replacement therapy in primary hypothyroidism and the cost burden in the UK is over 5 million pounds per annum.

In order to provide rational and cost-effective recommendations on monitoring, we performed a systematic review on the use of TSH measurement in predicting the outcome of replacement therapy in adults. Five clinical outcome areas were examined, including morbidity & mortality, cardiovascular disease, bone metabolism, fertility, psychiatry or psychology and quality of life. Thirty-six studies were included in the review: two meta-analyses, one randomized controlled trial, 16 cross-sectional follow-up studies, seven case-controls, observational studies, two case studies and eight reviews.

No relationship was found between TSH values and morbidity/mortality of patients on thyroxine replacement. Studies on the effect of thyroxine replacement on cardiac function provided no conclusion on the value of TSH measurement in predicting outcome. Out of eight studies dealing with the effect of thyroxine on bone metabolism, four studies showed a significant relationship between TSH suppression and bone density in postmenopausal women, two studies showed no correlation and one recommended third generation TSH assays for the assessment of outcome. Of the eight studies dealing with the effect of thyroxine on fertility and pregnancy, two studies demonstrated a relationship between TSH and outcome of pregnancy, the rest provided no clear evidence. Of the 10 studies dealing with the effect of thyroxine on psychological/psychiatric functions, two studies found relationship between TSH and outcome, two showed no correlation and six were inconclusive.

There is no clear evidence to support the role of TSH in monitoring clinical outcome. Further studies, using third and fourth generation TSH assays, are needed to clarify whether annual TSH monitoring improves clinical outcome and cost efficiency of therapeutic interventions in primary hypothyroidism.

Laboratory automation and integration  P1/S05

P1/S05-1

ANALYTICAL EVALUATION OF THE BIOCHEMISTRY COBAS MIRA plus ANALYZER

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The Cobas Mira plus is a fully selective analyzer for routine and stat tests. Evaluation of the system was performed according to ECCLS protocol for imprecision, assessment accuracy, carryover and correlation with the Abbott VP analyzer. Endogenous interference (hemoglobin, triacylglycerol and bilirubin) was also considered. Results were as follows: within-run imprecision using 30 samples from two commercial sera over three days gave a CV less than 2% for almost all analytes except for less than 6% for bilirubin in normal control sera. Between-run imprecision carried out in triplicate for ten days on the same two control sera was less than 5% for almost all analytes. Results showed satisfactory level of accuracy according to the criteria based on biological variation. Reagent and sample carryover examination showed no significant cross-contamination. Comparison between the results obtained on the two instruments was processed using the Passing-Bablok method and showed no statistically significant differences for glucose, total bilirubin, creatinine, urate, total protein, triacylglycerol, AST, ALT, CK and LDH. The Cobas Mira plus is an instrument which may be recommended for use in laboratories with a low workload.

P1/S05-2

RAPID AND SIMPLE DETERMINATION OF DIGITOXIN SERUM LEVELS WITH THE DIMENSION® AR ANALYZER

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Measurement of Digitoxin (DTX) serum levels is an important tool to prevent DTX induced adverse reactions. Due to methodical problems a
pretreatment step was necessary in many procedures. This may produce erroneous results. In the following we present the evaluation results of a new immunoassay (Dade Behring) using monoclonal antibodies on the basis of a magnetic particle separation procedure on the Dimension® AR analyzer.

The intra-assay precision (CV) was below 5.2%. The inter-assay precision was below 5.6%. The lower limit of detection was 0.61 ng/mL. There were no significant differences between EDTA - plasma and serum. The recovery of DTX in a concentration range of 10-100 ng/mL was between 97.7-109%. Method comparison with the FPIA-method on the TDX analyzer (Abbott) showed higher values when compared to the Dade Behring method (y = 0.86x + 2.58; r = 0.88). This is probably due to the use of polyclonal antibodies in the Abbott test. Samples of 3 patients, which could not be measured due to high background fluorescence, were measureable without problems on the dimension analyzer. A further correlation study with the ACS Centaur (Bayer Chiron) showed a better correlation (y = 0.97x + 1.83; r = 0.93) with the Dimension® method.

The new immunoassay proves to be a rapid and simple method with small sample volume and good precision data.

