

ACBNews

The Association for Clinical Biochemistry | Issue 581 | September 2011

NHS Improvement
Diagnostics

NHS Improvement

In this issue

**NHS
Improvement
and
Diagnostics**


**Registration
from the ACS
Assessor's
Perspective**

**Focus on
Clinical
Cases**

**Managing
Scientific
Careers in
Northern
Ireland**

**Renal Stones
in Brecon
Beacons**





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Editor

Dr Jonathan Berg
Department of Clinical Biochemistry
City Hospital
Dudley Road
Birmingham B18 7QH
Tel: 07973-379050/0121-507-5353
Fax: 0121-507-5290
Email: jon@bergfamily.co.uk

Associate Editors

Mrs Sophie Barnes
Department of Clinical Biochemistry
12th Floor, Lab Block
Charing Cross Hospital
Fulham Palace Road
London W6 8RF
Email: sophie.barnes@imperial.nhs.uk

Mr Ian Hanning

Department of Clinical Biochemistry
Hull Royal Infirmary
Anlaby Road
Hull HU3 2JZ
Email: ian.hanning@hey.nhs.uk

Dr Derren Ready

Microbial Diseases
Eastman Dental Hospital
University College London Hospitals (UCLH)
256 Gray's Inn Road
London WC1X 8LD
Email: d.ready@eastman.ucl.ac.uk

Mrs Louise Tilbrook

Department of Clinical Biochemistry
Broomfield Hospital
Chelmsford
Essex CM1 5ET
Email: louise.tilbrook@meht.nhs.uk

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Email: admin@acb.org.uk

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ACB Administrative Office

Association for Clinical Biochemistry
130-132 Tooley Street
London SE1 2TU
Tel: 0207-403-8001
Fax: 0207-403-8006
Email: admin@acb.org.uk

ACB President

Dr Michael Thomas
Department of Clinical Biochemistry
Royal Free Hospital
Pond Street
London NW3 2QG
Email: president@acb.org.uk

ACB Home Page

<http://www.acb.org.uk>

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ACB News

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General News	page 4
Practice FRCPath Style Calculations	page 8
Clinical Microbiologists	page 10
Current Topics	page 11
Focus on Harrogate	page 16
Meeting Reports	page 17
Obituary	page 23
ACB News Crossword	page 24
Situations Vacant	page 25

Front cover: Lesley Wright, Director - Diagnostics, NHS Improvement, on her stand at Focus in Harrogate



Focus
Association for Clinical Biochemistry
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Liverpool 2012

focus on the patient
www.focus-acb.org.uk

The Arena
& Convention
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NICE CG58: Prostate Cancer Update

NICE has announced that the current Prostate Cancer Guideline has been reviewed and the decision is that it should be considered for an update. A guideline development group is in the process of being formed.

The current guideline was published by NICE in February 2008 and "Prostate Cancer; Diagnosis and Treatment" can be downloaded from the NICE website. The current guideline gives evidence for the current profile of PSA testing with the following details:

"The level of PSA testing is not centrally monitored in England and Wales. However, several surveys of GP practices and pathology laboratories have been carried out in recent years. There has been a significant increase in the rate of PSA testing from 1999 to 2002 (Melia *et al.* 2003; Melia *et al.* 2004). The rate of PSA testing decreased with increasing socio-economic deprivation, and independently decreased with increasing proportion of either black or Asian populations. Approximately 50% of PSA tests are ordered by GPs with a third of these tests being in asymptomatic men".



The other main area in the current guideline which talks of PSA is Appendix 1 which contains a summary of the use of PSA.

The ACB Scientific Committee is working to ensure that the views of ACB members are fully represented at all stages in the development of a new guideline. If you would like to ensure your comments get into the review process please email: douglas.thompson@leedsth.nhs.uk ■

Sudoku

This month's puzzle

		H	Y					
	C		E			H	R	
M				S				C
S	R				E			
		E				C		
			T				S	H
	Y			E				T
	T	I			H		E	
				T	S			

Last month's solution

S	E	C	R	Y	H	I	T	M
R	Y	M	S	I	T	H	E	C
H	I	T	C	E	M	Y	S	R
T	H	Y	M	R	S	E	C	I
E	R	I	Y	T	C	S	M	H
C	M	S	I	H	E	R	Y	T
I	S	R	T	M	Y	C	H	E
Y	T	H	E	C	R	M	I	S
M	C	E	H	S	I	T	R	Y

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Modernising Scientific Careers

The move to the new style Trainee Clinical Scientists continues with a series of information and feedback sessions being organised. The new training programme is being implemented in a very short timeframe. Trainees are taking up their contracts from early September and will be moving through pathology disciplines in their first year including Biochemistry, Immunology, Haematology and Genetics. Key areas at present appear to be:

Communication: there is a real need for supervisors, trainees and course organisers to work together to ensure everyone is "in the loop". Apparently the trainees themselves are already in discussion on the internet while some supervisors are getting more information from their trainees. For example, more than one supervisor found out from their student which university was delivering the training.

Haematology component: there are raised eyebrows at the detail of content of the haematology component to be delivered in a short timeframe.

Trainees' expenses for block university placement: here different SHAs are offering various support for students, who have to spend up to 7 weeks at a remote university on block release, and may also be required to attend for further days. Some SHAs are offering £2,000 as a total support for travel and accommodation while one is still not offering anything, instead suggesting that trainees use their salary to support this cost. Trainees are paid this coming year on AfC Band 6. Some of the Trainees are relatively mature and there is a suggestion that the remote locations of Manchester and Nottingham for some could make juggling home/work difficult, for example for those with a young family.

There is acceptance that the first year of the implementation of MSC is going to be quite hard and the SHA implementation team seem to be working very hard to take things forward. Certainly the attitude of supervisors will be important but already there are signs that the students themselves will be crucial to making this long in the planning initiative a success. ■

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Medical Device Alert

MDA/2011/084 Issued: 27th July 2011

This notice is relevant to radiometer models ABL505/555, EML105, ABL600, ABL700 Series and ABL800 which concerns the calcium membranes. There is potential for biased blood calcium results. Calcium membrane units may need to be replaced more frequently. Radiometer has reported that wrinkles may form in calcium membrane units. Retention of fluids between the wrinkles can cause a positive bias of approximately 14% in whole blood at low calcium levels of around 0.80 mmol/L.

