Methods: This is a retrospective cohort study based on data from three databases. Daily HFx incidence was calculated using discharge data from the hospital of Alcorcón for the period 2000–2015. Daily weather conditions were compiled from records of the national meteorological station (AEMET). Daily air pollutant levels (mcg/m³) were calculated from data from the Ministry of Environment for the Madrid Community: sulfur dioxide (SO₂), nitrogen monoxide (NO), nitrogen dioxide (NO₂), ozone (O₃) and particulate matter in suspension <2.5 µm (PM_{2.5}) and <10 µm (PM₁₀), for the same period. Pollutant concentrations were categorised into quartiles (Q1 to Q4, lowest to highest). Associations between HFx incidence and air pollutant levels were examined through Generalized Additive Models (GAM) at a daily level with Poisson link function. Models were adjusted for a penalised spline function of time.

Main outcome measures: Daily hospital admissions for hip fracture.

Results: HFx incidence showed a direct association with NO, NO₂, PM_{2.5} and PM₁₀ and inverse association with O₃ levels. Incidence rate ratios for Q1vsQ2, Q1vsQ3 and Q1vsQ4 respectively were: 1.171 (1.103–1.244), 1.245 (1.173–1.322) and 1.331 (1.253–1.414) for NO; 1.057 (0.996–1.122), 1.185 (1.116–1.259) and 1.276 (1.199–1.357) for NO₂; 1.028 (0.943–1.12), 1.092 (1.006–1.185) and 1.146 (1.049–1.253) for PM_{2.5}; 1.083 (1.016–1.155), 1.099 (1.034–1.168) and 1.213 (1.136–1.294) for PM₁₀; and 0.975 (0.914–1.04), 0.868 (0.815–0.924) and 0.814 (0.765–0.867) for O₃. These associations persisted when the models were corrected for season, day of the week and weather conditions. When participants were stratified by age and sex, associations persisted only in women older than 75 years.

Conclusions: A short-term effect was observed of several indicators of air pollution on hip fracture incidence. This is the first study that finds this association.

Disclosure of Interest: None declared

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OP0069

THE RELATIONSHIP BETWEEN ESTIMATED BONE STRENGTH BY FINITE ELEMENT ANALYSIS AT THE PERIPHERAL SKELETON TO AREAL BMD AND TBS AT LUMBAR SPINE IN ADULTS

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Background: Bone strength, estimated by finite element (FE) analysis based on high resolution peripheral quantitative computed tomography (HR-pQCT) images is an important contributor to understanding risk of fracture. However, it is a peripheral device and cannot be evaluated *in vivo* at lumbar spine L1-L4.

Objectives: The aim of this study was to investigate if the axial bone quality can be predicted by strength measurements of peripheral bone.

Methods: Peripheral bone microarchitecture, areal bone mineral density (aBMD) and trabecular bone score (TBS) were measured in adults individuals (n=262, 60 years and older; 63% women). Stiffness and failure load were estimated by FE analysis at HR-pQCT images at radius and tibia. Areal BMD and TBS were measured by dual energy X-ray absorptiometry (DXA) at L1-L4. Correlations between peripheral and axial data were estimated for each gender adjusted by age, weight, and height.

Results: Areal BMD L1-L4 resulted in weak to moderate significant correlations with stiffness and failure load at radius (women: R²=0.178, p<0.05 and R²=0.187, p<0.001, respectively; men: R²=0.454 and R²=0.451, p<0.001, respectively) and at tibia (women: R²=0.211 and R²=0.216, p<0.001, respectively; men: R²=0.488 and R²=0.502, p<0.001, respectively). TBS showed a very weak or no correlation with stiffness and failure load at radius (women: R²=0.148 and R²=0.150, p<0.05, respectively; men: R²=0.108 and R²=0.106, p<0.05, respectively) and at tibia (women: R²=0.146 and R²=0.150, p<0.05, respectively; men: R²=0.072 and R²=0.078, respectively).

Conclusions: These data suggest that aBMD L1-L4 was better explained by peripheral bone strength characteristics than the TBS, mainly in men and tibia is generally the site with a better relationship.

Disclosure of Interest: None declared

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WEDNESDAY, 13 JUNE 2018

New drugs – new perspectives: clinical and regulatory issues concerning biosimilars

OP0070-HPR

IS PATIENTS' SATISFACTION WITH BEING SWITCHED TO A BIOSIMILAR MEDICATION ASSOCIATED WITH THEIR LEVEL OF HEALTH LITERACY? RESULTS FROM A NORWEGIAN USER SURVEY

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Background: Economically motivated switching to biosimilar medication has been practiced in Norway since March 2016. There are several studies comparing the efficacy, safety and immunogenicity of biosimilars, however no studies have yet described patients' experiences and attitudes towards economically motivated switching.