P1/S05-4

CYSTATIN C AND URINE PROTEIN ON THE ADVIA 1650

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The aim of the study was to prepare and to evaluate determination of Cystatin C and protein in urine on the automated biochemical analyzer ADVIA 1650 System (Bayer Corp., Business Group Diag., Tarrytown, USA). We used as a reagent DAKO Cystatin C PET Kit (DAKO A/S, Glostrup, Denmark) and Total Protein 600 T (SKALAB, Svitavy, Czech Republic).

Imprecision was assessed by testing control sera over multiple runs and days. Within run imprecision was below 3% and 6% for cystatin and urine protein, respectively, and total imprecision was below 5% for cystatin and 8% for urine protein. The linearity was tested with the samples prepared from real patient samples. The dilution thresholds were 18.5 mg/L for cystatin C and 3.6 g/L for urine protein.

All results showed that the methods were fully acceptable for routine operation. The cost saving is the great advance of these determinations on ADVIA 1650. Two times more tests could be performed from a single kit as compared to other instruments.

P1/S05-3

COMPARISON OF 2 ANALYTICAL SYSTEMS FOR SERUM DIGOXIN LEVEL MONITORING

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The aim of this study was to compare the performance of two different analyzers (Abbott AxSYM System and Vitros - Johnson & Johnson) for serum digoxin level monitoring.

Serum digoxin levels were measured and compared in 47 patient serum samples. The quantitative measurement of digoxin was obtained using MEIA (Microparticle Enzyme Immunoassay - AxSYM Digoxin II) and test multiple - point immuno - rate (Vitros - Johnson & Johnson). Control materials used as control samples were those supplied by manufacturers.

The patient serum sample comparison results show good correlation level and clinical performance for both methods. The correlation coefficient is 0.97.

P1/S05-5

ANALYTICAL EVALUATION OF THE DADE BEHRING DIMENSION RXL AUTOMATIC ANALYZER

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The performance of the Dade Behring Dimension RxL analyzer was evaluated according to the guidelines of the European Committee for Clinical Laboratory Standards. Glucose, urea, creatinine, albumin, phosphorus, cholesterol, triglyceride, uric acid, magnesium, sodium, potassium, chloride, calcium, iron and bilirubin were tested to compare Dimension RxL to Hitachi 704, Bayer RA-1000, Ektachem 250 and Chiron 865 depending on the tests available on these analyzers.

140 samples using five different human based controls and 50 patient samples were correlated and showed very high correlation (0.92-0.99), ex-
cept for albumin (0.88) and calcium (0.80) because of home made reagents used on Hitachi.

Inter- and intra-assay variations were within 4% for majority of tested analytes. Glucose showed no sample-to-sample carry-over.

Hemolysis increased analytical values of bilirubin (90%), potassium (27%), iron (139%) and decreased phosphorus (43%). Lipemia increased bilirubin (778%), iron (69%), glucose (29%) and decreased magnesium (70%) and cholesterol (10%). Bilirubin interfered phosphorus increasing it (45%) and decreasing glucose (32%), creatinine (30%), cholesterol (33%) and magnesium (75%).

The Dade Behring Dimension RxL was found to be a reliable analyzer with low sample volume and particularly suitable for emergency laboratory work.

The simplest method that yielded acceptable results was “point to point” method, but this method did not give any statistical information of quality of the assay performance. The “spline” method also yielded acceptable results but gave no statistical information about the quality of assay performance. The “4-parameter logistic-log” method yielded the best inter-assay performance with statistical information of quality of the assay performance. In conclusion, automated data processing of radioimmunoassay of T4 using the “4-parameter logistic-log” method for fitting the standard curve not only increased the speed, but also provided more thorough and statistically rigorous analysis of results.

