INFORMATION ABOUT EQAnews 2010

General
EQAnews provides information on quality assurance issues in Clinical Laboratory Medicine; such as Clinical Biochemistry, Clinical Immunology, Clinical Microbiology, Clinical Parasitology, Clinical Virology, Haematology, Coagulation and Haemostasis. EQA-news is issued twice a year; in May and September.

SCOPE OF EQAnews
EQAnews regards Quality Assurance (QA) as a professional activity with the aim of improving the quality of service provided by the clinical laboratory.

One important aspect of QA is External Quality Assessment (EQA, proficiency testing, inter-laboratory comparison). EQAnews sees External Quality Assessment as a rapidly developing scientific and practical area where worldwide understanding and support for further development is essential. EQAnews is established to facilitate worldwide communication of scientific, organizational and practical aspects of EQA.

EQAnews is owned by the European Committee for External Quality Assurance in Laboratory Medicine, EQALM.

EQALM will ensure contact with the various disciplines of Laboratory Medicine. EQAnews collaborates with the IFCC, ECLM and WASP and welcomes co-operation with other scientific organizations.

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Progress and Improvement for Identification of Extended Spectrum Beta Lactamases (ESBLs) through External Quality Assessment

Veronica Restelli*, Robin Barteluk, Esther Kwok, Robert Rennie, CMPT Advisory Committee, Michael A. Noble

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Abstract

A retrospective compilation of reports by laboratories participating in an external quality assessment (EQA) program shows the progress of these laboratories in detecting extended spectrum beta-lactamase (ESBL)-producing organisms. ESBL detection increased from 10% in 1997 to 100% in 2008. Laboratories also showed progress in the reporting and interpretation of third generation cephalosporins results over time.

The use of extended spectrum cephalosporins in treating infections caused by ESBL-producers is strongly associated with clinical failures (9,10,15,16,19).

Because ESBLs are not always detected by traditional susceptibility testing methods, like disk diffusion or broth dilution, screening and confirmatory tests methods and guidelines for reporting results of susceptibility tests for resistant organisms have been developed along the years (1, 2, 13).

Laboratories have been required to make sure that the minimum inhibitory concentration (MIC) or zone diameter was equal to or below the breakpoint for cephalosporins; (se of screening tests to detect ESBLs when these were suspected; when ESBLs were detected and confirmed, report the isolate as resistant to all cephalosporins and aztreonam regardless of the susceptibility results.

We show the progress in performance that laboratories participating in the Clinical Microbiology Proficiency Testing (CMPT) external quality assessment (EQA) program had in their ability to detect ESBL-producing organisms and correctly report third generation cephalosporins results.

Data obtained from proficiency testing challenges over a period of 11 years were intercurrently reviewed and retrospectively compiled.
During that period of time, four well characterized ESBL-producing organisms were distributed over seven proficiency testing (PT) challenges. At each step, the committee elected to introduce another challenge or educational material in order to continue and hopefully enhance the progression to improvement.

Susceptibility data were collected from the reports received from category A (high complexity) and category B (medium complexity) laboratories.

Only interpretative categories of susceptible (S), intermediate, and resistant (R) were evaluated. Both zone size measurement and MIC values for third generation cephalosporins were excluded from evaluation because of the wide range of reporting styles and values. Reporting a result as S when R was considered a very major error (VME); due to the characteristics of the strains used, no major errors could occur (reporting R when S); reporting I when R (minor error) was not evaluated until after 2003 when CMPT decided to consider it as a VME (6).

The report of ESBL production was assessed from comments added by the laboratories in the report form.

The first two challenges (1997) tested only the ability of laboratories to detect and report ESBL producers since at that time no clear recommendations were available for the reporting of cephalosporins in these isolates.

Only 16% of category A and 3% of category B laboratories reported or suspected the presence ESBL in the challenge strain (Figure 1). Feedback for those challenges highlighted the criteria for suspicion of ESBL-producers, the existing screening methods and the importance of using different substrates to increase method sensitivity. (2, 3) The CMPT Committee recommended reporting all cephalosporins as R when ceftazidime result was R (3, 11).

Five more challenges were sent to the laboratories following the publication of ESBL screening and confirmation methods (12, 13) and after guidelines recommending the report of all cephalosporins as resistant were issued. (1, 13) ESBL detection increased to 76% in 2000 and reached 100% in 2008 for category A laboratories while category B laboratories showed a slower progress, with 32% of them reporting ESBL in 2000 and up to 79% in 2006 (category B laboratories did not participate in the 2008 challenge). Despite existing guidelines and recommendations in 2000, 28% of category A and 67% of category B laboratories reported the ESBL isolate as susceptible to third generation cephalosporins.
Figure 1: Progress of participant laboratories in the detection of ESBL in challenge strains and in the reporting of third generation cephalosporins results over time and correlation of such progress with NCCLS/CLSI guidelines, CEQA-AGAR guidelines, and CMPT’s interventions (critiques, newsletter).

*n/a: not available; no third generation cephalosporins data available.
# Bacterial strains sent in each challenge – arrows – with the corresponding characterized ESBL.
VME-A and VME-B: very major errors in categories A and B laboratories respectively.
ESBL-A and ESBL-B: detection of ESBL by categories A and B laboratories respectively.

The issue was aggressively addressed through various articles and discussions in the CMPT’s newsletter (4, 5, 17, 18). Laboratories were advised to add the comment “The isolate is a suspected or proven ESBL producer… ESBL production may predict therapeutic failure in some patients treated with drugs such as penicillins, ceftazidime, cefotaxime, ceftriaxone and aztreonam. Alternatively therapy should be considered “ on the results report (1).
In the following challenges the occurrence of VME dropped abruptly to 2%, 0%, and 7%.

As expected, category A laboratories showed better performance and faster improvement than category B laboratories.

At the end of the 11 year period, the improved performance of the laboratories support the belief that the CMPT-EQA program has been very successful in identifying areas of improvement in susceptibility testing methods and reporting of test results which has led to better laboratory performance.

Due to the retrospective nature of the study, some data could not be retrieved in detail. Reporting of results varied since laboratories were not instructed on which antimicrobial agents to test, but were expected to report results as per their normal protocol.

Acknowledgements
CMPT wishes to acknowledge Dr. Michael Mulvey, Chief, Antimicrobial Resistance and Nosocomial Infections, National Microbiology Laboratory, Winnipeg, MB for the characterization of ESBLs and CMY enzymes of the strains used for this study.

We also thank the CMPT Advisory Committee for their critical reading of the manuscript. All authors are aware of the conflict of interest requirements of the ASM, and declare at this time no interests, commercial or financial, that would constitute a conflict. This project was developed within the Clinical Microbiology Proficiency Testing program of the University of British Columbia, Canada. No supplemental funding source was involved with the creation of the project or manuscript.