Actions to be taken include not reporting calcium results below 1.00 mmol/L until the revised procedure in the Field Safety Notice has been followed, ensuring daily quality control checks are performed, performing additional quality control checks to confirm results where calcium concentrations are unexpectedly low and ensuring the upper and lower calcium concentration limits are appropriate. For further details see: <http://www.mhra.gov.uk/home/groups/dts-bs/documents/medicaldevicealert/con123325.pdf> ■

Focus into the Future and Inside MSC

Next month ACB News will include comment by Ian Godber on where he is aiming to direct our annual national Focus meeting.

We also hope to start the "Diary of an MSC Trainee", where one of the new style Trainees will be starting to give us all an insider's view on Managing Scientific Careers from the inside. ■



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Deacon's Challenge

No 124 - Answer

A man admitted with nausea and confusion was found to have a serum sodium concentration of 107 mmol/L. Calculate the volume of 1.8% sodium chloride anticipated to raise his serum sodium to 125 mmol/L, and the rate of infusion expected to achieve a rate of increase of 0.5 mmol/hour (atomic masses: Na 23, Cl 35.5).

FRCPath, Autumn 2010

Assume the following:

- Pure Na loss has occurred i.e. patient is fully hydrated.
- All the administered Na remains in the ECF i.e. no redistribution or loss by renal (or other) routes.
- The patient has an idealised body weight of 70 kg with ECF vol of 14 L.
- The administered fluid does not increase ECF volume (i.e. is excreted in the urine).

$$\text{Target Na change} = 125 - 107 = 18 \text{ mmol/L}$$

$$\text{Total Na needed} = 18 \times \text{ECF vol} = 18 \times 14 = 252 \text{ mmol}$$

Calculate concentration of 1.8 % NaCl in mmol/L:

$$\text{MW NaCl} = 23 + 35.5 = 58.5$$

$$1.8\% = 1.8\text{g}/100 \text{ mL} = 18 \text{ g/L} = 18,000 \text{ mg/L}$$

$$\text{Concn (mmol/L)} = \frac{\text{Concn (mg/L)}}{\text{MW}} = \frac{18,000}{58.5} = 308 \text{ mmol/L}$$

$$\text{Vol 1.8\% NaCl needed} = \frac{\text{Total Na needed}}{\text{Fluid NaCl (mmol/L)}} = \frac{252}{308} = 0.818 \text{ L (approx 820 mL)}$$

Since administration of all of the 818 mL would increase plasma ECF Na by 18 mmol/L

Administration of $\frac{818 \text{ mL}}{18}$ would raise ECF Na by 1 mmol/L

and administration of $\frac{818 \times 0.5}{18} = 22.7 \text{ mL}$ would raise ECF Na by 0.5 mmol/L

Therefore required infusion rate = **22.7 mL/h (approx 23 mL/h)**

Question 125

Calculate the range for the 95% confidence limits of a plasma osmolarity calculated using the following formula:

$$\text{Osmolarity (mmol/Kg)} = 1.86[\text{Na}^+] + \frac{[\text{glucose}]}{\text{mmol/L}} + \frac{[\text{urea}]}{\text{mmol/L}} + 9$$

if the analytical standard deviations are: Na⁺ 0.8 mmol/L, glucose 0.2 mmol/L and urea 0.25 mmol/L.

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End of an Era for the Microbiology Professional Committee

Professor Paul Klapper, Consultant Clinical Scientist in Virology, Manchester Royal Infirmary, has stood down as Chair of the ACB Microbiology Professional Committee (MPC, formerly Association of Clinical Microbiologists Council) after more than five years in the role.

Paul was elected to ACM Council in April 2004 and became Chair in November 2005, following the departure of Dr Sue Skidmore (Princess Royal Hospital, Telford). He presided over the start of an on-going period of great change for Clinical Scientists that included the Carter Review of Pathology Services and the introduction of Modernising Scientific Careers. Paul saw that a stronger voice for Clinical Scientists in Microbiology during these changes would require the support of a



larger organisation. Following the example of the Clinical Immunologists, he was instrumental in negotiating the merger of the ACM with the ACB to form the ACB Microbiology Group (MG).

He brought considerable wisdom and humour to the role of Chair, which was much

appreciated and will be greatly missed by his fellow committee members. As a gesture of thanks from the MPC, he was presented with a commemorative tankard at the MG Training Day on 23rd March 2011.

However, Paul continues to provide advice and support to the MPC through his membership of the Association of Clinical Scientist's governing body and the Royal College of Pathologists Standing Committee for Clinical Science. He has been succeeded as MPC Chair by Dr Kirsty Dodgson (Consultant Clinical Scientist, Manchester Royal Infirmary), with Dr Steve Green (Health Protection Agency, Southampton General Hospital) as interim Chair while Kirsty is on maternity leave. ■



Medical Device Alerts

Readers have asked that *ACB News* tries to capture all the MHRA medical alerts that are relevant to the readership. Up until now we have been sent information on MHRA alerts by a variety of sources and this has sometimes meant that we have had an inconsistent approach.

ACB News is now receiving all alerts from the MHRA and sifting them so that we can publish ones directly relevant to *ACB News* readers. ■

Certification . . . An ACS Perspective

Dr Joanna Sheldon, *ACB Immunology & Secretary ACS*

It is really encouraging to read “an applicant’s perspective” on the process involved in achieving HPC registration via the Association of Clinical Scientists (ACS) in the August issue of *ACB News* (*ACB News Issue 580, Trainee News, P16 – 20*). Darren Powell’s article is filled with very useful tips and advice and I hope that Trainees, from all ACS modalities, take it on board!

It may be useful if I make a few additional comments to give a perspective from the Assessor and the ACS.

