of an occupational therapy and splint intervention for thumb base OA. A Delphi study was conducted to obtain a consensus opinion of both patients with thumb base OA and AHPs about the most appropriate NHS OT programme, splint and placebo splint intervention to use in the RCT. The findings from the consensus study will inform the full trial, and define the three components of the trial interventions.
Methods: The Delphi panel consisted of 63 AHPs experienced in treating adults with thumb base OA, and 7 patients with thumb base OA. The panel were asked to rate how much they agreed or disagreed about what optimal NHS OT care for thumb base OA should include; which trial splint design options should be included; what should be included in the design of an appropriate placebo splint; and what outcome measures to use. The Delphi study comprised 3 rounds. In Round 1, a 38-item questionnaire was used consisting of closed questions and some open questions to allow for additional comments for the panel's consideration. A 7-point Likert scale was used. Rounds 2 and 3 consisted of closed questions only.
Results: The response rate for Round 1 was 49.21% for AHPs and 85.71% for patients; Round 2 87.10% AHPs and 83.33% patients; and Round 3 96.30% AHPs and 100% patients. The Delphi study provided consensus between AHPs and patients on the optimal NHS treatment for thumb base OA. This included: Education about General OA and Hand OA; Joint Protection General and Hand Specific; Advice on Hand Exercise; Splint Assessment and Provision; Aids and Equipment for Hands; Fatigue Management and Pacing; Activities of Daily Living; Hobbies; Pain Assessment and Management; Prognosis Advice; and Subjective Verbal Functional Assessment. Agreement regarding thumb base splint options were: a short splint distal to wrist; a hard thermoplastic splint; a soft splint; an off-the-shelf commercial splint; and a therapist manufactured splint. Agreement regarding outcome measurement for thumb base OA included: hand pain, hand mobility, hand function, hand impairment, quality of life, satisfaction, aesthetics, and adherence/non-adherence.
Conclusions: In order to develop a standardized package of care for delivery within a multi-centre AHP RCT, it is imperative to gain the consensus of clinicians and patients about what is important to include

in an optimal NHS OT consultation. There are differences in the provision of NHS care and OT consultation for people with thumb base OA across the UK. This Delphi study provides clinician and patient agreement on the optimal components of national OT intervention, splinting and placebo splint design options that reflect optimal NHS intervention and are feasible to provide throughout the UK within national OT departments for use in the OTTER trial RCT.
Disclosures: The authors have declared no conflicts of interest.

133. USE OF WII FIT IN BALANCE TRAINING IN OSTEOPOROSIS

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Background: The main objective of osteoporosis treatment is to reduce fragility fractures. Pharmacological interventions though increase bone mineral density, falls contribute significantly to fractures. Balance training is an important part of physical intervention for osteoporosis. Traditional balance training may not appeal to many patients. Gaming console maker Nintendo has developed a unique balance board based games called Wii Fit. This uses interactive computer graphics to maintain individual's attention and interest. We wanted to explore the usefulness of Wii Fit balance board to aid balance training in osteoporosis patients. To assess benefits of Wii Fit tilt table function in improving balance in osteoporosis patients
Methods: Osteoporosis patients attending physiotherapy sessions were invited to attend Wii Fit sessions. All had an opportunity to attend education programme on osteoporosis before starting the balance programme on the Wii Fit. Baseline balance was assessed using validated measures like Timed up and go (TUG), Tinnetti score, balance on one leg (measured for each leg in seconds). In addition, time on Wii Fit balance board was also measured. Each patient had total 6 training sessions at weekly interval on the Wii Fit. Assessment measurements were taken on each visit. Mean baseline and final balance assessment parameters and Wii Fit scores were compared.
Results: 32 patients were invited to attend the education and training sessions between April 2011 and August 2012. 28 (87.5%) patients were women. Average (S.D.) age was 73.12 (10.51) years (range: 40–93). One patient declined to take part. 6 patients dropped out due to health reasons after the first assessment. Total 25 patients completed the full training programme. Improvements were noted in all four assessment domains (see Table 1). 8/32 (25%) patients achieved maximum Tinnetti score at final assessment. Patients completing the full training programme did not have any falls or fractures during the study period. Patients enjoyed the Wii Fit sessions despite initial reservations by some of them.
Conclusions: Wii Fit tilt table exercise improves balance as shown in Table 1 below. Subjectively patients enjoyed the exercise sessions. Patients were able to see the improvements on the screen during the exercise sessions which contributed to improve the confidence. Some of the patients were impressed and motivated enough to buy the equipment to continue balance programme at home.

TABLE 1. Measures of balance assessment before and after the completion of Wii Fit intervention

Mode of assessment	Baseline mean (S.D.)	Final mean (S.D.)
Wii Fit score	27.44 (13.96)	46.92 (21.56)
Tinnetti score	21.12 (4.87)	26.29 (1.96)
One leg balance right leg, s	99.44 (196.84)	196.84 (290.37)
One leg balance left leg, s	98.44 (141.62)	165.48 (236.66)
Timed up and go, s	16 (5.32)	12.33 (4.42)

Disclosures: The authors have declared no conflicts of interest.

134. AN INVESTIGATION INTO THE PREVALANCE OF DISABLING FOOT PAIN IN PATIENTS AWAITING TOTAL KNEE ARTHROPLASTY

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Background: It has been shown that only 81% of patients are satisfied with their primary total knee arthroplasty (TKA). A number of clinically important predictors of pain and function outcomes following TKA have been identified, including pre-operative pain, function, anxiety, social deprivation, age and gender. Whilst the study provides a good insight into predictors of TKA outcome it is made clear that other predictive factors are yet to be identified. As of yet the role of the foot and ankle in as a predictor for TKA outcome has yet to be investigated. The aim of this study was to describe the prevalence of disabling foot pain and foot posture in patients awaiting TKA.
Methods: Patients awaiting TKA, already enrolled on the Clinical Outcomes in Arthroplasty Study (COAST) were including within this study. COAST is a prospective cohort study which aims to identify factors which may predict outcomes of hip and knee arthroplasty. Foot posture (Foot Posture Index) and foot pain (Manchester Foot Pain and Disability Index) were measured at patients pre-operation assessment. To accommodate sensitivity to age and sex, as per recent recommendations, disabling foot pain has been defined as at least one of the 10 foot pain and disability index function items experienced on most/every day (s).
Results: 63 patients (35 female, 28 male, mean (S.D.) age of 66.4 (9.6) years were included. Disabling foot pain inclusive of either limb was present in 41.3% of patients awaiting TKA. Of these, 50% displayed a pronated foot type, 19.2% a supinated foot type and 30.8% a normal foot type on either limb. On the limb awaiting TKA, 34.6% displayed a pronated foot posture, 15.4% supinated and 50% normal. Of the patients with foot pain, 73.1% were female and 26.9% male. Of all patients with pronated foot posture 59.3% were female and 40.7% male.
Conclusions: Preliminary findings suggest a high prevalence of foot pain within patients awaiting TKA. Foot pain has been identified as a risk factor for locomotor disability, impaired balance and falls and may therefore affect post-operative rehabilitation. These figures are in contrast to those from UK general population studies, which indicate only 18% of adults, aged 55 and over are affected by foot pain, with an 8–11% prevalence of disabling foot pain in 18–80 year olds. A high proportion of patients with foot pain displayed a pronated foot posture on either side; such resting alignment may potentially have a functional effect on the lower limb. As per previous studies foot pain was more prevalent in females than males. There was however only a small difference in foot posture between genders. Further investigation is required to inform potential associations between foot and ankle variables and TKA outcomes.
Disclosures: The authors have declared no conflicts of interest.

135. THE MEASUREMENT PROPERTIES OF THE DUTCH KEELE ASSESSMENT OF PARTICIPATION QUESTIONNAIRE IN OLDER ADULTS WITH JOINT PAIN AND COMORBIDITY

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Background: Social participation provides an account of the wider influence of musculoskeletal conditions on functioning and captures the personal and social impact. Maintaining social participation is important to individuals with musculoskeletal conditions. The Keele Assessment of Participation (KAP) questionnaire measures problems in social participation, in 11 areas of life. This study determined the measurement properties of the Dutch KAP questionnaire in older adults with joint pain and comorbidity (≥2 chronic conditions); in particular we focused on exploring the use of a continuous scoring for application in longitudinal studies in the UK and the Netherlands.
Methods: The original KAP was translated into Dutch and additional filters were added in 3 items to aid classification of restrictions in participation. A longitudinal cohort of older adults, aged 65 and over, with joint pain and comorbidity provided baseline data ($n = 407$), follow-up data at 6 months ($n = 364$) and test-retest data ($n = 121$), to examine the following measurement properties: structural validity [factor analyses (FA)], internal consistency (Cronbach's alpha), construct validity (hypothesis testing; comparison with SF-36, Impact on Participation and Autonomy, IADL index), reliability [Intra-class Correlation Coefficient (ICC)], responsiveness [anchor-based approach, Area Under the Curve (AUC)] and cross-cultural validity (multi-group confirmatory FA (CFA) and DIF analyses).
Results: FA revealed two domains: (i) everyday participation (6 items) and (ii) discretionary participation (3 items), with Cronbach's alpha's of 0.74 and 0.57 and ICC's of 0.63 (95% CI 0.49, 0.73) and 0.57 (95% CI 0.44, 0.68), respectively. Construct testing confirmed about 75% of the hypotheses. The AUC for discrimination between stable and

deteriorated participants was 0.62 for everyday participation and 0.54 for discretionary participation. The multi-group CFA showed some measurement invariance (RMSEA = 0.106, CFI = 0.967, TLI = 0.973) and DIF testing on item level showed uniform DIF in 7 out of 11 items (64%).

Conclusions: The domain everyday participation showed good convergent validity and moderate reliability, suggesting it could be applied to measure participation in research studies. However, the results suggest that the items of discretionary participation (i.e. work, education and social activities) may be best applied as single items. The poor responsiveness and high levels of uniform DIF question the application of the KAP domains in longitudinal studies, however further testing is required (e.g. in a larger sample, with a longer follow-up period).

Disclosures: The authors have declared no conflicts of interest.

136. IMPROVING ADHERENCE IN RHEUMATOID ARTHRITIS: A PILOT STUDY

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Background: The current study aimed to address non-adherence in RA patients by targeting both practical (i.e. amount, cost, memory) and perceptual issues (i.e. beliefs about illness/treatment) known to impact on medication adherence by using a psychological intervention. The intervention was based on an approach called Compliance Therapy developed by Kemp, Hayward and David (1997) [1] originally for patients with psychosis. The approach draws on cognitive behavioural therapy (CBT) including motivational interviewing techniques. The two principle objectives of the study were to adapt the intervention for RA patients and assess its effectiveness in terms of improving adherence and quality of life (QoL).

Methods: Patients attending an Outpatient RA Centre in a London Hospital with a DAS of 3.2 or above were asked to complete the Medication Adherence Rating Scale (MARS). Participants scoring ≤23 were eligible. Those who consented were randomly allocated to either the intervention group (N = 10) or wait-list control group (N = 7). Those in the intervention group received up to six weekly individual sessions of 'Compliance Therapy' whilst those in the wait-list control group received usual care and were offered the treatment after 12 weeks. Outcome measures assessing adherence, illness/treatment beliefs, QoL, and disability were delivered pre-intervention (baseline) and post-intervention (at 6 weeks) for both groups.

Results: Ninety-nine patients were screened on the MARS with a mean average score of 21.95 suggesting that overall the majority of patients screened were demonstrating sub-optimal adherence levels. Of the 99 patients screened ($n = 45$) were eligible but ($n = 28$) declined to take part for a variety of reasons. The 17 participants who finally participated were all female and had a mean age of 47.41 years (S.D. 14.405). Eighty-three per cent were White British and 17% were from a Black and Ethnic Minority background. Paired *t*-tests were used to carry out within group comparison of the outcome measures (Table 1). Those in the intervention group demonstrated significant improvement in mean scores at post-intervention on both adherence measures, but not in the control group. In addition, we carried out between group comparisons but none of the variables were significant, although this may be related to the small number of participants who completed the pilot.

Conclusions: The pilot study, suggests that an intervention based on CBT may improve adherence in patients with RA and that further research, such as a randomized control trial, is needed to examine the efficacy of the approach.

TABLE 1. Paired *t*-tests summary

Pairing	Mean	S.D.	Sig. (2-tailed)
Intervention comparison			
MARS time-point 1—MARS time-point 2	–4.07143	3.32200	0.018
Morinsky time-point 1—Morinsky time-point 2	0.62500	0.74402	0.049
control comparison			
MARS time-point 1—MARS time-point 2	0.71429	4.19183	0.668
Morinsky time-point 1—Morinsky time-point 2	–0.28571	1.38013	0.604

Disclosures: The authors have declared no conflicts of interest.

Reference

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137. TIBIALIS POSTERIOR TENOSYNOVITIS IN RA: RESPONSE TO ORTHOTIC AND CORTICOSTEROID INTERVENTION

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Background: Tibialis posterior (TP) tendinopathy in RA is associated with a progressive flatfoot deformity and walking disability [1]. Inflammatory and mechanical mechanisms are thought to contribute [2]. However no study has investigated response to intervention which targets these mechanisms in combination.

Methods: Patients with RA and ultrasound confirmed TP tenosynovitis were recruited and underwent 3D multi-segmented foot and EMG analysis at baseline and 12 weeks. Demographic and disease characteristics were recorded at both time points. Participants were divided into 2 groups: one received mechanical intervention in the form of customized foot orthoses (FO) and one received customized FO in combination with targeted corticosteroid (CS) injection.

Results: Ten patients were recruited; all participants were issued with customized FO and 4/10 received peri-tendinous CS injections. Treatment response was highly variable at the individual patient level and only in those receiving targeted CS injection were changes in tendon pathology observed. At a group level no significant improvements were observed for 3D joint motion patterns, muscle activity or

TABLE 1. Summary of key variables difference between baseline and follow-up

Variable/subject	A001	A003	A004	A005	A007	B002	B004	B006	B007
Δ sagittal ankle joint power, Nm.kg	0.06	–0.37	0.23	0.23	0.54	0.12	0.25	0.36	–0.05
Δ ankle joint power, W/kg	0.11	0.09	–0.13	–0.31	–1.83	–0.37	–0.18	–0.70	0.52
Δ peak RF eversion, 0	–0.18	5.50	–0.11	0.43	–2.48	0.85	1.16	7.44	0.63
Δ lowest navicular height, mm	32.77	39.68	34.62	33.05	25.89	38.34	43.99	33.71	31.04
Δ peak forefoot abduction	2.18	1.42	4.54	3.15	5.24	0.63	–1.71	5.02	4.27
Δ TP transverse, mm	–0.10	2.90	–0.50	0.20	0.30	–0.50	0.20	[a]	–3.30
Δ TP longitudinal, mm	1.00	–2.70	1.40	1.00	–0.60	0.50	1.50	[a]	–0.60
Δ fluid transverse. mm	–1.10	0.00	0.10	–1.60	–0.50	–3.60	–1.00	[a]	–1.30
Δ fluid longitudinal, mm	0.00	–0.80	–1.90	0.00	0.50	–2.80	1.70	[a]	–0.10
Δ PDS TS medial malleolus	–1	0	0	0	0	2	–2	[a]	1
Δ PDS TB medial malleolus, mm	0	0	0	0	2	–2	–2	[a]	0
Δ PDS TS midway	–1	0	0	0	2	–2	–1	–1	2
Δ PDS TB midway	–2	0	0	0	3	–2	–1	–1	1
Δ PDS navicular	–1	0	–2	0	0	–3	0	0	0
Δ FIS (impairment subscale 0–21)	–3	1	2	3	0	–1	–2	4	–3
Δ FIS (disability subscale 0–30)	0	5	2	7	–1	–1	0	4	–8
Δ DAS28	–0.3	2.08	0.63	2.25	1.54	–0.36	1.34	–0.02	–1.32
Δ peak TP contact phase baseline[b]	–12	5	111	–20	–68	–12	–9	–16	–29
Δ peak MS/P baseline[b]	54	–45	211	0	–113	3	3	–16	45

Δ: change; RF: rearfoot; PDS: power Doppler signal; TS: tendon sheath; TB: tendon body; midway: midway between navicular and medial malleolus; FIS: foot impact scale.
[a]Missing data; [b]EMG within session only.

foot-related impairments and disability (individual results expressed in Table 1). Global disease activity and systemic therapy may have influenced outcome.
Conclusions: This study has provided preliminary insights to the mechanical and inflammatory response to targeted treatment in flatfoot associated with TP tenosynovitis in RA. Further work is required to understand the mechanisms more fully and treatment response in larger controlled trials.
Disclosures: The authors have declared no conflicts of interest.

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138. OBJECTIVELY MEASURED SEDENTARY BEHAVIOUR AND PHYSICAL ACTIVITY IN RHEUMATOID ARTHRITIS

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Background: There is evidence that levels of physical activity are reduced in people with RA. There is growing evidence that time spent sedentary i.e. seated or lying results in health risk in the general population independent of physical activity levels. No studies to date however have objectively examined sedentary time and activity profiles across different intensity levels in people with RA in comparison with matched controls. The aim of this study was therefore to measure time in sedentary behaviours and time spent at different intensities of activity.
Methods: Nineteen people with RA and 19 controls matched for age, sex and BMI were recruited. Demographic details and clinical characteristics of the RA population were recorded. The activity profiles were recorded over 5 consecutive days using an Active PAL activity monitor. The 5 days were averaged to provide an average daily profile for each participant. Activity was classified as being sedentary if the activity monitor which is worn on the thigh was horizontal or near horizontal, and time in different cadence bands quantified. Total time in activity suggestive of moderate to vigorous physical activity (MVPA) i.e. a cadence of greater than 100 steps/min, considered to be of health benefit was calculated. Data were explored using ANOVA and Cohen's d effect size, with a positive effect sizes indicating an increase in time spent in that behaviour.
Results: People with RA spent 1 h per day more in sedentary behaviours (18 h 50 min S.D. 1.43) in comparison with controls (17 h 43 min SD 1.37) ($P = 0.029$, Cohen's $d = 0.55$). In the RA group time spent in MVPA activities (25 min SD 11) was less than half that of the control population (55 min SD 27) ($P < 0.001$, Cohen's $d = -1.2$). Total number of steps taken per day was significantly lower for people with RA 6052 (SD 1955) than the control population who accrued 11045 (S.D.4329) steps per day ($P < 0.001$, Cohen's $d = -1.45$).
Conclusions: Time spent in sedentary behaviour for people with RA was moderately and significantly higher in comparison with matched controls. Additionally time spent in activities like to result in health benefit i.e. MVPA was highly and significantly lower in people with RA. People with RA should be encouraged to increase their levels of physical activity and spend less time in sedentary behaviours to mediate against the long term effects of inactivity.
Disclosures: The authors have declared no conflicts of interest.

139. CRITICAL APPRAISAL OF CLINICAL PRACTICE GUIDELINES FOR FOOT AND ANKLE MANAGEMENT IN RHEUMATOID ARTHRITIS

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Background: Clinical practice guidelines are systematically developed recommendations used to inform stakeholders about appropriate health care and assist in clinical decision making. There are many clinical practice guidelines currently available for the management of RA. However, the foot and ankle is still under-represented in these guidelines, even though problems are common. Whilst clinical practice guidelines have many benefits, these are only achievable if the guidelines are good quality. To our knowledge, the quality of guidelines for foot and ankle management in RA has never been appraised. Therefore, the objective was to identify and critically appraise the clinical practice guidelines for the management of foot and ankle problems in RA.
Methods: Guidelines were identified in electronic databases (from 1950 to March 2012). Search terms of 'rheumatoid arthritis' with 'clinical practice guidelines' and related synonyms were used. Foot and ankle search terms were not included, as to not preclude guidelines that did not include foot and ankle care specifically in the title or keywords. Guidelines were also identified by hand searching. Critical appraisal and quality rating were conducted using the Appraisal of Guidelines for Research and Evaluation (AGREE) II instrument.
Results: The inclusion criteria were met by 22 clinical practice guidelines. Five guidelines were high quality and recommended for use, and five were high quality and recommended for use with modifications. Six guidelines were low quality but recommended for use with modifications, and six were low quality and not recommended for use. Two recommended guidelines were specifically identified for the foot and ankle. There were five early RA guidelines and eleven established RA guidelines recommended for use. Five recommendation domains were found in both early and established RA guidelines. They were multidisciplinary team care, access to foot health care, foot health assessment/review, orthoses/insoles/splints, and therapeutic footwear. A sixth recommendation domain was found in the established RA guidelines. This was 'other treatments' and included debridement, nail care, education, injection therapy, and low level laser. Guidelines not recommended for use had no foot and ankle recommendations that were not also present in recommended guidelines.
Conclusions: Foot and ankle care features in many RA management guidelines, that following appraisal, would be recommended for use clinically. It is encouraging that foot and ankle care is present in these guidelines. Unfortunately, supporting evidence is low, and the agreement levels are predominantly 'good clinical practice' or 'expert opinion'. Therefore, more research studies in foot and ankle care in RA are needed prior to further inclusion in future high quality clinical practice guidelines.
Disclosures: The authors have declared no conflicts of interest.

140. LONGITUDINAL FOLLOW UP OF PLANTAR PLATE PATHOLOGY IN THE PAINFUL FOREFOOT OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: The plantar plate is a fibrocartilaginous structure found on the plantar aspect of the MTP joint and has a role in maintaining the structural integrity of the forefoot. Plantar plate pathology in the painful forefoot of patients with RA is most frequently reported at the 5th MTP joint and is associated with features of disease severity. Longitudinal follow up of developing plantar plate pathology has not previously been reported; this study aimed to identify inflammatory and mechanical factors that may predict plantar plate damage at the lesser MTP joints in RA.
Methods: The more symptomatic forefoot was imaged using 3T MRI; intermediate weighted fat-suppressed sagittal and short axis sequences were acquired through the lesser MTP joints at baseline and 2 years. All MR images were read prospectively by two radiologists and consensus reached, plantar plate pathology was defined as absence of the plantar plate, or full/partial width tear. Standard antero-posterior radiographs were taken to identify damage (Larsen score) and ultrasound power Doppler signal was recorded for synovitis at MTP joints. Patients completed a 100 mm VAS for current pain across the plantar MTP joints and the Foot Impact Scale (FIS_{IF}, FIS_{AP}). Forefoot deformity (Platto's Structural Index), barefoot peak

plantar pressure and gait velocity were measured, and current disease activity was quantified using DAS44. Multilevel logistic regression models were constructed to quantify the risk of progression of plantar plate pathology (normal to tear, normal to absence, or tear to absence) at 2-year follow-up. Mann–Whitney *U*-tests were used to compare VAS, FIS_{IF}, FIS_{AP}, Platto scores and gait velocity between a group of patients who had progression of plantar plate pathology and those who did not.

Results: 37 patients with RA [70% female, 75% RhF positive, mean (SD) age 55.1 (11.1) years, median (IQR) disease duration 7.0 (2.0–14.9)] and forefoot plantar pain took part in the study. In this group of patients with RA progression of plantar plate pathology occurred in at least one joint of 42.9% (15/35) of patients and in 16.8% (21/125) of all lesser MTP joints during the course of the follow-up study. Longer disease duration (>12 months) (OR 9.0, 95% CI 1.6, 50.2, $P = 0.012$), a Larsen score > 1 (OR 10.1, 95% CI 3.1, 33.2, $P < 0.001$) and higher peak plantar pressure (>485 kPa) (OR 0.1, 95% CI 0.0, 0.7, $P = 0.016$) at baseline were associated with the increased odds of developing/deteriorating plantar plate pathology. No other associations were significant.

Conclusions: This is the first longitudinal study to report the progression of plantar plate pathology at the lesser MTP joints in patients with RA during a 2-year follow up period. The findings provide evidence to support the hypothesis that the development of foot disease in patients with RA is the consequence of a combination of inflammatory and mechanical factors during the course of the disease.

Disclosures: The authors have declared no conflicts of interest.

141. THE LIFESTYLE MANAGEMENT FOR ARTHRITIS PROGRAMME IN PRACTICE: RESULTS OF AN OBSERVATIONAL STUDY

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Background: The Lifestyle Management for Arthritis Programme (LMAP) is a practical, group self-management programme led by occupational therapists (OT) and physiotherapists (PT), including two modules (weekly meetings: 4 x 2.5 h) and a review session. It includes: module A: arthritis information, joint protection and, fatigue management; module B: exercise (flexibility, strength, walking programme, Tai Chi for arthritis), foot care, pain and stress management. Each module is led by one LMAP trained therapist. At 12 m follow-up of an earlier randomized parallel group trial, significant improvements in pain, self-efficacy and self-management behaviours resulted. We next investigated its effectiveness in clinical practice.

Methods: A team of 5 OTs and 2 PTs completed 4 days LMAP training, with protocolized leader manuals and patient workbooks for each module. This included theory, the evidence for LMAP components, skills practice and role play. The OTs led both modules A and B; the PTs led module B.

An observational pre-post study was conducted with postal questionnaires at 0, 6 and 12 m. Patients with RA, early inflammatory arthritis (EIA) or PsA attending rheumatology out-patients at one district general hospital were invited to the LMAP and provided with study information.

Results: Over 2.5 years, 393 people were referred: 224 wished to attend (57%); but 144 did so (37%). 100 women and 34 men consented: average age was 55.66 years (S.D.12.62); disease duration 3.81 years (S.D.5.57); and 65 (49%) were employed. Significant improvements occurred in hand pain and self-efficacy (see Table 1). Significant improvements also occurred at 6 and 12 months in self-reported use of joint protection, fatigue management, exercise and cognitive symptom management ($P = 0.002$–0.005). No significant differences in pain or fatigue resulted.

Conclusions: The LMAP in clinical practice resulted in similar outcomes to those in a previous trial. The team of therapists successfully delivered it following 4 days training, suggesting it can be readily implemented elsewhere.