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References
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raemic infection caused by extended spectrum beta-lactamase (ESBL) producing *E. coli* compared to non-ESBL producing *E. coli*. J. Infect. 55:254-259.


Programme of the EQALM Symposium 2010

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Abstract EQALM Symposium 2010

Long-Term Evaluation of Qualitative EQA Results

Vivienne James, UK NEQAS for Microbiology, United Kingdom

Most analyses in clinical microbiology are qualitative in nature which does not lend itself naturally to objective evaluations over time. However surrogates can be used so that long term evaluations can be made. These include looking at the percentage of participants reporting the intended result for individual organisms or specimen types and aggregating this data to look at trends. This type of analysis is illustrated by a report for the UK NEQAS schemes for blood and faecal parasitology which were introduced in 1986. Participant performance was monitored and a significant overall improvement was noted in the ability to correctly identify all faecal parasites since the scheme was introduced. Similar results are noted for malaria detection and parasitemia estimations.

Evaluations can be made to address a specific issue such as to review changes in practice or the effect of changes to kit usage; this type of evaluation is usually done as a single exercise. An example of this was a review of the UK NEQAS scheme for mycobacterium culture which was introduced in 1993. In the same year the Centre for Disease Control (CDC) recommended the of use liquid culture techniques to improve the time taken to diagnose *Mycobacterium tuberculosis* infection such that identification could be achieved within 21 days. The review of examination methods was published in 2005 and looked at the changes in time to reporting of results to see whether the CDC target had been achieved. The review showed the percentage of participants reporting a positive result by 21 days had risen from 55% in 1995 to 83% in 2002.

In other areas of microbiology, such as viral serology, even though results have a qualitative interpretation the immunoassays have a numerical cut off value. Following change to UK guidance regarding the level of rubella IgG antibody that was considered to confer immunity against infection a review of specimens with low levels of antibody showed that six of the commercially available assays gave significantly higher and five significantly lower values than the Abbott AxSYM which had previously been the most commonly used assay.

To provide an objective measure to enable monitoring of participant performance over time a numerical score can be applied to results. In UK NEQAS for Microbiology, for most types of distribution a four
point scoring system is applied with a score of 2 for a full correct result, 1 for partially correct, 0 for wrong and -1 for a misleading result. Performance is monitored over a rolling set number of distributions and participants are provided with information on their total score for the specimens/test combinations they reported, the mean score calculated from the reports returned by other participants in their country for testing the same specimen/test combinations and the standard error. In addition they are provided with a performance rating of the number of standard errors their score lies above or below the mean performance for the laboratories in their country examining the same specimens. A performance rating of more than 1.96 standard errors below the mean indicates possible poor performance (z-score 2).

Governance of UK laboratory performance is monitored through the use of long-term evaluation of EQA results with details of persistently poor performing laboratories managed sequentially through the Scheme Organiser and the National Quality Assurance Advisory Panel by the Joint Working Group (JWG) for Quality Assurance and through the JWG to the Quality Care Commission.

Abstract EQALM Symposium 2010

The Long-Term Evaluation of Quantitative EQA Data

Piet Meijer, ECAT Foundation, Leiden, The Netherlands

Results of an individual External Quality Assessment (EQA) survey should be carefully evaluated by the laboratory. This provides the laboratory with information about their performance in relation to other participants. Depending on the design of the EQA programme information regarding precision and accuracy could also be obtained. However, for an individual laboratory it is also of major importance to know whether they show stable performance over time. Therefore the monitoring of EQA performance over time should be done, in order to identify potential problems error, human error, etc.

There are several approaches to evaluate the long-term analytical performance. For instance, a graphical plot of performance scores (e.g. Z-score) from survey to survey can be given in order to monitor the analytical performance. This approach enables unusual or unexpected results to be highlighted, as well as assisting in the identification of trends.

In the presentation several examples of different long-term evaluation approaches will be shown.
Particular attention will be paid to an evaluation model in which the individual laboratory results are correlated to the consensus values/target values of the corresponding survey. By application of linear regression several parameters can be calculated resulting in the assessment of the long-term analytical imprecision and bias. An Excel tool for the application of this evaluation model will be shown.

Regardless the evaluation model chosen by an EQA organisation it is of major importance that long-term evaluation of EQA data is included in the standard evaluation procedures of an EQA organisation.

Abstracts EQALM Symposium 2010

Use of Performance Scores for Long-Term Evaluation of EQA Performance

Jane Gun-Munro, QMP-LS, Toronto, Ontario, Canada

Introduction
QMP-LS is a mandatory external quality assessment (EQA) program for licensed Ontario medical laboratories. Its mandate includes long-term monitoring of poor-performing participants to ensure successful corrective action. Performance is monitored over two years to ensure satisfactory performance is maintained. Tools used for long-term evaluation include:

- Performance scores to provide tracking and trending capabilities;
- Survey and management reports to provide graphical evidence of performance over time.

Performance Scores
The performance of each participant is assessed on the difference between its result for a given measurand and the assigned value. Fitness-for-purpose performance criteria for qualitative and quantitative surveys are set by advisory committees and define the magnitude of acceptable difference between the participant result and the assigned value through assignment of numeric scores. Performance criteria are based on scientific literature, guidelines, biological variation and achievable performance.

Performance scores provide consistent, objective and measurable means of quantifying error. They are included in the laboratory survey reports and are linked to codes which determine requirement for action (investigation) by the participant, thus providing timely feedback to participants and enabling self-monitoring of performance for prompt corrective action.
Reports
Participants receive reports of performance for each EQA survey. These reports contain graphical presentation of the laboratory’s performance in comparison with peers, by result, score and/or method, as applicable to the discipline. In addition, each laboratory receives a cumulative report that provides performance data for the same survey for up to two years by result and score. This report provides run chart information of performance score by survey and, when applicable, by measurand concentration. For each analyte or test parameter in quantitative surveys, participants are able to monitor their method accuracy and precision. For qualitative disciplines, performance is monitored by test process e.g., cross-match, culture, IHC marker.

These reports also contain ‘Required Action’ codes that instruct participants to investigate reasons for any unacceptable score. “Warning” codes indicate suboptimal performance and require participant investigation for preventive action. “Action” codes indicate unacceptable performance and require investigation and implementation of corrective action; these investigations must be submitted to QMP-LS. A two year summary of cumulative performance is available for laboratory management review. This contains a chart of all ‘Required Actions’ for each test parameter within each survey (e.g., cholesterol within Lipid survey).