- ◆ The Health Professions Council is an independent UK healthcare regulator so it is most appropriate to use the term HPC Registration rather than State Registration.
- ◆ There is a subtle difference between a register and a regulator. Anyone can hold a register ... a supermarket loyalty card is a register where they keep information about you! A regulator is an organisation with clearly defined standards that registrants are expected to achieve and maintain. A regulator will have a process for investigating and removing registrants who do not continue to achieve those standards.
- ◆ The HPC website is a wealth of useful and important information and I urge you to look at it ... in particular the Standards of Proficiency and Standards of Education and Training for Clinical Scientists. This may just come up in your assessment. The HPC even has an iPhone app!
- ◆ The strict portfolio criteria ... well, applicants who put in portfolios with 250 pages in an 8 point font with certificates reduced to fit 4 on an A4 page made us realise that some rules were needed! They are there to guide and help rather than irritate.
- ◆ You will need to make choices – the best bits of evidence to include are those that cover many competences. A case study where you can summarise a clinical problem and the science behind the investigation with perhaps some technical considerations would be good. If you can add on how you communicated the results or even presented the findings at a meeting – even better. Don’t include things just because you like them!
- ◆ The interview is with two senior colleagues from the profession. There may be an additional assessor present as the ACS has to train new assessors and audit assessments; you should be informed by the ACB Office if another assessor is to be present for your assessment.
- ◆ You will not be expected to know absolutely everything but make sure you have a good knowledge of the main things, the “urgent” or “clinically critical” things and have some knowledge of the more rare or esoteric.
- ◆ Fees, fees, fees – yes, it may seem a lot of money but the ACB does put a big chunk of money into the ACS so your assessment fees are heavily subsidised. The ACS does not make profit, nor does it pay any of the assessors, board or executive! I think in the current financial climate, these days of relatively cheap assessments are numbered!

The ACB website has links to the ACS and HPC websites – all really useful sources of information. The ACB Office gets many questions relating to the ACS process and answers them directly or forwards them on to appropriate ACS Board members. ■

Lean in Pathology

Lesley Wright, Director – Diagnostics, NHS Improvement



Lesley Wright and Ian Snelling launching the new NHS Improvement document: *First steps in Improving Phlebotomy at Focus 2011 in Harrogate*

The profile of Pathology has been raised in the last couple of years with the publication of the Lord Carter 'Review of NHS Pathology Services in England' 2006 and 2009. The case for using Lean and Six Sigma was recognised by this review and this methodology is currently being applied in many Pathology departments in the UK. Supported by the DH Pathology Modernisation Programme, the NHS Improvement – Diagnostic Service Improvement team have been piloting Lean methodology with a number of departments.

Lean is certainly generating great interest in the NHS and many Trusts are using Lean methodology across a variety of clinical pathways; and in clinical specialities.

Many see Lean as a 'quick fix', a 'set of tools', and despairingly some will say "we've done Lean" or think they have a Lean process because they have purchased the latest track system.

Leaders need to understand the foundations which Lean is based on:

- ◆ Long term philosophy.

- ◆ Continuously eliminating waste in the process.
- ◆ Respect for people, to develop and grow them.
- ◆ Continuous problem solving.

Lean is about changing culture, using A3 thinking to problem solve, stopping to fix a problem using daily huddles, seeing the service from the customer or patient's perspective, the Lean journey is never ending. You are never 'done'.

Putting the Patient First

There has been huge recognition of the need to design services around the patient: 'Too often, patients are expected to fit around services, rather than services around patients' - Equity and Excellence: Liberating the NHS, a White Paper, December 2010.

Lord Carter recognised that it was important to see the whole patient journey, "Pathology needs to be managed in future as an end to end clinical service and a core contributor to the clinical aspects of the patient's journey".

The recommendations were that services should be:

- ◆ Clinical effective
- ◆ Responsive to users
- ◆ Cost effective
- ◆ Integrated with other elements of health reform

At the heart of Lean thinking are the customers, our patients, and seeking to understand what parts of the processes they believe are valuable.

Lean applied in healthcare focuses on the flow of patients by removing waste. The more waste you remove the more you will see, as we have traditionally set up systems to mask the waste. The most important task a senior manager or Consultant can do is to walk the whole patient pathway from sample collection to the result being available.

‘Go see, ask why, and understand the root cause of the problem you are solving’ – David Fillingham, Lean Healthcare (ISBN: 978-1-904235-56-9. Price: £16.95).

Understanding the Problems

It is important to understand the problem, what is it we are trying to improve? What does the customer need? We need to use evidence and the best place to start is with the data.

To quote Liker and Meier (The Toyota Way, 2004, presently available on Amazon.co.uk at £10.39 delivered free - Ed) “without data, the severity of the situation is only a subjective feeling”. Yet many decisions are made purely on emotion, and ‘it feels like’ we should. Data should be used to inform the decision-making process.

Identifying the Value from the Patient’s Perspective

Using a value stream map, to create a helicopter view of the whole end to end pathway can demonstrate the amount of value added activity in the whole end to end pathway. Value added is anything that improves or changes the process, something the patient would be happy to pay for. Many have demonstrated as little as 5% of the pathway has any value added component from the patient’s perspective. We have

involved users in the process, engaging staff from emergency care, endoscopy, doctors and ward staff.

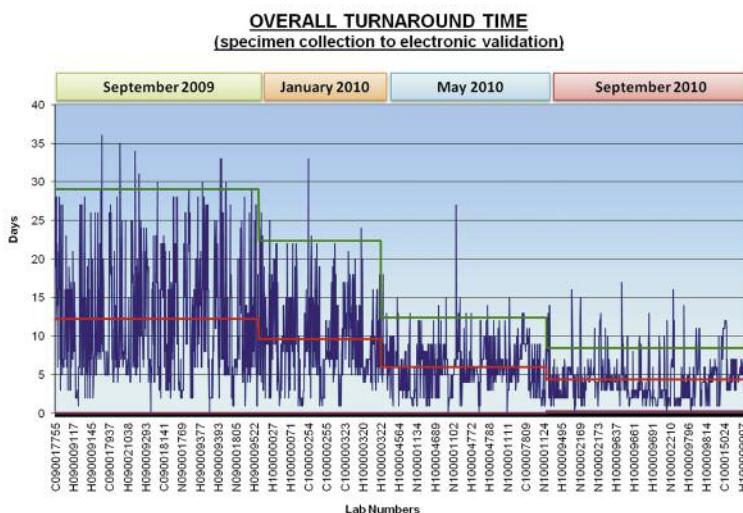
Waste

Lean works if all staff are empowered to remove waste. So what is waste?

There are seven key forms of waste:

- ◆ Overproduction – producing something before it is required, or more than is needed, e.g. unnecessary testing.
- ◆ Defects – poorly labelled specimens and requests e.g. insufficient or illegible information.
- ◆ Transport – material or information that is moved unnecessarily or repeatedly.
- ◆ Motion – unnecessary walking, bending or stretching e.g. equipment in the wrong location.
- ◆ Overprocessing – duplication of data or repeat testing due to defects.
- ◆ Waiting – patients waiting for tests and results, staff waiting for other staff, or equipment and information.
- ◆ Inventory – Excess levels of stock in cupboards and store rooms. Patients waiting are inventory too.