TABLE 1. Improvements for hand pain and self-efficacy

	0 months	6 months	12 months	12-month *P*
Hand pain VAS	48.34 (24.38)	41.87 (25.78)	41.44 (28.72)	0.01
Perceived health VAS	58.73 (23.40)	64.50 (18.97)	66.13 (22.59)	0.02
RA Self-efficacy	106.34 (11.77)	108.99 (11.19)	108.14 (14.73)	0.04
Self-efficacy: pain	5.64 (1.95)	6.25 (1.60)	6.30 (1.94)	0.0005
Self-efficacy: other	5.82 (1.91)	6.54 (1.76)	6.58 (1.91)	0.0005
Perceived control	20.79 (3.93)	21.77 (4.26)	21.93 (4.86)	0.04

Disclosures: The authors have declared no conflicts of interest.

142. THE EFFECTS OF EXERCISE TRAINING ON CARTILAGE BREAKDOWN AND SYNOVIAL AND SYSTEMIC INFLAMMATION IN RA

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Background: Intensive aerobic and resistance exercise has shown no acute effect on cartilage breakdown, synovial inflammation of the knee and systemic inflammation in RA. However, the effects of continued exercise training on these markers of joint health are unknown. The aim of this study was to investigate the effect of an intensive, progressive aerobic and resistance exercise training intervention on joint health in RA.

Methods: 9 stable RA patients (age: 57 ± 14 years; disease duration: 13 ± 10 years; mean ± SD) completed an 8-week combined and progressive exercise programme. Exercise sessions were performed thrice weekly and involved 30 min of interval treadmill walking exercise with target heart rates of 70–90% age-predicted heart rate maximum (HRmax) for high-intensity intervals and 40–50% HRmax for low-intensity intervals. Three sets of eight repetitions of leg press, leg extension and hamstring curl resistance exercises at 80% of 1 repetition maximum were also performed. Participants were assessed at baseline and 1 h post-exercise at weeks 0, 4 and 8. The main outcome variables were serum cartilage oligomeric matrix protein (COMP), synovial inflammation of the knee joint (using ultrasonography to determine colour fraction; CF) and systemic inflammation (serum C-reactive protein; CRP). Repeated measures ANOVA was used for statistical analysis in SPSS.

Results: No significant changes in cartilage breakdown (serum COMP; week 0: 806.7 ± 258.1 ng/ml; week 8: 778.4 ± 283.4 ng/ml; $F = 1.05$, $P = 0.380$) or systemic inflammation (serum CRP; week 0: 3.11 ± 1.83 mg/l; week 8: 3.11 ± 2.20 mg/l; $F = 1.18$, $P = 0.337$) were observed over the exercise intervention. No synovial inflammation was observed at baseline ($CF = 0.00$) and this was maintained over the 8-week programme. The exercise intervention was well-tolerated and significant improvements in aerobic fitness, lower body strength and physical function were observed ($P < 0.05$).

Conclusions: This research offers further confirmation that, in RA patients with low disease activity, intensive exercise training is not detrimental to joint health. Moreover, it appears that previous conclusions indicating no acute effect of exercise on joint health sustain over an 8-week period of continued exercise training. The intervention also offered important health benefits and therefore these findings can be used to assist health professionals when prescribing exercise.

TABLE 1. Changes in physical fitness and function over the 8-week training intervention

	Week 0	Week 4	Week 8	*P*-value
Predicted VO_2max, ml/kg/min	29.8 (8.4)	30.7 (7.6)	32.5 (8.3)	0.005
Leg press predicted 1RM, kg	166.2 (27.9)	1184.7 (36.6)	196.9 (38.8)	0.002
Leg extension predicted 1RM, kg	21.3 (7.9)	33.6 (19.8)	32.4 (10.2)	0.09
Leg curl predicted 1RM, kg	8.1 (4.8)	11.5 (5.9)	12.8 (6.3)	<0.0001
8 foot up-and-go performance, s	4.2 (1.0)	4.1 (1.1)	3.8 (0.7)	0.002
Sit-to-stand performance, number of repetitions	14.4 (2.9)	17.1 (3.6)	18.8 (3.2)	0.003

Data are mean (S.D.); 1RM: 1 repetition-maximum; *P*-value represents the change from week 0 to week 8.

Disclosures: The authors have declared no conflicts of interest.

143. FOOT INVOLVEMENT IN EARLY RHEUMATOID ARTHRITIS STUDY: A PROSPECTIVE STUDY INVESTIGATING CHANGE IN ULTRASOUND FEATURES, IMPAIRMENT AND DISABILITY

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Background: Foot involvement in early RA is highly prevalent and active disease can persist even in patients in remission state. The progression of active foot disease and foot-related impairment and

disability in early disease is largely unknown. Therefore the aim of this study was to investigate ultrasound features and self-reported foot and ankle joint impairment and disability over a 12 month period in a cohort of early RA patients.

Methods: A prospective cohort study of early RA patients was assessed over 12 months. High-resolution B-mode and power Doppler (PD) ultrasound images were scored for joint effusion, synovitis, erosion and PD signal at the ankle, subtalar, talonavicular, calcaneocuboid, metatarsophalangeal and inter-phalangeal joints and tenosynovitis in the tibialis posterior and anterior, peroneal, flexor and extensor tendons between baseline and 12 months. Change in cumulative scores for ultrasound features of foot disease were calculated for joints (0–28) and tendons (0–14) in both feet alongside foot-related impairment [FIS-RA (IF)] and disability [FIS-RA (AP)] using FIS-RA subscales and global disease scores including DAS28 and the HAQ.

Results: Thirty early RA patients (22 female/8 male) with a mean ± S.D. age of 48.8 ± 12.2 years and median (IQR) disease duration of 7.5 (4, 18) months were studied. Change in cumulative scores for ultrasound features over a 12 month period are shown in Table 1. These small or stable changes in ultrasound features were observed in a cohort where a 3-fold increase in the number of patients entering disease remission ($n = 5$ at baseline, $n = 15$ at 12 months) was observed alongside stable self-reported global disability [mean ± S.D. change in HAQ score was –0.02 (0.63)], foot-related impairment [mean ± S.D. change in FIS-RA (IF) score was –1 (3)], foot-related disability [mean ± S.D. change in FIS-RA (AP) score was 0 (7)] and increased DMARD (change in patients on MTX, SSZ and HCQ were –7%, 23% and 26% respectively) and biologic therapy (change in patients was 10%) over 12 months.

Conclusions: A trend towards small or stable changes in foot and ankle joint ultrasound features in an increasing proportion of patients entering disease remission supports the assessment and targeted therapy of foot and ankle joint disease in early RA.

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TABLE 1. Change in cumulative scores for key ultrasound features detectable in foot and ankle joints and tendons over 12 months

Ultrasound feature	Baseline, median (IQR)	12 month follow-up, median (IQR)	Change between time points, median (IQR)
Joint effusion (0–28)	8 (5–12)	5 (3–9)	–2 (–7–2)
Joint synovitis (0–28)	2 (0–4)	3 (2–5)	1 (–1–3)
Joint erosions (0–28)	2 (0–4)	3 (1–4)	0 (–2–2)
Joint power Doppler signal (0–28)	1 (0–3)	2 (0–3)	1 (–1–3)
Tendon tenosynovitis (0–14)	0 (0–1)	0 (0–1)	0 (0–1)

BIOLOGY OF BONE, CARTILAGE AND CONNECTIVE TISSUE DISEASE

144. CRITICAL ROLE FOR PAR-2 IN HUMAN OSTEOCLAST DIFFERENTIATION *IN VITRO*

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Background: Osteoarthritis (OA) is characterized by cartilage degradation and increased subchondral bone formation (osteosclerosis). Osteoclasts are responsible for bone resorption, and therefore osteosclerosis in OA could occur due to a lack or reduced functionality of these cells. PAR-2 is a receptor that has been shown to play an important role in experimental OA, as disease is reduced in PAR-2 deficient mice or by inhibition of this receptor [1]. This study seeks to identify a role for PAR-2 in human osteoclast differentiation.

Methods: $CD14^+$ cells were isolated via magnetic selection from the blood of healthy donors and differentiated into osteoclasts in the presence of M-CSF and RANKL. SLIGKV-NH_2, a PAR-2 agonist, or its reverse peptide control VKGILS-NH_2 (RP) was added to the cultures to investigate the function of PAR-2 in osteoclast development. Osteoclasts (TRAP positive, ≥3 nuclei) were counted via light microscopy after 7 and 14 days in culture. Cells were also harvested for qPCR analysis of cathepsin K mRNA levels.

Results: The addition of SLIGKV-NH_2 to osteoclastogenic cultures resulted in a significant decrease in osteoclasts when compared with vehicle or RP treated cultures (81 ± 29, 473 ± 69, 482 ± 91, respectively; means ± S.E.M.; $P < 0.02$ compared with either vehicle or RP, Bonferroni *t*-test). Results were similar in 7 day cultures. This finding was confirmed at a transcriptional level, as qPCR analysis revealed that after 14 days of SLIGKV-NH_2 treatment there was a 5-fold decrease in cathepsin K gene expression compared with vehicle.

Conclusions: The lack of osteoclasts in the SLIGKV-NH_2 treated wells suggests that activation of PAR-2 on monocytes inhibits human osteoclast differentiation driven by M-CSF and RANKL.

Disclosures: The authors have declared no conflicts of interest.

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EDUCATION

145. PREFERENCES WHEN APPLYING TO RHEUMATOLOGY SPECIALIST TRAINING PROGRAMMES

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Background: Recruitment for rheumatology specialist training (RST) in 2012 was co-ordinated through the Royal College of Physicians London (RCP). At the time of application, trainees were aware of the number of National Training Number (NTN) and locum appointment for training (LAT) posts in each deanery for each specialty involved in RCP co-ordinated recruitment. Trainees could apply to up to 6 different RCP-coordinated specialties. Deanery clusters were formed for rheumatology (Rh) interviews; trainees could apply to up to 2 clusters. At the time of interview applicants ranked in order of preference all posts available within the cluster. To obtain feedback on potential factors influencing application for RST a questionnaire was sent to all 2012 round 1 RST applicants.

Methods: All RST applicants to round 1 recruitment in 2012 were sent a link to the web-based questionnaire by RCP once round 1 was complete. Applicants were asked about the number of specialties applied to, where Rh ranked in their preferences, whether known competitiveness for a specialty influenced their applications, in what circumstances they would accept a NTN or LAT post and further influences on their deanery preferences such as the ability to train in Rh alone or in General Internal Medicine (GIM) with Rh, the opportunity to undertake research, the reputation of the training programme, geographic location of the training programme and interview dates. Information on influences on career choice was also sought

Results: Replies were received from 44 of 109 (40%) round 1 applicants to RST in 2012. Candidates had applied to a mean of 2 specialties (median 1, range 1–6). 25% applied to 2 specialties, 20% to 3.

Rh was 1st choice specialty for 80% and 2nd choice for 16% of applicants. Most trainees wished to train in Rh alone; <25% stated a preference for GIM and Rh training. Those preferencing GIM and Rh training were less likely to accept an NTN in Rh alone, preferring to take up or keep LATs in GIM and Rh. Trainees preferencing training in Rh alone were more prepared to consider NTN posts that included GIM.

The top 4 factors influencing choice of deanery were: geography, programme reputation, opportunity to train in Rh alone and opportunity to undertake research. 83% reported previous experience in Rh—29% in LAT, 49% in core training (CT) and 14% in foundation training (FT) posts. 93% reported having received no careers advice through careers fairs etc. 86% stated that role models had influenced their career choice. Over half decided on RST during CT, 17% as a student and 24% during FT

Conclusions: Many potential factors influence trainee's career choices. This survey indicates that trainees have a preference for RST in Rh alone but such applicants are prepared to consider training that includes GIM. Most applicants to RST have Rh as their 1st or 2nd choice specialty and made that choice in CT posts. Geographical factors remain a major influence in choice of deanery for RST

Disclosures: The authors have declared no conflicts of interest.

146. THE USE OF ONLINE HEALTH INFORMATION BY ARTHRITIS PATIENTS: A SYSTEMATIC REVIEW

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Background: The objective was to review the current evidence for the use of online information and e-learning by patients with arthritis
Methods: A literature search was performed using the databases, AMED, BNI, CINAHL, MEDLINE and PsycINFO. The main search keywords were arthritis, e-learning, internet and education. Patient factors affecting the frequency of e-learning, current resources for e-learning and its benefits/pitfalls were analysed. A meta-analysis was performed on the percentage of arthritis patients that search the internet for health information.
Results: There is a large volume of on-line information available to patients with arthritis. Its quality is variable but some sites, such as internet based self management programmes, have produced encouraging results for patient education. 37% of patients used the internet to search for arthritis information (95% CI 27%, 47%). Higher internet use was associated with younger age, female gender, employment, marital status/ living with a partner, higher education, shorter disease duration or poorer health. There was increased internet use from 2006–2011 (49%; 95% CI 40%, 58%) compared with 2001–2005 (25%; 95% CI 10%, 39%).
Conclusions: Although there is evidence for some good online health resources for patients with arthritis, the proportion of patients that use e-learning remains low. There is a need for current research to study the use of e-learning in arthritis patient education and to further develop e-learning opportunities for patients to optimize this under-utilized resource.
Disclosures: The authors have declared no conflicts of interest.

147. THE INFORMATIONAL NEEDS OF PATIENTS WITH ANCA-VASCULITIS: A MULTINATIONAL STUDY

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Background: Modern therapy with intensive immunosuppression using cyclophosphamide, rituximab and glucocorticoids has transformed the prognosis of the ANCA-associated vasculitides (AAV) [granulomatosis with angiitis (Wegener's) (GPA), eosinophilic granulomatosis with polyangiitis (Churg Strauss) (EGPA) and microscopic polyangiitis (MPA)], such that they should be considered chronic diseases and thus need interventions in keeping with chronic disease management including patient education. We have previously shown that UK patients with AAV have high informational needs.

The aim of this study was to compare the informational needs of UK patients with those from North America and Europe.
Methods: A vasculitis informational needs questionnaire (VINQ) was developed. Patients were asked to rank the importance of information in 33 questions relating to 5 domains (disease symptoms, investigations, treatment, physical aspects, and psychological aspects) on a 5 point Likert scale (1 = not important to 5 = extremely important). This was distributed to the patient registrants (2740) of the Vasculitis Clinical Research Consortium (VCRC) via the internet VCRC Contact Registry. The VINQ was mailed to patient members (600) of Vasculitis UK (VUK).
Results: There were 273 [184 female; median age 58 (IQ range 49–64); GPA 193, MPA 21, EGPA 59; North America (86%)] respondents from the VCRC and 314 [116 female; median age 63 (IQ range 52–70); GPA 255, MPA 13, EGPA 46] from VUK. Disease duration was shorter in the VCRC group duration (< 1 year VCRC 16.4%. *vs* VUK 6.1%). Respondents ranked information on diagnosis, prognosis, test results, treatments and side effects of medication as extremely important. The most needed information was about investigative tests with a mean score of 4.5 (VUK) and 4.5 (VCRC). Lifestyle issues such as leisure activities scored 4.25 (VUK) and 4.33 (VCRC). Information on patient support groups and psychosocial care was viewed as less important with mean scores of 3.1 (VUK) and 3.0 (VCRC). Patients with the shortest disease duration (< 6 months) viewed information on psychosocial aspects as least important. There was no difference in the pattern of needs between VUK and VCRC respondents, gender, age, disease duration or disease subtype.
Conclusions: This study highlights the high informational needs of patients with AAV. Patient education programmes should be targeted to provide reliable information on the diagnosis, clinical treatment and outcomes and provided as quickly as possible. There do not appear to be any differences between North American and UK patients, suggesting that the needs reflect disease requirements more than cultural differences or the two methods of surveying the patients.
Disclosures: The authors have declared no conflicts of interest.

148. SPECIALTIES CHOSEN FOR FOUNDATION YEARS TRAINING BY MEDICAL STUDENTS ARE RELATED TO CAREER CHOICE: IS RHEUMATOLOGY WOMEN'S PREFERENCE AMONG MEDICAL STUDENTS?

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Background: In a survey taken place among medical students in the UK with regards to their views on rheumatology being part of the foundation years (FY) training, medical students were given the chance to put down their opinions in a free text format as open text responses in addition to structured questions [1]. From replies to open text responses medical students commented that rheumatology is considered rheumaholidays at the medical school, niche specialty and women's preference.

The aim is to identify whether rheumatology as a specialty for FY training is women's preferred choice.
Methods: Those medical students expressing an interest in rheumatology as a specialty of training at FY were analysed according to gender and career choice.
Results: The questionnaire was completed by 256 students from 11 of 31 medical schools existing in the UK in 2009. Table 1 shows the demographic characteristics of the total group and analysis according to gender, including whether they are undergraduates or entered medical school through the Graduate Entry Programme (GEP), year of attendance at medical school and the age group they belonged to as well as the preference for rheumatology as specialty for FY training according to gender. Open responses from 10/24 students chosen rheumatology for FY training showed 2 to want rheumatology as career choice (CC), 5 to help them with CC (2 aiming for orthopaedics, 3 for GP) and 3 to help them decide CC.
Conclusions: Similar percentages of boys and girls expressed interest in rheumatology as specialty for the FY training ($P = 1$; NS). Although a very small percentage of students aim for rheumatology as a career choice, students aiming for orthopaedics and general practice wish to have rheumatology training at FY. There is also a percentage of students who express the need for more exposure in order to decide.

TABLE 1. Students' demographic characteristics as a total group and according to gender

Characteristics	Total number of students ($n = 256$) Total number (%)	Males ($n = 78$; 30.3%)	Females ($n = 178$; 69.7%)
Undergraduates	229 (89.4)	70 (89.7)	158 (88.8)
GEPs	27 (10.6)	8 (10.2)	19 (10.6)
4th year students	87 (34.3)	33 (42.3)	54 (30.3)
5th year students	153 (59.8)	42 (53.8)	111 (62.3)
6th year students	16 (5.9)	3 (3.8)	13 (7.3)
Age 22–28	238 (92.9)	74 (94.8)	164 (91.6)
Age 29–35	14 (5.5)	3 (3.8)	11 (6.1)
Age 36–42	4 (1.6)	1 (1.2)	3 (1.7)
Rheumatology (total)	24 (9.4)	7 (9.0)	17 (9.6)

Data are *n* (%).

Disclosures: The authors have declared no conflicts of interest.

Reference

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149. VIRTUAL PATIENTS FOR RHEUMATOLOGY EDUCATION: PRELIMINARY RESULTS FROM A MULTI-CENTRE STUDY

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Background: Virtual patients (VPs) are web-based representations of realistic clinical cases used to teach clinical reasoning. A systematic literature review has highlighted the lack of evidence to support VP design typologies. Our objective was to research the effectiveness of different design features on undergraduate performance and evaluation of musculoskeletal (MSK) VPs.
Methods: This is an ethically approved randomized 2x2 factorial study, evaluating VPs for MSK education in three institutions. We chose two independent design variables informed from our earlier research. The independent variables are: (i) branching case structure, either present or absent and (ii) presence or absence of additional structured clinical reasoning instruction. Participants were volunteers from a year-group of medical students at three UK medical schools. We authored and piloted four 30-min long VPs in four core topics: large joint oligo-arthritis, inflammatory polyarthritis, connective tissue disease, low back pain. The 2x2 study design produces four versions of each VP case. Each case has an integrated 15-item assessment comprising 8 Key Feature Problems, 2 diagnosis MCQs, 1 Bayes reasoning MCQ, and 4 clinical decisions. Students completed each case, followed by an established self-reported VP evaluation. We randomized students to four groups, each group completing the cases in the same order, but with different designs. Primary outcomes were: (i) the in case assessment score; (ii) the self-reported evaluation. To detect a 5% difference in the primary outcomes measures, with a power of 0.8 and two-sided α of.05, we require 112 participants. Increasing recruitment above this increases the power to detect interactions between independent variables.
Results: To date, from 686 invited students, 543 (79%) consented to participate. Case completion rates were 508 (94%) for case 1, 431 (79%) for case 2, 405 (74%) for case 3, and 340 (63%) for case 4. The 1784 completed cases took a mean 29.3 min to complete, and 1080 (61%) of these had completed self-evaluations. One-way between groups ANOVA for the two independent variables across all completed cases showed no statistically significant differences in the 15-item assessment or self-reported evaluation score. Cases with additional structured clinical reasoning instruction scored significantly higher in Bayes reasoning ($P < .001$), and clinical decisions scores ($P < 0.05$). Pearson product moment correlation shows a positive correlation between VP scores with both (i) the end of year summative assessments from one institution (moderate effect size, $r = 0.433$, $n = 100$, $P < 0.01$) and (ii) the self reported VP evaluations (small effect size, $r = 0.18$, $P < 0.05$).
Conclusions: This multicentre study provides evidence to inform effective VP design. These preliminary data suggest that some design features improve clinical reasoning in MSK medicine, and that overall performance in these MSK VPs correlates with summative assessment scores.
Disclosures: The authors have declared no conflicts of interest.

150. CAN MEDICAL STUDENTS SUCCESSFULLY ENGAGE WITH THEIR PEERS TO ENCOURAGE INTEREST IN MUSCULOSKELETAL MEDICINE AND SURGERY? THE FIRST NATIONAL UNDERGRADUATE MUSCULOSKELETAL CONFERENCE

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Background: Established and run by medical students, the University of Glasgow Orthopaedics and Rheumatology Society (GORS) promotes knowledge and understanding of musculoskeletal medicine and surgery among students and provides opportunities for peer-assisted learning. In 2012, GORS sought to extend these opportunities beyond Glasgow by hosting a one-day national educational event with clinically relevant and topical lectures, practical skills workshops and an opportunity to present high-quality undergraduate research in musculoskeletal disease. Here the challenges and successes of the first National Undergraduate Musculoskeletal Conference (NUMC) are assessed and its future potential considered.
Methods: To ensure national participation and affordability, sponsorship was sought from the Scottish Society for Rheumatology, BSR, ARUK, and BOA. NUMC was advertised to all medical students and foundation year one doctors through individual medical schools, foundation schools and sponsors. Delegates evaluated each component using a 5-point Likert scale and provided free text comments
Results: Sponsorship allowed a basic registration fee of £10 or £15 including skills workshops. 97 delegates attended NUMC at the Royal College of Physicians and Surgeons of Glasgow. 75 delegates returned their questionnaire (77%). 36% were from the University of Glasgow, 24% from other Scottish medical schools, and 28% from English medical schools. 15 UK medical schools were represented. 76% of delegates were senior medical students and the main clinical interest of those attending was either rheumatology (16%), orthopaedics (48%) or both (20%). Each component of the event had a median rating of either 4 (very good) or 5 (excellent), with free-text comments suggesting that the practical skills workshops were the most well-received. 100% of delegates rated the overall event as good, very good or excellent. 93% stated they would attend again.
Conclusions: Delegate satisfaction and desire to re-attend NUMC suggests an appetite exists among students to foster a musculoskeletal career at an early stage in their education. With a newly established framework in this approach to engaging medical students, musculoskeletal education links with students at other universities should continue to be developed, and with the support of the professional societies another NUMC should be held.
Disclosures: The authors have declared no conflicts of interest.

151. IMPACT OF RA ON EMOTIONS, RELATIONSHIPS AND INTIMACY

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Background: The NRAS 2012 survey RA and the Impact on the Family highlighted that there was little or no support for people living with RA to help with issues on emotions, relationships and intimacy. 41% had difficulties in their close relationships as a direct result of RA and 67% said that their sex life had been negatively affected. However 32% felt that their partner's RA had brought them closer together. NRAS undertook as part of the conclusions and recommendations of this survey to research more imaginative ways to provide information and support on the topic of close relationships and is producing a booklet and online resource on RA and Relationships. A study in 2005 showed that while rheumatology nurses acknowledge the importance of including sexuality in the care management of patients with RA, in practice the impact of the condition on a patient's sexuality is only discussed briefly with nurses, identifying the need for further training in this complex arena. 83% of the nurse respondents had never received any training on this subject. A study in France in 2012 showed that while it is known that RA has a negative impact on patients' sexuality, there have been few attempts to quantify the problem. That study triggers the question how to include this topic into care.
Methods: Independent health journalist, Kate Wilkinson and psychotherapeutic counsellor, Sarah Collins were commissioned to work with NRAS on this project. Initially a focus group on the topic of emotions and RA was attended by 8 patients and one spouse. Being independently facilitated allowed people to speak openly and anonymously. Subsequently 2 teleconference focus groups with 16 people explored in more depth the issues around sex and intimacy. Thirdly, an online questionnaire was hosted on the NRAS website and promoted via NRAS social media sites. This survey gave people the opportunity to share their experiences of how RA has impacted on personal relationships. The survey evaluation will help shape the structure of the booklet and the NRAS online resource. Real life stories captured via qualitative interviews form the sections of this new NRAS resource to be launched at BSR 2013.
Results: A common issue identified at the 3 focus groups was that RA affects your sense of self-belief and self-esteem, and it's hard to feel sexy. All attendees felt being listened to matters even if nothing changes, being listened to is a relief, a connection, and you feel less lonely. Key messages were that the resource should make it clear that all feelings are OK; there is no magic recipe or standard way of dealing with RA; it is a personal and continual process of adjustment.
Conclusions: This NRAS booklet and online resource will be an interactive tool for individuals and their health care professionals to assist the discussion of sensitive and difficult topics. Containing real-life experiences will help the user relate to the issue and find tangible ways to address problems that may arise in their relationships.
Disclosures: The authors have declared no conflicts of interest.