In addition, annual performance summary reports are being developed which chart the ‘Required Actions’ received for each survey within a laboratory discipline (e.g., Routine Chemistry, Lipid and Drug surveys within the Chemistry discipline) and for each discipline within a laboratory (e.g., Chemistry, Hematology and Bacteriology). This provides a high-level overview of laboratory performance for management review purposes.

Summary
Performance scores and associated action codes provide tangible means of tracking EQA data for participants, EQA providers, accrediting bodies and regulators or clients. When used with cause analysis investigations for long-term evaluation of EQA performance, they are invaluable tools for monitoring, measuring and improving the effectiveness of participants’ analytical processes within their quality management systems.
Since 1972, the Swiss Centre for Quality Control (CSCQ) has been organising EQA schemes in many medical laboratory fields such as biochemistry, haematology, haemostasis, tumor and cardiac markers, blood gases, and quick tests. Surveys are usually organised four to six times and even twelve times per year. Analyte target values are consensus values (medians) calculated from the results given by the participants for each method or diagnostic device. A personal report is sent to each participant, detailing both quantitative and qualitative performances of all the analytes.

Each quantitative result is evaluated in two or three different ways. 

The tolerance range: when an analyte is mandatory according to Swiss regulations, the latter defines a given percentage tolerance to apply to the target value. Acceptable results must be within this tolerance range.

The Z-score: (laboratory results - target value)/SD. With that score, laboratories can compare their results with those of other participants.

The FAC performance factor: (laboratory results - target value)/target value tolerance percentage. Laboratories can evaluate their results according to the tolerance defined by the Swiss scientific societies. Results close to target values correspond to FAC values close to 0. FAC ranges are characterised by appreciations: “excellent” (0 – 0.5), “very good” (>0.5 to 1), etc. In order to allow laboratories to follow analyte performances over time, reports also indicate EQA FAC values dating back over one or two years.

For qualitative results, laboratories are given FAC values depending on the quality of their results. This assessment also allows laboratories to monitor the performance of qualitative analyses over time. In the end, we can add that, apart from the above-mentioned reports, the CSCQ has been studying and publishing long-term analyses of some analytes based on thousands of EQA results.
Abstract EQALM Symposium 2010

Long -Term Evaluation of EQA Data in Croatia

1Zlata Flegar-Meštrić, 1Sonja Perkov, 1Aida Nazor, 1Mirjana Sikirica, 2Dubravka Juretić

1 Institute of Clinical Chemistry University Hospital Merkur, 2 Croatian Society of Medical Biochemists - Committee for External Quality Assessment, Zagreb, Croatia

External quality assessment programs in Croatia have been continuously performed since 1973, by the Committee for External Quality Assessment in Medical Biochemical Laboratories under the auspices of the Croatia Society of Medical Biochemists. EQA surveys are organized three times per year for the field of laboratory haematology and coagulation, general medical biochemistry, urinalysis, pH and acid base analysis, thyroid hormones and tumour markers. Certificate of participation is issued to each laboratory every year. Summary statistics review is sent to the Croatian Chamber of Medical Biochemists once per year.

There are more than 200 medical biochemistry laboratories in Croatia, most of them in primary health care. These laboratories were supplied during 1996 and 1997 with new equipment, as a part of the First Croatian Health Project, carried out by the Croatian Ministry of Health and Croatian Institute for Health Insurance. We evaluated the impact of the use of new equipment on the analytical quality of the test results within the Croatian External Quality Assurance program. Evaluation of method performance revealed that after the introduction of new equipment interlaboratory variation decreased, so that an increasing proportion of laboratories included in the project produced results within the target limits.

In 2004, during the course of Croatia’s accession to the European Union together with implementation of accreditation standard (ISO 15189) we started with project of harmonization of laboratory results governed by the Croatian Society of Medical Biochemists (Committee for External Quality Assessment of MBLs), Croatian Chamber of Medical Biochemists and Institute of Clinical Chemistry Clinical Hospital Merkur: Reference centre of the Ministry of Health for the production of reference values. The main goals of this project were: analytical comparability of the results based on recommended analytical methods as well as clinical comparability of the results based on reference intervals produced for Croatian population.
For the long-term evaluation of EQA results we calculate the performance statistics graphically using z-scores in order to demonstrate the variability of obtained results and identifies trends. In order to monitor qualitative results (in urine analysis) we use the ratio of acceptable to unacceptable results. Based on the results of these ongoing long-term evaluation, the major benefits of EQA are to (1) enhance patients care through improved analytical quality and working conditions in the medical biochemistry laboratories in Croatia; (2) to evaluate laboratory results across different methods and different reagents; (3) to identify medical-biochemical laboratories with poor performance and unacceptable results; (4) to evaluate possible sources of error; (5) to satisfy accreditation standard and regulatory requirements of Croatian Chamber of Medical Biochemists.

Abstract EQALM Symposium 2010

Human Control Serum for Long-Term Evaluation - the HK Program from DEKS

Gitte M. Henriksen and Inger Plum, DEKS, Herlev Hospital, Denmark

The Danish Institute for External Quality Assurance for Laboratories in Health care (DEKS) has for several years offered lyophilized external human control materials for long-term evaluation of most components in clinical chemistry. The program is called the HK program and consists of different long-term stable serum materials. The HK program is regarded as an external quality assurance (EQA) program which is not meant to replace traditional EQA, but is offered as a supplement. It is designed to monitor the continuing performance of the laboratories. unique for this kind of program. Thus you can compare CV% within laboratories between methods. The benefit for the laboratories is that they have materials with well known target values that they can use for several years. The materials represent a single concentration level. The materials can be used daily, weekly or monthly. The results are processed monthly. In the data processing report the laboratories can see their own results, mean and SD of the different methods, number of results and CV%. The distribution of the mean results and CV% (VK%) is also shown graphically in histograms. The data management of the intralaboratory CV% is Results, intra- and interlaboratory SDs are shown visually, accumulated for one year. You can
see your own result and CV%, results and CV% for all methods and own method, see an example in Figure 1.