For Pathology two other areas of waste are significant.



- ◆ Staff with unused employee skills. Highly qualified staff performing inappropriate tasks.
- ◆ Automating inefficient processes – technology is substituted to compensate for a poor process e.g. tracking systems.

Empowerment and Leadership

When staff understand waste and how to identify it, managers need to empower them to remove it every day. Simply having a quick spurt every now and again will not change a culture. Empowerment is a challenge for managers, leaders need to become coaches. Staff need to be seen as the process “experts” in their field, and should be responsible for improving it. We frequently find the ‘shop floor’ staff see the waste and the need for redesign more than the senior or Consultant staff, as they are the ones who are often neck deep in waste, whilst those in managerial roles are not.

The Challenge of Standard Work

For many the real challenge of Lean will be implementing standard work, for example, standard layouts for equipment and rooms, with standard processes to follow. The mere mention of standard work in the NHS will, for many staff, immediately conjure up restrictive practices, lack of freedom and turning professional staff into robots.

If safety is to be fundamental to the care of patients, we need to see the benefits of standard work rather than seeing it as restrictive practice. Standard work should be seen as the ‘Gold Standard’ - the best way we know now, until we know a better way tomorrow.

Visual Management

Visual management is used to develop standardisation. The purpose of visual management is to reflect actual performance, we are visual creatures. Good visual management tells you straight away what the situation is, if it is safe and if the resources are being used effectively.

In pathology standard work and visual management have been implemented to reduce inappropriate demand, improve safety

and aid communication. At St Helens and Knowsley NHS Trust the lab staff developed a standard algorithm for testing urine samples. The algorithm and photograph of the correct sample container where placed in the sluice area of wards and clinics. This has reduced demand and encouraged only appropriate testing of samples. A similar approach has been used for MRSA testing.

Visual management promotes safety and is communicated by a picture or diagram placed at the point of use and not filed away in policy documents.

An information board or dash board should provide the most up-to-date date information to all involved in the process and to those in the organisation responsible for the service.

Developing Predictable Turnaround Times

If patients are to flow through the whole healthcare system, predictable turnaround time will allow staff to plan the patients care and treatment more effectively.

Pathology teams have found there are some basic changes have a huge and significant impact on improving turnaround times.

- ◆ Investment in transport – regular and multiple van runs to collect samples from primary care and a comprehensive vacuum system connecting clinical areas to the labs in secondary care.
- ◆ Eliminating batching of samples.
- ◆ Developing a work cell to improve flow.
- ◆ Redesigning the process first to understand the skills required.
- ◆ Some technology can slow the process down.

Pathology an Impact on Health Care Systems

With over 500 million tests performed annually, Pathology cuts across virtually every clinical pathway. For many, it is a hidden service, having little or no impact on key healthcare goals. However, we have demonstrated using Lean methodology, efficient Pathology services can support the

wider healthcare system to deliver more effective services. Providing short and predictable turnaround times we can:

- ◆ Avoid admissions for emergency care patients to avoid breaching the 4 hour A&E targets.
- ◆ Reduce length of stay by providing early morning phlebotomy services to wards, where the results are available prior the ward round.
- ◆ Redesign clinics where blood tests are performed prior to seeing the consultant thereby reducing the number of clinic appointments.
- ◆ Reduce unnecessary admissions from primary care.

On a visit to a Pathology laboratory in the USA, I asked the question, "Why did you start your lean journey in Pathology?" The response came, "There were long waits in the Emergency Care Department, they could not redesign their services until Pathology could give them short predictable turn around

times". Pathology Departments need to look outside their own departments, and demonstrate their worth to executive teams, by investing in Pathology, savings could be made across the wider service.

Lean is about changing the culture, and management systems need to change. The only chance a Lean culture has of being implemented and sustained is with strong, committed leadership. It should start in the boardroom and it cannot be delegated or done from the office. Leaders need to go to the 'gemba' or workplace and walk the pathway. Leaders must be willing to change their own behavior by setting and communicating a Lean vision, developing the people and seeing Lean as a long term philosophy and not a short quick fix.

Copies of case studies are available at www.improvement.nhs.uk/diagnostics ■

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Focus Clinical Cases

Joanne Carter, East Kent Hospitals

Although only registered for the final day at Focus 2011 in Harrogate, it was well worth the long trip from Canterbury, Kent. The parallel session on 'Clinical Cases' in the morning was back by popular demand and involved audience participation, albeit anonymously. Each speaker had prepared a set of multiple choice questions relating to their case. Throughout the presentations we were asked to select answers using a keypad and after a countdown of 10 seconds the results were revealed. Interestingly, the most popular choices were not always correct.

The first case by Danielle Freedman described a woman with raised testosterone, history of secondary amenorrhoea, baldness and hirsutism. The Ferriman Gallwey score to evaluate hirsutism in women and appropriate further testing, including overnight dexamethosone suppression test, DHEAS, androstenedione and pelvic ultrasound were discussed. The scan revealed ovarian cysts and polycystic ovarian syndrome (PCOS) was diagnosed. The importance of environmental as well as genetic risk factors in the aetiology of PCOS was highlighted since a significant reduction in her weight (80 kg down to 55 kg) was associated with lower testosterone and regular periods.

Too Much Gas and Air

Mike Hallworth discussed a case of a young pregnant woman with abdominal pain and a history of analgesics abuse. We were asked to assess her acid/base status on admission and not surprisingly many of us got this wrong! The patient had a mixed metabolic acidosis and respiratory alkalosis induced by overbreathing on gas and air. On readmission she presented with hypokalaemia and a metabolic acidosis with a normal anion gap which was consistent with type 2 renal tubular acidosis (RTA). RTA was induced by analgesics

abuse. The baby was born at full term with no health problems.

Eric Kilpatrick described a patient with diabetes with an unusually high HbF concentration (8%) detected on the HbA1c chromatogram. Reactivation of HbF (>0.5%) is observed in poorly controlled diabetes but not normally to this extent. The patient was referred to the Haematologists and they noted pancytopenia and an increased monocyte count since 2002. A subsequent diagnosis of chronic myelomonocytic leukaemia was made. The mechanism for raised HbF in this condition is unclear.