152. THE VALUE OF SOCIAL MEDIA TO THOSE LIVING WITH RHEUMATOID ARTHRITIS

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Background: The National Rheumatoid Arthritis Society (NRAS) was established to offer education, information and support to people living with RA. Historically the helpline, publications and website were the primary sources of support and information but recently NRAS has introduced social media platforms including Facebook, Twitter, an online Members' forum, and the HealthUnlocked NRAS community site (HU). We have noticed a growth in use of these sites in the past year; HU for example has seen the number of monthly visits rise from 9,955 in November 2011 to 26,664 in October 2012; and our Facebook 'likes' have reached 5,664 since joining the platform in 2009. Therefore we are looking to measure the value of these sites to those with RA.
Methods: Research included a literature review, Google Analytics and existing data from a 2010 survey into use of the NRAS members' forum and from a 2012 survey conducted by HU across all of its communities. From these data, we developed an online survey (using Survey Monkey) to determine the value of the NRAS social media sites for people with RA. The survey comprised both multi-choice and free-text questions, was posted on all 4 NRAS social media platforms for 1 month and emailed to Members and supporters with RA.
Results: Analysis of survey data is currently being undertaken. However, findings from the HU survey demonstrate that connecting with others who have RA, and being able to ask questions about their condition are what people value most about the site. From the 2010 NRAS Members' survey into the benefits of membership, 46% felt that the NRAS Members' forum was of greatest benefit to them. These findings and the growth in use of these platforms indicate that people with RA are increasingly using social media sites relevant to their disease but findings from the current survey will give greater insight into what real value they provide.
Conclusions: The use of social media is growing continuously, with over 300,000 patients now visiting over 100 patient communities on HU and we could easily conclude it must be of value to these users, however, we feel this assumption must be tested. A recent HU user states, 'I have found so much support on this site, it is the one place I feel understood'. We can see from Google Analytics and previous survey findings that use of social media by those living with RA is increasing substantially. The findings from the survey will help determine how we develop our social media portfolio to ensure that we are providing all avenues of support for people with RA, especially those who do not have easy access to information and support offline. There is evidence that online sharing of health data by patient self-reporting may also have potential health benefits in self-management and education. One way in which we are developing these sites is by piloting a 'symptom tracker' and DAS28 tool on the HU NRAS community site which we hope will add further benefit to the current platform.
Disclosures: The authors have declared no conflicts of interest.

153. SURVEY OF JOINT INJECTION PRACTICE WITHIN WESSEX DEANERY

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Background: Corticosteroid injections are a common therapeutic tool in managing a variety of musculoskeletal conditions and have been used to treat inflammatory arthritis since the 1950s with studies demonstrating symptomatic and functional improvement in the short to medium term.
Methods: Traditionally training in joint injections has occurred through a number of informal mechanisms including the see one, do one, teach one maxim leading to variations in clinical practice.

As part of establishing formal injection skills training we surveyed current practice within the Wessex region to assess variations in training, technique, skill, consent and advice provided to patients.

All Wessex-based rheumatologists and allied health professionals known to provide joint injections were surveyed. Data were collated and analysed to assess trends associated with geography; seniority and the presence or absence of formal injection technique training. Qualitative data were collected regarding consent, the information provided to patients prior to undergoing joint injection and advice given post-injection.
Results: In total we received responses from 28/42 (66%) rheumatology doctors and specialist practitioners within Wessex region. 46% of responders were consultants; 40% trainees; and 14% specialist nurses/ physiotherapists (AHP). Of those surveyed 20/28 had never received formal training in injection techniques with no significant differences based on seniority or geographical location. Consultants tended to perform repeat injections into a given joint earlier and offered a greater number of individual injections during a consultation as compared with trainees or AHP. They were more likely to consent patients for some specific complications arising from joint injection (skin thinning and lightening; fat atrophy) than either trainees or AHP, and perceived a higher likelihood of benefit from their injections as compared with trainees and AHP (70%; 66%; 60% respectively). Consultants demonstrated the greatest breadth of injection techniques were more likely to perform ultrasound or X-ray guided injections and there were several procedures that trainees and AHP had no experience in providing e.g. chemical/ radiation synovectomy, some regional nerve blocks and temporo-mandibular joint injection. There was significant variation regarding advice provided to patients in respect to the use of anti-coagulation; the monitoring of blood glucose levels in diabetic patients; and fitness to drive after injections.
Conclusions: Joint injection remains a common procedure. Senior rheumatologists have the greatest breadth of injection techniques at their disposal and trainees are not acquiring the skills to perform less common injections during their training which may limit the services they can provide in the future. At present there is considerable variation in clinical practice. The development of formal training would help standardize practice and ensure key skills are not lost to future rheumatologists.
Disclosures: The authors have declared no conflicts of interest.

154. DEVELOPMENT OF A NURSE-LED ULTRASOUND-GUIDED JOINT INJECTION SERVICE AT CANNOCK

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Background: Rheumatology department at Cannock and Stafford caters for over 1 million populations with an average turn over of 270 new and follow-up out patient visits/week. Due to the demand, dedicated joint injection clinics were up and running for years though the waiting times exceeded 10 weeks in some instances. Also, some injections like hip and acromio-clavicular joints were performed in theatres under image guidance which had radiation exposure to patients and prolonged waiting time. There was a need to expand the capacity and an efficient way of delivering a better service.
Methods: The specialist rheumatology nurse who was performing blind injections was enrolled on an accredited ultrasound course to enable her to perform guided injections. She was also trained to do diagnostic scans of hands, wrists and feet with an idea of freeing up the consultant sonographer's time to perform more complex scans and injections. The training was under the consultant sonographer who has more than 10 years experience in musculoskeletal ultrasound at Cannock and Keele. The training was focused on all commonly

TABLE 1. Number of joint and soft tissue injections performed before and after the appointment of nurse injector

Injector	Competencies	Injections performed weekly before nurse injector	Number of injections performed after nurse injector
Staff grade	Unguided injections including caudal epidural	6	6
Registrar	Unguided injections including caudal epidural	6	6
Consultant sonographer	All injections excluding caudal epidural	8	8
Nurse injector	All injections excluding caudal epidural	14 (2 sessions)	42 (5 sessions)

performed joint, soft tissue and tendon sheath injections. It required 30 supervised injections of individual joints which were submitted with the required mentorship from the consultant sonographer. Competency for diagnostic scans was assessed by external assessors from Canterbury. The nurse injector was allocated 5 sessions/week for joint and soft tissue injections.
Results: Table 1 shows the increased number of injections performed by the Nurse injector after training. The present waiting time now is under 4 weeks. This training and a commitment to a full time post has enabled the department to almost double its joint injection capacity and to extend the diagnostic ultrasound service.
Conclusions: With appropriate training and mentoring, it is possible to introduce a nurse led Ultrasound guided Injection clinic. This has also freed up more capacity in the routine clinics, improved waiting times, avoiding unnecessary radiation exposure through theatrical procedures and better patient satisfaction.

On-going effective business case and future planning have enabled the department to purchase additional ultrasound equipment and support services to facilitate the expansion of the service. The demand for ultrasound in Rheumatology is increasing and trained nurse delivered services may prove to be a highly cost effective service for future.
Disclosures: The authors have declared no conflicts of interest.

155. DID THE 2012 OLYMPIC GAMES INSPIRE A GENERATION OF RHEUMATOLOGY PATIENTS TO EXERCISE?

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Background: Exercise is of paramount importance for rheumatology patients, but in practice few patients exercise effectively. The London 2012 Olympic and Paralympic Games were seen as a catalyst to increase mass participation in physical activity. We studied our patient group to find out if the Olympics inspired them to increase exercise.
Methods: Two weeks after the Olympics and Paralympics we invited all outpatients attending rheumatology clinics over a 3-week period to complete anonymous questionnaire comprised of 23 questions regarding activity levels, lifestyle, motivation, obstacles and attitudes to exercise.
Results: 87 questionnaires were completed. The mean patient age was 54.4 years (range 22–87); 44 were female. 12 (14%) were current smokers, 32 (37%) were ex-smokers and 53 (60%) never smoked. 13 (15%) spent <2 h per day (h/day) sitting down, 53 (61%) 2–5 h/day, 21 (24%) >5 h/day. 41 (47%) patients stated that they exercised daily, 24 (28%) weekly,14 (16%) less than weekly and 8 (9%) patients did not exercise. Types of exercise included walking (89%), swimming (26%) and cycling (15%). 60 (69%) claimed they had never been advised to exercise by a health professional. The most common barriers to exercise were pain (49%), tiredness (36%) and lack of motivation (24%). 83 (95%) patients thought exercise was beneficial. 29 (33%) thought that exercise could cause harm. Interviewees rated the importance of exercise on a 10 cm VAS at a mean value of 8.3 (S.D.1.7), whereas they rated their confidence to maintain an exercise programme at a mean value of 6.31 (S.D.2.68). 16 (18%) would take part in exercise classes if they were organized by the hospital. 7 (44%) of those would be prepared to pay for the classes. For 11 (13%) patients, the Olympics/Paralympics altered their attitudes towards exercising. 5 (6%) increased their amount of exercise having watched Olympics/Paralympics. This subgroup consisted of non-smokers only and their visual analogue scale valued the importance of regular exercise significantly higher ($P<0.05$) than the values of the rest of those surveyed.
Conclusions: Although the majority (95%) of patients regards exercise as beneficial, one third (33%) still think it does harm, less than half (47%) exercise daily, mostly just walking and one quarter are sedentary. Only a small minority (6%) of rheumatology patients increased their exercise in response to the London 2012 Olympic and Paralympic games.
Disclosures: The authors have declared no conflicts of interest.

156. FACTORS INFLUENCING A CAREER CHOICE IN RHEUMATOLOGY

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Background: Recruitment statistics have highlighted a problem with recruitment to Rheumatology at ST3 level. Exposure to a subject during training has been shown to be of great importance when choosing it as a career. The advent of Modernizing Medical Careers (MMC) with earlier specialization means that junior doctors now have less opportunity to experience multiple specialties. This could lead to a worsening of recruitment problems in rheumatology as exposure decreases further.
Methods: South Thames rheumatology SpRs and all core medical trainees (CMTs) in one London NHS Trust were invited via email to attend focus groups. Participation was voluntary. Pre-set, open-ended questions were directed to the groups to stimulate the discussion and ensure coverage of objectives. The sessions were audio-taped with consent. The audio recordings were transcribed, coded and then categorized using an iterative process, before undertaking inductive thematic analysis.
Results: Four focus groups were held: two with a total of 22 SpRs and two with a total of 3 CMTs.

Factors influencing career choice could be divided into four themes: previous experiences (including BSc, inspirational mentors, interesting patients and good teaching), subject matter (particularly intellectual stimulation), lifestyle factors (including opportunities for flexible training, working hours, 'fit with personality' and financial security) and environment and recruitment factors (including preferences for clinic-based work, timing of interviews and competition rates). Three main themes emerged to explain difficulties with recruitment to rheumatology: lack of exposure, subject matter and poor teaching/training (including having to work as a medical registrar). Methods suggested to increase recruitment centred around three main themes: increased exposure, improved teaching and raising the profile. One of the most striking outcomes of this study was the similarity in themes extracted from both the CMTs and the SpRs.
Conclusions: The majority of rheumatology SpRs and the CMT applying for rheumatology all mentioned the value of their undergraduate rheumatology attachments and teaching. Undergraduate exposure may, therefore, represent a valuable opportunity to influence the careers of our future doctors. Rheumatologists need to be visible within the hospital setting and actively involved in delivering relevant, interactive, learner-centred teaching. In conclusion, the findings of this study support published literature regarding the importance of role models, clinical experience and teaching when it comes to career choices in medicine. These factors are all modifiable to enhance recruitment. Other factors such as subject matter, job structure and lifestyle factors are less easily modifiable. When it comes to rheumatology as a specialty—we are fortunate to have many positive features within these categories which can be highlighted to juniors to increase interest in this career.
Disclosures: The author has declared no conflicts of interest.

157. OPTIMIZING UNDERGRADUATE STUDENT–PATIENT INTERACTION IN A DISTRICT GENERAL HOSPITAL

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Background: It can be challenging to ensure medical students have adequate exposure to core clinical conditions on their clinical placements. Due to a number of factors, including fewer inpatients, the pressures of service delivery and increased student numbers, creating time and space for direct student-patient contact is becoming increasingly difficult. Overall student feedback on musculoskeletal placements in the Princess of Wales Hospital, Bridgend, has been positive, however, in keeping with other centres described in the literature, it has highlighted that students would like more opportunities for patient interaction, particularly history taking and examination. To help address this, specialty trainee-led teaching clinics have been created.
Methods: The appointment of two 60% flexible trainees to a full time post provided staffing for extra teaching clinics. The clinics consist of a weekly unselected outpatient clinic of new and follow up patients, and an alternate week selected patient clinic in the education centre. Patients with appropriate clinical signs are selected for the second clinic from electronic records. To enhance exposure to acute conditions, patient that contact the rheumatology helpline with, for example, an acute monoarthritis or flare of polyarticular disease, are also invited. An evaluation has been undertaken of 3 consecutive groups of students in the form of feedback questionnaires.
Results: 15 students have attended the clinics and provided feedback. Outpatient clinics provided opportunities for every student to take a history from 2 or more patients and the majority of students examined 3 or more patients in the education centre clinic. Overall

feedback has been positive. All students agreed or strongly agreed that the sessions allowed them to communicate directly with patients, actively participate and that they received constructive feedback. All bar 1 felt the clinics increased the range of rheumatology conditions they have seen. Most students had opportunity to discuss learning needs and self-directed learning.
Conclusions: Dedicated teaching clinics with longer appointment times have provided students with numerous opportunities for direct patient interaction. Students have learned through task based learning, for example, interviewing a patient, and are encouraged to solve problems, for example, managing an acute flare of RA. Selecting cases can enable a more focused teaching session and help reduce the inequalities of clinical exposure. Inviting different patients to each clinic helps with service delivery and, with appropriate consent, we have increased the number of patients enrolled onto the education centre patient database. Overall, setting up specialty trainee-led teaching clinics seems to have enhanced the medical student experience and achieved a balance between the pressures of teaching and service delivery.
Disclosures: The authors have declared no conflicts of interest.

OSTEOPOROSIS AND METABOLIC BONE DISEASE

158. HIP FRACTURE INCIDENCE OVER 7 YEARS IN A POPULATION SERVED BY A FRACTURE LIAISON SERVICE: COMPARISON WITH AN FLS-'LITE' HEALTHCARE AREA

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Background: Fracture Liaison Services (FLSs) aim to identify patients with (signal) fragility fracture and screen patients for osteoporosis, associated conditions and instigate 'secondary' fracture prevention management. The success of an FLS is substantially and importantly demonstrated by its effect on reducing secondary fractures. Few, if any, analyses have shown FLSs to clearly demonstrate a direct and specific effect on fracture prevention.
Methods: An FLS was implemented at the Ipswich Hospital in 2004 and since then patients age >50y with fracture have been assessed and treated accordingly for osteoporosis aiming to reduce the risk of 'secondary' fragility fracture (e.g. hip fracture). Expected hip fracture incidence 2003–11 was estimated by applying age-sex specific hip fracture rates, derived from UK Hospital Episode Statistics (HES), to the demographic profile of the local population. Rate ratios were calculated based on observed fracture incidence (Hip fracture codes: S72.0–3). SDs and CIs for the rate ratios were estimated using the Poisson function. Osteoporosis drug prescribing statistics (2006–11) were obtained from The UK NHS Business Service Authority. Results were compared with data from Norwich, an area where a structured FLS has not been in place over the same period.
Results: The incidence of hip fracture was similar to expected (rate ratio 1) for Ipswich but was significantly greater for Norwich (rate ratio 1.3—1.4). Hip fracture rate ratio (Ipswich or Norwich *vs* England) was stable 2003–11 with no trend over time clearly detected. From 2006–2010, there was an increase in osteoporosis drug prescribing in the Ipswich FLS-associated Healthcare area by 50% (20,000—30,000 prescriptions) and from 2008–11 in Norfolk by 25% (32,000—40,000). In neither area was there a structured, comprehensive nor commissioned community falls service.
Conclusions: The apparent hip fracture incidence in Ipswich over the period we have been running an FLS is broadly similar to expected hip fracture incidence estimated from National demographic statistics. The apparent hip fracture incidence for Norwich, by comparison, is significantly higher than the incidence in Ipswich and what would be expected. The degree of assumptions made, and uncertainties generated, by the process of deriving local HES and National data, degraded the investigators' confidence in the reliability of data systems though with the caveat that the relative change in hip fracture incidence rate ratio over time might, through systematic process, be the most relevant output. Our experience may inform further DoH and HQIP backed efforts to 'clean' and specify relevant data acquisition to allow appropriate analyses of FLSs in the context of a wider Healthcare initiatives aimed at reducing fragility fracture.
Disclosures: G.C., Amgen, Roche—Small Honoraria for Participation in Educational Events 2010–11, Novartis—Grant Award 2007–10 for Investigator-Led Research. All other authors have declared no conflicts of interest.

159. CHILDHOOD BONE SIZE, MINERALIZATION AND DENSITY ARE ASSOCIATED WITH METHYLATION STATUS OF THE *CDKN2A* PROMOTER AT BIRTH

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Background: We have previously demonstrated that relationships between early development and later bone health might be mediated through epigenetic mechanisms. *CDKN2A* is a tumour suppressor gene, with roles in development and healthy ageing. We used a population based mother-offspring cohort to explore relationships between methylation status of the *CDKN2A* gene locus in umbilical cords at birth, and bone size and density measured by DXA in childhood.
Methods: To identify potentially informative genomic regions, we undertook a MeDIP-CHIPmethylation array (Agilent), comprising a genome-wide panel of ~500 000 probes, in 19 human umbilical cords. Following processing to account for CpG density via a Bayesian algorithm (BATMAN), differential analysis located a differentially methylated region within the *CDKN2A* gene locus with strong correlations between methylation status and childhood bone size and density assessed by DXA (Hologic Discovery); we used pyrosequencing to carry out in-depth analysis of the methylation status of 9 CpGs within this region of *CDKN2A* in umbilical cords of 292 children assessed by DXA (Hologic Discovery) at 4 and 6 years old from the Southampton Women's Survey, with appropriate institutional ethics committee approval and participants' informed consent.
Results: Percentage methylation varied greatly. After taking account of age and sex, there were negative associations between *CDKN2A* methylation at 5 of 9 CpG sites and bone indices in childhood (all $P < 0.05$). At one of these sites, consistently strong negative associations between percentage methylation and offspring whole body bone area, mineral content and areal density at both 4 and 6 years were observed. Thus for each 1 percentage point increase in CpG methylation, BMC decreased by 1.0 g at age 4 years and 1.8 g at age 6 years ($P = 0.005$ and 0.008 respectively). Adjustment for percentage methylation at RXRA promoter sites, maternal parity, and maternal smoking, triceps skinfolds and physical activity in late pregnancy (all previously associated with offspring bone mass) did not alter these relationships.
Conclusions: We have demonstrated that perinatal methylation status of CpG dinucleotides within the *CDKN2A* gene locus is negatively associated with bone size, mineral content and areal density in childhood. These findings, if replicated in other cohorts, might suggest a specific role for CDKN2A in skeletal development and the potential for its use as a novel biomarker for later osteoporosis risk.
This work was supported by the EpiGen Consortium.
Disclosures: The authors have declared no conflicts of interest.

160. A BRISTOL-BASED POSTAL SURVEY INVESTIGATING THE GUIDANCE USED AND ADVICE GIVEN TO THEIR PATIENTS BY GENERAL DENTAL PRACTITIONERS REGARDING BISPHOSPHONATE-INDUCED OSTEONECROSIS OF THE JAW

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Background: Bisphosphonate induced osteonecrosis of the jaw (BIONJ) is a rare but serious potential side effect of bisphosphonate treatment. BIONJ may occur spontaneously, though it is more

common following invasive dental procedures such as extraction and in those exposed to high doses of bisphosphonate, corticosteroids or alcohol. Recently, patients (with no specific risks for BIONJ) attending our rheumatology outpatient department reported being told they could no longer be cared for by a general dental practitioner (GDP), but would require specialist dental care should they opt to start an oral bisphosphonate. We needed to understand more about local GDP views about, and experience with, BIONJ.
Methods: We designed a short answer questionnaire, with space for free comments and posted one to each dentist listed as practising in Bristol City. We included a stamped addressed envelope for returns and offered to inform the respondent of the results if they provided their name and contact details. A reminder letter was sent 10 days after the first to all practitioners who had yet to respond.
Results: 14/196 questionnaires were returned as the dentist no longer practiced at the address listed. 60/182 (32.9%) GDPs responded. Each GDP treated an average of 345 patients each month (range 10 to 800) and advised 24 patients each year about bisphosphonate therapy. 11/60 (18.3%) of GDP's had had direct experience of BIONJ within the last 12 months, and a further 6/60 (10%) indirect. Dentists cited the following sources of information regarding BIONJ in descending order of frequency: Specialist colleagues (14), BDJ/other journals (11), Internet/Google (8), BNF (5) and other sources (14). 15/60 (25%) GDPs stated they would wish to perform dental checks, and any necessary work, on all patients recommended bisphosphonates. Free comments included: 'Nobody I have spoken to is clear on which guidelines to use', 'Difficult as no 'go to' source for us, 'Would be good to have guidelines e.g. from NICE' and 'Letters to GDP's and pamphlets to distribute to patients would help'. 27 dentists supplied contact details and expressed interest in meeting to discuss BIONJ
Conclusions: The respondents to our survey have highlighted disparity among Bristol GDPs in the information they use to advise patients on the use of bisphosphonates in relation to BIONJ and a clear perceived need to agree a standardized protocol for advising and managing this group of patients. Our findings seem to show a disparity in the advice given by dentists regarding BIONJ and the source of guidance they use. Guidelines produced with the input of medical and dental professionals regarding what advice to give patients, that could be distributed around the Bristol area, could help to alleviate this problem.
Disclosures: The authors have declared no conflicts of interest.

161. BISPHOSPHONATE-INDUCED ATYPICAL FEMORAL FRACTURES: ARE WE AWARE?

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Background: Atypical femoral fractures are strongly associated with long term bisphosphonate usage, with a relative risk of 47 in some published studies. Although there has been increasing literature on this subject, there have been no published studies so far, looking at awareness of this condition among radiologists, particularly, diagnosing it based on plain radiographic features. We sought to investigate this in our study.
Methods: 32 radiologists were asked to review and provide radiological diagnosis on two anonymized radiographs from different patients demonstrating complications related to bisphosphonate therapy. They have been provided with details of clinical indication for the studies but history of bisphosphonate usage was initially withheld. After the radiologists made their provisional diagnosis, additional information of bisphosphonate usage was provided, and they were asked whether that changes their diagnosis.
Results: Of 32 radiologists, 17 were consultants and 15 specialist registrars (ST3 to ST6). 3 of the 17 consultant radiologists and 3 of the 15 specialist registrars have special interest in musculoskeletal radiology. 10 of the 14 Non-MSK radiologists identified the abnormality on the 1st radiograph, but none made correct interpretation on initial attempt. With additional information of bisphosphonate usage, 21% ($n = 3$) made the correct diagnosis. All the MSK radiologists observed the abnormality, 2 made correct diagnosis on initial attempt, one made correct diagnosis with additional information. Two of the 3 SpRs with MSK interest identified the abnormality but one of them made correct interpretation and diagnosis. 9 of the 12 Non-MSK SPRs identified abnormality but none made correct diagnosis on initial attempt. Additional information helped to make correct diagnosis by one (7%), who thought the abnormality thought to be not significant. With regard to second radiograph, only 2 of the 14 Non-MSK consultants made relevant key observation in addition to the obvious abnormality but none made correct diagnosis on initial attempt, additional information helped to make correct diagnosis by 21% ($n = 3$). All the three MSK consultants made correct diagnosis on initial attempt. Only 2 of the total 15 SpRs made key observation, of which the MSK SpR made correct diagnosis with additional information. One Non-MSK registrar made correct diagnosis with additional information but didn't make key observations.
Conclusions: Non-MSK radiologists are generally not quite aware of bisphosphonate induced atypical femoral fractures compared with MSK radiologists, in our study only 21% made correct diagnosis with avail of history of bisphosphonate usage. Our study emphasizes the need to educate all the general radiologists on this important condition to facilitate prompt, appropriate treatment and prevent unnecessary investigations carrying radiation burden and financial implications.
Disclosures: The authors have declared no conflicts of interest.

162. RELATIONSHIPS BETWEEN BIRTHWEIGHT AND BONE MICROARCHITECTURE IN LATE ADULTHOOD: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY

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Background: Evidence is accruing that environmental factors in early life have a critical influence on the magnitude of peak bone mass achieved, and on later risk of fracture. However, to date, no studies have investigated the relationship between birthweight and bone microarchitecture in human populations. The advent of high resolution peripheral quantitative CT (HRpQCT) scanners now permits the non-invasive assessment of cortical and trabecular structure; we utilized this technology to investigate the relationship between birthweight and bone microarchitecture in older age in the Hertfordshire Cohort Study.
Methods: 112 men and 86 women from the Hertfordshire Cohort Study born between 1931 and 1939 were studied. Birthweight was obtained from birth records. Ages at the time of scanning ranged from 72.1 to 80.9 years. HRpQCT images (voxel size 82μm^3) of the non-dominant distal radius and tibia were acquired with an Xtreme CT scanner (Scanco Medical). Standard morphological analysis was performed for assessment of macrostructure, densitometry, cortical porosity and trabecular microarchitecture. Anthropometric measurements were taken and information on demographics, lifestyle, and comorbidities were obtained from study questionnaires.
Results: The mean (SD) age of participants was 76.0 (2.6) and 75.9 (2.6) years in men and women respectively. Relationships between birthweight varied by site and gender, such that relationships were stronger in women than men, and greater at the tibia compared with the radius. Hence in women, a higher birthweight was associated with a greater tibial total and trabecular bone area ($P < 0.001$), but a lower tibial cortical area, thickness and density ($P < 0.005$). These associations were robust for adjustment for adult height, weight, calcium intake, physical activity, alcohol, smoking, and social status.
Conclusions: We have observed relationships between early life and tibial microarchitecture in women but not men in their eight decade. Further work in larger groups is now indicated to reproduce these findings, and to relate their significance to fracture incidence.
Disclosures: The authors have declared no conflicts of interest.

