ONE-TO-ONE

TOTAL BODY SCANNER

Dr Ramsey Badawi discusses a medical imaging scanner: *p.16*

THE BIG STORY

DARK AGE HEALTH

The tribal existence that followed the fall of the Roman empire: *p.26*

HOW TO...

UKAS ACCREDITATION

Practical guidance for compliance with ISO 15189:2012: *p.54*

THE BIOMEDICAL SCIENTIST

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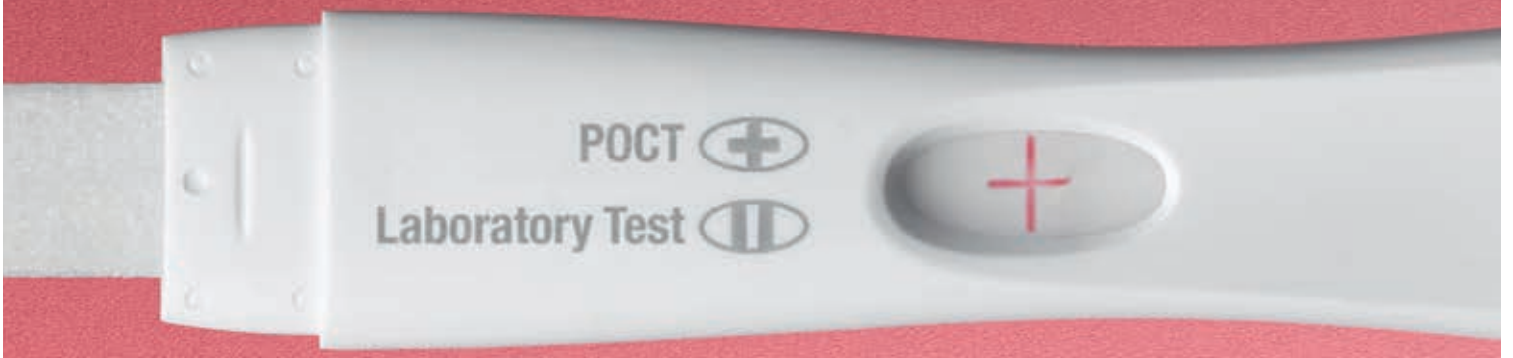
FEBRUARY 2019



TESTING TIMES

The birth of the home pregnancy test

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CONTENTS

IBMS.ORG FEBRUARY 2019

EDITORIAL

NEWS

OPINION

SCIENCE

COVER FEATURE

COVER PHOTOGRAPHY: GETTY

ADVICE

MY IBMS

MY LAB

EDITOR
Rob Dabrowski
SENIOR DESIGNER
Gary Hill
PICTURE EDITOR
Akin Falope
PUBLISHING DIRECTOR
Aaron Nicholls
PRODUCTION
Rachel Young
DISPLAY ADVERTISING
James Rundle-Brown

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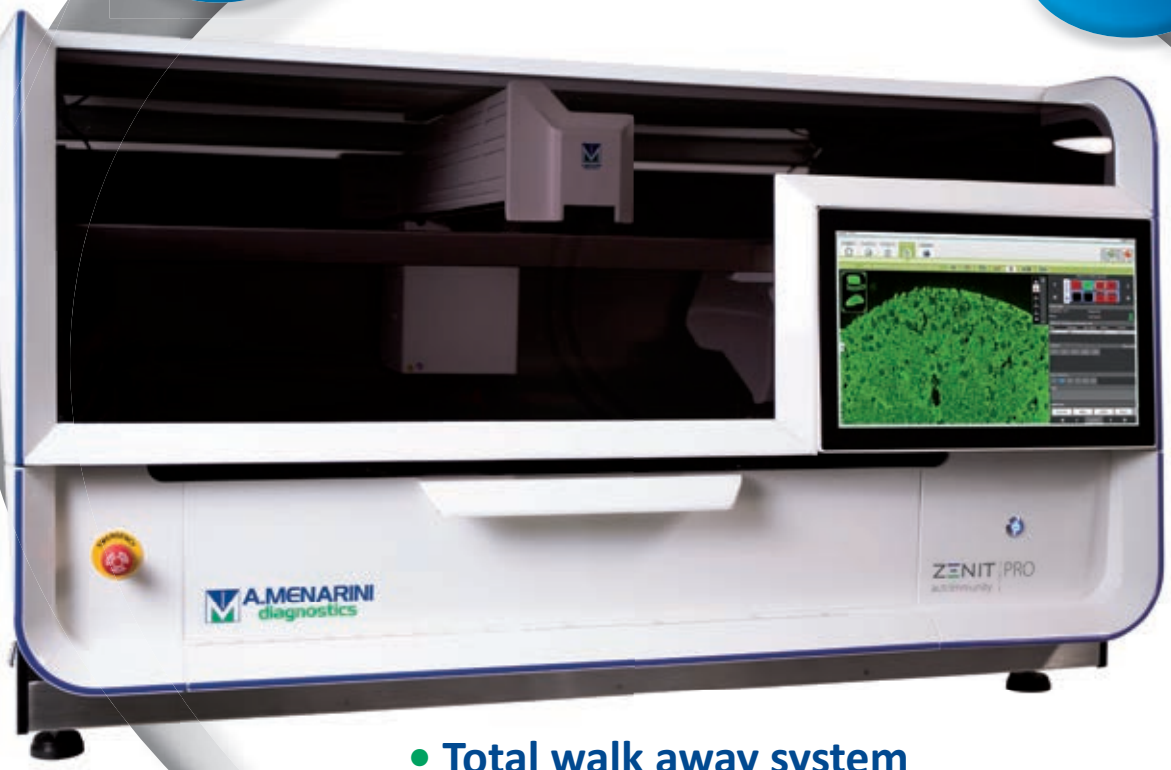

