The Annual Scientific Meeting of College of Pathologists, Academy of Medicine of Malaysia: Opportunities and Challenges in Laboratory Medicine, was held at Riverside Majestic Hotel, Kuching, Sarawak on 27-28 June 2019. Abstracts of K. Prathap Memorial Lecture, plenary, symposium and paper (poster) presented are as follows:

K Prathap Memorial Lecture:
Opportunities and challenges for laboratory professional in patient safety

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Pathology has been the engine of healthcare system in understanding diseases and in the last few decades in monitoring therapy. However, the approach and technique we use remain very much the same. As we move into the future of the digital age and artificial intelligence, the challenge is should we continue doing the same or do we need to change and reinvent the discipline and the service we provide. To remain relevant, we have to embrace the change and move with the times. The digitization of pathology laboratories makes the specialty more efficient, specimen more reproducible and the work of pathologists less cumbersome. New technologies that produce biomedical "big data" (next generation sequencing, multiparameter / multiplex flow cytometry, high-throughput proteomics and metabolomics, systems biology analysis) have also caused us to rethink the best approach to diagnostics. While these opportunities and challenges seem daunting, we still have to grapple with old challenges of funding and leadership.

Plenary 1:
Challenges in diagnosis of monoclonal gammopathy

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The monoclonal gammopathies (MG) are a group of disorders characterised by the proliferation of clonal plasma cells to produce resulting in a detectable abnormality called monoclonal component or M-protein or paraprotein. Direct measurement of the M-protein spike by electrophoresis and immunochemical measurements of specific isotypes or free light chains pairs has provided useful information about the quantity of M-protein. Nonetheless, quantitation of M-protein by electrophoretic method gives suboptimal measurements on small M-proteins. In addition, measurements by electrophoresis of M-proteins migrating in the β- and α-regions are difficult due to the presence of normal serum proteins in those regions. The nephelometric quantitation of immunoglobulins (Igs) is a simple automated method that uses anti-human Ig antigen binding fragments (Fabs) that target the constant region of Ig. The method measures both monoclonal and polyclonal immunoglobulins, and therefore, its diagnostic use for identification of monoclonal proteins is not recommended and is also of no value for biclonal and triclonal gammopathies. Use of the serum free light chain (FLC) immunoassay, has led to improvements in the diagnosis and monitoring of patients with plasma cell dyscrasia and other monoclonal gammopathies. Not all MG secrete excess FLC. Abnormal serum FLC ratios have only been detected in 90–95% of intact Ig multiple myeloma and 40% of MGUS. Since these two patient groups can be easily diagnosed by serum M-proteins by protein electrophoresis, a combination of tests is needed to detect all MGs. Nephelometric methods using antisera specific for Ig heavy and light chain epitopes separately quantitate IgG kappa and IgG lambda, IgA kappa and IgA lambda, and IgM kappa and IgM lambda and may be useful for monitoring monoclonal proteins migrating in the beta fraction. The heavy-light, isotype-specific kappa to lambda ratio has been proposed as a potential monitoring method for IgA or IgM M-proteins migrating in the beta fraction. Although the assay is not sensitive enough to use as a routine screening method for MM, a 97% sensitivity observed in IgA MM and IgA MGUS indicates that almost all IgA MM patients can be monitored by HLC for both detection of the disease clone and quantitation using the IgA HLC assay. A 24-hour urine collection allows the quantitation of both the albumin and M-protein that has been rapidly cleared by the kidneys. The potential broad use of mass spectrometry for MG has been recently demonstrated by the application of matrix assisted laser desorption ionization – time of flight instruments (MALDI-TOF) for detecting monoclonal proteins. The Mayo Clinic group performed a large retrospective study in which patients with an assortment of plasma cell proliferative diseases had SPE, IFE, and FLC as well as urine protein electrophoresis and IFE performed at the time of diagnosis. The study shows patients would have had M-proteins detected by the various tests singly or in combination and if urine assays are removed from the diagnostic panel, there is no decrease in sensitivity. This and other studies have led the IMWG to recommend a panel of serum protein electrophoresis, immunofixation electrophoresis and FLC to screen for a MG; the inclusion of diagnostic urine testing is only recommended if amyloidosis is suspected, which simplifies collection for the patient and workflow for the laboratory and reduces costs as well.