163. PREDICTING ADHERENCE TO BISPHOSPHONATES IN A POPULATION-BASED COHORT OF OLDER WOMEN

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Background: It is estimated that between one-third and one-half of patients do not take their bisphosphonates as directed. This is a concern because poor adherence with bisphosphonates has been associated with an increased risk of fracture in comparison with optimal adherence. Interventions aimed at improving non-adherence to bisphosphonates are becoming increasingly common. However, as many older women take bisphosphonates, it will be more cost-effective to target interventions aimed at improving non-adherence, rather than using blanket approaches. Therefore we wished to use a primary care-based cohort of older women to identify predictors of non-adherence to bisphosphonates.
Methods: This study was based on the Cohort for Skeletal Health in Bristol and Avon (COSHIBA), consisting of 3200 women aged 65–80 years. Those identified as being on bisphosphonates at baseline were

asked every 6 months for 2 years if they were still taking them, sometimes missed them, or had stopped taking them. Participants were then categorized into complete adherence, intermittent adherence or having stopped the bisphosphonate completely. To validate this self-reported measure, fracture rates across the categories of adherence were compared. Data were also collected at baseline on socioeconomic status, traditional risk factors for osteoporosis, mobility, other medication usage, physical activity and diet. Associations between these baseline variables and categories of non-adherence at 2 years were examined by Chi-squared. Logistic regression was used to identify independent predictors of non-adherence.

Results: Of the 3200 participants, 233 (7.3%) self-reported being on a bisphosphonate at enrolment. By 2 years, 68 (29.2%) self reported complete adherence, 149 (64.0%) self-reported intermittent adherence, and 16 (6.9%) self-reported stopping the bisphosphonate during this time period. Those with complete adherence had a reduced fracture rate over 2 years compared with those with intermittent or no adherence (3.0% *vs* 11.9%, $P = 0.041$), and this association still held after adjustment for confounders. Those with intermittent adherence were older (74.9 *vs* 73.6, $P = 0.037$), were more likely to be prescribed sleeping tablets (12.1% *vs* 2.9%, $P = 0.031$), and less likely to be prescribed concomitant calcium/vitamin D supplements or previous HRT, compared with women with complete adherence. There was a trend for those who did more physical activity and had a high dietary calcium intake to be less likely to be non-adherent, although this did not reach statistical significance. Logistic regression showed that only age and use of current sleeping were independent predictors of non-adherence. Non-adherence was unaffected by socio-economic status or knowledge about osteoporosis.

Conclusions: Predictors of non-adherence in women taking bisphosphonates were older age and concomitant prescription of sleeping tablets. This information could be used to target interventions aimed at improving adherence.

Disclosures: The authors have declared no conflicts of interest.

164. PLACENTAL MORPHOMETRY PREDICTS BONE SIZE AND DENSITY IN 9-YEAR-OLD BRITISH CHILDREN

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Background: We have previously shown that placental volume is associated with offspring bone size at birth. It is not known whether such associations persist into later childhood and whether there might be differential placental determinants of bone size and density. We examined associations between placental morphology and childhood bone size and density in a population-based mother-offspring cohort.

Methods: The Avon Longitudinal Study of Parents and Children (ALSPAC) recruited women from the former region of Avon, UK. From April to December 1991, 12,942 babies were born at term and their placentas were preserved in formaldehyde. At age 9 years, 7470 of the children underwent a DXA scan to assess whole body minus head bone area (BA), bone mineral content (BMC), areal bone mineral density (aBMD) and size-corrected BMC (BMC adjusted for BA, height and weight). In 2010 a sample of 1,680 placentas were measured and photographed. Placental length, width, thickness, volume, weight and the number of cotyledons were recorded.

Results: Placental volume predicted BA ($B = 0.14$, $P = <0.001$), BMC ($B = 0.12$, $P = 0.0001$) and aBMD ($B = 0.08$, $P = 0.02$) after adjusting for child age and sex. The number of cotyledons per volume predicted size-corrected BMC ($B = 0.09$, $P = 0.01$) after adjusting for age and sex.

Conclusions: These results demonstrate that the previously observed positive relationships between placental volume and offspring neonatal bone size persist into later childhood. Additionally, the positive relationship between the number of cotyldons per volume and size-corrected BMC suggest a possible differential effect of placental size and architecture on childhood bone size and density; placental volume is more closely related to bone size, whereas the cotyledon: volume ratio is more closely related to volumetric bone density independent of size. We hypothesize that a greater number of cotyledons per volume may produce a more efficient placenta, enabling greater transfer of nutrients from mother to child, and thus a positive impact on offspring mineralization within the overall skeletal envelope

Disclosures: The authors have declared no conflicts of interest.

165. DOES DENOSUMAB INCREASE INFECTION RATES IN RHEUMATOID ARTHRITIS PATIENTS ON BIOLOGICS?

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Background: Osteoporosis is common in patients with severe RA needing biologic therapy. Denosumab or zolendronate are the second line options for osteoporosis in these patients if they are intolerant to oral bisphosphonates. An increased risk of infection is well recognized in RA patients on biologics. A small increase in infection rate was seen in patients on denosumab compared with control in the large clinical trial in postmenopausal osteoporosis but not in a trial in RA. However, there is a theoretical increased risk of infection posed by the use of dual biologic therapy due to their effects on the immune system, although currently there is a lack of clinical data to confirm or refute this. We aimed to assess whether RA patients with co-existent osteoporosis are at an increased infection risk when denosumab (a fully humanized RANK ligand inhibitor) is added to background biologic therapy (e.g. tumour necrosis factor alpha blockers, rituximab).

Methods: 756 patients currently receive biologic therapy for RA and the 350 patients receive denosumab for the management of osteoporosis in our department. We identified 13 RA patients from our databases as having received denosumab on the background of biologic therapy. A retrospective case-note analysis was performed. Data collected included basic demographics (age, sex), RA characteristics (antibody status), comorbidities (underlying lung disease, diabetes etc), full drug history (start dates of current and previous biologic and disease modifying anti-rheumatic therapy), date of initiation of denosumab and details of all admissions for infections. In addition, all patients were contacted directly and further details regarding infectious episodes requiring antibiotics (but not admission) were collected.

Results: RA patients with osteoporosis had a mean age of 69 years and 77% were female. Denosumab was prescribed on the background of a range of biologic therapies. The average duration of combination therapy of biologic and denosumab was 15 months, with an average of 2 denosumab injections. 5 (38%) patients reported infections during the period of dual therapy, with an average infection rate of 2.8 infections/year. However, only 2 patients had a higher frequency of infections leading to discontinuation of their biologic therapy. 3 patients had pre-existing comorbidities like bronchiectasis predisposing them to infection. In total, 3 patients were hospitalized for infections during the period of dual therapy, but all patients felt this was not increased from baseline biologic therapy.

Conclusions: Combination of biologic therapies for co-existent RA and osteoporosis may result in increased infection rates particularly amongst those with predisposing comorbidities like bronchiectasis. Intravenous zolendronate may be more appropriate second-line choice for the management of osteoporosis in RA patients already on biologic therapy and at a high risk of infection.

Disclosures: The authors have declared no conflicts of interest.

ADOLESCENT AND YOUNG ADULT RHEUMATOLOGY

166. BASELINE COMORBIDITIES IN PATIENTS WITH JIA STARTING ETANERCEPT OR METHOTREXATE: RESULTS FROM THE BSPAR ETANERCEPT REGISTER

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Background: Understanding the short and long-term safety of etanercept (ETN) use in children with JIA is of paramount importance to patients, families and the rheumatology community. However, when interpreting adverse events, it is important to consider the burden of comorbidity among children starting new therapies for JIA, which may

increase the risk of certain adverse events. Therefore, the aim of this analysis was to describe and quantify the baseline medical and health conditions among children newly starting either etanercept or MTX for JIA.

Methods: The national BSPAR ETN register was established in 2004 to monitor the safety and effectiveness of ETN in children with JIA. A comparison cohort of children with JIA who are biologic naive starting MTX were also recruited. To 31/12/2011, 865 patients with JIA were enrolled (ETN: 668, MTX: 197). Rheumatology centres were asked to provide a list of all co-existing medical conditions and whether they were active at the time of drug start. These comorbidities were medDRA coded and grouped into one of 16 categories. Comparisons between the cohorts were made using non-parametric descriptive statistics.

Results: ETN patients were older with a mean age of 12 years compared with 8 years in the MTX cohort. They also had longer median disease duration (ETN: 4 years, MTX: 1 year). Within both cohorts, 44% patients had at least one comorbidity (ETN: 46%, MTX: 37%), with a higher proportion of children starting ETN having multiple comorbidities (ETN: 22%, MTX: 11%). The most frequent comorbidities presented were atopic conditions, chronic anterior uveitis and congenital conditions. There were some differences in comorbidities between the groups, for example ETN treated patients were more likely to have low bone density (ETN: 6%, MTX: 0%) and growth/developmental abnormalities (ETN: 9%, MTX: 3%), which may be explained by the longer disease duration in this cohort. ETN patients were also more likely to have eye (ETN: 8%, MTX: 4%) and renal/urinary conditions (ETN: 7%, MTX: 4%) at the start of therapy.

Conclusions: Comorbidity is common among children with severe JIA, with a similar distribution between treatment groups. ETN treated patients had more comorbidities overall and so should be considered when interpreting long term outcomes amongst these patients.

Disclosures: The authors have declared no conflicts of interest.

167. SAFETY AND EFFICACY OF ADALIMUMAB IN CHILDREN WITH ACTIVE POLYARTICULAR JUVENILE IDIOPATHIC ARTHRITIS AGED 2 TO <4 YEARS OR ≥4 YEARS WEIGHING <15 KG

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Background: Adalimumab (ADA) is approved for moderate to severe JIA in patients ≥4 years in the US, EU, and Japan. Limited data are available in younger patients and those weighing <15 kg. The primary objective was to assess safety in such patients; secondary objectives were pharmacokinetics (PK) and clinical effectiveness.

Methods: This is an interim analysis of an open-label study in patients 2 to <4 years or ≥4 years weighing <15 kg with moderately to severely active polyarticular JIA. ADA was given subcutaneously every other week, 24 mg/m^2 BSA up to 20 mg/dose, for at least 24 weeks and continued until patients reached 4 years and weighed 15 kg. Concomitant MTX was allowed. Adverse events (AE) are being collected through 96 weeks. Serum trough concentrations of ADA were determined. Key effectiveness endpoints were PedACR30/50/70/90, tender joint count, swollen joint count, Pain on Passive Motion, Limitation on Passive Motion, Active Joint Count, Child Health Assessment Questionnaire, and Physician's/Parent's Global Assessment of Disease (PhGA/ PaGA).

Results: Of 32 enrolled patients, 88% were female; 31 completed 24 weeks. At baseline, mean age = 3 years, weight = 13 kg, duration of JIA = 12 months, and 39% had elevated CRP (≥0.9 mg/dl). AE incidence rates included: any AEs (84%, 27/32), serious AEs (16%, 5/32), infectious AEs (69%, 22/32), and serious infections (9%, 3/32). No deaths, malignancies, opportunistic infections/TB, congestive heart failure, demyelinating disease, allergic reactions, lupus-like syndrome, or blood dyscrasias were reported. The mean serum ADA trough concentrations achieved a steady-state of 7–8 μg/ml at weeks 12 and 24 ($n = 15$). Clinical improvements by PedACR response and other JIA outcomes were seen at week 24 of ADA treatment (Table 1).

Conclusions: The safety profile, PK, and effectiveness of ADA were similar to that seen in older pediatric patients with JIA, demonstrating that ADA is also safe and effective in younger patients 2 to <4 years or ≥4 years weighing <15 kg with active polyarticular JIA.

TABLE 1. Clinical outcomes at week 24

	Response rate, *n* (%); $n = 30$[a]	Response rate, *n* (%); $n = 32$[b]
PedACR30	27 (90)	27 (84)
PedACR50	25 (83)	25 (78)
PedACR70	22 (73)	22 (69)
PedACR90	11 (37)	11 (34)
Mean (S.D.) change from baseline		
Tender joint count (TJC75)	–3.0 (5.5)	
Swollen joint count (SJC66)	–6.3 (5.8)	
Pain on passive motion (POM75)	–3.9 (7.3)	
Limitation on passive motion (LOM69)	–5.6 (5.6)	
Active joint count (AJC73)	–7.0 (5.7)	
Child Health Assessment Questionnaire (DICHAQ)	–0.5 (0.7)	
PhGA of disease activity (VAS 0–100 mm)	–45.3 (21.3)	
PaGA of disease activity (VAS 0–100 mm)	–32.2 (29.7)	
PaGA of pain (VAS 0–100 mm)	–29.5 (28.3)	
CRP (mg/dl)[c]	–0.2 (3.2)	

[a]Observed data; [b]Non-responder imputation; [c]$n = 28$.

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168. USE OF NON-ETANERCEPT BIOLOGICS IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS: RESULTS FROM THE BIOLOGICS FOR CHILDREN WITH RHEUMATIC DISEASES STUDY

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Background: The introduction of biologic therapies has revolutionized JIA management. Previously, etanercept (ETN) was the only choice of licensed therapy in the UK for children with JIA aged ≥ 2 years. However, recent additions include abatacept (ABA) in 2009 (≥ 6 years), adalimumab (ADA) in 2011 (≥ 4 years; previously ≥ 13 years), and tocilizumab (TCZ) in 2011 (≥ 2 years, systemic arthritis). The objective of this analysis was to describe non-ETN biologic pattern of use in children with JIA.

Methods: The Biologics for Children with Rheumatic Diseases (BCRD) study is an ongoing prospective observational cohort study which has been collecting detailed information on children <18 years newly starting a non-ETN biologic therapy for JIA since 2010. Detailed demographic and disease information, including past biologic therapies, are collected at baseline. Using non-parametric descriptive statistics the use of non-ETN therapy as a first-line or subsequent biologic therapy was compared.

Results: To 19/11/2012, 169 children across the UK were recruited: median age 10 years, 65% female. The most common ILAR subtypes were systemic arthritis (31%) and rheumatoid factor (RF) negative polyarthritis (25%). Seventy-nine patients (47%) were starting a non-ETN biologic as first-line biologic therapy (see Table 1). Of these, 51 (65%) were prescribed off-licence largely accounted for by infliximab (39%), anakinra (ANA) (24%), and ADA (24%). First-line biologic users were a younger cohort compared with subsequent biologic users ($P = 0.0006$). All patients on ANA had systemic arthritis, whereas only 76% of TCZ patients used it for this ILAR subtype. Of those registered starting a 2nd-line biologic, 76% had received prior ETN. The majority of all patients receiving previous biologic treatment had received 1 prior biologic (70%) although 21 children had received 2 prior biologics, 4 children had received 3 and 2 children had received 5 previous biologics. Subsequent biologic users had a higher limited joint count ($P = 0.0045$).

Conclusions: In the UK, many children are now receiving non-ETN biologics, although over half of these are being prescribed off-licence. Continual follow-up in children with JIA will help to address questions of, the best choice of biologic therapy, both as first-line and

subsequent use, as well as determine the safety of these drugs in children, for which limited clinical experience exists.

Table 1. Biologic use

Drug, n (%)	First biologic ($n=79$)	Subsequent biologic ($n=90$)	Total ($n=169$)
Adalimumab	28 (35)	28 (31)	56 (33)
Tocilizumab	18 (23)	24 (27)	42 (25)
Infliximab	20 (25)	21 (23)	41 (24)
Anakinra	12 (15)	1 (1)	13 (8)
Abatacept	1 (1)	9 (10)	10 (6)
Rituximab	0	6 (7)	6 (4)
Canakinumab	0	1 (1)	1 (1)

Disclosures: The authors have declared no conflicts of interest.

169. FAMILY HISTORY OF AUTOIMMUNITY IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS: PREVALENCE AND INFLUENCE ON DISEASE PRESENTATION: RESULTS FROM THE UK CHILDHOOD ARTHRITIS PROSPECTIVE STUDY

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Background: It is widely accepted that autoimmune diseases (AID) tend to cluster in both families and individuals. There has been limited previous work to date examining the prevalence of AID in families of children with JIA. The purpose of this analysis is to (i) determine the prevalence of AID in first degree relatives of children with JIA and (ii) study the influence of a family history of AID on presentation of JIA.
Methods: This analysis included 863 children with JIA enrolled in the Childhood Arthritis Prospective Study (CAPS), an ongoing prospective inception cohort of children <16 years with inflammatory arthritis. Demographics, disease features, joint count, childhood health assessment questionnaire (CHAQ), physician's global assessment (PGA), parent's general evaluation of well-being (PGE), and ESR were collected at first presentation to paediatric rheumatology and annually thereafter. International League Against Rheumatism (ILAR) category was defined at one-year. All families were interviewed and self-reported family medical history was recorded. Differences in presentation between those children with and without a family history of AID were compared using non-parametric statistics.
Results: The median age at presentation was 7.2 years and 65% were female. 31% of children had a family history of AID: psoriasis (13.3%), thyroid disease (8.8%), inflammatory arthritis (6.8%), IBD (2.3%), type 1 diabetes mellitus (1.9%) connective tissue disease (1.4%), autoimmune eye disease (0.5%), multiple sclerosis (0.5%), coeliac disease (0.4%) and other (0.7%). Children with a family history of AID were more likely to have PsA (12.5 *vs* 4.5%) (Table 1). No other differences in presentation were observed, including age at diagnosis, disease duration, pain scores and disease activity.
Conclusions: A family history of AID was common among our cohort of children but with the exception of a higher proportion of children classified as PsA, fitting within the current classification criteria, few other differences were noted in presentation. Whether or not a family history of AID influences disease course and long term outcomes is an area for further research.
Disclosures: The authors have declared no conflicts of interest.

170. MINIMAL DISEASE ACTIVITY IN A CLINICAL COHORT OF CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS: RESULTS FROM THE CHILDHOOD ARTHRITIS PROSPECTIVE STUDY

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Background: Despite recent advances in the management of children with JIA, complete clinical remission is uncommon. A state of minimal disease activity (MDA) may be a useful therapeutic goal. Recently, a definition of MDA has been proposed (Magni-Manzoni AandR 2008), with discrete definitions for oligoarticular (physician global assessment (PGA) ≤ 2.5 cm and swollen joint count (SJC) $= 0$) and polyarticular patterns (PGA ≤ 3.4 cm, parent global assessment ≤ 2.1 cm, and SJC ≤ 1). Currently, no definition exists for enthesitis-related arthritis (ERA). This analysis describes the proportion of children with JIA reaching MDA over time during the first 2 years following diagnosis.
Methods: All children recruited to the Childhood Arthritis Prospective Study (CAPS) more than 2 years ago (except ERA) with available data at all four time points were included. MDA was determined at presentation, and at 6, 12 and 24 months following diagnosis and is presented for the entire cohort and within the oligoarticular and polyarticular subsets. The proportion of children in MDA with oligoarticular and polyarticular pattern disease was compared at all time points, using chi-squared statistic. Proportions of children achieving MDA during the first and second halves of the study (first 4.5 years *vs* second 4.5 years) were compared using chi-squared statistic.
Results: To September 2012, 1235 children had been recruited to CAPS. Of these, 735 children were eligible for inclusion and had data available for analysis at all time points. Median age at disease onset was 6.1 years (IQR 2.5–10.3), median disease duration 5.2 months (2.8–10.6), 69% female. Sufficient data to calculate MDA were available in 520 (71%), 519 (71%), 485 (66%) and 408 (56%) of the 735 children at baseline, 6, 12 and 24 months respectively. A minority of children were in MDA at presentation, increasing to 61% at 1 year and 67% at 2 years. Significantly more children with oligoarticular pattern JIA were in MDA at 2 years ($P = <0.001$). A higher proportion of children achieved MDA by 2 years during the most recent 4.5 years of the study (74%, $P = 0.002$), most marked in children with polyarticular pattern disease ($P = 0.005$).
Conclusions: Overall, just 67% of this cohort had reached MDA after 2 years of follow-up. Although the proportion achieving MDA was significantly higher during the most recent half of the study, this

Table 1. Results

	Positive history of AID	Negative history of AID	*P*-value
n (%)	264 (30.6)	599 (69.4)	
Age at onset, years	6.9 (2.7–11.2)	7.3 (3.1–10.7)	0.98
Female	172 (65)	386 (64)	0.84
Ethnicity Caucasian	242 (92)	530 (88)	0.16
Disease duration at presentation (months)	12.5 (3–15.1)	0.5 (2.8–12.1)	0.08
ILAR Classification systemic arthritis, persistent oligoarthritis, extended oligoarthritis, RF(–) polyarthritis, RF(+) polyarthritis, enthesitis related arthritis, PSA, undifferentiated	14 (5.5), 102 (40.0), 15 (5.9), 62 (24.2), 7 (2.7), 19 (7.4), 32 (12.5), 5 (2.0)	45 (7.7), 285 (49.0), 40 (6.9), 122 (21.0), 21 (3.6), 27 (4.6), 26 (4.5), 16 (2.8)	<0.001
Active joint count	2 (1–6)	2 (1–5)	0.12
Limited joint count	1 (1–4)	1 (1–3)	0.45
PGA	3.0 (1.8–5.6)	3.0 (1.8–5.6)	0.60
CHAQ	0.75 (0.13–1.38)	0.62 (0.13–1.38)	0.75
PGE	2.3 (0.6–0.5)	2.1 (0.5–5.0)	0.38
ESR	22 (6–50)	20 (7–50)	0.97

n (%) or median (IQR).

analysis suggests a significant level of ongoing disease activity at 2 years. Understanding why a high proportion of children persist with higher levels of disease activity, despite advances in therapies, may help to improve the targeting of therapies in the future.

TABLE 1. Minimal disease activity in JIA patients

	% in MDA (total scores available)			
	Baseline	6 months	12 months	24 months
Whole cohort	7 (520)	50 (519)	61 (485)	67 (408)
Oligoarticular pattern	9 (410)	52 (401)	63 (374)	73 (304)
Polyarticular pattern	0 (110)	44 (118)	53 (111)	51 (104)

Disclosures: The authors have declared no conflicts of interest.

171. IDENTIFICATION OF UVEITIS-SPECIFIC AUTOANTIBODIES IN CHILDREN WITH JUVENILE ARTHRITIS: COMPARISON OF THE PLASMA PROFILES OF UVEITIS, NON-UVEITIS AND AGED-MATCHED CONTROLS

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Background: JIA is a common chronic disease of childhood affecting one in a thousand children. Uveitis eventually affects between 15% and 40% of these children and accounts for 75% of all forms of childhood uveitis. Uveitis is a major cause of visual loss in these children. If undetected or inadequately treated it can result in decreased visual acuity, and blindness in up to 50% of children. Anti-nuclear antibodies are frequently found in children with uveitis associated JIA, but are neither sensitive nor specific enough to be used as a screening tool. Histological examination of the uveitic eye in JIA has shown the ciliary body to be the main site of inflammation and the primary infiltrate B cells. We hypothesized that patients with JIA associated uveitis may have developed other autoantibodies to proteins present in the ciliary body. We undertook this pilot study to investigate whether antibodies were directed against proteins derived from this eye cell line and whether different profiles existed between JIA children with and without uveitis and healthy aged matched controls.
Methods: The human ciliary epithelial cell line (HNPE) [a gift from Professor Miguel Coca-Prados (Yale University], was cultured and proteins extracted using standard methods. Protein quantification was carried out using the 2D Quant Kit. Proteins were run using standard 2D polyacrylamide gel electrophoresis. 2D gels were transferred onto Immobilon-P membranes, blocked for non specific binding then incubated with patients with uveitis N = 3, patients with no uveitis N = 3 and aged matched controls N = 3, plasma and matching synovial fluid (SF) at a dilution of 1/500. Secondary antibody binding was detected with Pierce ECL detection kit.
Results: There was good correlation between antibody profiles for matched plasma and SF samples.

There were discrete differences in the 2D Western blot profiles between the uveitis and non-uveitis patients and healthy aged matched controls. These differences could be used to discriminate between patients with and without uveitis. 9 proteins/auto antibodies were identified that were uniquely expressed in the uveitis group. We are currently undertaking mass spectroscopy in order to identify these proteins.
Conclusions: In this pilot study we have used a novel ciliary body cell line and have identified antibodies directed against the extracted proteins, in plasma and matching SF from children with JIA and aged matched health controls. We identified antibodies that could discriminate between children with and without uveitis. These preliminary findings are the first step in identifying antibodies specific for JIA associated uveitis and form the basis of a larger auto antibody screening study.
Disclosures: The authors have declared no conflicts of interest.

172. STANDARDS OF CARE FOR JUVENILE IDIOPATHIC ARTHRITIS: AUDIT ACROSS THE EAST OF ENGLAND PAEDIATRIC RHEUMATOLOGY NETWORK

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Background: Recent ARMA/BSPAR guidance sets out aspirational standards of care for JIA. The East of England Paediatric Rheumatology Network was formed to improve care in the area. The region covers 17 trusts with different models of service. This audit evaluates the baseline situation in the region. The aims are to identify issues most at need of improvement across the region and to help Trusts inform discussions with commissioning bodies regarding service pathways and resources.
Methods: A retrospective case note review was performed in March-August 2012 using the ARMA/BSPAR audit tool. Each trust was asked to review their last 10 cases diagnosed with JIA. The results were centrally analysed to give both regional and individual Trust results.
Results: 132 responses were returned from 13 Trusts.

Only 50% patients were diagnosed within 10 weeks of symptom onset (range for individual trusts 25–72%). The bulk of this delay was in referral to hospital, or initial referral being to another department. 65% were seen in paediatric rheumatology within 4 weeks of referral (range 27–100%). 30% were diagnosed with JIA at their first visit, with most diagnosed within 1 month of being seen.

Only 38% had access to a clinical nurse specialist (CNS). 81% patients were referred to physiotherapy (PT) at diagnosis with 56% seen within 8 weeks. Although 69% trusts reported Occupational Therapy (OT) as available, only 17% patients were referred at diagnosis. 89% patients were referred to ophthalmology at diagnosis. However, only 39% were seen within 6 weeks of referral. Three trusts did screen 90–100% patients within this time.