Objectives: The aim of this study was to describe patients' experiences regarding being switched to an alternative medication (the switch) and further to investigate possible associations between such switching and health literacy.

Methods: Potential users of Etanercept or Infliximab were asked to participate using three patients' interest associations. Data from this convenience sample was collected using a web-survey in January 2017. Attitudes and experiences with a possible switch to an alternative medications were assessed using several questionnaires. In addition, data on gender, age and marital status were collected. Patients' experiences, attitudes and satisfaction were assessed using a self-developed questionnaire. In addition, health related literacy was measured using The Health Literacy Questionnaire¹ a multi-dimensional validated questionnaire. We used three domains covering patients' ability to actively engage with health care providers (Scale 6), ability find good health information (Scale 8) and understanding health information well enough to know what to do (Scale 9). Data were analysed using multiple logistic regression and the results expressed as odds for being satisfied with the switch.

Results: Of all included responders (n=290), 155 reported being switched to a biosimilar medication in 2016. Median age was 51 years, range 20–74. The majority of responders were females, 61% (n=176) and more than half (51%) completed higher education. Over 80% of those who were switched (economically motivated switch to a biosimilar drug) were neutral or satisfied with their new medication. Patients who were dissatisfied with being switched had lower levels of health related literacy compared to patients who were satisfied. Further, older patients reported more often being satisfied compared to younger patients. Only 14% reported that they were involved when a decision to being switched was made, male patients significantly more often compared to female patients (p=0.02). Self-assessed good health was strongly associated with higher probability of being satisfied with the switch, only 9/74 patients who reported bad health also reported being satisfied. When adjusted for age and self-assessment of one's own health, scales 6 and 8 but not scale 9, were significantly associated with higher odds for being satisfied with being switched (OR=2.5, 95% CI: [1.2 to 5.2] and OR=2.7, 95% CI: [1.2 to 5.9], for scale 6 and 8, respectively).

Conclusions: A great majority of patients reported being satisfied with being switched to a cheaper biosimilar medication, however, almost one in five (19%) reported being dissatisfied. Our findings suggest that patients' attitudes and level of satisfaction are associated with being given sufficient and necessary information concerning their health.

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WEDNESDAY, 13 JUNE 2018

Movement in musculoskeletal pain; from risk to management

OP0071

THE PREVALENCE OF PAIN FLARES: IMPACT OF DEFINITION

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Background: Rapid acute pain exacerbations, colloquially called *pain flares*, affect quality of life and are a key driver for patients to seek healthcare. There is no standardised definition of pain flare.¹ Daily collection of patient-reported symptoms with mobile technology enables monitoring pain flares in real-time. The

choice of definition may identify different people and patterns of pain severity. If remote monitoring of flares is to inform clinical practice and research, it is important to understand the implications of these choices.

Objectives: Investigate the frequency of pain flares from daily pain symptoms under various definitions in a population with chronic pain.

Methods: Participants with chronic (≥ 3 months) musculoskeletal pain in the smartphone study Cloudy with a Chance of Pain² reported daily pain severity and impact of pain on a 5-point scale. Pain flares were defined in five ways:

1. *Worse than average:* pain severity higher than personal median
 2. *Above threshold:* pain value 4 or 5
 3. *Move to above threshold:* pain value 1 or 2 or 3 yesterday to 4 or 5 today
 4. *Absolute change:* 2-point increase in pain since yesterday
 5. *Composite:* 2-point increase in pain severity since yesterday and impact 4 or 5
- Daily pain-flare rate was calculated by dividing the number of pain flares by the number of days a pain flare would have been possible, hereafter called *at-risk days* (def. 1+2: total days of symptom entry; def 3 to 5: days of data entry for which participant also entered data on preceding day). Monthly pain-flare rates per person were calculated by multiplying the rate by 30.

Results: The study smartphone app was downloaded by 13 256 people. After excluding people that never reported pain severity ($n=2020$), did not complete the baseline questionnaire ($n=947$), stayed in the study for less than 7 days ($n=3418$), and reported non-musculoskeletal chronic pain ($n=728$), 6143 were eligible for analysis.

Abstract OP0071 – Table 1. Participants with pain flares and monthly pain flare rates under 5 definitions

	Participants with ≥ 1 flare (%)	Flares	Monthly pain flare rate
Worse than average	5304 (86.3)	1 09 616	8.0
Above threshold	5627 (91.6)	1 18 596	8.7
Move to above threshold	4246 (69.1)	33 661	3.2
Absolute change	3940 (64.1)	22 173	2.1
Composite	2577 (42.0)	9531	0.9

Table 1 shows that the portion of eligible people with at least one pain flare varies by definition, with 42% reporting at least one pain flare according to the most restrictive classification criterion. Depending on the criterion used, the monthly pain-flare rate per ranges from 0.9 to 8.7.