**Figure 1:** Data processing in the HK program, an example

Another way to use the results obtained on the long-term materials is to look at the results from all the years that it has been analyzed and see whether the method concentration have changed. One of the lyophilized control materials in the HK program is called HK06 Special. It is a control material for evaluation of cardiac markers, tumor markers, Pancreatic Amylase and CRP. The lyophilized control serum was produced by SERO A/S in 2006 according to specifications set by DEKS. The batch consisted of 8,010 vials of 5mL and was stored at -20°C for long term storage. The last vials were sent to the laboratories at the beginning of 2010 and results are still being processed. There are approximately 40 participants from mainly Danish laboratories and a few Norwegian laboratories. We have looked at all the results obtained on this control material from 2006 to 2010. Figure 2 shows the data for C-reactive protein where we have received 1,841 results in total to date and Cancer antigen 125 where we have received 3,592 results.
Abstract EQALM Symposium 2010

Homogeneity and Stability

Pål Rustad, NKK, Oslo, Norway

The standard ISO 13528:2005: "Statistical methods for use in proficiency testing by interlaboratory comparisons" give advice on how to test for homogeneity and stability of EQA material. The following advice will be presented and discussed:

- Considerations of external quality assessment (EQA) versus proficiency testing (PT), e.g. how to select the σ (standard deviation of PT results) and defining the goals for acceptable homogeneity and stability.
- Uncertainty of the test results produced according to the standard
- Suggested improvements of tests
- Provide information from manufacturers of EQA/PT materials as to how these tests are currently performed in practice.

Figure 2: Results from HK06 Special

The presentation will show results obtained over several years from selected components and provide in depth detail of our findings.
Discrepancies observed in Automated Counting EQA: what do they mean?

Barbara De la Salle¹, Paul McTaggart¹, Carol Briggs², Anne Mahon¹, Keith Hyde¹

¹UK National External Quality Assessment Scheme for General Haematology, United Kingdom. ²Department of Haematology, University College Hospitals London, London, United Kingdom

The UK National External Quality Assessment Scheme for General Haematology (UKNEQAS(H)) issues 12 distributions annually to more than 2000 instruments registered in the Full Blood Count (FBC) Scheme.

UK NEQAS (H) is undertaking an in-depth review of EQA data gathered for different individual key parameters within Haematology, to give a comprehensive overview of performance, especially at the levels of clinical decision making. The first parameter to be examined was platelet counting in thrombocytopenic specimens, followed by an examination of performance in haemoglobin (Hb) estimation.

Accurate and precise platelet counts in severely thrombocytopenic patients are vital for clinical practice. To assess the accuracy of platelet counting by all counters and technologies, UK NEQAS (H) undertook a preliminary study in 2006 with a series of ten partially fixed human blood samples with platelet counts close to the level of current transfusion thresholds. The platelet counts (mean, SD and CV) were compared both within and between instrument groups and the “true” platelet count was determined by flow cytometry using the International Reference Method (IRM). This preliminary study showed that 96% of the automated counts overestimated the platelet count compared to the IRM and 33% were significantly higher (p<0.01). The results from smaller impedance analysers were no more inaccurate than the top of the range instruments. Although some of the instruments included in the survey could use different methods to report platelet counts (optical, impedance or immunological), it was unknown which method of counting was utilised to report the results to UKNEQAS (H). This may not only contribute to the high CV’s observed within some instruments but make comparisons between different platelet counting methods for these instruments difficult. UK NEQAS (H) extended this survey during 2008 and 2009, until data from a total of 29 thrombocytopenic specimens had been gathered. This unique survey demonstrated significant variation in platelet counting both between
laboratories and between different analysers, highlighting an inaccuracy of modern haematology analysers in platelet counting in severe thrombocytopenia. The different values obtained for the various analysers/methods on the same sample is useful information and may allow different transfusion thresholds to be determined for any group of analysers that persistently give higher or lower counts than the IRM.

A preliminary examination of Hb data from 8 specimens distributed in four trials of the UK NEQAS (H) FBC scheme over four years has been performed. The all methods trimmed mean Hb values of these specimens ranged from 5 to 20 g/dL and data from 1023 automated haematology analysers were included. Differences in median values between the analyser groups were observed. Similar differences were found between the analyser group medians and the all method median, and the International Committee for Standardisation in Haematology reference method Hb value for each specimen. Although small, these differences were statistically significant using sample t-tests (p<0.001) for the majority of the major instrument groups.

The impact of the nature of the survey material on discrepancies observed between different instrument types in haematology EQA must always considered. The UK NEQAS H FBC survey material is prepared from pooled, CPD-A1 anticoagulated blood, manipulated by addition or removal of plasma or other components, partially fixed and has antibiotics added. Partially fixed blood, particularly the cellular elements, does not react in the same way as EDTA blood in the different reagent systems used in haematology analysers. However, this does not account for discrepancies observed between analysers of the same type located in different laboratories. The influence of stabilisation on the measurement of Hb should be negligible; hence UK NEQAS (H) plans to introduce performance assessment against all methods for this parameter in a future build of the performance analysis software.

Abstract EQALM Symposium 2010

Challenges in an EQA Program for Glucose (POCT)

Gitte Marie Henriksen, DEKS, Herlev Hospital, Denmark

The Danish Institute for External Quality Assurance for laboratories in Health Care (DEKS) has for many years offered an EQA program for Glucose in whole blood mainly for Point Of Care Testing
(POCT) instruments. Two whole blood samples are distributed 4 times per year in a regular EQA program with statistics, graphs and a letter with comments. The individual results are compared with reference method values and scored in four categories: “very satisfying” “satisfying” “less satisfying” and “not satisfying”. The number of participants varies from about 50 to 200 participants in each distribution. Each participant can send in several results. About 50 participants from hospital laboratories and a few producers participate in all four distributions. Some general practitioners are also invited by their local hospital to participate in one distribution per year by prior arrangement with DEKS. The preparation of the sample material is undertaken at DEKS. About 450 mL of whole blood is collected using a plastic donor bag containing EDTA. After collection, Sodium Fluoride (NaF) is added, and approximately 1 mL dispensed into plastic vials.

After the results have been received, and data treatment undertaken, a report is provided to the participants with comments on the performance of each method/-instrument.

Over the years we have had many challenges. The main challenges have been the preparation of sample material along with the cooperation with manufacturers of POCT instruments. We want to deliver a material that has no matrix effects to ensure that the reference method value is valid. However we need to add additives to stop coagulation and glycolysis. Based on experience and experiments we have chosen to use EDTA and Sodium Fluoride (NaF). We have asked the manufacturers that claim that there is a matrix effect using our samples to document the matrix effect. They have not been able to document that their latest POCT methods are sensitive to NaF. However a few test strips have shown to be sensitive towards EDTA. In my presentation I will show results obtained using iodine acetate instead of NaF, and Heparin instead of EDTA. I will also show the results that have been obtained over the years and share some of the observations that we have made.

Abstract EQALM Symposium 2010

External Quality Assessment in Portugal - 32 Years of Experience

Maria Adelina Peça Amaral Gomes, PNAEQ, Portugese EQAS, Portugal

The National Institute of Health Dr. Ricardo Jorge (INSA) was established in 1899, as the Central Institute of Hygiene, in order to provide "technical and professional qualification of health exercise", to
structure and put in place a protection mechanism for the health of the population.