Aldosterone Synthase Deficiency

Next was Ruth Lapworth with an interesting case of a four week old baby with severe hyponatraemia and hyperkalaemia and metabolic acidosis. Urine sodium output was inappropriately excessive relative to the serum sodium. Follow up tests were discussed (cortisol, 17-hydroxyprogesterone, TFTs) which excluded Addison's disease, congenital adrenal hyperplasia and hypopituitarism. Diagnosis was aldosterone synthase deficiency which is a rare autosomal disorder with potentially fatal electrolyte abnormalities. The urine steroid profile was consistent with this diagnosis. Prognosis is good if diagnosed early and treated with fludrocortisone.

The session ended with Jonathan Kay describing a clinical incident in which a pregnant woman with eclampsia was given a 10 g loading dose of magnesium sulphate intravenously instead of 4 g. Not all of us remembered that Humphrey Davy first isolated magnesium. As randomised controlled trials have shown that magnesium sulphate reduces risk of maternal death and is not harmful to baby, it is currently the first line of treatment. A changeover in staff was a probable factor in this incident. ■

Aspects of Neurology and More

Gary Woodward, John Radcliffe Hospital, Oxford

ACB Southern Region Spring Scientific Meeting and Annual General Meeting

It almost seemed as if the winds of change were blowing through the doors of Carlton House Terrace, the home of the Royal College of Pathologists. This spring the ACB Southern Region members met to discuss the clinical aspects of neurology from a laboratory perspective, whilst the Annual General Meeting focused on the numerous and important changes taking place in the field of clinical biochemistry, particularly regarding the changes to clinical training and Modernising Scientific Careers.

There and Back Again: A Biochemist's Tale

The meeting was opened with an intriguing account by Patrick Walker, detailing his experiences at a Clinical Biochemistry Department in India. A full account of Patrick's time in India may be found in the February 2011 edition of the ACB News. In brief, Patrick described his thoughts on the Christian Medical College Biochemistry Department, situated in Vellore in the state of Tamil Nadu, South India and founded by the inspiring physician Ida Scudder. This 2,500 bed hospital sees 6000 patients per day and runs a large 24 hour Clinical Biochemistry Department receiving 4000 samples per day analysed on automated analysers, including a Roche P and E module, Cobas Elecsys, Olympus AU2700 and an Olympus AU2400.

The talk given by Patrick highlighted the unique opportunities that are opened to trainees who take part in the ACB funded

foreign placement programme. Whilst in India, Patrick was able to conduct a short study looking at the potential benefits of reflex testing for some biochemical tests within a distinctly different environment to those seen in the NHS. Indeed, Patrick's talk highlighted the value of foreign placement programmes, where these experiences may prove valuable to future clinical biochemists.

Lysosomal Storage and Mitochondrial Disorders

Dr Robin Lachmann (National Hospital for Neurology and Neurosurgery) and Professor Simon Heales (Great Ormond Street Hospital) gave an interesting account of three important lysosomal storage diseases, Gaucher, Fabry and Pompe's. Dr Lachman focused his talk on the treatability of these conditions, using cross culture correction of cells in the case of Gaucher's Disease and enzyme replacement therapy. Simon discussed the investigation of Gaucher, Fabry and Pompe's with a short account of biomarkers for each condition. These markers included chitotriosidase (CHITO), glucocerebrosidase and its substrate 4-methylumbelliferyl (4-MU) for Gaucher's, ceramide rihexosidase (CTH), also known as globotriaosylceramide (Gb3) and urinary saposins for monitoring Fabry's and cross-reactive immunologic material (CRIM) analysis and multiplex assays for Pompe's.

An interesting case was presented by Dr Phil Wilkinson (East & North Herts NHS Trust) highlighting the male inheritance of mitochondrial disorders, where mitochondrial activity relies on the expression of genes from both the cellular "host" and mitochondrial genome. He also argued that lactate:pyruvate ratios were not useful in the diagnosis of mitochondrial disorders and the meeting members discussed available alternatives.

CSF Microbiology and Uses in Neurological Diagnosis

Dr Derren Ready (Eastman Dental Hospital, UCLH) gave a colourful account of cerebrospinal fluid (CSF) from the microbiologist's perspective. The initial part of his presentation focused on the variety of micro-organisms that may be found in CSF, including *N. meningitides* and *E. coli*, protozoa such as *Amoeba* spp. and fungi such as *Cryptococcus* spp. Importantly, Dr Ready highlighted the inter-disciplinary considerations associated with CSF analysis. He asked the question "should CSF cell counts be performed by biochemist or microbiologist?" and indicated that there are real issues associated with data sharing between disciplines in some departments. This represents a real area for consideration in the future. Indeed, a preliminary role performed by Dr Ready suggested that there was a 50:50 split in opinions of lab integration between departments. However, it was generally agreed that most microbiology departments would be happy for biochemists to perform certain microbiological investigations, such as microscopy. The future for integration of departments is "hopeful".

In a comprehensive presentation by Dr John Land (National Hospital for Neurology and Neurosurgery) the current lack of useful CSF biomarkers was highlighted. It was suggested that this lack stems from the limited sample supply, which represents a major hindrance to research in this field. Initially, Dr Land's presentation gave an account of the common

analytes measured in CSF, which included protein, lactate and immunoglobulin, among others. Subsequently, some rarer uses of CSF was described. He highlighted the issues with CSF xanthochromia analysis before discussing the topical subject of dementia screening. In patients suspected of having Alzheimer's disease (AD), alterations in CSF biomarkers may be reflective of neurological changes where total tau, p-tau181 and A₄₂ measurements may be useful to predict the presence of AD pathology. Associated with dementia, investigations of CSF glucose transport deficiency should be considered in patients with epileptic and psychomotor retardation. The diagnosis of GLUT-1 deficiency syndrome (GLUT1DS) is established by reduced cerebrospinal fluid CSF glucose concentration (hypoglycorrhachia) and low ratios of CSF glucose concentration to blood glucose concentration. Furthermore, molecular genetic testing for SLC2A1, the only gene known to be associated with GLUT1DS, was discussed. Other rare CSF markers presented by Dr Land included angiotensin converting enzyme (ACE), amino acid profiles (with particular emphasis on serine), vitamin B12, neurotransmitters, folate, pyridoxal 5'-phosphate (to assess pyridoxamine 5'-phosphate oxidase activity) and tetrahydrobiopterin (BH₄), to name but a few.

