Conclusions: The majority of patients do not store their bDMARDs within the SmPC recommended storage temperature range. To what extent moderate and extreme deviations in bDMARD storage temperatures could affect drug quality and influence efficacy and occurrence of adverse drug reactions needs further investigation.

86. Prevalence and Overlap of Asthma Phenotypes in a General Asthma Population

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Background: Atopic, eosinophilic, and T helper cell type 2-high (Th2-high) asthma phenotypes may overlap. Several new biologic therapies targeting specific asthma phenotypes are either available or in development; newer medications may also treat more than one phenotype. Understanding the overlap across asthma phenotypes may be useful in determining treatment guidance, optimization, and overall care.

Objectives: The aim of this study was to describe the prevalence and overlap of atopic, eosinophilic, and Th2-high phenotypes in a general asthma population.

Methods: Data from the annual National Health and Nutrition Examination Survey, among a representative sample of the general US population, were analyzed. Asthma patients were identified based on the participants' self-report. Eosinophilic asthma was defined as a blood eosinophil count ≥300 cells/μL. Atopic asthma was identified as an allergen-specific immunoglobulin E (IgE) level of ≥0.35 IU/mL, for any of the nine tested perennial allergens. Th2-high asthma was defined as total serum IgE ≥100 IU/mL and a blood eosinophil of either ≥100 or ≥200 cells/μL (Corren et al. N Engl J Med 2011;365:1088–1098). The study included only survey years 2005–2006 for which IgE data were collected.

Results: The study included 265 children (aged 6–17 years) and 303 adult (18–64 years) asthma patients; 57% of children and 41% of adults were classified as eosinophilic, 50% and 42% as Th2-high, and 63% and 61% as atopic asthma, respectively. Among those with atopic asthma, 75% of children and 50% of adults were also eosinophilic, and 70% and 60%, respectively, were Th2-high. Among those with Th2-high asthma, 80% of children and 62% of adults were eosinophilic; 38% of children and 23% of adult patients could be classified as eosinophilic, atopic, and Th2-high, simultaneously; 77% of children and 74% of adult asthma belonged to one of these three phenotypes.

Conclusions: A significant overlap exists among eosinophilic, atopic, and Th2-high asthma phenotypes in a general asthma population, especially in children. Future studies need to examine whether an overlap is also present in severe asthma patients who are the likely target of biologics and new asthma therapies.

87. Insulin Treatment and Breast Cancer Risk; A Systematic Review of In Vitro, Animal and Epidemiological Evidence

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Background: In 2009, the concern has been raised that insulin analogues, especially insulin glargine, might increase risk of (breast) cancer. Many *in vitro* and epidemiological and some animal studies have been performed, but there is still no clarity on this issue.

Objectives: The aim of this study was to investigate the association between insulin and insulin analogue treatment and breast cancer development, and plausible mechanisms, based on *in vitro*, animal and epidemiological evidence.

Methods: A systematic literature search was performed on breast cell-line, animal and human studies

using the key words 'insulin analogue' and 'breast neoplasia' in MEDLINE at PubMed, EMBASE and ISI Web of Science databases. A quantitative and qualitative review was performed on the epidemiological data, and a complete overview was composed for *in vitro* and animal studies. Protein and gene expression was analysed for the cell lines most frequently used in the included *in vitro* studies.

Results: Sixteen *in vitro*, 5 animal, 2 *in vivo* human and 29 epidemiological papers were included. Insulin AspB10 showed mitogenic properties in *in vitro* and animal studies. Glargine was the only clinically available insulin analogue for which an increased proliferative potential was found in breast cancer cell lines. However, the pooled analysis of 13 epidemiological studies did not show evidence for an association between insulin glargine treatment and increased breast cancer risk (HR = 1.04, 95%CI = 0.91–1.17, $p = 0.49$) versus no glargine in patients with diabetes mellitus. It has to be taken into account that animal data were limited, and epidemiological studies were underpowered and suffered from methodological limitations.

Conclusions: There is no compelling evidence that any clinically available insulin analogue increases breast cancer risk. Overall, the data suggest that insulin treatment is not involved in breast tumour initiation but might induce breast tumour progression by up-regulating mitogenic signalling pathways.

88. Patient-Reported Health Utility Scores (HUS) in Non-small Cell Lung Cancer (NSCLC) Patients with Epidermal Growth Factor Receptor (EGFR) Mutations by Drug Therapy

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Background: Health utility scores (HUS) help define quality-adjusted life years in pharmacoeconomic analyses. There are several approved epidermal growth factor receptor (EGFR) tyrosine kinase inhibitors (TKIs) in use worldwide for patients with non-small cell lung cancer (NSCLC), and many are still in development. A lack of reference HUS exists for these patients.

Objectives: The aim of this study was to generate patient-reported HUS in NSCLC patients with EGFR mutations eligible for or on TKI therapy.

Methods: Using a cross-sectional survey design, 55 consecutive metastatic NSCLC outpatients with EGFR mutations at Princess Margaret Cancer Centre completed clinico-epidemiologic surveys (risk factors, demographics, health status) and the EQ5D-3L questionnaire that generates HUS (0–1). Results were correlated with clinico-epidemiologic data.

Results: Median age was 60 years; 55% were female; 55% had Asian ancestry; 66% were never smokers; 80% had stage IV at diagnosis, but 100% had stage IV at the time of survey (at a median of 29 months after initial diagnosis). Eighty-four percent were on targeted therapy, 25% were on third or later line of therapy, and 22% were on a clinical trial. Sixty-two percent of patients were on first-generation EGFR TKIs (gefitinib, erlotinib), of whom 65% (95%CI: 46–80%) had partial response or stable disease (PR/SD). Twenty percent of patients were on third-generation EGFR TKIs (mostly AZ9291) of whom 80% (95%CI: 44–95%) had PR/SD. Overall mean ± SEM HUS = 0.802. The mean HUS for NSCLC patients with PR/SD on EGFR TKIs ($n = 31$) was 0.82 ± 0.16, while patients responding to standard chemotherapy had HUS = 0.80 ± 0.12 ($n = 5$). In contrast, patients with progressive disease during TKI therapy were associated with lower HUS = 0.74 ± 0.08. Patients that responded to gefitinib (HUS = 0.84 ± 0.14), to erlotinib (0.82 ± 0.17), or to AZD9291 (0.83 ± 0.16) had similar mean HUS values. Race, gender, time since diagnosis, smoking status and number of lines of therapy were each unassociated with HUS.

Conclusions: Response to TKI therapy may be an important driver of HUS, which were generally high. Mean HUS scores were similar across all major clinico-epidemiological factors; no HUS differences were found by specific TKI agent.

89. Frequency and Trends of Disease-Modifying Antirheumatic Drug (DMARD) Use in Germany

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Background: The use of disease-modifying antirheumatic drugs (DMARDs) for rheumatoid arthritis