This includes a score of vitality level (a lower score is suggestive of more fatigue). RDW was recorded, in addition to standard markers of lupus disease activity including Erythrocyte Sedimentation Rate (ESR), Complement C3, anti-double-stranded DNA (anti-dsDNA), C-reactive protein (CRP) and SLEDAI/ BILAG. Spearman binding (anti-dsDNA), C-reactive protein (CRP) and SLEDAI/BILAG. Spearman’s rank was used to analyse variables with a p-value of <0.05 considered significant.

Results In cohort 1, 72 patients aged 14–42 (median 21) were recruited. FACIT score did not correlate with anti-dsDNA (p=0.4), C3 (p=0.06), ESR (p=0.06), CRP (p=0.1) or SLE-DAI (p=0.6). There was a strongly significant correlation between FACIT and RDW (p≤0.001; r=−0.44); figure 1. In cohort 2, 106 patients were recruited aged 18–75 (median 44.5). RDW correlated with ESR (p=0.03; r=−0.20), BILAG (p=0.002; r=−0.30) and vitality scores (p=0.02; r=0.23); figure 2. In cohort 3, 47 patients aged 19–75 (median 46) were recruited. FACIT correlated with RDW (p=0.03; r=−0.32); figure 3.

Conclusions An elevated RDW correlates with higher levels of fatigue. For the first time a serologically marker has shown strong association with fatigue in patients with lupus. This is demonstrated in three groups of varying age, ethnicity and geography and using two different fatigue scores.
Purpose Given the heterogeneity of clinical presentations, the
diagnosis of Systemic Lupus Erythematosus (SLE) can be chal-
lenging, in particular in those patients presenting with early or
incomplete disease, or with overlapping or atypical features.
Autoantibodies (AABs) are important in aiding the clinical
diagnosis of SLE, with some few AABs, anti-double-stranded
DNA (dsDNA), anti-Smith (Sm), and anti-ribosomal P (riboP)
being highly associated with SLE. As none of the traditional
AABs has sufficient sensitivity to achieve diagnosis of SLE,
current testing is based on measuring multiple AAB assays
either in parallel or serial. We have recently identified novel
AABs in SLE, which hold promise for improving diagnostic
testing of SLE (1). We have developed quantitative ELISA-pro-
totypes for five new AABs, which were tested in combination
with traditional AABs. The objectives of this study were to
evaluate the diagnostic value of novel AABs and to screen for
an optimised combination of novel and traditional AABs using
logistic regression to increase the diagnostic accuracy of SLE
testing.

Methods Serum samples were obtained from 156 SLE patients
with European ancestry at the rheumatology department of the
Heinrich-Heine University (Düsseldorf, Germany), and Hannover
Medical School (Hannover, Germany). SLE samples were com-
pared against 126 samples from autoimmune diseases (AID; myo-
itis: n=20; Sjögren’s syndrome (SjS): n=31; rheumatoid arthritis
(RA) n=36; systemic sclerosis (SSc): n=39), and 77 healthy con-
trol samples. Prototype bead based ELISAs were developed for
5 recently identified novel antigens. Traditional diagnostic AABs
were measured using IVD ELISAs and included: SSA/Ro60, SSA/
Ro52, La/SSB, Sm, RNP, dsDNA, Scl70, CENPB, Jo-1, CCP, phos-
pholipid and dsDNA. Optimised marker combinations of new and
traditional markers were tested using logistic regression and
receiver operating curve analysis (ROC).

Results When comparing 156 SLE patients with 203 control sam-
ples, the area under the curve (AUC) of the five novel SLE ELISAs
ranged from 0.63 to 0.75. A cut-off was set at a specificity of 95%
yielded a sensitivity ranging from 13.5% to 21.2% for the five
novel assays. The sensitivity and specificity of new ELISAs was
comparable to traditional ELISAs, which was in this cohort for
anti-dsDNA 35% and 97%, anti-Sm 15% and 97%, and anti-
RiboP 26% and 97%. A logistic regression model was used to
combine the results of multiple tests. Compared to a logistic
regression with traditional assays, a logistic regression with novel
markers achieved higher sensitivity by pertaining high specificity.
The logistic regression model based on a multimarker IVD assay
with ten extracted nuclear antigens (ENA) yielded an AUC of 0.87
and a sensitivity of 58% at a specificity of 95%. By contrast, the
optimal combination of traditional and novel ELISAs reached an
AUC of 0.92 and a sensitivity of 75% at a specificity of 95%.

Conclusions This study demonstrates the feasibility of combing-
test results of novel and traditional AABs using logistic
regression to increase the diagnostic accuracy for SLE. Further
studies are required to assess the impact of different ethnici-
ties on marker selection and algorithm performance.

REFERENCES