P1/S05-7

AN EVALUATION OF A LIQUID STABLE PANCREATIC SPECIFIC AMYLASE REAGENT

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The determination of serum Amylase activity is primarily used as a diagnostic indicator of acute pancreatitis. Two types of amylase are normally present in human serum, the pancreatic (P-type) and salivary type (S-type). P-type amylase is specific for the pancreas, whereas S-type can originate from a number of non-pancreatic sites. The methods commonly used to measure serum amylase activity are unable to distinguish between P-type and S-type amylase. Studies have shown, however, that the determination of the organ specific P-type amylase can significantly improve the diagnostic value of the assay. TRACe scientific and HERBOS Diagnostika have recently developed a liquid stable reagent, which contains monoclonal antibodies to the S-type isoenzyme, for the determination of P-type amylase in serum. The aim of this study was to evaluate the performance of this pancreatic amylase reagent on an automated clinical chemistry analyzer.

All studies were undertaken with the pancreatic amylase reagent on a Hitachi 911™ analyzer. Linearity and patient correlation studies were carried out as per NCCLS guidelines. Interference form commonly occurring biological pigments was assessed according to the Glick interferograph method.

Reagent was linear to at least 2000 U/L (37°C)
Patient correlation: TRACE/HERBOS = 0.93
Reference: 3.5. R² = 0.999 (6-2138 U/L).

No interference from Hb up to 500 mg/dL, bilirubin up to 60 mg/dL and triglycerides up to 1000 mg/dL.

Based on the results obtained, we conclude that the TRACE/HERBOS pancreatic amylase procedure is a suitable method for the determination of pancreatic amylase in the routine diagnostic laboratory.

P1/S05-8

COMPARISON OF AUTOMATED URINE TESTSTRIP MEASUREMENT WITH MICROSCOPIC EXAMINATION AND QUANTITATIVE DETERMINATION OF GLUCOSE AND PROTEIN

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Prescreening of urine specimens by teststrips is a valuable procedure for reducing the work load of the urine analysis.

The aim of this study was to evaluate Bayer Multistix 10 SG test strips for urinalysis and confirm their reliability in determination of erythrocytes and leukocytes and semiquantitative measurement of protein and glucose.

Automated teststrip urinalysis was performed on 1182 urine specimens using Bayer teststrips on Clinitek 50 urinalysis analyzer. Sediment examination was performed by standardized protocol NCCLS using 0.5% Toluidine blue as a dye. GOD-PAP method was used for quantitative determination of glucose and photometric method with trichloroacetic acid for protein measurement. Bayer Chek-Stix Combo Pak (positive and negative controls) were used for quality control. The obtained results are summarized in the table.

In accordance to microscopic examination the teststrip results for erythrocytes and leukocytes show high sensitivity probably because of methodology reasons (pseudoperoxidase reaction of hemoglobin/myoglobin and leukocyte esterase). Correlation studies of glucose and protein showed wide range of concentrations obtained by quantitative methods, and suggest the use of range concentrations on the teststrips instead of single values.

Using Multistix SG 10 teststrips is a simple, effective method for semiquantitative screening in routine urinalysis which allows selection of pathological specimens and guides the operator to perform further investigations.

<table>
<thead>
<tr>
<th>Erythrocytes (No/µL)</th>
<th>Leukocytes (No/µL)</th>
<th>Glucose (mmol/L)</th>
<th>Protein (g/L)</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td>N Test strip Median (range)</td>
<td>N Test strip Median (range)</td>
</tr>
<tr>
<td>62</td>
<td>trace</td>
<td>7 (0-21)</td>
<td>51 5.5 (0.2-18)</td>
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<tr>
<td>54</td>
<td>25</td>
<td>15 (7-35)</td>
<td>35 14 (7.1-29.3)</td>
</tr>
<tr>
<td>84</td>
<td>80</td>
<td>67 (14-70)</td>
<td>27 28 (16.4-88.7)</td>
</tr>
<tr>
<td>130</td>
<td>200</td>
<td>50 (28-700)</td>
<td>63 &gt;55 (42.2-76.6)</td>
</tr>
</tbody>
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P1/S05-9