This section of the meeting was concluded with a description of how CSF collection may impact on final results. Particular attention was paid to sample collection tubes with reference to Lewczuk *et al.* (*Clin Chem* 52: 332-334, 2006). ■

Changes to Healthcare Scientist Training and More in Belfast

Janet Chestnutt

The venue for this year's ACB/ACBI joint meeting was once again the Radisson Hotel situated on the site of the old gasworks in Belfast. There was a good attendance from laboratories North and South of the border.

Paul Newland, Consultant Clinical Scientist at Alder Hey Childrens Hospital, focussed on new guidelines for diabetic ketoacidosis (DKA) issued by the British Society for Paediatric Endocrinology and Diabetes (BSPED) in 2009. The main change from previous guidelines was the recommendation to use capillary blood ketone levels in monitoring. Blood ketone meters measure beta hydroxybutyrate which forms the greater proportion of ketones present in DKA and is physiologically more relevant than acetoacetate detected by the older urine ketone dipstick test.

Betahydroxybutyrate is now available in many hospitals as a POCT and this makes turnaround time for these tests much faster, enabling more effective monitoring of patients and more accurate adjustment of their fluid and insulin regimes. An online calculator for estimating fluid requirements when treating children with DKA was illustrated. Ward-based ketone meters can also be used for monitoring ketone levels in children with epilepsy being treated with a ketogenic diet.

Dr James Shand, SpR from the Southern Trust Cardiology Department, considered high sensitivity Troponin T (hsTNT), a test which has only recently become available and is now being introduced in many laboratories. He explained the clinical benefits of this test over the old less sensitive troponin assays and gave a guide to the interpretation of results. In patients with chest pain, serial sampling is important to improve specificity. One benefit of the test is that many patients previously

classified as unstable angina are now found to have NSTEMI and treated appropriately, improves the prognosis. HsTNT has been shown to be significantly associated with CVD risk factors and any measurable TNT is associated with adverse prognosis.

We turned our attention to the proposed changes in training and career structure for Healthcare Scientists. This was explained by Professor Bernie Hannigan, Chief Scientific Advisor for Northern Ireland. She emphasised that the new Healthcare Scientist is seen as part of a multidisciplinary team and that ideally local workforce planning requirements should determine recruitment. A curriculum for an MSc in Clinical Science has been developed by the Modernising Scientific Careers Team in conjunction with Working Groups from the appropriate Professions. Commissioning for providers for this MSc course as part of the Scientist Training Programme is underway. Professor Hannigan also discussed the fact that benchmarking with Great Britain had highlighted significant under-representation of Healthcare Scientists in Northern Ireland as a percentage of total Health Service workforce numbers and in terms of training budget allocated per capita to this group.

Metallic Afternoon

The afternoon session was chaired by Liz McClean and began with Barry Sampson, Principal Biochemist at Charing Cross Hospital. The topic was the application of trace element analysis to monitoring metal-on-metal hip prostheses. It has been increasingly recognised that these hip prostheses can release cobalt and chromium when damaged by wear and tear. The metals leak into periarticular tissue and eventually are detected in the blood.



High levels in blood are associated with a high level of erosion and may indicate a need for revision surgery. Some confusion has occurred in the popular press due to misinterpretation of the term pseudotumour coined by researchers to describe the radiological appearance of collections seen in some prosthetic joints. These are entirely benign and not related to any risk of cancer as feared.

Standardisation of serum calcium adjustment was discussed by Mrs Annette Thomas, from WEQAS. Many hospitals have started reporting albumin adjusted calcium. WEQAS surveys show that most hospitals are still using the traditional equation for correction $Ca_{adj} = Ca_{tot} + (40 - Alb) \times 0.02$ quoted in many textbooks but with little evidence for validity over the range of methods. This may lead to varying results for adjusted calcium depending on methods used for both albumin and calcium. It is recommended that each laboratory should ideally now derive their own equation using linear regression on local results.

POCT Eire Style

Ruth O'Kelly from Coombe Womens Hospital in Dublin discussed Point of Care services in

the Republic of Ireland. She outlined some of the advantages and disadvantages of POCT and emphasized the importance of laboratory involvement in the selection and use of tests. A recent survey audited accreditation status, POCT committees, and quality management systems as recommended by recently introduced guidelines. The survey found that many hospitals do not have a committee to plan and oversee the delivery of POCT services, to ensure that users are trained and that appropriate quality control is in place.

Margaret McDonnell, from the regional Endocrine Laboratory in Belfast Trust, gave the final talk of the day addressing the topical question of whether or not to screen for vitamin D deficiency. Concern about vitamin D deficiency in the UK has been increasing and consequently the number of serum vitamin D levels requested has been increasing. Vitamin D deficiency has been postulated to have a role in various conditions from cancer to multiple sclerosis but the evidence so far in most cases is inconclusive and firm evidence for the effect of vitamin D supplementation in preventing these conditions is also lacking. It was concluded that widespread screening for vitamin D deficiency is not yet justified. ■

Renal Stones Made Crystal Clear

Therese Michael, University Hospital Wales, Cardiff

The ACB Wales Spring Meeting was held in “The Barn” which is located in the picturesque village of Brynich in the heart of the Brecon Beacons National Park

The day, as the name implies, was themed around renal stones, pathogenesis, management and analysis.

Methods for Analysis

The morning session was chaired by Dr Avril Wayte and the first talk was given by Pervaz Mohammed, Principal Clinical Scientist in Sandwell and West Birmingham Hospitals. He presented the different methods available for renal stone analysis which included wet chemistry, chemical kits, X-ray diffraction, polarised microscopy, thermogravimetry and infra-red spectroscopy.

After discussing the advantages and disadvantages of each method, he detailed the method used in their laboratory, which is FTIR (Fourier Transform Infrared Spectroscopy) using the ATR (Attenuated Total Reflectance) technique.

In this technique, the powdered sample is placed onto an ATR crystal. The IR beam is reflected onto the crystal and the sample. As the sample has a lower refractive index than the crystal the reflecting light produces a unique spectrum for that sample. The components of the stone are then identified by means of special software which corrects the resulting data and then compares it with existing libraries. The speaker mentioned that this method is very sensitive and specific across a wide range of molecules compared to other

methods, but requires experience in interpretation. His conclusion at the end was that renal stones analysis is still widely used and that wet chemical analysis is still the commonest method. The methodology has changed very little over time, but the technology has moved forward considerably.

Medical Evaluation and Management

Dr Yee Ping Teoh, Consultant Chemical Pathologist in Betsi Cadwaladr University Health Board described the epidemiology of renal stones. She mentioned that the risk factors for development of stones are low urine volume, abnormal pH, absence of inhibitors, presence of infection, metabolic disorders, structural kidney abnormalities but some cases are idiopathic.