Founded in 1899, first in Oporto and later at Lisbon, by the physician and humanist Dr. Ricardo Jorge, an arm of the health system laboratory Portuguese, INSA develops a triple role as a laboratory of the State in the health sector, the national reference laboratory and national observatory health. The decision to establish the Institute was taken with the need to combat an outbreak of bubonic plague that reached the city of Oporto that year.

The image "Instituto Ricardo Jorge" is a mark of prestige and scientific projection characterised by:

- Qualified human resources to provide health care for the practice of biomedical research, epidemiological and clinical research and also for action in several sectors outside of health care;
- Promote, organize and ensure the External Quality Assessment in the laboratory - clinical laboratories and environmental;
- Provide differentiated analytical services (in particular in the function reference) to a wide variety of individual and institutional clients, public and private.

The National Programme for External Quality Assessment (PNAEQ) is inserted within the remit of the National Health Institute Dr. Ricardo Jorge, since 1978. Participation is voluntary and confidential, and the program for External Quality Assessment (EQA) is for the laboratories the only way to detect systematic errors by comparing its results.

The PNAEQ/ INSA is the only national organization with recognized competence in the organization of inter-laboratory tests in the clinical area, by the Portuguese Institute for Accreditation (IPAC). The EQAS are a legal requirement for all laboratories, and a mandatory requirement for the accreditation standards (NP EN ISO / IEC 17025 / NP EN ISO 15 189).

Our evolution in more than 32 years in the Clinical Area can be summarized in this way:
1. Different areas starting with the Clinical Area in the Year 1978; Water Microbiology Area – Year 1996; Food Microbiology Area – Year 2001.
2. Growing number of participating laboratories in the clinical area, from 43 public Laboratories in 1978 to 408 public and private in 2010.
3. The support of collaborators with technical competence of various Hospitals, Universities laboratories and recognised Specialists of some Public Clinical Laboratories has grown over the years.
4. The system used to obtain the statistical data, graphic and final
The number of new programmes has grown from 1 in 1978, to 78 in 2010.

The PNAEQ has made a major commitment to training throughout these years. Initially the training given to the laboratories involved the implementation of Internal Quality Control and a few years later the External Quality Assessment. It has always given special attention to key themes and specific clinical laboratory requirements – as an example, we are now developing an action plan at a national level, together with the IFCC in Portugal (for laboratories, physicians, patients and patient associations), on the changes of HbA1c units from % to mmol/mol.

More recently in this evolution was the introduction of new and very special schemes in some very important areas for clinical laboratories, such as the Pre and Post-Analytical Phase, and Safety. This year we are also trying to start a POCT Scheme for pharmacies and hospitals nurseries.

The acquisition of some equipment by this Institute, and the training of some of our collaborators in Reference European Laboratories enables the implementation of reference methodologies aimed at assessing the true value of some parameters - e.g. gas and liquid chromatography and mass spectrometry.

Recently, we are also collaborating with some countries in Africa (PALOP’s - African Countries of Portuguese Official Language) like Angola, Cape Verde, Guinea-Bissau, Mozambique, S. Tomé and Principe and Macau in Asia, by offering this service for clinical and environmental areas.

In October 2009, the 31 years of experience in Portugal was the main reason for the World Health Organization in deciding to invite us to the National Institute of Health in Ankara, to alert the Turkish managers and employees to the need of creation and implementation of an EQAS in Turkey. In this case they had a specific focus in the list of requirements for an organiser. It was a fantastic collaborative experience.

The EQAS organisation is recognised for its important role not only for its participating laboratories. These programmes are also committed to benefit Programs of Public Health, to generate reliable data in order to guide the activities of Public Health, to provide gaps and strategies for improving the skills within the laboratory, promote the guidance on planning and evaluating the training of the laboratory, to identify laboratories of excellence and to strengthen the laboratory network. This is very important work for all countries.
Finally we can state that in Portugal it is possible to meet the recommendations of the World Health Organization issued in Lyon’s (France) meeting, in April 2008, and published on August 8 on the “WHO - CONFERENCE ON LABORATORY QUALITY SYSTEMS IN THE 21ST CENTURY (2008)” proceedings and available through the following links:

This document indicates that each country must, among their activities, provide at national level a mechanism that can support laboratories throughout the country, develop national resources in order to ensure internal quality control and external quality assessment, and develop a process for monitoring the improvement of laboratory performance.

Finally, another important recommendation of WHO is that all the countries must be encouraged to aim for internationally accepted standards such as ISO 15189. This includes as we all know, one of the more important requisites for the accreditation of each parameter that is the evidence of very good results/performance in the External Quality Assessment Schemes.

Abstract EQALM Symposium 2010

Post-Analytical Automated Haematology Survey Organized by EQALM

Anne Christin Breivik, NOKLUS, Bergen, Norway

Background
The Norwegian Quality Improvement of Primary Care Laboratories (NOKLUS) started in 2007 to develop an External Quality Assessment Scheme for Post-analytical Automated Haematology. The focus of the control programme is interpretation of cell counts and plots from 5-part differential haematology cell counters. In 2009, the WG in Haematology in EQALM started an international cooperation on this subject. Fifteen countries agreed to participate.

Methods
The scheme is conducted via the internet using a specific username and password. A printout from a 5-part cell counter, a short case history and a questionnaire is provided. The participants interpret the counts and the plot corresponding to their main haematology instrument. The questionnaire asks e.g. if they would have trusted the results given by the instrument on the requested parameters, whether they would have reported additional
parameters (not requested), and how they would report the results. Each participant will receive a report where they can compare their own response with other laboratories using the same instrument and laboratories from other countries.

Results:
A pilot survey was run in February and the main survey is being completed in August. The results from the main survey will be presented at the EQALM-meeting.

Conclusion:
Surveys conducted in Norway have shown that there are large differences between laboratories regarding what results they report and what actions they take before reporting them.

Abstract EQALM Symposium 2010

Virtual External Quality Assurance (EQA)-Surveys: A Pilot in Haemostaseology

Michael Spannagl and Martin Fischer, INSTAND, Germany

Introduction
EQA-surveys are successfully applied for quality control in laboratory medicine and meanwhile are made mandatory for many parameters through guidelines of the German Medical Association. Thus probes containing different materials are shipped to participating laboratories where they get analysed. As of May 2010 Instand e.V., organizer of EQA-surveys since 1970, in collaboration with the Institute for Health Sciences, Witten Herdecke University, offers virtual components as a part of external quality management. A first pilot took place in July 2010.