AUTOMATED ENZYMEOIMMUNO ASSAY METHOD FOR MEASURING SERUM Anti-dsDNA AND Anti-ss DNA

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Several manually operate enzymoimmuno assays have been introduced to measure the concentration of serum anti-dsDNA and anti-ssDNA. Anti-DNA antibodies are of two populations, one directed to double strand DNA (dsDNA) and other targeting single strand DNA (ssDNA). Anti-dsDNA antibodies are specific for SLE. Anti-ssDNA antibodies are not specific for SLE, occurring in patients with many different diseases. This study was undertaken to evaluate the analytical performance characteristics of a method based on enzyme-linked immunosorbent assay (ELISA) method on a mini B.O.S. immunoanalyser (Biome-
The ELISA test is performed as an indirect solid phase sandwich-type immunoassay. Microwells are coated with dsDNA or ssDNA antigen followed by blocking the unreacted sites to reduce nonspecific binding. The intra-assay CVs were 3.0 to 6.8% and inter-assay CVs were 4.3 to 7.5%. The detection limit was <4.0 IU/ml and the method observed to be linear within entire range indicated by the calibrators (0 to 1000 IU/ml). The Cogent anti-dsDNA was compared to manual anti-dsDNA sensitive immunoassay of Diastat anti-dsDNA (Shield Diagnostics, Scotland, UK). Correlation of 30 patients sera was r=0.89. The Cogent anti-ssDNA was compared to manual sensitive immunoassay of Dialab anti-ssDNA (Dialab Ges. m. b. H. Wien). Correlation of 30 patients sera was r=0.87. The automated enzyme-immuno assay method proved to be an analytically adequate method, superior to its manual predecessors.

P1/S05-10
COMPARISON OF CRP DETERMINATION ON DIFFERENT CLINICAL CHEMISTRY SYSTEMS
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The number of CRP analyses is growing rapidly. We use different methods and analyzers for its determination, so there is a possibility of different results at the same institution. For regular work at our laboratory we use Hitachi 911-912 and reagents Roche, Olympus AU 640 and reagents Olympus and Behring-Nephelometer 100 with adequate reagents. We comparatively included in our work the Ehring-Dade Dimension RXL with adequate reagents.

In our study we tried to ascertain the comparability of the CRP measuring. We ascertained the variation coefficient (CV) for all four systems: Hitachi 912, Olympus, Dimension RXL and nephelometer and Pearson correlation coefficient (r), t-test and f-test according to nephelometer. The sera with different CRP concentrations were collected and classified in three different groups: 0-20 mg/L (I), 21-150 mg/L (II) and >150 mg/L CRP (III). They had been kept at -20 °C and then measured at the same time on the same instruments.

In the group I:
CV = 1.97 (Hit), 3.51 (Oly), 0.46 (RXL), 3.01 (neph)
r = 0.970 (Hit), 0.961 (Oly) and 0.983 (RXL)

In the group II:
CV = 3.97 (Hit), 2.89 (Oly), 1.18 (RXL), 3.30 (neph)
r = 0.989 (Hit), 0.985 (Oly) and 0.971 (RXL)

In the group III:
CV = 1.33 (Hit), 1.33 (Hit-decrease), 1.49 (Oly-decrease), 1.35 (Oly-dilution), 1.92 (RXL), 3.09 (neph)
r = 0.984 (Hit), 0.989 (Oly-decrease), 0.978 (Oly-dilution) and 0.988 (RXL)

All variation coefficients were under 5%. According to statistics (an even two-paired t-test and f-test) there were no essential differences among biochemical analyzers - measuring of CRP on Hitachi, Olympus and Dimension RXL was comparable to each other in all three concentration ranges.

Liver P1/06

P1/06-1
DISCRIMINATORY POWER OF "ENZYME MARKERS" OF CHOLESTASIS IN SEPARATION OF MALIGNANT FROM BENIGN EXTRAHEPATIC OBSTRUCTIONS
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"High relative molecular mass alkaline phosphatase" (HMW-ALP), a biliary isoenzyme of alkaline phosphatase (ALP: EC 3.1.3.1) appears in serum as an answer to the obstruction of bile flow.

The aim of our study was evaluation of HMW-ALP and other liver plasma membrane bound enzymes/γ-glutamyltransferase (GTT), leucin aminopeptidase (LAP), 5'-nucleotidase (NTP) in discrimination of malignant and benign extrahepatic cholestasis.

Therefore the results of these analytes obtained from 118 exactly clinically diagnosed cholesatic patients were evaluated by graphic evaluation of probabilistic test analysis.

The graphic evaluation of probabilistic test analysis showed that all “enzyme markers” of