68% patients required joint injection. 79% of these occurred within 6 weeks, with 75% injections performed by an 'appropriately trained clinician' under general anaesthetic or entonox. 20% patients required intravenous steroids, all of whom were treated in a paediatric setting.

Communication of the clinical plan was good, with letters copied to 98% GPs, 86% referring doctor and 77% families. However, only 46% reported written information about JIA being given to parents. Although 81% patients were of school age, only 10% schools were contacted. Transition was only discussed in 4% patients, despite 25% cohort being older than 11. Recording of important discussions was very poor, but it was unclear whether this was a failure of action or documentation.

Only 15% patients were recruited to clinical trials, with 30% stating that the centre did not know if they were eligible.
Conclusions: As expected, results were variable across the region. Priorities for commissioners include timely access to CNS, PT, OT, Ophthalmology and clinical trials, possibly through networked provision. The audit suggests that general counselling is poor, but this may be an issue of documentation. Patients are not reaching paediatric rheumatology quickly enough, and this will require education of GPs, the public and hospital colleagues.
Disclosures: The authors have declared no conflicts of interest.

TABLE 1. Compliance with quality criteria for transition

Quality criteria for transition	Number of centres with at least 1 full time paediatric rheumatologist ($n = 14$) who report compliance	Number of centres with either a paediatrician and/or adult rheumatologist with an interest in paediatric rheumatology ($n = 5$) who report compliance
Written policy	8	2
Start in early adolescence (i.e. 11+ years)	11	3
Routine transition planning for ALL young people	7	2
Transition issues of parents addressed routinely	8	2
Increasing autonomy for young people during consultation including opportunity to be seen independently of parents/caregivers	13	5
Copy clinic letters sent to young people	8	2
Provision of patient-held medical summary to young person	4	1
Medical summary template for transfer of information between paediatric and adult teams	6	2
Tracking mechanism of young people post transfer into adult care	8	3

173. HAS THE GAP BEEN BRIDGED YET? CURRENT STATUS OF ADOLESCENT RHEUMATOLOGY SERVICES IN THE UK

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Background: In 2000, a national audit identified only 18% of rheumatology units seeing children with rheumatic disease had any dedicated adolescent and/or transitional care provision. Since then the specific health needs of adolescents with chronic conditions have been increasingly recognized nationally. Transitional care for such young people was identified as a critical area still in need of service improvement in a national review of Children's Services in 2010. Transitional care as well as age-appropriate services for young people have been recommended for inclusion in the NHS Outcomes Framework in 2012. The aim of this study was to re-audit current adolescent rheumatology (including transitional care) service provision in centres represented by members of the British Society for Paediatric and Adolescent Rheumatology (BSPAR).
Methods: A questionnaire based on national standards for transitional care and youth friendly health services was created and emailed to all BSPAR members ($n = 247$) using the Survey Monkey software.
Results: 28 replies were received including responses from 14 paediatric rheumatology PR units with at least one full time consultant paediatric rheumatologist and 5 units with a paediatrician and/or adult rheumatologist with an interest in PR. In 13 of the 19 units, there was an adolescent and/or a transition clinic and in 10 centres, a young adult clinic. These clinics took place at variable frequency from weekly to quarterly. The most frequent transition model identified was the combined clinic model with 8 clinics taking place in the paediatric setting and 5 in the adult setting. Other models employed included a developmental model i.e. including a specific adolescent clinic ($n = 12$), direct transfer ($n = 8$) and a single doctor ($n = 3$). The median number of quality criteria for transition as defined by national guidance ($n = 9$) which were met by the major centres was 5 (range 1 to 8). A significant proportion of centres did not comply with key quality criteria for young person friendly services.
Conclusions:: There remains significant variation in transitional care provision in UK paediatric rheumatology centres with sub-optimal compliance with quality criteria for young person friendly services. Although transitional care is now recognized as an important aspect of paediatric rheumatology, more consideration of the challenges for implementation is required.
Disclosures: The authors have declared no conflicts of interest.

174. PATIENTS' AND PARENTS' VIEWS ON THE ARMA/BSPAR 2010 STANDARDS OF CARE AND ACCESSING TERTIARY LEVEL CARE

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Background: In 2010 the British Society of Paediatric Rheumatology (BSPAR) alongside the Arthritis and Musculoskeletal alliance (ARMA) released 43 standards of care relating to the management of children with JIA [1]. The standards are aimed at achieving optimal care but recent audits [2,3] have shown that UK paediatric rheumatology falls short of the standards, even in tertiary centres. Ideally all standards should be met, but implementation will take time and resources.

As part of the development of a regional paediatric rheumatology network in the East of England we sought the views of children and families on the standards of care and on their willingness to travel for tertiary centre care.
Methods: A questionnaire was sent out to patients and parents from 7 centres across the region from 15/5/12 to 15/8/12. These included two small district general hospitals, four medium sized and one teaching hospital offering tertiary paediatric rheumatology. The questionnaire was adapted from one used previously in the Oxford region [4] It asked patients/parents to rank each standard as vital, very important, important or useful. They were then asked to go back and rank their top ten. A secondary section asked their views on frequency of attendance and acceptable travel time to a regional tertiary centre.
Results: 33 questionnaires were returned in the time frame of the study. Five did not rank a top 10 and three miss ranked their response. Standard 4 was ranked as number 1 by 8/33 responders. 23 of the 43 standards were ranked vital more than other category. 37.5% of responders felt they shouldn't travel more than 1 h and 36.4% felt they should be seen at least 3 times per year in a tertiary centre. See Table 1. Demonstrates the standards ranked useful most times.
Conclusions: Children and parents feel that the majority of standards are vital and should be part of the standard care they receive. They ranked the use and regulation of drugs most highly, but skill in recognizing the diagnosis, as well as early referral to specialist care was also prioritized. A minimum of annual review in a tertiary setting was vital, however the majority wants to be seen more often, with this specialist care close at hand.
Disclosures: The authors have declared no conflicts of interest.

175. T-CELL-DEPLETED AUTOLOGOUS STEM CELL TRANSPLANTATION RESULTS IN A CHIMERA OF CLONES FROM BEFORE AND AFTER TRANSPLANT IN SYSTEMIC JUVENILE IDIOPATHIC ARTHRITIS

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Background: Children with systemic JIA (sJIA), the most severe subtype of JIA, can suffer from destructive polyarthritis and growth failure. Treatment for sJIA has considerable side effects and can result in osteoporosis and growth delay. In some children, where there is failure or toxicity from drug therapies, severe arthritis has been successfully controlled by T-cell-depleted autologous stem cell transplantation (ASCT). At present, it is unknown whether remission is achieved through the generation of a new naïve immune system or by resetting of immune balance.
Methods: Blood was collected from 5 children before, early and late after ASCT. Peripheral blood mononuclear cells were isolated. Expression of T and B cell, NK cell, and monocyte surface markers were examined using 9-colour flow cytometry. CD4+ and CD8+ T-cell populations were separated using magnetic bead sorting, and used for mRNA extraction, cDNA synthesis, and T-cell receptor beta variable region (TCRBV) PCR. PCR products were used for CDR3 spectratyping, subcloning and sequencing to investigate clonal heterogeneity of CD4+ and CD8+ T cells.

Table 1. The 10 standards ranked vital the most times and how many times they were ranked in the top ten

Standard	The following standards were ranked vital most frequently	% Vital	% In top 10
22	Drugs used for the treatment of JIA will be prescribed and monitored in accordance with BSPAR/NICE guidelines	84.8	34.6
5	Healthcare practitioners should refer all children with suspected JIA to a paediatric rheumatology team within 6 weeks of symptoms onset	69.7	46.1
11	All children and young people with JIA should be reviewed at least annually by a designated regional paediatric service	66.7	23.1
23	Children and parents should be fully informed about the benefits and risks of taking both licensed and unlicensed drugs	66.7	34.6
8	At diagnosis children with JIA should have a full assessment of their disease, health, psychosocial and pain management and educational needs	66.7	50.0
27	Children should be screened by an ophthalmologist with training and experience in paediatric uveitis and be part of a regional network	63.6	42.3
7	Members of paediatric rheumatology team will have appropriate training and experience as defined by professional bodies	63.6	26.9
18	Those children with JIA and active disease should have regular specialist review	60.6	19.2
28	Specialist surgery should be performed by appropriately trained surgeons with experience in management of JIA	60.6	23.1
4	All healthcare professionals likely to come in to contact with a child with JIA should acquire the skills to recognize the condition	57.6	46.1

Results: At mean follow up of 10.5 years, 4 patients remain in complete remission, while 1 child relapsed within 1 month of transplant. Early after ASCT, frequency of peripheral blood cell subsets was highly skewed. Total T- and B-cell frequencies decreased while monocyte frequencies increased. Interestingly, reversal of the CD4/CD8 T-cell ratio, decrease in naive and increase in memory T-cell frequencies were observed early in immune reconstitution. These reverted to pre ASCT proportions by 2 years after transplant. Immediately post ASCT, in the CD8+ subset, length of CDR3 distribution was skewed, suggesting a highly oligoclonal T-cell repertoire early in reconstitution. Interestingly, full CDR3 length diversity was observed immediately post ASCT in the one child who had relapsed. In successful cases, there was re-emergence of pre ASCT dominant peaks post transplant in certain TCRBV families. This was reflected in persistence of clones in sequencing the same family. Relative sizes of re-emerging clones were similar before and 1 year after transplant. In other TCRBV families, unique clones developed post ASCT.
Conclusions: These results reveal that after T-cell-depleted ASCT the immune repertoire is a mixture of clones from before and after ASCT, and suggest children with this repertoire can achieve complete remission. Furthermore, adequate immune depletion might be essential for successful recovery, highlighting the importance of an effective conditioning regimen before stem cell infusion. Risks associated with ASCT are significant, and include exacerbation of macrophage activation syndrome and serious infection during prolonged lymphopaenia. However, outcomes in some children, who suffer from refractory and debilitating arthritis, can be highly successful.
Disclosures: The authors have declared no conflicts of interest.

PAIN

176. WHAT DO PATIENTS REFERRED TO PHYSIOTHERAPY FOR CHRONIC KNEE PAIN BELIEVE, EXPERIENCE AND EXPECT ABOUT EXERCISE AND PHYSICAL ACTIVITY?

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Background: Knee pain is recognized as a serious musculoskeletal complaint due to its high prevalence and substantial impact on functional disability, health care costs, sickness absence and work disability. Knee pain is managed almost exclusively using primarily analgesics and exercise. Exercise reduces self reported pain and improves physical functioning, strength, walking speed and self efficacy in knee pain patients. However, long term adherence to exercise remains poor and little is known about what motivates patients with knee pain to exercise. This study aimed to identify the beliefs, experiences and expectations towards exercise of patients with chronic knee pain caused by a range of aetiologies.
Methods: A qualitative research strategy using a case study approach was selected as appropriate for this particular research question. A convenience sample was used to recruit 10 participants who had been referred for physiotherapy; most of them had knee OA. Semi-structured interviews were conducted. Interview transcripts were transcribed verbatim and analysed using the content analysis approach.
Results: There were 4 main themes identified. The first theme was physical ability and included the subthemes knee limitations and general limitations to exercise; the second theme was patients' perception of exercise and included the importance of exercise, experience of exercise and the advice they received towards exercise; the third theme was motivators and barriers to exercise and the subthemes was symptom relief, enjoyment and social benefit, priority, and taking control; the fourth theme was the effectiveness of the intervention and included supervision and guidance, structure and variation, location and expectations. In summary exercise behaviour was influenced by perceived control over their knee pain; believing exercise to be beneficial; being motivated to exercise and experiencing a positive impact from health care professionals.
Conclusions: Findings from this study highlighted important beliefs, experiences and expectations of patients with chronic knee pain. Healthcare professionals must consider these individual beliefs to maximize exercise adherence. Potential strategies include advice on the appropriate exercises to undertake (i.e. swimming and cycling), education about the benefits of exercise, and realistic goal setting. This study has also confirmed previous interventions for health care professionals to increase patient exercise. These include strengthening patients' self efficacy and outcome expectations; tailoring exercise prescriptions that match the motivation of the patient, and providing encouragement and support during patient consultations. Further research is needed to not only study the effect of patients' beliefs towards exercise interventions, but also into the nature of these beliefs.
Disclosures: The authors have declared no conflicts of interest.

177. CHRONIC PAIN IN RA: IS IT MEDIATED BY CORTICAL REORGANIZATION?

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Background: Chronic pain in RA causes significant disability and socio-economic costs. Pain relief, identified by majority of RA patients as the highest priority, remains inadequate despite treatment advances. Many continue to have pain even after inflammation has subsided. Cortical reorganization has been shown to be a possible contributor to chronic pain in phantom limb pain, complex regional pain syndrome and low back pain. We tested the postulated correlates of cortical reorganization such as finger misperception, astereognosis, abnormal hand laterality and abnormal body scheme in RA patients with chronic pain. These signs may capture the central pain mechanisms reflected in DAS28-P.
Methods: 36 RA patients recruited from the rheumatology clinic. Four standardized clinical tests: 1. Finger perception, 2. Astereognosis, 3. Hand laterality and 4. Body scheme reporting. The optimum cut-offs for positive tests were defined from pilot data (complex regional pain syndrome patients and healthy volunteers) by plotting sensitivity and specificity for every possible cut-offs and analysing the ROC curves and by independent review of results.

5 questionnaires (Brief Pain Inventory, Upper Extremity Functional Index, Lower Extremity Functional Index, Neglect-like Symptom Questionnaire and Hospital Anxiety and Depression Score) were administered. DAS28-ESR and DAS28-P (Proportion of DAS28 contributed by the patient reported outcomes of tender joint count and global health-VAS) were calculated.
Results: Patient characteristics: 83% (30) female, 86% (31) right handed, 2.7% (1) dyslexic, 61% (22) positive for Rheumatoid factor, anti-CCP or both, 42% (15) erosions. Mean age = 54.3 (Range 22–91). Mean duration of RA = 12.4 years (range = 1–50).

52.8% (19/36) had average pain score of $\geq$5 indicating moderate to severe level of pain. Prevalences of positive clinical signs: finger misperception (33%,12/36), abnormal hand laterality (50%,18/36), astereognosis (28%,10/36) and abnormal body scheme (14%,5/36). Out of 36, 12 (33%) had no signs positive, 10 (28%) had 1 sign, 8 (22%) had 2 signs, 5 (14%) had 3 signs and 1 (3%) had four signs. Pain scores (average and maximum) and DAS28-P were higher (statistically significant) in the group with at least 1 clinical sign positive compared with those with no signs positive (Table 1).
Conclusions: Pain relief in RA patients remains inadequate despite adequate control of inflammation.

Patients with at least 1 of the 4 clinical signs of finger misperception, abnormal hand laterality, astereognosis and abnormal body scheme had more severe pain scores and higher DAS28-P. This suggests central mechanisms such as cortical reorganization may play an important role in maintaining pain in RA. Strategies in addition to inflammatory disease suppression are required to adequately treat pain.

Table 1. Results

Number of clinical signs positive	Average pain score (0–10)	Maximum pain score (0–10)	DAS28 ESR	DAS28-P
None	2.91	3.42	2.54	0.180
At least one (1–4)	4.45 (2 tailed $P = 0.021$)	5.25 (2 tailed $P = 0.042$)	3.44 (2 tailed $P = 0.014$)	0.369 (2 tailed $P = 0.0016$)

Disclosures: The authors have declared no conflicts of interest.

178. CLASSIFICATION CRITERIA FOR FIBROMYALGIA HAVE LIMITED SENSITIVITY IN PATIENTS REFERRED TO A MULTIDISCIPLINARY CLINIC

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Background: Fibromyalgia (FM) is a condition characterized by chronic widespread pain which in most patients is associated with other non-musculoskeletal symptoms including fatigue, psychological disorders and somatic symptoms. Although FM is a clinical diagnosis, the 1990 ACR classification criteria are often used as an aid to diagnosis despite exclusive reliance on musculoskeletal tenderness. However, it has been shown that they have a sensitivity of only around 75% for patients treated in secondary care for FM. Recently suggested diagnostic criteria, consisting of the widespread pain index (WPI) and symptom severity score (SSS), employ subjective measures of the distribution of pain as well as physician-scored measures of fatigue, waking unrefreshed, cognitive symptoms and somatization, and have been found to have greater sensitivity for patients seen in rheumatology clinics with a clinical diagnosis of FM.
Methods: Patients who had been referred to a multidisciplinary FM clinic were asked to complete questionnaires as part of their routine clinical assessment: these were for pain (visual analogue scale (VAS) and WPI), degree of somatic symptoms (PHQ15), depression (PHQ9), anxiety (GAD7), fatigue (FACIT-fatigue) and the revised fibromyalgia impact questionnaire (rFIQ). Tender point count (TPC) and SSS were recorded by the physician. Differences between groups were tested with parametric or non-parametric statistics after testing for Gaussian distribution and significance set at $P < 0.05$.
Results: Data were available for 155 patients and the diagnosis confirmed clinically in 150; of these 89% were female and the mean age was 45 years. 99% of FM patients met the diagnostic criteria with only 76% meeting the classification criteria (at least 11/18 tender points). Of the 7 patients not meeting the diagnostic criteria 3 had at least 11/18 tender points; the diagnosis was confirmed clinically in 2 and in the third a diagnosis of chronic fatigue syndrome (CFS) was felt to be more appropriate. Of the four patients meeting neither set of criteria 2 were diagnosed with CFS, 1 with inflammatory arthritis and 1 had a less severe picture of chronic non-inflammatory pain. Patients meeting both criteria had significantly higher scores for degree of somatic symptoms than those meeting the diagnostic criteria alone. There were no significant differences between the groups for depression, anxiety, VAS pain, fatigue, total rFIQ or rFIQ subdomains.
Conclusions: Reliance on classification criteria for the diagnosis of FM may miss a significant proportion of patients. In contrast, in our population the diagnostic criteria performed well with high sensitivity. Other than a higher score for somatic symptoms a high TPC does not appear to be a marker for disease severity. The diagnostic criteria encompass the spectrum of symptoms experienced by FM patients and should be preferred for routine clinical use.
Disclosures: The authors have declared no conflicts of interest.

179. BODY WEIGHT IS A STRONGER PREDICTOR OF KNEE PAIN THAN BODY COMPOSITION

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Background: Obesity is a main risk factor for knee OA (KOA). Hypotheses explaining this relationship presently fall into two categories: mechanical and metabolic. Previous studies focus on radiographic KOA, not necessarily including knee pain and predominantly use BMI or body weight (BW) as a surrogate measure of obesity, neither of which fully consider body composition (BC). It is not clear if it is BW per se, or specific components of BC that are important in this relationship. BW, BMI and BC measures are examined to identify longitudinal associations with knee pain in a female community population.
Methods: In 1989, 1003 women aged 43–65 years from a general practice in Chingford, UK were recruited to a population based cohort study. At year 8 (Y8) and year 15 (Y15) clinic visits, the following data were collected for 603 women:

(i) BW was measured in kilograms by electronic scales, height was measured in centimetres using a wall-mounted stadiometer and BMI was calculated.

(ii) Whole body dual-energy X-ray absorptiometry scans provided total fat mass (TFM), fat mass index (FMI), fat-free mass index (FFMI), android gynoid ratio (AGR = % android fat/% gynoid fat) and fat mass ratio (FMR = % trunk fat/% leg fat).

(iii) Knee pain was assessed by a self-administered questionnaire using the question 'Have you had knee pain in the last month?'

Differences in Y8 BW, BMI and BC measures between those with and without knee pain at Y15 were calculated using independent-sample *t*-tests. Variables were standardized by subtraction of the mean then division by standard deviation and the standardized difference was calculated thereby allowing comparison of effect size.
Results: At Y15, 272 women (45.1%) reported knee pain. When women with and without knee pain were compared they did not differ significantly in terms of age, but women with knee pain had higher mean BW ($P < 0.001$), BMI ($P < 0.001$), TFM ($P < 0.001$), FMI ($P < 0.001$) and FFMI ($P < 0.02$) than those without knee pain. However, the two groups did not significantly differ in AGR or FMR. When standardized differences were calculated and effect sizes compared, BW demonstrated the strongest effect at 0.32.
Conclusions: BW, rather than BC, appears to be the driver in the obesity—knee pain relationship suggesting that the association is more mechanical than metabolic.
Disclosures: The authors have declared no conflicts of interest.

180. TREATMENT OF FIBROMYALGIA WITH AMITRIPTYLINE, DULOXETINE, PREGABALIN AND MILNACIPRAN WITH PAIN AS AN OUTCOME MEASURE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Fibromyalgia (FM) is a common condition characterized by chronic widespread pain and tender points on examination. In most patients it is associated with a number of other symptoms including fatigue, poor sleep, somatic symptoms, depression and anxiety. The symptoms of fibromyalgia cause substantial disability with a significant impact on work, personal life, relationships and self-esteem. Existing treatment guidelines recommend a combination of pharmacological therapy with physical therapy, cognitive behavioural therapy and other non-pharmacological treatments. Three drugs- duloxetine, pregabalin and milnacipran- are approved by the FDA for treatment of fibromyalgia; amitriptyline is also commonly used in clinical practice in the UK. It is not clear which drug is most effective for pain or should be considered first line and no head-to-head trials have been carried out.
Methods: A systematic review was carried out using Embase, Medline and Web of Science databases, identifying all randomized placebo-controlled trials in FM of amitriptyline, duloxetine, pregabalin and milnacipran with pain as an outcome measure published up until March 2011. Only studies published as full articles in English were

TABLE 1. Chingford cohort study population demographics

Y8 demographic	Total ($n = 603$)	Y15 knee pain ($n = 272$)	Y15 no knee pain ($n = 331$)	Standardized difference[a]	*P*-value[a]
Age, years	59.8 (5.7)	59.9 (5.9)	59.8 (5.6)	–	0.80
BW, kg	68.6 (12.1)	70.7 (12.6)	66.9 (11.4)	0.32	<0.001
TFM, kg	29.3 (9.6)	30.9 (9.8)	28.1 (9.3)	0.29	<0.001
BMI, kg/m^2	26.5 (4.5)	27.1 (4.7)	25.9 (4.2)	0.27	<0.001
FMI, kg/m^2	11.3 (3.7)	11.9 (3.8)	10.9 (3.6)	0.26	<0.001
FFMI, kg/m^2	14.8 (1.3)	15.0 (1.4)	14.7 (1.2)	0.19	0.02
AGR	0.89 (0.20)	0.90 (0.18)	0.87 (0.21)	0.05	0.505
FMR	0.80 (0.18)	0.80 (0.15)	0.79 (0.20)	0.04	0.569

Values are mean (S.D.) unless otherwise indicated. [a]Values calculated for differences between women with and without Y15 knee pain.

included. Studies with insufficient data, no pain outcome, and no control group were excluded. Studies were assessed for quality using Jadad scoring. Data for pain outcomes were extracted and a meta-analysis was done for each drug at a selected daily dose using RevMan 5 software. Dose analysed were amitriptyline 25–50 mg daily, duloxetine 60 mg daily, pregabalin 450 mg daily, and milnacipran 100–200 mg daily.
Results: 31 studies were included in the final review. All studies had a Jadad score of 2 or more. There was considerable heterogeneity between the study populations, study design and outcome measures of existing studies. This was limited by grouping each drug into a selected dose range and analysing outcomes at a range of time points from 6–27 weeks. Doses and follow-up times falling outside these limits were not analysed. All drugs improved pain compared with placebo with a small-moderate effect size, with amitriptyline being greatest at –0.55, There was little difference between the effect size for the remaining drugs: duloxetine –0.28, pregabalin –0.31, milnacipran –0.24. The Jadad score varied from 2 to 5.
Conclusions: This review suggests that the effect size for pain with these agents is modest. Trials of amitryptiline were more heterogeneous; for the other agents effect sizes were similar in the short term. It remains unclear which should be used as first-line, whether specific drugs are more appropriate for particular subgroups of patients and whether combination therapy may be more effective. Head-to-head studies may help to clarify these questions. However, they remain a useful component in the multidisciplinary management of fibromyalgia for some patients.
Disclosures: The authors have declared no conflicts of interest.

181. WHAT IS THE BEST MEASURE OF PAIN IN THE ARTHRITIS CLINIC?

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Background: It is increasingly recognized that current tools used for pain measurement in the arthritis clinic in subjects with OA and RA may not be optimally assessing pain symptoms. In this study we aimed to evaluate patients' pain perception by assessing nociceptive and neuropathic elements to evaluate their significance in OA and RA pain respectively.
Methods: Pain perception was assessed with VAS (Visual Analogue Score) range 0–10 cm [1] for nociceptive and painDETECT range 0–38 [2] for neuropathic pain. Consecutive patients with OA ($n = 106$) and RA ($n = 108$) were recruited from rheumatology/physiotherapy at St George's Hospital, London. Data were analysed using Graphpad Prism: *t*-tests for correlation; Mann–Whitney *U* and Kruskal–Wallis for group comparisons, with $P \leq 0.05$.
Results: The mean age for OA participants was 63.5 ± 13.1 and 58.7 ± 14.3 for RA ($P = 0.01$). There was no correlation between age and VAS or painDETECT scores for either group. In the OA group, 83 were female (78.3%) and 23 male (21.7%) and in the RA group 83 female (76.9%) and 25 male (23.1%). The mean duration of diagnosis for OA was 5.3 years $\pm$ 4.4 and 11.1 years $\pm$ 10.7 for RA ($P < 0.0001$). VAS scores were categorized into <3.1 cm mild pain, 3.1–5.3 cm moderate pain and >5.3 cm severe pain as previously described (1). The mean VAS score in the OA group was 5.5 ± 2.6 and in the RA group was 4.6 ± 2.7, $P = 0.04$. In the OA group, 54.7% reported severe pain, 22.6% moderate pain and 22.7% mild pain. In the RA group 40.7% reported severe pain, 25.0% moderate pain and 34.3% mild pain. When evaluating the painDETECT scores for both groups, recommendations are that >18 is likely neuropathic pain (NP), 13–18 is possible NP and <13 is unlikely to be NP and thus nociceptive. The mean painDETECT score in the OA group was 13.0 ± 8.7 and 10.2 ± 6.7 in the RA group, $P = 0.03$. In the OA group, 26.4% were classified as likely to have NP, 20.8% as possible NP and 52.8% as unlikely to have NP. In contrast in the RA group, 11.1% had likely NP, 24.1% possible NP and 64.8% unlikely to have NP. There was a positive correlation in pain severity between the OA and RA groups for VAS ($P = 0.0005$) and painDETECT scores ($P = 0.0001$) respectively. In the OA group, 59 patients (55.7%) had pain radiating to other body areas compared with 38 patients (35.2%) in the RA group. Pain radiation to the ankles bilaterally was the most common reported in the OA group and arms unilaterally in the RA group.
Conclusions: Despite arthritic pain traditionally considered to be nociceptive, 26.4% patients with OA and 11.1% with RA demonstrated neuropathic pain elements in our study. Our OA group also demonstrated significant pain radiation. Using VAS only may lead to neuropathic symptoms being underdetected and it may be pertinent to use tools such as painDETECT when assessing OA and RA pain.
Disclosures: The authors have declared no conflicts of interest.