Method
The pilot of the first virtual EQA-survey was run under the topic “Haemostaseology” and explicitly addressed medical technical assistants (MTA). Twenty-one tasks, mainly from pre- and postanalytical daily laboratory routine were to be solved online. At the end of each task the correct and incorrect answers were disclosed. In addition, each task contained an extensive commentary on the various options of solution. At the end of the virtual survey an evaluation-questionnaire was integrated.

Results
67 out of more than 500 registered haemostasis survey participants took part. The majority (68%) would have passed this test successfully, assuming a threshold of 60% correct answers. The type of task
mapping, multiple or single best choice) did not affect the results.

The evaluation showed that three quarters of the participants regarded the tasks as too difficult; nevertheless the majority (91%) did not feel overstrained and more than 50% would take part in another virtual survey in the future.

Discussion
Testing of pre- and postanalytical knowledge seems to be feasible in this virtual approach, which can be undertaken in a multidisciplinary way. In a next step this virtual EQA-survey will be offered to all medical laboratories registered with INSTAND and additional ones will be developed.

Abstract EQALM Symposium 2010

“Post-Analytical External Quality Assessment of Vitamin K Antagonist (VKA) Monitoring: an International Survey”

Ann-Helen Kristoffersen, Geir Thue and Sverre Sandberg, NOKLUS Bergen, Norway

Background
A model for post-analytical quality assessment has been developed by the Norwegian Centre for Quality Improvement of Primary Care Laboratories (NOKLUS) (1, 2, 3, 4). In this model, case histories and a corresponding questionnaire regarding different issues on laboratory testing is distributed to the doctors requesting laboratory tests. The results from such a survey can be used to evaluate the participating doctors' knowledge of laboratory tests, and to educate the doctors on issues where knowledge is lacking. The educational part is in the form of a personal feedback report. In this report, each doctor receives a comparison of his/her answers compared to the answers of all the other doctors. It also contains a general overview of the literature/guidelines, and detailed suggestions on how to handle the specific patient in the case history according to the guidelines (where they exist).

The current study will focus on post-analytical quality assessment of vitamin K antagonist (VKA) monitoring, and have been designed according to the model described above. The study is a cooperation between EQALM, NOKLUS and EFCC.

Aim
The aim of the study was to evaluate the knowledge and practice on treatment with vitamin K antagonists (VKAs) and INR monitoring in different countries. The aim was also to educate the participating doctors by sending an educational feedback report on how to handle the patients and the INR measurement in the case histories according to existing guidelines.
Methods
An English questionnaire with two different case histories was distributed to project coordinators from 14 different countries (mostly European) in addition to Norway. The project coordinators distributed the questionnaire (translated version if necessary) to the doctors taking care of most of the patients treated with VKAs in their country. 10-14 days after the first questionnaire, a reminder should be sent. Case history A focused on treatment with VKAs in a patient with atrial fibrillation and stable INR values. Case history B focused on treatment with VKAs in a patient with pulmonary embolism and a supra-therapeutic INR value. Among others, the participating doctors answered questions about frequency of INR measurement, on which INR values to change the dose of VKAs, and risk of stroke and bleeding in different settings.

Results
Preliminary results of the study will be presented at the EQALM meeting.

Abstract EQALM Symposium 2010

Commenting on Laboratory Results - is it of any value?

Dr Pat Twomey, Ipswich, United Kingdom

Pathology plays a significant part in approximately 70% of diagnoses and management decisions. When Pathology requests are broken down, Clinical Biochemistry laboratories provide the greatest number of tests of all the Pathology specialities and the absolute numbers are increasing in many countries. As the same time, there is a need to “add value” to the whole process. Laboratory commenting, along with telephoning, reflex and reflective testing are

References
all ways of adding value. The evidence base for adding value in Clinical Biochemistry is small but is growing. What is permissible varies from country to country. Laboratory comments can be entered reflexly by laboratory information systems or entered reflectively. The former is automatic and standardized in contrast to the latter. Both approaches have pros and cons. Thus, the laboratory information system and knowledge of how it works as well as staffing at the clinical validation stage are other variables.

Abstract EQALM Symposium 2010

Implications of ISO/IEC 17043: 2010 for Microbiology PT Providers

Jane Gun-Munro, QMP-LS, Toronto, Ontario, Canada

Introduction
Achieving accreditation to international standards gives proficiency testing (PT) providers a framework for standards of practice and continual improvement, and provides stakeholders with confidence in the quality of product and service. ISO/IEC 17043:2010. Conformity Assessment - General requirements for proficiency testing is a new standard for PT providers. It replaces and expands on both ISO/IEC Guide 43:1997, and the ILAC Guide 13:2007 and is intended to be a general standard for assessing competence of PT for testing and calibration laboratories regardless of industry or nature of testing, and also accommodates organisations such as inspection Guide 13:2007 and address all operational aspects of a PT program (planning, production, transportation, analysis, evaluation and reporting) with expanded focus in certain areas, including: competency and training of personnel, operation and use of appropriate facilities, equipment bodies and individuals. Within the standard, notes and appendices address the intent of the clauses, providing guidance to both PT providers and their assessors. The overarching intent is “fitness for purpose”. The previous guides focused primarily on PT schemes managing numerical data through statistical analysis, this was a challenge for microbiology PT providers since result data is frequently categorical in nature. This standard accommodates analysis of data in various formats.

Technical Requirements
The technical requirements require interpretation with respect to industry and nature of testing. They are consistent with ILAC and methods, use of assigned values and transportation.

Management Requirements
The Management Requirements are consistent with ILAC Guide 13 and ISO 9000 quality management system (QMS) requirements, which form the basis for ISO/IEC

**Implications for Microbiology**
Evidence of a fully functioning QMS must be in place. PT providers need to demonstrate conformity to technical requirements as they apply to their field of activity. Examples of ISO/IEC 17043 clauses, their intent and what this means for microbiology PT providers are listed below.