She gave details of the clinical presentation, complications and investigations of renal stones. The main part of the talk was about the different types of renal stones, their particular risk factors and their management. She then gave an overview of her practice in the renal stone clinic, particularly with regards recurrent stone formers.

Then Dr Bill Robertson, Royal Free and University College Medical School, gave an in-depth fascinating talk about the nutritional and metabolic factors that influence renal stone formation. He explained why the “bad” western diet rich in protein, salt, fat and refined sugar results in renal stones and demonstrated with examples and data from studies his principle of increased stone incidence with this kind of diet and the lower incidence of stones in vegetarians. He compared diet from different parts of Europe, the US and the Middle East and related that to frequency and type of stones.

Paediatric Renal Stones

The afternoon session was chaired by Dr John Geen and was opened by Dr Judith Van de

Voort, Cardiff and Vale UHB, who gave us an overview about renal stones in Paediatric population through very interesting case studies. The cases varied from cystinuria, nephrocalcinosis and even calcified renal fungal balls. She highlighted the fact that symptoms in paediatrics are non-specific, unwell or septic and then the history and investigations would reveal the stones.

Hyperoxaluria

Dr Gill Rumsby, University College London Hospitals was our next speaker and her intriguing talk was titled "Investigating Hyperoxaluria", hyperoxaluria being secondary and primary. The secondary causes are either due to diet, GI tract disease or defect in renal handling of oxalate. Primary hyperoxaluria was divided into types 1 and 2 until recently, when type 3 was reported in the literature. She then focused on the clinical presentations in the form of renal colic, stones, haematuria, nephrocalcinosis and sometimes renal impairment, up to ESRD. With regards the investigations, she mentioned renal function and 24 hour collection of urine for oxalate measurement. She, however, reiterated the fact that the values could be variable and sometimes repeat collection and measurement for confirmation is needed. After excluding secondary causes of hyperoxaluria, extra confirmatory tests for primary hyperoxaluria should be carried out. The definitive test is a liver biopsy and then either measuring the defective enzyme activity or more affirmatively genetic testing for the

mutations and ultimately gene sequencing.

Dr Rumsby then presented a few cases of primary hyperoxaluria and mentioned that treatment modalities are variable ranging from pyridoxine therapy, through to liver and kidney transplant for type 1 and kidney transplant for type 2. There are also ongoing clinical trials on Oxalobacter Formigenes, which is an oxalate-degrading bacterium.

Urological Management

Finally, Mr Raj Babu from University Hospital of Wales, Cardiff, outlined the clinical management of renal stones, starting from the initial management in the emergency room through to radiological diagnosis which involves intravenous urography and more importantly CT scan. Then he focused on further management depending on the presentation, patient factors, size of stone, its location and its recurrence. Management options for patients are usually either watchful waiting or urological intervention. The different urological techniques varied from extracorporeal shock wave lithotripsy (ESWL) to PCNL (Percutaneous Nephrolithotomy), open stone surgery and medications. The different indications for each intervention, as well as a brief outline of each technique, were eloquently presented.

In summary, the Renal Stone Day was enjoyable and very useful, with a range of very well informed speakers both from clinical and biochemical backgrounds.

It certainly gave us a most comprehensive view of renal stones. ■

North East Virology Stalwart

It is with regret that we announce the untimely death of Dr Clive Taylor, formerly Consultant Clinical Scientist in Virology at the Newcastle upon Tyne Health Protection Agency Laboratory. Clive died in a motorbike accident whilst riding on the A82 North of Glasgow.

For much of his professional life Clive worked in Newcastle upon Tyne, first within the Department of Virology at the Royal Victoria Infirmary, and then at the Public Health later (Health) Protection Agency Laboratory at Newcastle General Hospital. In his early career he worked with the pioneers of rapid virus diagnosis, Joyce McQuillin, Phillip Gardner and Rosemary McGuckin and absorbed some of their careful and persistent scientific methodology by means of which they notoriously changed the unreliable immunofluorescent detection method into a very reliable one.

Rapid Viral Detection

Under the guidance of Professor Dick Madeley Clive continued his interest in rapid virus diagnosis and developed a range of specialist methods in support of the routine service. He worked with European colleagues in an EU sponsored Concerted Action on Virus Encephalitis and Meningitis and developed friendships with many leading Clinical Virologists of Europe. Friendships that remain

to this day. Clive's helpfulness and diligence were associated with a modest outlook and friendly charm qualities appreciated by all who knew him. For many years he was a stalwart of the Association of Clinical Microbiologists, serving as Secretary to the Council and the ACM gained much from his experience and dedication. Clinical Scientists in Microbiology have much to thank Clive for in his work supporting their profession. Within the Health Protection Agency his contributions to committees won him much appreciation throughout the organisation. In the later years of his working life he assumed sole responsibility for Clinical Virology in Newcastle and because of his dedication and professionalism worked very long hours with little or no support. A job made worse by the uncertainties surrounding the future of virology in Newcastle. He retired from work barely two years ago for a well earned rest. In recent months his interest in virology and especially respiratory virology was rekindled and he spoke at the recent meeting of the Scottish Rapid Virus Diagnosis group.

Clive is survived by his long-term partner Frances, and Saul and Hannah, his son and daughter from his former marriage and we offer them our sincere condolences. His many friends in science are going to miss him greatly. ■

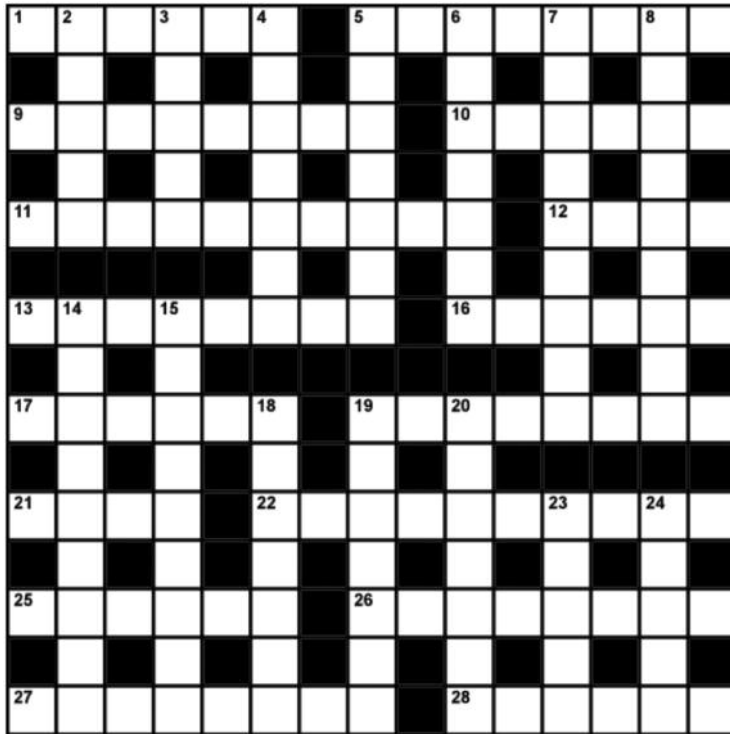
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Set by Rugosa