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PRIMARY CARE

182. 'SOMEBODY TO SAY ''COME ON, WE CAN SORT THIS'' ': A QUALITATIVE STUDY OF HEALTH-SEEKING IN OLDER ADULTS WITH SYMPTOMATIC FOOT OSTEOARTHRITIS

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Background: Symptomatic foot OA represents a relatively poorly understood condition, lacking clinical priority and clear clinical guidance. As part of a series of investigations aimed at describing the condition and its management we undertook a nested qualitative study among community-dwelling adults with painful, radiographically confirmed foot OA and recent contact with their general practitioner (GP) to understand current health-seeking behaviour, influences on this, and experiences of primary care.
Methods: Semi-structured interviews were conducted by a trained researcher in a purposive sample of 11 participants (6 female/5 male; 56–80 years) registered with 3 general practices in North Staffordshire and recruited to a population-based cohort study. The interview schedule covered health-seeking behaviours, consultation experiences, and the perceived health impact of the foot problem in the context of their general health. Interviews were conducted in participants' homes and were audio recorded and transcribed verbatim. Transcriptions were analysed using interpretative phenomenological analysis. Emergent themes were collated for each participant before being clustered into higher-order themes. These were then compared across participants to generate the main themes.
Results: The decision to consult was often the outcome of a complex process influenced by quantitative and qualitative changes in symptoms, difficulty maintaining day-to-day roles and responsibilities and the effect of this on family and work colleagues, as well as a reluctance to present a fragile or ageing self to the outside world. Self-management was commonly negotiated alongside multimorbidities. Consulting to enable better management of symptoms and consequences, participants often felt they received limited information, brief or even cursory assessment, and an unwelcome focus on analgesic drugs for treatment.
Conclusions: This is the first qualitative study of patients' experiences of primary care for symptomatic foot OA. The decision to consult and the experience of consultation largely reflects processes common to hip/knee OA and to minor ailments in general. Particular issues included the importance of footwear and foot appearance, especially for women, and the difficulty for patients and GPs to recognize and prioritize foot symptoms alongside other health problems. The experience of primary care seldom appeared to move beyond a label of arthritis and an unwelcome emphasis on pharmacological treatment. As a pre-requisite to addressing this, the evidence base for diagnosis and management of foot OA in primary care needs strengthening.
Disclosures: The authors have declared no conflicts of interest.

183. WIDESPREAD VARIATION IN METHOTREXATE SHARED CARE PROTOCOLS: IS A UNIFORM NATIONAL PROTOCOL NEEDED?

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Background: With the advent of patient choice, a general practice may have care provided by several different rheumatology units, depending on provider geography. Any variability between units in

shared care protocols (SCPs) increases the risk of drug errors, particularly where these contain different advice.
Methods: Google search of published MTX SCPs, for information about dosing, monitoring, folic acid and withholding MTX.
Results: 22 SCPs, representing all regions in Great Britain. There was significant variation in initial MTX dose (median 7.5 mg, range 2.5 to 15 mg) and speed of titration (range 2.5 mg weekly to 2.5 mg every 6 weeks) with a maximum dose 20 mg (3 protocols), 25 mg (13) and 30 mg (4).

15 protocols stated once weekly Folic Acid 5 mg, but with different specific advice, ranging from day after MTX (5), 2 days after MTX (1), 3 days after MTX (1) day before MTX (2) and any day except MTX day (4). Three protocols recommended folic acid 5 mg daily except MTX day and four recommended 10 mg per week (either 2 days after MTX or 2 days before).

All but one protocol cited 2-weekly monitoring for first 6 weeks, in line with BSR guidance. After this, testing was monthly (17), quarterly (3), 6-weekly (1) or 2-weekly for another 6 weeks (1). Of the 17 monthly schedules, this increased to 3 monthly either after 4 months (2), 6 months (1), 12 months (8) or when stabilized (1).

Withholding MTX was recommended if either AST or ALT more than 2X ULN (13), more than 3X ULN (3) or when AST or ALT > 100 (1). In two protocols specialist advice only was recommended if LFTs were abnormal. Withholding MTX was advised if either WBC <3.5 (15), <4.0 (4) or <3 (1). The thresholds for neutropenia were <2 (16), <1.8 (2) or <1.5 (2) and for platelets were <150 (20), <100 (1) or no information (1). Table 1 shows advice for renal function.
Conclusions: These variations, if reflected in clinical practice, potentially have significant implications. This includes the clinical effectiveness in early RA if starting doses are suboptimal and only slowly escalated. There is significant potential for confusion regarding Folic acid dosing and the variable thresholds for stopping MTX in renal impairment. There are cost implications of variation in monitoring frequency. The clinical effectiveness, cost and safety of MTX would be enhanced by a uniform national SCP.

Table 1 MTX: advice for renal function

Stop drug if mild–moderate renal impairment	5
Stop if significant deterioration in renal function	3
Stop if worsening renal function	2
Reduce dose if significant deterioration	2
Stop if GFR < 50	1
Stop if creatinine >2x upper limit	1
Reduce dose in mild-moderate impairment (GFR < 50)	1
C/I if GRF < 10, avoid if <30, 30–50 reduce dose	1
C/I if Cr > 300	1
Rising creatinine, monitor closely and contact hospital for advice.	1
No information given	4

Disclosures: The authors have declared no conflicts of interest.

SLE AND ANTIPHOSPHOLIPID SYNDROME

184. MAJOR BLEEDING COMPLICATIONS FOLLOWING PERCUTANEOUS RENAL BIOPSY IN LUPUS NEPHRITIS PATIENTS WITH ANTIPHOSPHOLIPID ANTIBODIES

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Background: Renal biopsy remains the gold standard investigation for both diagnostic and prognostic purposes in the management of LN. It is not however without potentially significant complications. In this study we determined the rate of significant bleeding post renal biopsy and identified risk factors associated with haemorrhagic complications in LN patients.
Methods: Clinical data were retrospectively reviewed following 215 renal biopsies performed in 199 LN patients over a 12 year period (1999–2012). Patients were categorized into 3 groups: a diagnosis of SLE alone ($n = 80$), SLE with coexisting Antiphospholipid Syndrome (SLE/APS) ($n = 48$) and a diagnosis of SLE with either positive anticardiolipin antibodies and/or lupus anticoagulant without clinical antiphospholipid manifestations (SLE/APL) ($n = 87$).

Major complications were defined as those who required post procedural intervention such as blood transfusion, surgical revision of hematoma, embolization, sepsis, nephrectomy or death. Minor complications included subcapsular hematomas, perinephric hematomas regardless of size or hematuria requiring close observation only.
Results: An overall bleeding rate of 14.8% was observed. 8.8% experienced minor bleeding and 6% developed major haemorrhagic complications. The rate of major bleeding was significantly higher in SLE/APS (11%) and SLE/APL (8%) than SLE alone (1%). Lupus anticoagulant, older age at time of biopsy (>40 years) and elevated serum creatinine (>400 umol/l) were independent risk factors for increased risk of bleeding ($P = 0.03$, $P = 0.04$ and $P = 0.03$ respectively).

20% and 25% of patients in our study were taking warfarin or aspirin, respectively, neither of which was associated with an increased risk of bleeding. Coagulation parameters including prothrombin time (PT) and activated partial thromboplastin time (APTT) did not differ significantly between bleeding and non-bleeding groups.

Renal thrombotic microangiopathy (TMA) was significantly more common in SLE/APS and SLE/APL than in SLE ($P = 0.008$ and $P = 0.009$ respectively). TMA and severe arterial fibrous intimal hyperplasia on renal biopsy were significantly more common in those who developed severe bleeding which may reflect an underlying vasculopathy predisposing to haemorrhagic complications.
Conclusions: The role of renal biopsy remains pivotal in the management of LN. Based on the findings of this study, patients with SLE/APS, SLE/APL and TMA are at increased risk of bleeding post biopsy. Antiphospholipid antibodies should be checked in all SLE patients prior to renal biopsy to stratify their risk of developing post procedure bleeding complications. In this subset of at risk patients additional caution needs to be exercised pre and post biopsy. Similar precautions should be taken in those LN patients with elevated serum creatinine, thrombocytopenia and those aged over 40 years of age.
Disclosures: The authors have declared no conflicts of interest.

185. LONG-TERM USE OF MYCOPHENOLATE MOFETIL IN SYSTEMIC LUPUS ERYTHEMATOSUS—IS IT EFFECTIVE, IS IT SAFE?

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Background: MMF has been proved in clinical trials to be effective in treating certain clinical manifestations of SLE. We reviewed the clinical and serological course of patients on long term MMF treatment for more than 5 years in a cohort of over 600 SLE patients.
Methods: Systematic review of demographic data, disease duration, duration and indication for use of MMF, concomitant medications, side effect profile, disease activity assessed using BILAG scores, and serological markers e.g. anti-dsDNA antibody and C3 levels was conducted.
Results: 21 out of 72 patients who ever received MMF used it for more than 5 years. Mean age was 37.4 years (range 22–67).The majority were females 90.5%.

9 (42.9%) were Caucasians and 6 (28.6%) each were Asians from the Indian sub-continent and Afro-Caribbeans. Duration of SLE before MMF use ranged from <1 year to 11 years. Average dose of drug used ranged from 0.9 to 1.4 g; the maximum dose achieved was 2.5 g. Duration of use ranged from 60 to 144 months.

Renal complications were the main indications for initiating therapy (66.7%), mucocutaneous (9.5%), haematological (9.5%), neurological (9.5%) and respiratory (4.8%). MMF use resulted in stable disease in 11 (52.4%) patients; four developed renal failure, two already had end stage renal failure before initiation of therapy. The remaining six continued to have disease flares despite treatment. Most flares and drug dose adjustment occurred in the second year of treatment.

Six (28.6%) developed side effects whilst on treatment mainly cytopenias in three. Treatment resulted in tapering of glucocorticosteroid dose over time in majority of patients 95.2%, and improvement in disease activity as reflected by rise in C3 levels in 14 (66.7%) patients and anti- dsDNA antibodies dropped in 13 (62%). BILAG scores improved in 11 (54.4%) and most accurately reflected disease activity and drug treatment changes.

16 patients had previous immunosuppressive treatment prior to starting MMF, 14 had AZA, 5 cyclophosphamide, 6 rituximab, 2 cyclosporine for renal transplantation and 1 MTX. 63% were on moderate to high doses of prednisolone.

Twelve started new therapies after starting MMF mainly, HCQ in six, four had rituximab (one had previous treatment) and one cyclophosphamide. Two started tacrolimus after renal transplantation.
Conclusions: MMF was mainly initiated for renal complications in this cohort of SLE patients. The recommended dose of 3 g daily was rarely achieved. Side effects were temporary and did not result in complete cessation of therapy. MMF had steroid sparing effect, improved disease activity and resulted in less use of other immunosuppressive agents. Although clearly effective in over half our patients, long term use is no panacea, though the drug is relatively safe and generally well tolerated.
Disclosures: The authors have declared no conflicts of interest.

186. ASSOCIATION BETWEEN RETINAL ARTERIOLAR CALIBER AND ENDOTHELIAL DYSFUNCTION IN WOMEN WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Background: Retinal vascular abnormalities are associated with cardiovascular risk factors and adverse cardiac events. Endothelial dysfunction, arterial stiffness and carotid intima-media thickening (CIMT) reflect sub-clinical atherosclerosis. In patients with autoimmune diseases, the relationship between retinal vascular changes and these vascular indices is unknown. The aim is to correlate retinal vascular changes with endothelial function, arterial stiffness and CIMT in SLE women without coronary heart disease (CHD).
Methods: A single-Centre, cross-sectional study of 28 SLE women (7 with secondary anti-phospholipid syndrome; mean age 42 ± 10 years; mean disease duration 13 ± 5 years) without CHD. Retinal digital photography, brachial artery flow-mediated vasodilatation (FMD), local carotid pulse wave velocity (PWV) by a Doppler echo-tracking system and CIMT were performed. FMD was expressed as percentage change relative to baseline diameter.
Results: Pearson's correlation analysis showed FMD and retinal arteriolar caliber size (RetA) was inversely correlated ($r = -0.47$, P-value $= 0.02$). There was no significant correlation between PWV and RetA ($r = -0.39$, P-value $= 0.05$) as well as between CIMT and RetA ($r = -0.13$, P-value $= 0.54$). Reduced FMD was associated with a wider RetA after adjusting for age and disease duration with multivariate linear regression analysis (P- $= 0.009$). FMD, PWV and CIMT were not associated with retinal venular caliber size.
Conclusions: In SLE women without CHD, a wider retinal arteriolar caliber is associated with reduced FMD, independent of age or disease duration. These findings suggest retinal arteriolar caliber may be a marker of systemic endothelial dysfunction.
Disclosures: The authors have declared no conflicts of interest.

187. SUPPRESSION OF INFLAMMATION REDUCES ENDOTHELIAL MICROPARTICLES IN ACTIVE SYSTEMIC LUPUS ERYTHEMATOSUS

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Background: SLE is associated with endothelial dysfunction and an increased cardiovascular risk, in part due to inflammatory disease activity. Endothelial microparticles (EMPs) are membrane-bound subcellular particles produced by endothelial cells in response to activation triggers. EMPs reflect endothelial damage and may correlate with measures of endothelial function. In a prospective observational study, we investigated whether patients with active SLE had higher indices of endothelial damage and dysfunction compared with healthy controls, and whether improved disease control was associated with improvement in these indices.
Methods: Twenty-seven patients (mean (SD) age 41.5 (14.1) years) with active SLE ($\geq$4 ACR criteria) and 22 age-matched controls (mean age (SD) 38.5 (9.3) years) were assessed. EMPs were quantified (number/ml) using flow cytometry after incubating platelet-poor-plasma with the cell surface markers CD31, CD42b and Annexin-V. Events positive for annexin-V and CD31, and negative for CD42b, were classified as EMPs. Brachial artery flow-mediated dilatation (FMD) was measured using 2D ultrasound and automated edge-tracking software. Twenty-two patients were re-assessed after initiating new immunosuppressive therapy (median (IQR) interval 20 (16, 22) weeks) and disease activity (BILAG 2004 and SLEDAI 2K) was recorded at each visit. Continuous data were compared using Mann–Whitney test, and Spearman's Rank was used to correlate EMP levels with FMD (%).
Results: At baseline, median (IQR) global BILAG 2004 score was 14 (1222) and SLEDAI-2K was 6 (5, 13) in SLE patients. EMPs (n/ml) were significantly elevated in the SLE cohort (median (IQR) 157,548/ml (59,906, 272,643) *vs* 41,025 (30,179, 98,082); $P = 0.003$). Endothelial-dependent FMD was also significantly reduced in SLE patients (median (IQR) FMD 1.63% (–1.22, 5.32) *vs* 5.40% (3.02, 8.57); $P = 0.05$). EMPs were negatively correlated with FMD (%) (r2 –0.42; $P = 0.008$). In a multiple regression model including SLE, age, blood pressure, total cholesterol, plasma glucose and renal function, SLE was independently associated with EMP levels (n/ml) (B coefficient 145 (29, 260), $P = 0.02$). In the 22 SLE patients who were re-assessed, disease activity improved significantly [median (IQR) change in global BILAG-2004 score –11 (–18, –3)]. EMP levels were reduced [166,982/ml (59906, 278,775) *vs* 55,655 (29475, 188,659); $P = 0.02$] and FMD improved (0.33% (–2.31, 4.1) *vs* 3.19% (0.98, 5.09); $P = 0.1$) over time. There was a moderate correlation between change over time in EMP count (%) and change in global BILAG 2004 score ($r2 = 0.40$ $P = 0.08$) in SLE patients.
Conclusions: Active SLE is associated with evidence of increased endothelial damage and endothelial dysfunction that improved with suppression of inflammation. Better control of active inflammatory disease may contribute to improved cardiovascular risk in SLE patients.
Disclosures: The authors have declared no conflicts of interest.

188. LUPUS NEPHRITIS FLARES PRECIPITATED BY SWITCHING FROM MYCOPHENOLATE MOFETIL TO AZATHIOPRINE IN PRE-PREGNANCY PLANNING

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Background: SLE is a complex autoimmune disease that affects women of childbearing age. LN is a major cause of morbidity and mortality in SLE and is characterized by unpredictable exacerbations and remissions. Following induction therapy of LN, patients are generally maintained in remission by either MMF or AZA. Due to potential teratogenicity, the use of MMF is contraindicated during pregnancy.
Methods: We retrospectively reviewed the clinical data and obstetric outcomes of eight LN patients in the maintenance phase of therapy who were switched from MMF to AZA in pre-pregnancy planning. The aim of this study was to identify risk factors predictive of renal flare.
Results: Three patients developed significant LN flares when switched from MMF to AZA. Two of these achieved pregnancy; one was delivered at 35 weeks by Caesarean section and the other was inducted at 37 weeks, both due to pre-eclampsia. Both experienced post partum flare of nephritis, one requiring cyclophosphamide and the other was controlled with an increased corticosteroid dose and reintroduction of an angiotensin-converting-enzyme inhibitor.

Age of onset of disease and duration of disease were not predictive of renal flare. Ethnicity, class of nephritis, autoantibody profile or presence of antiphospholipid syndrome was not predictive of renal relapse. Urinary protein creatinine ratio, anti-dsDNA antibody titres and ESR were significantly higher in those who experienced renal flare ($P = 0.027$, 0.024 and 0.049 respectively). C3 levels were significantly lower in those who relapsed ($P = 0.03$). Serum creatinine, haemoglobin, serum albumin and C4 levels did not significantly differ between the two groups.
Conclusions: Pre-pregnancy planning is an important aspect of the clinical management of LN. When switching apparently stable patients from MMF to AZA it is important that adequate time and consideration is given to ensure the patient is stable on their new medication regimen before proceeding to pregnancy. Current recommendations advise that stable remission of renal disease is achieved for at least 6 months before conception. This study has found that urinary protein creatinine ratio, anti-dsDNA antibody titres and C3 levels are important predictors of flare in this subset of patients.
Disclosures: The authors have declared no conflicts of interest.

TABLE 1. Clinical details of patient cohort

	Patient who flared post MMF to AZA switch ($n=3$)	Patients who did not flare post MMF to AZA switch ($n=5$)
Age at SLE diagnosis, years	20 (16–25)	19.5 (15–27)
Ethnicity	Caucasian ($n=2$) African ($n=1$)	Caucasian ($n=4$), African ($n=1$)
Successful conception	Yes ($n=2$) No ($n=1$)	Yes ($n=4$) No ($n=1$)
Autoantibody profile	ANA/anti-Ro/RNP/Sm/anti-dsDNA ANA, anti-dsDNA ANA, anti-Ro	ANA only ANA, anti-dsDNA ($n=3$), ANA, anti-dsDNA, anti-Ro
Antiphospholipid syndrome	Negative ($n=3$)	Positive ($n=2$) Negative ($n=3$)
Age at time of MMF to AZA switch, years	30.7 (28–34)	31.4 (20–39)
Disease duration at time of switch, years	10.7 (5–15)	10 (5–15)
Time since last renal biopsy, months	57 (15–96)	22 (12–48)
Class of nephritis	WHO Class III + V WHO Class IV ISN/RPS Class IV-G + V	ISN/RPS Class III ($n=2$) ISN/RPS Class IV-S + V ($n=2$) ISN/RPS Class IV-G + V

Values are mean (IQR) unless otherwise indicated.

189. TARGETING GLYCOSPHINGOLIPID BIOSYNTHESIS PATHWAYS RESTORES T-CELL FUNCTION IN PATIENTS WITH SLE

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Background: Patients with SLE are characterized by hyperactive T cells that provide help to auto-reactive B cells. Underlying this hyperactivity are alterations in the lipid and protein composition of membrane lipid microdomains (lipid rafts) that influence the nature, duration and outcome of immune synapse formation between T cells and antigen-presenting cells including B cells. We examined the profile of lipid-raft-associated glycosphingolipids (GSL) in T cells, the mechanisms underlying their abnormal expression in patients with SLE and whether by normalizing GSL expression, T-cell function could be restored in patients.
Methods: High performance liquid chromatography and flow cytometry were used to assess the GSL profile and phenotype of T cells from 98 patients with SLE compared with 82 healthy controls and 23 patients with other autoimmune rheumatic disease. Western blotting, quantitative PCR and confocal microscopy using fluorescently-labelled GSLs were used to assess levels of proteins controlling GSL expression and GSL location within T cells. T-cell function was assessed by measuring phosphorylation of proximal and downstream signalling molecules, proliferation and cytokine production.
Results: The expression levels of lipid-raft-associated GSL lactosylceramide (LC), Gb3 and GM1 were significantly increased in T cells from patients with SLE compared with healthy and disease controls. In healthy donors LC+, GM1+ and Gb3+ T cells had an activated phenotype, however, raised GSL expression was not associated with a specific phenotype in T cells from patients with SLE. Increased GSL expression in T cells from SLE patients was not associated with altered levels of enzymes controlling GSL biosynthesis, but was associated with increased GSL recycling from the plasma membrane to intracellular compartments. T cells from patients with SLE incorporated fluorescently-labelled-LC into intracellular vesicles more rapidly compared with T cells from healthy controls, and this was accompanied by increased expression of the Niemann-Pick 1 and 2 genes that control GSL recycling. In vitro culture with direct inhibitors of GSL synthesis normalized GSL membrane expression in T cells from SLE patients and restored their function in terms of lipid-raft-associated T-cell signalling, proliferation and cytokine production.
Conclusions: We show that increased expression of GSL in T-cell plasma membranes is associated with altered recycling to intracellular compartments. Furthermore, targeting lipid biosynthesis pathways using clinically approved inhibitors can rectify T-cell hyperactivity in autoimmune T cells and restore their function.
Disclosures: The authors have declared no conflicts of interest.

190. PREDICTORS FOR DAMAGE IN A LARGE LONG-TERM PROSPECTIVE COHORT OF SLE PATIENTS

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Background: To determine the predictors for development of damage in a large prospective cohort of SLE patients.
Methods: This was a longitudinal study of SLE patients under regular follow-up at a single centre (set up in 1989). Patients were included if they were recruited within 3 years of achieving the 4th ACR criteria for SLE. Data were collected on disease activity (BILAG), damage (SLICC damage index) and treatment at every visit. The censure date for analysis was 31/12/2010. Cox proportional hazards model was used to determine predictors of damage which includes disease activity, damage and drug exposure (corticosteroids, antimalarials, immunosuppressives and rituximab).
Results: There were 382 patients (92.4% females, 51.6% Caucasian, 20.7% Afro-Caribbean, 22% South Asian, mean age at recruitment 36.3 years (S.D. 13.3), mean follow-up 7.7 years [S.D.5.2, range: 0.2—21.3)] with 12072 assessments and total follow-up of 2958 patient-years. 94.2% had no damage at recruitment. 300 items of damage occurred in 143 patients. The most common damage were: musculoskeletal 46.2%, neuropsychiatric 39.9%, ophthalmic 30.1%, renal 16.8%, cutaneous 14.7%, pulmonary 14%, cardiac 14%, gastrointestinal 10.5% and malignancy 9.8%. There were 702 systems with Grade A disease activity from 584 assessments (85.4% had only 1 system with Grade A) in 188 patients. The most common systems with Grade A activity were: musculoskeletal 23.4%, mucocutaneous 22.8%, renal 17.4%, neuropsychiatric 16%, vasculitis 8% and general 7.4%. The predictors for development of damage are summarized in Table 1. When used as an alternative measure of disease activity, the number of systems with Grade A score per assessment was also predictive of damage (HR 1.8, 95% CI 1.2, 2.7).
Conclusions: The predictors for development of damage are active disease, age at diagnosis, prior damage, corticosteroids exposure and cyclophosphamide exposure. Use of rituximab appears to be protective.