HM-32. Impact of sports on haematological parameters among the university students

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Introduction: Participation in sports is increasingly popular among youths. Athletes are perceived to be healthier than non-athletes. Optimal athletic performance depends on proper function of many organs, including blood. Hence, haematological profile is one of the best biological indicators to differentiate athletes and non-athletes. There is no published haematological data among Malaysian athletes. Therefore, this study was designed to examine the impact of sports on haematological parameters among UNIMAS students, as well as to compare their nutritional (body mass index, body fat) and health status (anaemia, hypertension, haemoglobinuria, haematuria). *Materials & Methods:* This cross-sectional study involved 140 students (45.7% males, 54.3% females) with 64 athletes and 76 non-athletes from various faculties. Nutritional status was determined by a stadiometer, body composition monitor and electronic blood pressure (BP) set. Health status was assessed by full blood count, blood film examination and urinalysis. *Results & Discussion:* Prevalence of anaemia among UNIMAS students was 10%, which was higher in females (*p*=0.021), but not significantly different between athletes and non-athletes (*p*=0.259). Sports anaemia and haematuria were detected in 6.3% and 4.7% of the athletes respectively, who played intermittent sports. Athletes showed significantly lower white blood cell (WBC) and platelet (PLT) counts, but no significant difference was noted in red blood cell (RBC) parameters. Total training hours per week was significantly correlated with mean cell volume (r=0.249, *p*=0.048). Despite BP and nutritional status were not significantly different between athletes and non-athletes, athletes had significantly lower pulse rate (*p*<0.001). However, body fat composition among athletes had exceeded the recommended ideal range. *Conclusions:* This study found no significant difference in RBC parameters, however WBC and PLT were significantly lower among athletes. Further investigations are required to confirm the underlying aetiology of anaemia among the students so that proper management can be administered.

HM-33. Comparison study of qualitative and quantitative tests for G6PD deficiency in Hospital Wanita dan Kanak-Kanak Sabah

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Introduction: Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency is a common hereditary abnormality in Malaysia. Neonatal screening programme in Malaysia has stated that all newborn babies must be screened for G6PD deficiency. G6PD deficiency is an X-linked inheritance which explains why most males are affected while females usually become carriers. Fluorescent spot test (FST) has been used widely as a screening method for G6PD deficiency. However, this test is subjective and has limitation in detecting intermediate or moderate enzyme deficiency which is commonly occurs in female heterozygotes. *Materials & Methods:* This study was done to compare the result of a quantitative G6PD test kit, Wellsbio Carestart Biosensor with qualitative method which is currently being used. Reference value used for quantitative test was according to a published study done in 2010 at Hospital Universiti Kebangsaan Malaysia. *Results & Discussion:* 11 adult and 24 newborn samples were used in this study. 81.82% (n=9) of adult samples and 29.17% (n=7) of newborn samples showed normal result on FST. 1 out of these 9 normal adult samples on FST showed intermediate result by Biosensor. Whereas all deficient samples on FST (adult n=2 and newborn n=17) showed intermediate result on biosensor. *Conclusions:* The different interpretation in quantitative method can be caused by either variation of mutation in different ethnics in Sabah, or a new reference range for Sabah population needs to be established as the previous published ranges only include population from Peninsular Malaysia.

HM-34. Red Blood cell distribution width and Framingham Risk Score: Cardiovascular disease risk

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Introduction: Red cell distribution width (RDW) is routinely reported as part of full blood count (FBC) test. Higher levels of RDW may be associated with high risk of cardiovascular events among healthy adult population. This present study was aimed to assess the potential role of RDW as a marker for cardiovascular disease risk assessment in its relationship with Framingham Risk Score (FRS). *Materials & Methods:* A total of 75 healthy individual in Universiti Putra Malaysia were recruited. Respondents were required to answer a simple research questionnaire. Respondents' clinical data, anthropometrics measurement and 5 mL of collected blood samples were subjected for full blood count, blood sugar and lipid profile. *Results:* There were 19 males and 56 female respondents with the majority (77%) were between 30 to 40 years old. They were divided into four groups based on their RDW levels: Group I, <12% (n=8); Group II, 12-13.4% (n=42); Group III, 13.5-14.8% (n=22) and Group IV, >14.8% (n=3). Respondents with higher levels of RDW from this study, tended to be younger, female, non-smoker, normal lipid profile and fasting blood sugar, normal body mass index, and had low FRS. There was no statistically significant correlation between RDW and FRS (*p*>0.05) where most of the respondents were with low FRS. *Discussion & Conclusions:* A novel association was revealed between higher levels of RDW and an elevated FRS in patients with coronary artery disease, which raises the possibility that a simple readily available in FBC parameter, RDW, may be associated with an increased risk of heart events. However, a multicentre with a larger scale of study population is required to further verify the insignificant role of RDW as a potential additional marker to FRS for cardiovascular disease risks assessment of this study.