<table>
<thead>
<tr>
<th>ISO 17043 Clauses</th>
<th>Intent</th>
<th>Implication for Microbiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.3 Homogeneity and Stability</td>
<td>Ensure material is sufficiently uniform throughout testing period</td>
<td>Pre-test to ensure sufficient viable and/or recoverable micro-organisms in PT items OR provide evidence that procedures assure uniformity</td>
</tr>
<tr>
<td>4.4.4 Determination of Assigned Value</td>
<td>Ensure that the “right answer” is verifiable and the reason for variation is understood</td>
<td>Use reference material e.g., Type Collection Cultures OR reference/expert labs e.g., accredited labs, OR consensus of participant results</td>
</tr>
<tr>
<td>4.6.3 Transportation Conditions</td>
<td>Ensure that transportation does not negatively impact quality of PT item</td>
<td>Identify transportation temperature and monitor OR provide evidence to support practice</td>
</tr>
<tr>
<td>4.7.2 Performance Evaluation</td>
<td>Ensure evaluation is valid and performance is fit for purpose</td>
<td>Predetermine evaluation criteria and address method differences</td>
</tr>
<tr>
<td>5.5 Subcontracted Services</td>
<td>Ensure PT provider is responsible for entire operation of scheme</td>
<td>Maintain evidence of planning, scheme design, subcontractor competence, product specifications, report authorization</td>
</tr>
</tbody>
</table>

**Conclusion**
ISO/IEC 17043:2010 is sufficiently flexible to accommodate qualitative PT schemes such as microbiology. PT providers do need to interpret the clauses as they apply to their own schemes and maintain supporting documents and evidence.
Abstract EQALM Symposium 2010

EQA for Healthcare Acquired Infections

Christine Walton, UK NEQAS Microbiology, Centre for Infections, London, United Kingdom

Introduction
Healthcare-associated infections are a major problem for hospitals, in particular those caused by methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* (*C. difficile*). Infection can range from asymptomatic colonisation to serious life threatening illness. Laboratory diagnosis of these infections is crucial in supporting the management of individual patients, controlling spread and in establishing accurate epidemiological data.

The United Kingdom National External Quality Assessment Service (UK NEQAS) for Microbiology MRSA screening and *C. difficile* detection schemes were introduced in April 2009 and provide participants with the opportunity to assess the quality of culture, toxin detection and molecular screening techniques employed for the recognition of these important pathogens.

Aim
To analyse the performance of clinical laboratories participating in the MRSA screening and *C. difficile* detection schemes.

Methods

**MRSA Screening**
- From April 2009 to June 2010, 14 simulated nasal swab specimens were distributed.
- Specimens sent included nine positive and five negative for MRSA.

**C. difficile** detection
- From April 2009 to June 2010, 10 simulated liquid faecal specimens were distributed.
- Specimens sent included 9 positive and one negative for toxigenic *C. difficile*.

Results reported by participants for these specimens were analysed to determine their performance with these specimens.

**Results**

**MRSA Screening**
With the exception of one specimen (specimen 9281) performance by culture was very good with over 97% of participants reporting correctly on the detection of MRSA in the positive specimens, and by molecular detection, 94% correct. False positive reporting was 1% for culture and 3% for molecular detection with MRSA negative specimens.
C. difficile detection
Over 95% of participants reported correctly on the detection of toxigenic C. difficile in the positive specimens. Two specimens were not scored due to deterioration of toxin in the specimen over the distribution period. False positive reporting was 5% with the specimen containing a toxin negative C. difficile isolate.

Discussion
Results from the UK NEQAS MRSA screening and C. difficile detection schemes help participants monitor the performance of their methods, provides information on the most commonly used tests and testing algorithms followed. Importantly, participants can examine currently circulating strains and be kept informed about test limitations. Results from one of the MRSA screening distributions revealed that a commonly used selective media was unable to detect the ciprofloxacin susceptible MRSA isolate present. An increase in results reported for the molecular detection of both pathogens was seen over the first year of introduction. Deterioration of toxin in EQA specimens containing toxigenic C. difficile is an issue requiring further review. Both schemes have been well received and participation increased from 194 to 306 laboratories for the MRSA Screening scheme and from 177 to 273 laboratories for the C. difficile detection scheme by April 2010.

Abstract EQALM Symposium 2010

EQA for Reference Testing

Vivienne James, UK NEQAS for Microbiology, London, United Kingdom

EQA is an integral part of ensuring the quality outputs for clinical laboratories providing routine diagnostic services. In many countries EQA is provided on a full cost recovery basis through participant subscriptions. The need number of laboratories participating need to be sufficient such that data analysis is statistically valid.

An inherent factor of reference testing is that the tests performed are specialised and as a consequence these tests are only performed in a limited number of laboratories; in many instances in only one laboratory in each country. Staff working in the reference laboratories are experts in their field and often perform a wide range of tests before confirming a diagnosis. In order to demonstrate competence, improve standardisation and comparability between different
methods the reference laboratories may participate in ring trials. However these are often only circulated sporadically and may not be provided to the standards associated with provision of an accredited EQA scheme.

From a Public Health Microbiology perspective there is a need for robust infectious disease surveillance both nationally and internationally. Use of comparable typing methods assists with outbreak investigations and determining pathogenesis. EQA for typing methods can be provided in association with the routine EQA scheme as additional markers for testing by reference laboratories. This approach keeps the cost of the EQA provision within reasonable limits; provides the reference laboratories with comparability data and provides additional educational information to all participating laboratories regarding the current ‘state of the art’. This approach is particularly useful when new methodologies are gradually being adopted by a wider group of laboratories.

Alternative provision of EQA for reference testing is provided by commissioned or in Europe through ECDC funded projects for less common infections or those that require specialist diagnosis not necessarily provided in each European member state. In these instances the interlaboratory comparisons provide evidence of current capabilities and assist in determination of common and best methodologies. The collaboration between the EQA providers and reference laboratories helps to ensure the EQA is provided according to internationally recognised quality standards.

Abstract EQALM Symposium 2010

How is EQA for POCT PT-INR Performed in Europe?
A Project in EQALM Working Group of Haemostasis

Anne Stavelin, NOKLUS, Bergen, Norway

Introduction
Near patient testing or point-of-care testing (POCT) of protrombin time (PT), measured as International Normalized Ratio (INR), is widely used in primary health care to monitor patients on oral anticoagulation treatment. It is important that the POCT devices gives reliable and valid results, as the treatment depend on the PT-INR value. The laboratories should therefore participate in an External Quality Assessment (EQA) program and perform Internal Quality Control on a regular basis. The present study will concentrate on how the EQA of POCT PT-INR is carried out by the EQA organizers. To our knowledge, there are no studies that describe how the EQA for PT-INR value.
INR are performed in the European countries. Therefore, it would be interesting to investigate which EQA organizers in Europe have a program running for POCT PT-INR and compare how the EQA programs are organized (frequency, control samples, quality specifications etc).

**Aim**
The aim of this study is to get an overview of how the EQA programs for POCT PT-INR in the European countries are organized, and to publish the results in an international journal.

**Method**
A questionnaire has been distributed to members of EQALM. The table below shows which country and EQA organizer in Europe offer a POCT EQA program for PT-INR and have answered the questionnaire.