TABLE 1. Predictors for development of damage

Variable	Hazard ratio (95% CI)
Male sex	0.9 (0.5, 1.7)
Ethnicity: Afro-Caribbean, South Asian, Oriental, others	1.2 (0.7, 1.8), 1.3 (0.9, 1.8), 0.9 (0.3, 2.8), 1.2 (0.5, 2.6)
Age at diagnosis	1.03 (1.02, 1.05)
SLICC damage	1.3 (1.2, 1.4)
General A or B	1.4 (0.6, 3.3)
Neuropsychiatric A or B	3.4 (1.9, 6.0)
Mucocutaneous A or B	1.3 (0.8, 2.2)
Musculoskeletal A or B	1.2 (0.8, 1.8)
Cardiorespiratory A or B	0.4 (0.05, 3.0)
Vasculitis A or B	1.0 (0.3, 3.1)
Renal A or B	2.0 (1.03, 4.0)
Haematology A or B	0.7 (0.2, 1.9)
HCQ exposure	0.9 (0.7, 1.2)
Corticosteroid exposure	1.9 (1.1, 3.1)
Previous corticosteroid exposure	1.4 (0.7, 2.5)
Cyclophosphamide exposure	3.5 (1.8, 6.6)
Mycophenolate exposure	0.9 (0.5, 1.7)
Other immunosuppressive exposure	0.9 (0.7, 1.3)
Rituximab exposure	1.5 x 10–14 (3.6 x 10–15, 6.4 x 10–14)

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191. MORTALITY AND DEVELOPMENT OF DAMAGE IN A LARGE PROSPECTIVE COHORT OF SLE PATIENTS

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Background: To describe the mortality statistics and development of damage in a prospective cohort of SLE patients
Methods: This was a prospective longitudinal study of a cohort of SLE patients under regular follow-up at a single centre that was set up in 1989. SLE patients were included if they were recruited within 3 years of achieving the 4th ACR criteria for SLE. Data were collected on disease activity, damage (SLICC/ACR damage index) and treatment at every visit. Information on death was provided by the Office for National Statistics. The censure date for analysis was 31st December 2010. Analysis was with survival analysis and standardized mortality ratio (SMR) was calculated.
Results: There were 382 patients (92.4% females, 52.6% Caucasian, 20.7% Afro-Caribbean, 22% South Asian) with 12072 assessments and total follow-up of 2958 patient-years. The mean age at recruitment was 36.3 years (S.D.13.3) and mean duration of follow-up was 7.7 years (S.D.5.2, range: 0.2–21.3). Majority (94.2%) had no damage at recruitment. There were 300 items of damage (in 143 patients) and 37 deaths. The demographics of those who died were: 91.9% females, 67.6% Caucasian, 18.9% South Asian, 10.8% Afro-Caribbean, mean age at death 53.7 years (S.D.17.4) and mean disease duration at death 6.9 years (S.D.4.4). The causes of deaths were: infection 37.8%, cardiovascular 27%, malignancy 13.5%, ARDS 5.4%, active SLE 5.4%, pulmonary hypertension 2.7%, cardiac tamponade 2.7%, gastrointestinal bleeding 2.7% and alcoholic liver cirrhosis 2.7%. The overall SMR was 1.7 (95% CI 1.2, 2.4). The breakdown of SMR (95% CI) according to age groups (in years) were: 20 to 24—5.2 (1.3, 20.9), 25 to 34—3.5 (1.3, 9.3), 35 to 44—1.5 (0.5, 4.5), 45 to 54—3.0 (1.6, 5.7), 55 to 64—0.7 (0.2, 2.3), 65 to 74—2.0 (0.9, 4.1), 75 to 84—1.0 (0.2, 3.8) and >84—15.2 (2, 107.6). The incidence rate for the development of damage is summarized in Table 1.
Conclusions: SLE patients have premature mortality and the risk is highest in the younger age group. The most common causes of death were infection, cardiovascular disease and malignancy. The development of damage appears to be stable throughout the follow-up period.

TABLE 1. Incidence rate of development of damage over period of follow-up at 3 yearly intervals

Period of follow-up (year)	Person-years at risk	Number of new items of damage	Incidence rate, per 1000 person-years (95% CI)
0—3	1043.3	125	119.8 (100.5, 142.8)
3—6	779.1	67	86.0 (67.7, 109.3)
6—9	499.0	35	70.1 (50.4, 97.7)
9—12	322.4	28	86.8 (60.0, 125.8)
12—15	191.7	9	47.0 (24.4, 90.3)
15—18	86.5	6	36.4 (31.2, 154.4)
> 18	35.9	5	139.3 (58.0, 334.7)

Disclosures: S.B., Merck Serono, Eli Lilly, GlaxoSmithKline—Consultation Fees. C.G., Roche, Genentech—Consultation Fees, Aspreva/Vifor Pharma—Research Grant. C.Y., Roche, Genentech—Consultation Fees. All other authors have declared no conflicts of interest.

192. MEMORY T-CELL SUBSETS PREDICT THE RATE OF B-CELL REPOPULATION FOLLOWING RITUXIMAB THERAPY IN SLE

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Background: SLE is characterized by antibodies to nuclear antigen and abnormal B- and T-cell phenotypes. We have shown that higher rates of B-cell repopulation following rituximab therapy (RTX) correlate with early relapse but the number and phenotype of the B cells at relapse differ according to the levels of dsDNA antibodies. Improved understanding of the mechanisms of B-cell differentiation might help to predict B-cell repopulation and subsequent flare. The aim of this study was to correlate memory T-cell phenotypes with memory B-cell phenotypes and investigate whether memory T-cell phenotypes are associated with differences in B-cell repopulation.
Methods: 12 healthy controls and 74 patients with SLE who attended the rheumatology clinic at UCLH were included in the study. B cells were depleted using RTX 1 g on days 1 and 14 with most patients also receiving intravenous cyclophosphamide. Disease activity was measured using the BILAG index. Clinical relapse was defined as 1 new 'A' or 2 new 'B' scores. B cells were counted by the haematology laboratory at UCLH. B- and T-cell phenotypes were determined by flow cytometry using the markers CD19, CD27 and IgD for B cells and CD4, CD27 and CD45RA for T cells.
Results: Effector memory CD45RA-CD27– CD4+ T (Tem) cells and revertant memory CD45RA+CD27– CD4+ T (Trm) cells were increased in the CD4+ T-cell pool in patients with SLE (both $P = 0.01$) but were not associated with active disease and did not differ between patients with high or low dsDNA antibody levels. There were no changes in the T-cell phenotypes following RTX. In patients with a Trm:Tem ratio >0.1 pre-RTX there was a positive correlation between Trm cells and IgD-CD27– B cells ($R^2 = 0.84$, $P < 0.01$)—the latter is associated with relapse with low dsDNA antibody levels after RTX—and an inverse correlation between Trm and IgD + CD27 + memory B cells ($R^2 = 0.54$). In patients with a Trm:Tem ratio <0.1 pre-RTX there was a positive correlation between Tem cells and plasmablasts ($R^2 = 0.16$, $P = 0.02$)—the latter is associated with relapse with high dsDNA antibody levels after RTX. B-cell numbers increased the most rapidly in patients with high percentages of Trm cells (>0.8%) after RTX, followed by patients with high percentages of Tem cells (>3%) but low/normal percentages of Trm cells and the least rapidly in patients with low/normal percentages of Tem and Trm cells ($P < 0.0001$). The rates of relapse after RTX of the 3 groups paralleled the rates of B-cell repopulation, although the differences only became noticeable after 40 weeks ($P < 0.05$).
Conclusions: Memory T-cell phenotypes correlate with different B-cell phenotypes prior to RTX and different rates of B-cell repopulation following RTX. These T-cell subsets might be useful markers for predicting when patients with SLE will relapse following RTX. Our data also provide insight into T-B cell interactions during B-cell repopulation and flare in patients with SLE treated with RTX.
Disclosures: The authors have declared no conflicts of interest.

193. ELEVATED SERUM B-CELL ACTIVATING FACTOR CHARACTERIZES DISEASE RELAPSE FOLLOWING RITUXIMAB IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Background: Numerous reports suggest that B-cell depletion therapy (BCDT) using rituximab is effective for patients with SLE. However, two major trials did not confirm these results. We, and others, have shown that the characteristics and kinetics of repopulating B cells are associated with different clinical responses to BCDT. B-cell activating factor/B Lymphocyte Stimulator (BAFF/BLyS) is a key mediator of B-cell survival and self-tolerance. BAFF is over-expressed in many patients with SLE and is implicated in the pathogenesis of autoimmune disease. The present study examines changes in serum BAFF at disease flares and remission following BCDT and assesses the relationship between serum BAFF, B-cell numbers and autoantibody levels according to treatment outcome.
Methods: 35 patients with SLE had serum samples available for analysis following one or more cycles of BCDT using rituximab, cyclophosphamide and methylprednisolone. Patients were followed up until disease flare, further BCDT or for a minimum of 18 months following last BCDT. Anti-dsDNA levels, immunoglobulins and CD19+ counts were recorded throughout. Clinical disease was assessed using the Classic BILAG index. Serum BAFF was measured during disease flare prior to BCDT and at subsequent relapse or remission by ELISA.
Results: Following initial BCDT, 10 patients remained in remission for the duration of follow up. Twenty-five patients went on to relapse, of which 22 were treated with further BCDT. BAFF levels prior to BCDT were positively correlated with B-cell numbers ($R = 0.65$, $P < 0.05$) and serum IgG ($R = 0.56$, $P < 0.01$), but did not predict subsequent treatment outcome or time to repopulation following rituximab. However, BAFF levels at disease relapse after BCDT were significantly higher than in patients who remained in remission ($P < 0.05$) and were also greater than at disease flare prior to BCDT ($P < 0.05$). Following BCDT serum BAFF was inversely correlated with B-cell numbers at disease flare ($R = -0.44$, $P < 0.05$), with flare at lower B-cell numbers associated with the highest BAFF levels. Changes in serum BAFF during relapse or remission positively correlated with change in anti-dsDNA antibody levels ($R = 0.62$, $P < 0.05$).

Conclusions: The present data show disease relapse following BCDT in SLE is associated with significant elevation in serum BAFF, which parallels changes in anti-dsDNA antibody levels. Moreover, BCDT inverts the relationship between BAFF and B-cell numbers during active disease. The present data suggest a significant role for BAFF during disease flares after BCDT and support the rationale for using BAFF-targeted therapies following BCDT in a subset of lupus patients who flare with the combination of high BAFF levels, low B-cell numbers and high anti-DNA antibody levels.
Disclosures: The authors have declared no conflicts of interest.

194. ROLE OF SEROLOGICAL MARKERS AT BASELINE AND FOLLOW-UP IN PREDICTING BIOPSY-PROVEN LUPUS NEPHRITIS

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Background: Studies have shown that 30–50% of SLE patients develop LN. Patients with high affinity anti-dsDNA antibodies (abs) are more likely to develop LN. The Farr radioimmunoassay is the best method of detecting these abs but is rarely available. Instead ELISA tests for anti-dsDNA abs that detect abs of variable affinity and Crithidia test for detecting high affinity abs are used. It is unclear if the Crithidia test needs to be repeated at every visit with C3 and C4 and anti-dsDNA abs by ELISA to assess lupus activity and the risk of developing LN. Therefore, we audited the relationship between anti-dsDNA abs by ELISA and Crithidia, and low C3 and C4 at baseline and follow-up in SLE patients with and without biopsy proven LN.
Methods: Data were recorded prospectively from 1989 including lupus activity, renal biopsy (WHO classification), anti-dsDNA abs by ELISA and Crithidia, C3 and C4 levels. Patients were excluded if not seen in the clinic before 1st renal biopsy, had <2 visits to the clinic or had missing baseline and/or follow up data. Patients that developed Class III/IV $\pm$ Class V were combined. Pure class V LN was analysed separately. Chi squared analysis was performed.
Results: Of 309 patients, 290 (94%) were eligible: 93% female, 7% male,12.7% Afro-Caribbean, 17% South Asian, 63% Caucasian, 2% Chinese and 3% recorded as mixed/other. The mean $\pm$ S.D. age was 49 ± 15.1 and disease duration 17.5 ± 8.3 years. There were 43 eligible patients with renal biopsies. Distribution of each WHO class of LN was Class II 16%, Class III/IV 63%, and Class V 9%. The 27 patients that developed Class III/IV LN (LNIII/IV) were compared with remaining 263 patients.

At baseline: 78% of LN III/IV patients had anti-ds-DNA abs by ELISA and Crithidia, *vs* 20% positive (pos) for both without LN III/IV, and 81% of LN III/IV were pos for each anti-DNA abs test *vs* 33% without LN III/IV ELISA pos and 22% Crithidia pos. Low C3 and C4 was present in 63% with LN III/IV and 7% without LN III/IV, and 63% with LN III/IV had pos ELISA and low C3/C4 *vs* 5% without LN III/IV. Pos ELISA, Crithidia and low C3/C4 was found in 59% with LN III/IV *vs* 5% without LN III/IV (all $P < 0.001$).

There was no significant relationship between any anti-dsDNA antibody and complement test singly or in combination at baseline and the subsequent development of class V LN. Over time more patients developed anti-dsDNA abs measured by ELISA and Crithidia. Developing Crithidia pos later was not helpful in identifying those more at risk of LN III/IV than baseline measurement. The combination of anti-dsDNA by ELISA with low C3/C4 was sensitive for identifying those at risk of LN III/IV.

Conclusions: We suggest the combination of anti-ds DNA abs by ELISA and Crithidia together with low C3/C4 results at baseline can help to identify patients at most risk of developing class III/IV LN. Results do not support the need to measure anti-dsDNA abs by Crithidia serially, but do support the combination of ELISA, C3 and C4.
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195. RHUPUS: AN ULTRASONOGRAPHIC PERSPECTIVE

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Background: Lupus arthritis and RA are usually considered distinct, but the presence of joint erosions in lupus can obscure this boundary. Such erosive arthropathy is often referred to as rhupus and is thought to represent a minority of the joint involvement in SLE. In contrast to RA advanced joint imaging techniques including ultrasound have not yet been widely applied. Although there have been some attempts to correlate erosive arthritis in SLE with a particular antibody profile or an elevated CRP, there is no conclusive evidence.
Methods: 45 SLE patients with joint symptoms of varying disease duration and 40 RA patients matched for disease duration were recruited. All patients underwent a clinical examination and an ultrasound scan (Grey-scale and Power Doppler) of their hand which was scored according to a validated system.
Results: see Table 1.
Conclusions: Our study has shown that ultrasound may reveal a much higher percentage of erosions than previous estimates of $<5\%$. Previous research (albeit without ultrasound) has identified a link between erosive disease and anti-CCP antibodies as in RA, but our results show no association. Interestingly CRP in our subset of erosive lupus arthritis was similar to that of the RA group, and was significantly higher than in the non-erosive lupus arthritis group ($P = 0.02$).

Advanced imaging techniques may have an impact on the perception of SLE arthritis that will ultimately influence treatment approaches. Although no conclusive evidence exists surrounding the natural history of lupus arthritis we make the assumption that erosive disease as in RA may be prevented if treated early and aggressively. The potential ability to assign SLE patients into categories of which the natural history and joint disease progression were recognized would be invaluable terms of differentiated therapeutic decision-making. Although large prospective studies do not yet exist we believe that future wider application of ultrasound in lupus arthritis holds the key to a distinct classification system.
Disclosures: The authors have declared no conflicts of interest.

196. INTERFERON-ALPHA MAY IMPAIR ENDOTHELIAL REPAIR MECHANISMS IN SYSTEMIC LUPUS ERYTHEMATOSUS

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TABLE 1. Results

	RA $n = 40$	Erosive SLE arthritis $n = 14$	Non-erosive SLE arthritis $n = 14$	SLE arthralgia $n = 9$
RF positive, *n* (%)	39 (97.5)	2 (9)	1 (7.1) (low titres)	1 (11) (low titre)
Anti-CCP antibody positive, *n* (%)	38 (95)	2 (9)	1 (7.1)	0
Deformity present, *n* (%)	30 (75)	15 (68)	4 (28)	0
Swollen joint count, mean (S.D.)	6.1 (4.1)	5.1 (6.0)	3.57 (2.2)	0.3 (1.0)
Tender joint count, mean (S.D.)	4.3 (3.0)	3.8 (4.3)	4.3 (3.0)	4.4 (3.4)
CRP, median (IQR), mg/dl	5.6 (2.1–2.2)	3.4 (1.7–7.3)	1.3 (1.1–5.9)	1.5 (1.2–3.0)
ESR, mean (S.D.), mm/h	26.5 (23.5)	19.3 (15.3)	21.1 (23.5)	25.3 (27.5)
Wrist GSSH >2 PD >2 erosion >2, *n* (%)	22 19 12	18 9 13	7 3 0	0 0 0
2nd MCP GSSH ≥ 1 Erosion ≥ 2, *n* (%)	22 24	16 10	4 0	0 0
Tenosynovitis ECU PD ≥ 2, *n* (%)	9	3	3	0
Mean ultrasound activity score,[a] mean (S.D.)	9.97 (6.39)	10.18 (7.59)	5.78 (5.4)	0
Total Erosion score.[b] mean (S.D.)	3.03 (2.38)	3.0 (2.76)	0	0

[a]Total sum of GSSH and PD scores for all joints assessed. [b]Total sum of erosion scores for all joints assessed. GSSH: Grey-scale synovial hypertrophy; PD: Power Doppler; ECU: extensor carpi ulnaris.

Background: Patients with SLE have an increased risk of cardiovascular disease (CVD). Interferon-alpha (IFNα) may contribute to this increased risk by inhibiting endothelial repair mechanisms. Circulating angiogenic cells (CACs) enhance vascular repair in murine models and may be affected by IFNα. We aimed to characterize CACs in detail and determine the effects of IFNα on their function ex vivo to develop a model of failed vascular repair relevant to SLE.
Methods: Peripheral blood mononuclear cells were obtained from healthy controls (HC) and clinically stable SLE patients ($n = 5$ each) and cultured on human fibronectin in endothelial media for 7 days. CACs were identified as dual positive for LDL-uptake and lectin binding. Cell surface marker expression was determined by RT-PCR and immunocytochemistry. CAC function was studied in terms of: migration (towards SDF-1), adhesion to TNFα-activated aortic endothelium and angiogenic capacity (augmentation of endothelial network formation). The number of LDL-positive cells was enumerated after 7 days treatment with IFNα2b (0.01–100 ng/ml). To study angiogenic capacity, supernatant from day 8 CACs (± IFN pre-treatment) was added to human aortic endothelial cells (HAoEC) on Matrigel for 16 h. Network parameters were calculated using a semi-automated computer algorithm. The number of polygons (PG) in the network was used as a marker of network complexity, normalized to media alone (NPG) for comparison of HC and SLE cells.
Results: CACs expressed markers of myeloid (CD14, CD45, CD31) but not endothelial (vWF) lineage. Cells were phagocytes with high expression of CD163 and CD206 suggesting an alternatively-activated (M2) macrophage phenotype. CACs migrated towards developing endothelial cell tubules in Matrigel but were not able to form networks alone. CACs migrated towards SDF-1 (0.1–100 ng/ml, $r2 = 0.87$, <0.001) with increased adhesion to TNFα-activated HAoECs, compared with unstimulated endothelial cells ($P = 0.02$).

HC CAC supernatant was pro-angiogenic compared with media alone (PG 21.9 *vs* 38.3, $P < 0.01$). Although there was no difference in the number of CACs at day 8 between HC and SLE patients, there was a trend towards a reduced angiogenic capacity of SLE CACs (NPG 1.69 *vs* 1.47, $P = 0.26$). IFNα dramatically reduced HC CAC survival ($r2 = 0.77$, $P < 0.001$) at day 8. This was associated with loss of angiogenic capacity with 10 ng/ml IFNα (PG 38.1 *vs* 24.1, $P = 0.01$) but not 0.1 ng/ml (37.4 *vs* 36.8, $P = 0.90$). IFNα (0.1 ng/ml) did not significantly affect CAC migration or adhesion (relative no. cells 2.05 *vs* 1.72, $P = 0.40$, and 2.09 *vs* 2.21, $P = 0.67$ respectively).
Conclusions: We have characterized CACs as M2 macrophages with angiogenic capacity and shown that survival ex vivo is reduced by IFNα. CACs may be dysfunctional in stable lupus patients, and further inhibited by IFNα in active disease. Restoration of CAC function is a novel therapeutic target to reduce CVD in SLE.
Disclosures: The authors have declared no conflicts of interest.

197. CHARACTERISTICS OF PATIENTS WITH REFRACTORY SYSTEMIC LUPUS ERYTHEMATOSUS REQUIRING BIOLOGIC THERAPY IN A UK MULTICENTRE COHORT

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Background: The BILAG Biologics Prospective Cohort is a UK multicentre observational cohort study, set up to ascertain the safety and efficacy of biologics therapy in the treatment of patients with refractory SLE. In this abstract, we examined the baseline characteristics of patients with refractory SLE, who require biologic therapies, in this cohort. In particular we aimed to examine ethnicity, levels of disease activity and organ involvement within this population and the time between treatments in those retreated.
Methods: The BILAG Biologics Prospective Cohort aims to recruit patients with SLE (≥ 4 ACR 1997 criteria), refractory to conventional therapy and newly starting treatment with a biologic agent, and a comparison cohort of patients newly treated with a standard immunosuppressive, from a number of centres across the UK. We recruited patients from 15 centres and recorded baseline data at the time of commencing their new therapy. For each patient we collected baseline demographics, disease activity and organ system/distribution as well as previous and concurrent therapy.
Results: Seventy-one patients were recruited after commencing their biologics therapy, 67 (94.4%) commencing rituximab, 3 (4.2%) starting belimumab and 1 (1.4%) with tocilizumab, with the majority [65 (91.6%)] of patients being female. Twenty-eight (51.9%) describe themselves as White, 11 (20.4%) as Indian, Pakistani, Bangladeshi or other Asian, 8 (14.8%) as of African ancestry and 7 (13.0%) of mixed or other ethnicity. Thirteen (24.1%) patients were not working due to sickness or disability. The median (IQR) age at baseline, age at diagnosis and baseline disease duration were 38.9 (21.5), 30.0 (24.2) and 6.2 (12.2) years respectively. The number of patients with at least one A or B score on the BILAG 2004 index at baseline was 49 (92.5%) and the median (IQR) SLEDAI-2K score when therapy was started was 7.5 (8). The majority (51.4%) had a SLICC/ACR damage index (SDI) score ≥1. The median (IQR) prednisolone dose at entry was 11.25 (11) mg/day. Of the 67 patients receiving Rituximab, 60 (89.6%) were receiving it episodically, of which 12 (20%) required a retreatment, with a median (IQR) 9.5 (4.5) months between initial treatment and retreatment.
Conclusions: In this cohort of patients with refractory SLE, a high proportion were from ethnic minority populations, which has implications for healthcare planning and generalizing clinical trial data. Recruited patients have high disease activity and already have significant pre-existing damage by the time biologic therapy is initiated, which may influence future adverse event and morbidity rates.
Disclosures: I.B., GSK, HGS, Roche, Pfizer—Grants and Consultancy. D.D., Roche—Consultancy, GlaxoSmithKline—Consultancy, Participation in the Belimumab Clinical Trials. C.E., GSK, Roche—Advisory Boards, Received Honoraria for Lectures. C.G., Roche, Biogen—Honoraria for Consultancy on Trial Design, GSK—Advisory Boards, Honoraria and Lectures. D.I., Roche—Consultancy. A.R., GSK—Consultancy. L.T., GSK—Sponsored Meetings to EULAR and ISOQOL. All other authors have declared no conflicts of interest.

198. HIGH PREVALENCE OF A POSITIVE FAMILY HISTORY OF SYSTEMIC LUPUS ERYTHEMATOSUS IN JUVENILE-ONSET *VS* ADULT-ONSET DISEASE: A COMPARATIVE STUDY

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Background: The pathogenesis of SLE is complex and poorly understood. A genetic contribution is evident from a monozygotic twin concordance rate of 30–40%. Juvenile-onset SLE is often severe at presentation compared with adult onset disease. We compared family history of SLE, immunology, severity of organ involvement and differences between medications used in both groups.
Methods: Clinical and demographic data were collected on 25 juvenile-onset SLE patients (jSLE) and compared with 65 matched patients with adult-onset disease. All patients met the American College of Rheumatology (ACR) classification criteria for SLE. Juvenile-onset was defined as those who were diagnosed with SLE before16 years of age. Data collected included ethnicity, family history of SLE/autoimmune disease, autoantibody profile, lupus-related disease manifestations and medications used.
Results: 36% of jSLE patients had a positive family history of SLE compared with 12% of adult-onset disease patients ($P = 0.011$). Family history of other autoimmune conditions such as RA, hypothyroidism did not differ significantly between the two groups. In jSLE patients 21 (84%) were female and 4 (16%) male. Mean age of disease onset was

TABLE 1. Results

	Juvenile-onset SLE ($n = 25$)	Adult-onset SLE ($n = 65$)
ANA, anti-dsDNA, anti-Ro (SSA), anti-La (SSB), anti-Sm, anti-RNP, aCL, lupus anticoagulant, anti-C1q	23 (92), 18 (72), 9 (36), 3 (13), 7 (31), 10 (40), 13 (52), 8 (32), 11/17 (65)	64 (98), 32 (49), 24 (36), 7 (10), 16 (32), 24 (36), 19 (29), 16 (24), 19/30 (63)
Prednisolone, HCQ, mepacrine, MMF, AZA, MTX, CYC, rituximab, plasmapheresis, i.v. immunoglobulin	21 (84), 18 (72), 1 (4), 17 (68), 5 (20), 1 (4), 5 (20), 6 (24), 2 (8), 1 (4)	53 (81), 54 (84), 5 (7), 32 (49), 19 (29), (3) 10 (15), 7 (10), 0, 0

Data are *n* (%).

13 years (range 10–16 years). 13 (52%) were Afro-Caribbean, 7 (28%) Caucasian, 4 (16%) Asian and 1 (4%) was of mixed ethnic origin. In adult-onset disease, 60 (92%) were female and 5 (7%) male. Mean age of disease onset was 29 years (17–50 years). 29 (44%) were Afro-Caribbean, 13 (20%) Asian, 21 (32%) Caucasian and 2 (3%) were of mixed ethnicity. 18 (72%) patients of jSLE patients had LN, 3 (12%) had interstitial lung disease, 4 (16%) had APS. Only 1 (4%) patient had AIHA. 43 (66.1%) patients of adult-onset SLE patients had LN, 5 (7.69%) were diagnosed with interstitial lung disease. 12 (18.4%) patients had APS and 4 (6.1%) had either AIHA or thrombocytopenia.
Conclusions: A family history of SLE was significantly more common in jSLE than in adult-onset patients. Frequencies of LN and anti-dsDNA antibody positivity were higher in jSLE, which may reflect a more severe clinical phenotype. The majority of jSLE patients were of African ancestry, who are known to have worse clinical outcomes. Medications and clinical interventions such as MMF, cyclophosphamide and rituximab were more frequently used in jSLE patients, supporting the likelihood of more severe and difficult to manage disease in this subset of patients.
Disclosures: The authors have declared no conflicts of interest.