Under the 'worse than average' and 'above threshold' definition, most participants have more than 10 pain flares per month (figure 1). Under the two most stringent definitions, most participants have between 0 and 3 pain flares per month.

Conclusions: The five plausible definitions for a pain flare are demonstrated to

generate quite different flare rates through time. Pain flares in people with chronic musculoskeletal pain, however, remain common even as classification criteria become increasingly strict. As daily data collection of patient-generated data becomes possible, careful thought must be given to flares should best be defined for clinical practice and research.

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OP0072 SLEEP PROBLEMS AND FATIGUE AS A PREDICTOR FOR THE ONSET OF CHRONIC WIDESPREAD PAIN OVER A 5- AND 18-YEAR PERSPECTIVE. A 20-YEAR PROSPECTIVE STUDY

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Background: If localised pain represent one end of a pain spectra, with overall better general health, chronic widespread pain (CWP) and fibromyalgia represent the other end of the spectra with worse general health and more comorbidities with other somatic diseases and mental illness. Sleep problems and fatigue are common among individuals reporting CWP and previous research indicate that sleep problems may be an important predictor for pain prognosis.

Objectives: The aim of this population-based study was to investigate if sleep problems and fatigue predict the onset of CWP 5 and 18 years later.

Methods: In order to get more stable baseline classifications of CWP, a wash-out period was used, including only individuals who had not reported CWP (according to ^{ACR 1990} criteria for fibromyalgia) at baseline (-98) and three years prior baseline (-95). In all, data from 1249 individuals entered the analyses for the 5 year follow-up (-03) and 791 entered for the 18 year follow-up (-16). Four parameters related to sleep (difficulties initiating sleep, maintaining sleep, early morning awakening and non-restorative sleep), and one parameter related to fatigue (SF-36 vitality scale) were investigated as predictors for CWP. Binary logistic regression analysis were used for analyses.

Results: All investigated parameters predicted the onset of CWP five years later (problems with initiating sleep (OR 1.91; 1.16–3.14), maintaining sleep (OR 1.85; 1.14–3.01), early awakening (OR 2.0; 1.37–3.75), non-restorative sleep (OR 2.27; 1.37–3.75) and fatigue (OR 3.70; 1.76–7.84)) in a model adjusted for age, gender, socio-economy and mental health. All parameters except problems with early awakening predicted the onset of CWP also 18 years later. In all, 785 individuals did not report any of the sleeping problems at baseline (fatigue not included), 268 reported one of the problems, 167 two, 128 three and 117 subjects reported to have all four sleep problems. Reporting all four sleep problems was significantly associated with CWP at follow-up at both time points when adjusting for age, gender, socio economy and mental health (OR 4.00; 2.03–7.91 and OR 3.95; 1.90–8.20); adjusting for age, gender, socio economy and number of pain regions (OR 2.94; 1.48–5.82 and OR 2.65; 1.24–5.64) and in a model adjusting for age, gender, socio economy and pain severity (OR 2.97; 1.53–5.76; and OR 3.02; 1.47–6.21) for the 5 year and 18 year follow-up respectively, compared to not reporting any of the sleep problems at baseline.

Conclusions: Both sleeping problems and fatigue predicts the onset of CWP 5- and 18 years later. The results highlight the importance of the assessment of sleep quality in the clinic.

Disclosure of Interest: None declared
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OP0073 CENTRAL SENSITISATION PREDICTS FATIGUE INDEPENDENTLY OF MUSCULOSKELETAL PAIN

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Background: Fatigue is a common musculoskeletal (MSK) pain comorbidity that is associated with increased healthcare use and poor quality of life. Central sensitisation (CS), the amplification of sensory input across multiple systems, has been associated with MSK pain. It has been hypothesised that similar mechanisms may explain the co-occurrence of fatigue, but data are conflicting.

Objectives: To test the hypothesis that CS was associated with the presence of fatigue, and to establish whether the relationship was independent of the relationship between MSK pain and fatigue.

Methods: 2455 participants in a prospective cohort study completed a baseline questionnaire collecting data on fatigue (Chalder Fatigue Scale, score 0–33 (CFQ); pain (body map, score range 0–44); demographics (date of birth, sex); Rapid Assessment of Physical Activity (RAPA); analgesic use; and mental health (Hospital Anxiety and Depression (HAD) scale). During a clinic visit a random sample of participants ($n=290$, 11.8%) had a wind-up ratio test (the perceived intensity of a single 256mN pinprick/intensity of a series of 10 pinpricks) at the thenar eminence of the right hand (WUR-H) and dorsum of the left foot (WUR-F) to assess CS, and bioelectric impedance (Tanita BC-418 Segmental Body