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Prizes for your department: The first five correct solutions to appear on the ACB News fax machine (Fax: 0121-507-5290) will receive a copy of the new educational Calcium Cases CD-ROM by Aubrey Blumsohn, Christina Gray, Neil McConnell, John O'Connor, Anne Pollock & Roy Sherwood and which retails at over £50. Please state clearly the name and address of the Department that is entering the competition. Remember that ACB News appears first as a PDF on www.acb.org.uk around the 7th of each month.



Down

- 2 Crowd plod along (5)
- 3 Scrutinise investigation (5)
- 4 Inexpert outsider (7)
- 5 Shame it upset disbelief (7)
- 6 Improperly synthesised rip-off chemical (7)
- 7 Perhaps turn pig heart into food (9)
- 8 Intense postscript about incompetence (9)
- 14 Creature unlikely to be seen by curious zoo patron (9)
- 15 Still part of ridiculous number censored (9)
- 18 No logic about one function of 15 (7)
- 19 Gradual absorption in cosmos issues (7)
- 20 Responsible for the birth of modern science said Stephen Hawking (7)
- 23 Hear again about a score (5)
- 24 A rejection of French for conducting contact (5)

Across

- 1 Layers make a start (6)
- 5 User's software sorted index supplement (8)
- 9 Breaking code that results in fatality (3,5)
- 10 Scatter offspring (6)
- 11 Skin, for example, misrepresented euphemistically - not scaly (10)
- 12 Mite, first infinitesimal organism to attack (4)
- 13 Range of complex computers lacking nothing (8)
- 16 Brought up never-ending original ideas (6)
- 17 Alcoholic drink accounting fiddled - unit missing (6)
- 19 Being a form of endless roaming (8)
- 21 Comrades without arms regulations (4)
- 22 Without fail, go for plasma constituents for this poison screen (7,3)
- 25 Dwarf affecting no bias (6)
- 26 Answer is to avoid cant during upsetting consultation (8)
- 27 One of a group of six discovered resting midday (5,3)
- 28 Element of zero information about coordinates (6)

Last month's solution



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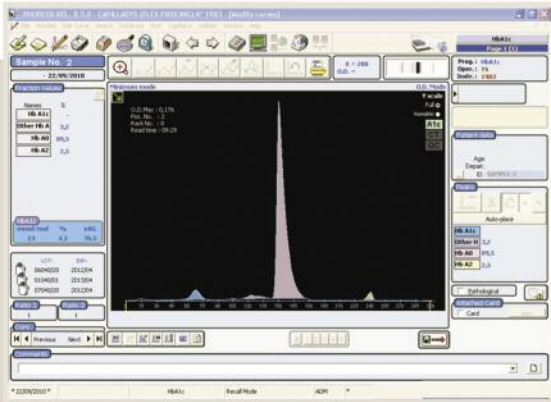
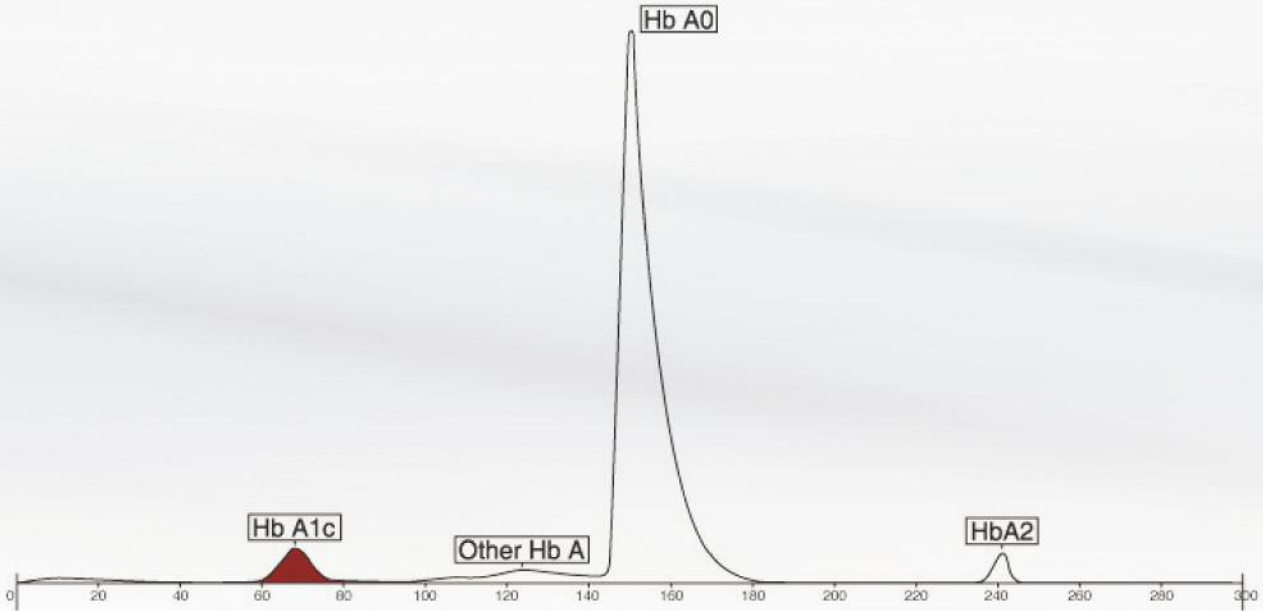
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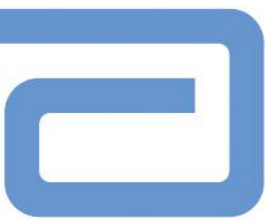
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