**Results**
Preliminary results will be presented at the EQALM Meeting in Lisbon.

<table>
<thead>
<tr>
<th>European country</th>
<th>EQA organizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>ÖQUASTA Austrian Society of Quality Assurance and Standardization</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>SEKK External Quality Assessment System for Clinical Laboratories</td>
</tr>
<tr>
<td>Denmark</td>
<td>DEKS Danish Institute for External Quality Assurance for Laboratories in Health Care</td>
</tr>
<tr>
<td>England</td>
<td>UKNEQAS United Kingdom National External Quality Assessment Service</td>
</tr>
<tr>
<td>Finland</td>
<td>Labquality -</td>
</tr>
<tr>
<td>Hungary</td>
<td>QualiCont In Vitro Diagnostic Quality Control Nonprofit Public Utility Ltd.</td>
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<tr>
<td>Netherlands</td>
<td>ECAT External Quality Control of Diagnostic Assays and Tests</td>
</tr>
<tr>
<td>Netherlands</td>
<td>FNT Federation of Netherlands Thrombosis Services</td>
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<tr>
<td>Norway</td>
<td>NOKLUS The Norwegian Quality Improvement of Primary Care Laboratories</td>
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<tr>
<td>Switzerland</td>
<td>CSCQ The Quality Control Center Switzerland</td>
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<tr>
<td>Switzerland</td>
<td>MQ Association of Medical Quality Control</td>
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<tr>
<td>Wales</td>
<td>WEQAS Wales External Quality Assessment Scheme</td>
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Stability of Anti Coagulated Whole Blood Samples for Performing Blood Cell Morphology Examination

Joan-Lluis Vives Corrons, AEHH, Barcelona, Spain

SUMMARY
During the last 10 years, the increasing centralization of clinical laboratories into the so-called “Core Labs”, and the need for long distance transportation of the blood samples after collection for analysis, has dramatically increased the time of blood storage before performing the analytical tests and the preparation of stained smears for blood cell morphology examination. In such conditions, if no careful control of pre analytical conditions of blood storage exists, cell deterioration may invalidate the analytical results.

Here, an international expert panel of blood cell morphologists from ICSH and EQALM has conducted a study for determining and quantifying the effect of whole blood storage after collection on peripheral blood cell morphology (BCM) including the manual differential leukocyte count (DLC). Since the manual DLC results have a wide range of variation, the study was performed on 5 different control blood samples which were maintained refrigerated (4ºC±2) and incubated at room temperature (0ºC±2) for 4, 12 and 24 hours. In all of the five blood samples, a blood smear was performed immediately after blood collection (Time 0) and after storage at the different times and temperature, a total of 35 stained blood films were prepared for each expert for BCM and manual DLC. The results obtained demonstrate that the storage of blood after 4, 12 and 24 hours of collection, at 4ºC and at 20ºC, is a cause of relatively important changes of BCM and DLC values. For white blood cells the most characteristic changes are an increase of band forms and of morphologically unidentifiable cells (smear cells) with a significant increase of smudge cells or storage artefacts. Due to this, an important percentage of cells are indistinguishable from abnormal leukocytes observed in myelodysplastic syndromes (MDS) and other haematopoietic disorders. One of the most characteristic apparently abnormal morphological storage effects is the cytoplasm degranulation and the Pelguer-Huet like forms. Storage effect on RBCs is also present but less evident than for WBCs especially when blood is incubated at 20ºC however, when refrigerated the storage effects appear only after 24 hours of incubation. These consist in a slight anisocytosis due to macrocytosis and a moderate echinocytosis. For platelets, the presence of anisocytosis due to
Abstract

Virtual Microscopy: a Realistic and Standardized Alternative to Conventional Microscopy?

Xavier Albe, CSCQ, Geneva, Switzerland

Virtual microscopy (VM) is a promising technique that offers many advantages as compared to conventional microscopy. In theory, it is applicable to all EQA schemes that use microscopic slides. However, an extensive and effective use of VM in EQA requires the following three prerequisites:

- Economics: schemes should be easy to organise and financially sound. This implies that the application should be licence free if possible with low maintenance costs.
- Development: the application should be Web based and scalable. The application itself and the development tools should be available at low cost with a non-proprietary solutions providing the best option.
- User: the application should ideally be free of charge and accessible from the Web using a simple browser. In this case, no installation would be required.

The interface should be simple and intuitive to use, requiring no special training. The application should be fast enough so that the displacements in the slide should be done almost in real time. The image quality should be optimal, i.e. adapted to the relevant elements to be observed in the slide.

The economical constraints impose collaboration between EQA centres. Acquisition of VM slides is an expensive and time-consuming process. The addition of valuable information (identification of the relevant elements, location, comments,...) to the cases requires expertise. EQA centres would have the advantage of sharing slide databases and well-documented cases. This objective requires an effort in standardisation, a crucial issue, that is currently unresolved.

The developments and user constraints should lead the EQA centres to use and adapt existing software. Geographic Information Systems (GIS) technologies could be used as a baseline for virtual microscopy applications and offer many advantages:

- huge developments have been made for the management, storage, display, edition and analysis of large scale images
open source applications are proposed with a very high technical specifications

- performance and scalability are excellent
- standardisation has been extensively considered and norms defined
- extensions for the processing and extraction of quantitative information of large scale images are available.

We will present a practical application of GIS technologies in EQA schemes using VM. We will also demonstrate the possibility of standardisation of information associated with VM slides using existing GIS standards.

To impose virtual microscopy as a realistic alternative to conventional microscopy in EQA schemes, joint actions should concentrate on three majors trends of development, close collaboration between EQA centres, the adaptation and use of low cost but effective software and a greater effort on standardisation.

Poster abstract EQALM Symposium 2010

Flowchart for Handling of Deviating Results from External Quality Assessment

Gunn B. B. Kristensen, NOKLUS, Norway

External Quality Assessment (EQA) is an important part of quality assurance in medical laboratories. The EQA-results continuously reflect the analytical quality of the measurements performed in the laboratory, and also the performance compared with other laboratories using the same instrument/method. Because the results are so essential, it is as important to find the cause of an error when the result is not as expected. Therefore, we have developed a flow cart for handling of deviating EQA-results.

The flowchart consists of several questions indicating possible causes to the deviating result, presented in a logical order. After answering each individual question in the flowchart, one might find a reasonable conclusion, further explained in the attachment to the flowchart. In EQA, the cause for an unexpected deviation might often be due to conditions outside the laboratory. It is especially important to find the errors caused by the laboratory itself. However, in some cases the route cause is difficult to ascertain. However, it is important to document what is done. The intended purpose of this document has been to develop a practical tool for handling deviating EQA-results that is feasible to use in the laboratories.
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