199. AFFINITY-PURIFIED ANTIBODIES DIRECTED TO DOMAIN I OF β2GPI ARE PATHOGENIC IN A MOUSE MODEL OF THROMBOSIS

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Background: Circulating IgG antiphospholipid antibodies (aPL) against β2-glycoprotein I (aβ2GPI) are a serological hallmark for diagnosis of the antiphospholipid syndrome (APS). We and others have shown that aPL targeting domain I (DI) of β2GPI (aDI) are APS-specific, predominantly correlating with thrombosis. We also demonstrated that recombinant DI inhibits aPL-induced thrombosis in a mouse microcirculation model. To date however, no study has confirmed a direct link between aDI and APS pathology. We employed the same mouse model to assess the thrombogenic potential of affinity purified polyclonal aDI IgG.
Methods: Serum from one female APS patient was incubated with DI coupled to nickel beads to adsorb aDI. The bead-serum mix was spun, serum re-collected and antibodies bound to the beads were eluted. IgG was purified from re-collected serum (aDI-poor) and eluted fractions (aDI-rich), and tested for aCL (GPLU), aβ2GPI (GBU, in-house calibrator) and aDI (GDIU, in-house calibrator) activity. For *in vivo* experiments, adult CD1 mice were injected twice with 100 μg/ml aDI-poor, aDI-rich, or healthy control IgG (NHS-IgG) (5–10 animals per group). 72 h after the first injection, the size of induced thrombi in the femoral vein was determined [1]. Tissue factor (TF) activity was measured in homogenates of pooled carotid arteries and peritoneal macrophages using a chromogenic assay. Mouse sera obtained on the day of surgery were tested for circulating aPL and whole human IgG.
Results: Purified aDI-rich IgG displayed high aCL (≥90GPLU), aβ2GPI (≥95GBU) and aDI (≥50GDIU) activity whilst aDI-poor IgG had high aCL (≥90GPLU) but reduced aβ2GPI (47GBU) and aDI (17GDIU) activity. aDI-rich IgG induced significantly larger thrombi compared with aDI-poor and NHS-IgG ($P < 0.0001$). In addition, aDI-rich IgG greatly increased TF activity in carotids (2.4 fold) and peritoneal macrophages (3.5 fold) compared with NHS-IgG. In contrast, aDI-poor IgG induced less macrophage TF activity and did not increase carotid TF activity above that of NHS-IgG (aDI-rich *vs* aDI-poor IgG, $P < 0.01$) (Table 1). Circulating aPL were detected only in sera from mice injected with aDI-rich IgG; whole human IgG was present in all mouse sera.
Conclusions: This is the first study to directly demonstrate that affinity purified aDI IgG are pathogenic *in vivo*. Despite aDI-poor IgG retaining aPL activity, significantly larger thrombi and elevated TF activity were induced with aDI-rich IgG. Our findings support the concept that although circulating aPL recognizing different domains of β2GPI can be pathogenic, the major populations that drive thrombosis are directed against DI.

TABLE 1. Results

Mice/ treatment	Thrombus size (μm^2)	TF activity[a] carotids (pM/mg.ml–1 protein)	TF activity[a] peritoneal macrophages (pM/mg.ml–1 protein)
NHS-IgG	525 (136)	150 (21)	31 (4)
aDI-poor	952 (224)*	223 (72)	29 (13)
aDI-rich	1990 (702)**	361 (181)***	107 (55)***

Mean (S.D.); *$P < 0.0001$ to NHS-IgG; **$P < 0.0001$ to NHS-IgG and aDI-poor; ***$P < 0.01$ to aDI-poor; [a]mean of ≥2 measurements.

Disclosures: The authors have declared no conflicts of interest.

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200. UNRAVELLING MONOCYTE RESPONSES TO ANTIPHOSPHOLIPID ANTIBODIES

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Background: Antiphospholipid syndrome (APS) is an autoimmune disorder characterized by recurrent vascular thrombosis (VT) and/or pregnancy morbidity (PM) in the presence of persistent antiphospholipid antibodies (aPLs). The mechanisms leading to the pathogenesis of aPLs are not fully elucidated. aPLs are known to activate monocytes by inducing the production of tissue factor and pro-inflammatory cytokines. However, diverse aPLs from either VT or PM patients are known to stimulate different monocyte intracellular pathways. In order to dissect the cellular mechanisms involved in the activation of monocytes by diverse aPLs, a comprehensive proteomic analysis was conducted.
Methods: Human monocytic cell line U937 and healthy monocytes were treated with 100 μg/ml of IgG from patients with VT or PM or healthy control IgG. Proteomic analysis of cell lysates was performed using two dimensional difference gel electrophoresis (2D DiGE) and label free quantification mass spectrometry (LC/MS). Differentially up regulated proteins were identified by mass spectrometry and validated using quantitative PCR (qPCR) and western blotting. Functional annotation of the significantly regulated proteins was investigated using various databases.
Results: In U937 cells, 2D DiGE analysis revealed more than 50 proteins were regulated by at least 2 fold in APS samples compared with healthy controls. 18 proteins were commonly up regulated in VT and PM, whereas 23 and 4 proteins were solely induced in VT and PM respectively. In monocytes, significantly higher numbers of regulated proteins were revealed. 190 proteins were regulated by more than 2 fold in APS samples compared with healthy controls; 65 proteins were up regulated in both VT and PM while 54 and 40 proteins were exclusively induced in VT and PM respectively. Mass spectrometry analysis of the most significantly regulated proteins identified at least 11 proteins with a high degree of confidence. Amongst these proteins, Vimentin and Zinc finger CCCH domain containing protein 18 were identified as the most significantly up regulated in both U937 cells and monocytes. Additionally, proteins such as Myeloperoxidase and CAP Gly domain containing linker protein 2 were identified as the most significantly down regulated in monocytes. These novel targets were validated using qPCR and western blotting analysis. Functional analysis of selected proteins is currently underway.

Further characterization of healthy monocyte proteome exposed to IgG from VT patients was carried out using LC/MS. This approach revealed unique and complementary proteins identified by 2D DiGE including ones involved in the immune response to infection, leucocyte migration and regulation of actin cytoskeleton.
Conclusions: Two different proteomic analyses were used to identify at least four novel proteins involved in the diverse pathogenic mechanisms of APS in monocytes, providing new potential targets for the treatment of this disease.
Disclosures: The authors have declared no conflicts of interest.

201. THE IMPACT OF NON-VISIBLE SYMPTOMS IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Background: SLE is an autoimmune condition that presents symptoms anywhere in the body. Not all are visible, such as fatigue, pain and cognitive impairment; previous research has highlighted difficulties faced by health professionals when dealing with symptoms that are less apparent [1]. A qualitative study explored the impact of non-visible symptoms associated with SLE from the patient's perspective.
Methods: Six semi-structured interviews were conducted with patients being treated for SLE. Transcripts were analysed using Interpretative Phenomenological Analysis in order to generate themes directly relevant to patients' experiences. Analysis was by an independent researcher with a subset analysed by the rest of the research team and a patient partner.
Results: Five overarching themes were identified:

'Worried they weren't taking me seriously' (not being believed). All patients highlighted negative aspects of non-visible symptoms. This applied to health professional involvement, 'they wouldn't listen to me' and relationships, 'stop being such a hypochondriac'. Occasionally less apparent symptoms were viewed positively, particularly in relation to friends and family, 'I don't want a fuss'.

'Why am I feeling so ill?' (Seeking explanation). A sense of needing to understand was identified in all transcripts, around the time of diagnosis, 'this can't be Lupus' and also continuing with the variety of symptoms experienced, 'don't know whether that's Lupus'.

'Out of my control' (loss of control). This was experienced on a number of levels, from the illness itself, 'it takes away your freedom' to relationships with health professionals, 'my doctor called the shots'. Also, some patients identified a loss of control within their relationships, 'he stopped people coming' and 'so protective I feel like a prisoner'.

'Who are you' (Impact on self) All patients demonstrated changing perceptions of the self. This was evident in comparison against others, 'not normal' and comparison against their earlier selves, 'used to party', 'never had spots as a girl'. There was also a sense of needing to change previous routines and beliefs about themselves, 'learning to adapt'.

'Don't think they understand' (Impact on relationships). Relationships with friends were identified as difficult, 'relationships start fading' and resulted in some social withdrawal, 'I can't go out'. Lack of understanding due to non-visible symptoms resulted in loss of friendships, 'lost along the way who don't understand'.
Conclusions: All patients highlighted the impact of non-visible symptoms on many aspects of their lives. As a result, it was seen how all the emergent themes interacted with far reaching consequences to the patients concerned. Future research should attempt to highlight ways in which primary and secondary care can try to improve the management of SLE in relation to non-visible symptoms.
Disclosures: The authors have declared no conflicts of interest.

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202. SERUM RITUXIMAB LEVELS AND EFFICIENCY OF B-CELL DEPLETION: DIFFERENCES BETWEEN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND RHEUMATOID ARTHRITIS

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Background: Variability in rituximab-induced B-cell depletion (BCD) occurs in a significant number of patients with SLE and to a lesser extent in patients with RA. A failure to adequately deplete (CD19 + B cells $<5/\mu l$) probably underlies poor clinical response in many patients with SLE. We have therefore investigated whether the levels of rituximab influence the degree of peripheral BCD.
Methods: To determine the serum levels of rituximab at 1 and 3 months post-rituximab in SLE and RA in conjunction with the measurement of absolute number of peripheral CD19+ B cells.

A total of 16 patients with SLE and 23 with RA were included. All were treated with rituximab (2 x 1 g doses given 2 week apart). Rituximab levels at 1 and 3 months post treatment was measured with a capture ELISA using sera diluted at a concentration of 1/40,000. CD19 counts were determined by flow cytometry. Adequate depletion was defined as CD19+ count <5 cells/μl. Data were compared using the Mann–Whitney *U*-test for non-parametric data and the Spearman Rank for correlation.
Results: At 1 month, 6 of 15 (40%) patients with SLE and 6 of 23 (26%) patients with RA had CD19 cell count >5 cells/μl. The median CD19 count in these patients was 20cells/μl and 8cells/μl for SLE and RA, respectively. The levels of rituximab were significantly lower in SLE when compared with RA, at both 1 and 3 months after rituximab treatment. The median rituximab level at 1 month for SLE was 43.07μg/ml (range 0–777) and for RA, 391.9μg/ml (range 1.3–2500) ($P = 0.0008$). The median rituximab level at 3 months were $<10\mu$g/ml (range 0–54) for SLE and 2.6μg/ml (range 0–1153) for RA ($P = 0.008$). Amongst patients who had depleted well, rituximab levels were significantly lower in patients with SLE when compared with patients with RA at 1 month ($P = 0.003$) and also at 3 months ($P = 0.008$). No such difference was found in patients who did not deplete well. Six patients with SLE had LN and the presence of LN did not influence the levels of rituximab or the degree of BCD, in this small group of patients. The levels of rituximab correlated inversely with the absolute numbers of CD19+ B cells in patients with RA at 1 month ($r2 = 0.69$) and in patients with SLE at 3 months ($r2 = 0.51$).
Conclusions: Our data indicated that patients with SLE had markedly (>9 fold at 1 month) lower serum levels than RA patients at both 1 and 3 months. A higher proportion of patients with SLE depleted less well with significantly higher residual CD19+ B cells due to factors involved in clearance of rituximab such as impaired recycling through FcRn, internalization and destruction by target B cells.
Disclosures: The authors have declared no conflicts of interest.

203. USE OF AN *IN VITRO* WHOLE-BLOOD DEPLETION ASSAY TO COMPARE THE EFFICACY OF B-CELL DEPLETING AGENTS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Background: Variability in clinical response to B-cell depletion therapy (BCDT) with the anti-CD20 mAb rituximab (RTX) has been well described in SLE. Poor clinical response is associated with incomplete depletion, which suggests that improving the efficiency of depletion might result in improved therapeutic outcome. GA101 is a recombinant, afucosylated fully human type II anti-CD20 mAb that has shown more effective depletion and clinical response in phase II trials in lymphoma. We have therefore compared the *in vitro* B-cell cytotoxicity (cytotoxicity index, CTI) of BHH2 (glycosylated GA101) with RTX, in lymphocytes from patients with SLE.
Methods: We included 23 patients with SLE, who met the American College of Rheumatology revised classification criteria. An *in vitro* autologous whole blood depletion assay (WBD) was used to assess the CTI. Briefly, 100 μl of heparinized blood was incubated with either RTX, BHH2 or an isotype control, at a concentration of 1 μg/ml at 37°C, 5% CO2 for 24 h. Samples were then analysed by flow cytometry for CD45 (all lymphocytes), CD3 (T cells), and CD19 (B cells). The CTI was calculated using the formula: CTI of mAb = 100—[(number of B:T cells in sample without antibody—number of B:T cells with mAb) / number of B:T cells in sample without antibody) X 100] and the mean from triplicate wells calculated. The relationship between the relative expression (mean fluorescence intensity; MFI) of CD20 and CD32B (FcγRIIB) on B cells and CTI was determined using spearman rank correlation. Concurrent clinical and laboratory parameters including anti-dsDNA and C3 were collected and assessed.

Results: The mean CTI of BHH2 was higher than RTX in all but one patient. Median CTI in 23 SLE patients was 30% (range 9–70) and 15% (range 1–42), for BHH2 and RTX, respectively ($P = 0.0002$). CTI was <25% in 5 (21%) and 16 (73%) patients, for BHH2 and RTX, respectively. The mean ± S.D.MFI of CD20 and CD32B on SLE-B cells was 9079 ± 4025 and 4223 ± 1587, respectively. The CTI of neither mAb correlated with the expression of CD20 (r2 = –0.1898, 0.1258, for BHH2 and RTX, respectively) or CD32 (r2 = –0.332, 0.204, for BHH2 and RTX, respectively). Also, there was no correlation between the CTI of mAbs and lymphocyte-count, CD19 cell count, serum creatinine, total IgG, C3, positivity for ENAs or anti-dsDNA.
Conclusions: These results indicate that BHH2 is superior to RTX at inducing cytotoxicity *in vitro* in B cells from patients with SLE. This study provides the preliminary data to consider type II mAbs (GA101-like) as an alternative BCD agent for SLE in a clinical trial setting.
Disclosures: The authors have declared no conflicts of interest.

204. ANTI-NUCLEOSOME ANTIBODIES ARE ASSOCIATED WITH DISEASE ACTIVITY AND HYDROXYCHLOROQUINE USE IN PATIENTS WITH SLE: A LONGITUDINAL, MULTIVARIATE ANALYSIS OF 398 SAMPLES

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Background: Impaired apoptotic clearance appears to play a pivotal role in the pathogenesis of SLE leading to the accumulation of nuclear debris, such as nucleosomes, ultimately stimulating the production of autoantibodies. Both nucleosomes and anti-nucleosome antibodies (AN) have been found in serum of patients with SLE and appear to correlate with disease activity. AN have been particularly associated with renal and skin disease. This abstract describes the result of longitudinal studies of AN levels, ethnicity, autoantibody profile, treatment and measures of disease activity in patients with SLE.
Methods: Longitudinal serum samples ($n = 398$) were selected retrospectively from a cohort of 49 patients with SLE with a mean of 8 samples per patient (S.D.2.16; min 3; max 14) and a mean follow-up of 89 months (S.D.46; min 14; max 180). Sera from 40 healthy controls were also tested. OD values were converted to standard absorbance units (AU) by comparison with a positive control serum sample loaded on every plate. AN levels were measured using a direct ELISA and a positive result was defined as mean + 3 S.D.of the healthy controls (0.17). Using the British Isles Lupus Assessment Group (BILAG) index, we categorized the samples by disease activity as follows:

Current activity was defined as high if global BILAG score was ≥5 and low if it was <5. Disease activity over the most recent 4 assessments was characterized as persistently low activity (all systems BILAG C, D or E) or persistently moderate-high activity (A or ≥1 B in any BILAG system on at least 2/4 occasions). 90% of all samples fell into one of those two categories and the rest were excluded.

Anti-dsDNA was defined as high or normal based on a cut-off of 50 IU/ml. C3 was defined as low or normal based on a cut-off of 0.9 g/l.

Data on the treatment at the time of each individual sample were also obtained, considering prednisolone dose and whether either immunosuppressants (IS) or HCQ were used.
Results: Higher AN levels were significantly associated with low C3 and high anti-dsDNA levels as well as with higher current or persistent disease activity defined by the BILAG index. We found no association between AN levels and ethnicity, ENA positivity or flares in individual organs. Patients who were taking HCQ and those on low dose steroids (≤5 mg/day) had significantly lower AN levels ($P < 0.0001$). No differences were found with regards to presence or absence of IS.
Conclusions: AN levels were significantly associated with disease activity assessed both by clinical and serological measures. In addition, it appears that the type of treatment used, namely the use of HCQ may influence the levels of AN.
Disclosures: The authors have declared no conflicts of interest.

205. ANTI-APOA1 ANTIBODIES ASSOCIATE WITH DISEASE ACTIVITY IN LUPUS AND ARE LOWER IN PATIENTS TAKING HYDROXYCHLOROQUINE: A LONGITUDINAL ANALYSIS OF 398 SAMPLES

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Background: Patients with SLE have a significantly increased risk of developing cardiovascular disease. The presence of chronic inflammation which characterizes SLE disease activity may contribute to this risk. Apolipoprotein A1 (ApoA1) plays a protective role against atherosclerosis. Anti-ApoA1 antibodies have been described in patients with coronary disease. This abstract describes the result of longitudinal studies of anti-ApoA1 levels and measures of disease activity, serological profile and treatment in patients with SLE.
Methods: Longitudinal serum samples ($n = 398$) were selected retrospectively from a cohort of 49 patients with SLE with a mean of 8 samples per patient (S.D.2.16; min 3; max 14) and a mean follow-up of 89 months (S.D.46; min 14; max 180). Serum from 40 healthy controls and 15 patients with RA was also tested. Anti-ApoA1 levels were measured using a direct ELISA. Using the British Isles Lupus Assessment Group (BILAG) index, we categorized the samples by disease activity as follows.

Current activity was defined as high if global BILAG score was ≥5 and low if it was <5). Disease activity over the most recent 4 assessments was characterized as persistently low (all systems BILAG C, D or E) or persistently moderate-high (A or ≥1 B in any BILAG system on at least 2/4 occasions). 90% of all samples fell into one of those two categories and the rest were excluded.

Anti-dsDNA was defined as high or normal based on a cut-off of 50 IU/ml. C3 was defined as low or normal based on a cut-off of 0.9 g/l.

Data on the treatment at the time of each individual sample were also obtained, considering prednisolone dose and whether either immunosuppressants (IS) or HCQ were used.
Results: Patients with SLE had significantly higher anti-ApoA1 levels than healthy controls and patients with RA ($P < 0.0001$). Higher anti-ApoA1 levels were significantly associated with disease activity, both sustained and at the time of sample collection ($P = 0.04$) as well as with low complement levels ($P = 0.017$). In addition, patients who weren't on HCQ or who were taking >5 mg prednisolone/day at the time of sample collection had significantly higher levels of anti-ApoA1.

We found no association between anti-ApoA1 and sex, ethnicity, positivity for anti-dsDNA or ENA profile.
Conclusions: The presence of anti-ApoA1 antibodies has been shown in patients with SLE and may play a role in disturbing the normal lipid homeostasis which in turn may contribute to the increased cardiovascular risk associated with this disease. We have found that anti-ApoA1 levels are increased in patients with SLE compared with healthy controls and patients with RA. Anti-ApoA1 levels appear to be associated with both clinical and serological disease activity measures. The use of HCQ seems to be associated with lower anti-ApoA1 levels.
Disclosures: The authors have declared no conflicts of interest.

206. ANTI-FACTOR XA ANTIBODIES ARE SIGNIFICANTLY INCREASED IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND ANTIPHOSPHOLIPID SYNDROME

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Background: Increased levels of antibodies against different serine proteases (SP) have been identified in patients with the antiphospholipid syndrome (APS) compared with healthy controls. These anti-SP antibodies have been shown to alter the function of these coagulation factors, hence may be important in the pathogenesis of thrombotic manifestations of the APS. Few studies however, have examined the prevalence of anti-SP antibodies in patients with other autoimmune rheumatic disease (ARD). Therefore, in this study, we examined the prevalence and specificity of anti-SP antibodies in APS patients compared with other ARD and healthy controls.
Methods: Serum was obtained from 265 patients with: APS, $n = 59$; SLE and no APS (SLE/APS-), $n = 106$; RA, $n = 30$; Sjögren's syndrome (SS), $n = 25$, myositis (Myo), $n = 23$; systemic sclerosis (SSc), $n = 22$; and 40 healthy controls (HC). Of the patients with APS: 34 had primary APS and 25 had SLE/APS; whilst 46 had thrombotic and 13 non-thrombotic APS. In patients with SLE/APS- 57 were aPL positive (SLE/aPL+) and 49 aPL negative (SLE/aPL-). Disease activity of SLE patients was recorded using the British Isles Lupus Assessment Group (BILAG) index. It was also used to categorize the samples according to their activity status. Serum was tested for the presence of IgG directed against:—Thr; FXa; FVIIa and PS/FXa complexes by ELISA. Results were expressed as percentage of binding compared with a positive control and positivity was defined as being ≥ 3 S.D. above the mean of healthy controls. Statistical analyses were performed using SPSS version 17.

Results: IgG anti-FXa antibodies were only found in patients with SLE ($n = 52$, 49.1%) and APS ($n = 20$, 34.5%) whilst healthy and all other disease control groups completely ($n = 0$) lacked these IgG ($P < 0.05$). IgG anti-Thr antibodies were also found in patients with APS ($n = 21$,36.2%) and SLE/APS- ($n = 59$, 55.7%) more frequently than in HC ($n = 2$, 5%, $P < 0.05$).In contrast to anti-FXa IgG the detection of anti-Thr IgG lacked specificity as they were also found in patients with RA, SS, Myo and SSc. IgG against anti-PS/FXa complexes were found more frequently ($P < 0.05$) only in patients with SLE/APS- ($n = 35$, 33%) compared with APS ($n = 8$, 13.8%), SS ($n = 1$, 4%), Myo ($n = 1$, 4.3%), SSc ($n = 0$) and HC ($n = 0$) groups. We found that anti-FVIIa antibodies were significantly increased ($P = 0.001$) in patients who had active renal disease and anti-FXa antibodies in persistently active musculoskeletal disease ($P = 0.04$).
Conclusions: Anti-Thr, anti-FVIIa, anti-FXa and anti-PS/FXa IgG are not specific to patients with APS. Our finding that anti-FXa IgG were unique to patients with APS and SLE/APS- may indicate that these IgG interfere with the inflammatory rather than coagulant effects of FXa. Further experiments are now underway to clarify the pathological and diagnostic significance of anti-FXa IgG in these patients.
Disclosures: The authors have declared no conflicts of interest.

207. CELLULAR ADHESION MOLECULES AS POTENTIAL BIOMARKERS OF NEPHRITIS, DAMAGE AND ACCELERATED ATHEROSCLEROSIS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Background: Increased levels of cellular adhesion molecules: vascular cell adhesion molecule-1 (VCAM-1) and E-selectin are predictive of future cardiovascular events in the general population. In SLE, they are associated with disease activity and specific disease manifestations, such as nephritis or skin disease, although results are inconsistent. The aims of this study were to compare levels of VCAM-1 and E-selectin in SLE patients and healthy controls and to investigate their association with lupus phenotype, activity, damage and subclinical cardiovascular disease (CVD).
Methods: A cross-sectional study of female SLE patients and age-sex-matched controls was conducted. Clinical assessment was undertaken, including evaluation of disease activity (using the SLEDAI-2000 score) and damage [using Systemic Lupus International Collaborating Clinics damage index (SDI)]. Carotid plaque was identified and carotid intima-medial thickness (IMT) measured, using B-mode Doppler ultrasound (US) in SLE patients. E-selectin and VCAM-1 were measured using a standard ELISA assay. Non-parametric tests and age adjusted linear regression models were employed.
Results: 178 SLE patients and 69 controls were included in the study, with a median (IQR) age of 53 (46,61) and 50 (39,60) years respectively ($P = 0.066$). In SLE patients, median SLEDAI-2000 score was 2 (0,4) and SDI was 1 (0,2). 5 patients (2.8%) had active nephritis, 57 (32.0%) had mucocutaneous disease and 26 (14.6%) had a history of CVD. On US, plaque was present in 82 patients (46.1%) and median IMT was 0.063 (0.053,0.073)cm.

Median E-selectin levels were significantly higher in patients than controls (10.5[6.9, 13.9] *vs* 7.9[5.4, 10.4] ng/ml respectively; $P < 0.001$) and were associated with presence of plaque and damage in patients (β[S.E] = 0.261[0.124], $P = 0.04$ and β[S.E] = 0.270[0.122], $P = 0.03$ respectively). There was no significant association with history of prior CVD or IMT (–0.098[0.133], $P = 0.46$ and –0.327[2.58], $P = 0.9$ respectively).

While there was no significant difference in median VCAM-1 levels between patients and controls, levels were significantly higher in patients with active nephritis than in those with either previous or no history of nephritis (515.5[307.692.9] *vs* 276.7[199.2,351.9], respectively, $P < 0.001$). After adjustment for age, there was a significant association between VCAM-1 and active nephritis in SLE patients (β[S.E] = 1.09[0.210] $P = 0.0012$). There was no association with clinical CVD, carotid plaque or IMT (β[S.E] = –0.78 (0.08), $P = 0.315$, 0.37[0.063], $P = 0.56$ and 0.146[0.171], $P = 0.396$ respectively).
Conclusions: E-selectin could act as a novel biomarker of cardiovascular risk in SLE; however longitudinal studies are required to investigate association with clinical outcomes. VCAM-1 may have a role as a non-invasive biomarker for LN activity.
Disclosures: The authors have declared no conflicts of interest.