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CONGRESS LAUNCHED

Sarah May, IBMS Deputy Chief Executive, on the extensive programme and additions for Congress.

I am about to retreat in to a darkened room with a damp tea towel wrapped around my fevered brow; I do not wish to be disturbed for some time. The reason? Congress.

After months of planning, I am immensely proud and relieved to launch the 2019 main lecture programme, which is in this edition of *The Biomedical Scientist* and on the Congress website. Everyone who knows me will know my biennial shroud waving as I wring my hands and predict problems ahead, but every Congress has proved me wrong. Somehow, no matter how tough the environment or how non-existent the budgets, Congress remains an essential in our professional calendar and long may that continue.

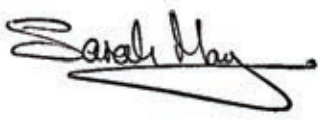
Like programmes from much loved concerts, I have kept past Congress programmes and revisiting them is somewhat akin to a highly condensed history lesson. As with any evolutionary process, it is the fittest that survive and the challenge is always to ensure that Congress remains strong and relevant in a challenging environment. With this in mind, Congress is offering even more content this year.

I know we fiercely protect our weekends but to help relieve staff pressures during the week Congress will again open on the Sunday to enable more people to attend its most popular programmes of quality management, and education and training, which will also feature during the week. Point-of-care testing (POCT) has grown massively in importance, so, new this year, is a whole lecture programme on POCT.

Also new is our veterinary pathology programme, which will appeal to a far wider audience than simply those of us in veterinary laboratories.

I can trail the benefits of Congress as much as I like, but there will always be the question of cost and I am very pleased to say that the premium early discount has been reintroduced. This started on 1 February when bookings opened and runs until 31 March, so delegates are advised to book early to benefit from this highly competitive rate.

I want to finish by remembering two very special ladies, Jennifer Johnson and Mary Macdonald. Jen and Mary were Council members who both died far too young but they left an amazing legacy that reflects the people they were. They each left funds to support the development of Institute members and this year the Jen Johnson bursary will fund 20 Congress places for members studying for an Institute exam and the Mary Macdonald award will fund 20 support staff members to attend the biomedical support staff programme. The generosity of these two people will help a new generation of members to experience Congress. Actions speak louder than words.



Sarah May
Deputy Chief Executive

Institute of Biomedical Science is the professional body for the biomedical science profession.

INSTITUTE OF BIOMEDICAL SCIENCE
12 Coldbath Square
London, EC1R 5HL
United Kingdom
+44 (0)20 7713 0214
+44 (0)20 7837 9658
Email: mail@ibms.org
Web: www.ibms.org

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EXAMINATIONS
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MEMBERSHIP
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SCIENCE NEWS IN NUMBERS

10yrs

This is the age by which the average child has exceeded the recommended level of sugar intake for an 18-year-old.
The news prompted **Public Health England** to suggest there may be a case for **introducing a sugar tax on puddings**. **A sugar tax was introduced in 2018**, but it just applies to fizzy drinks.

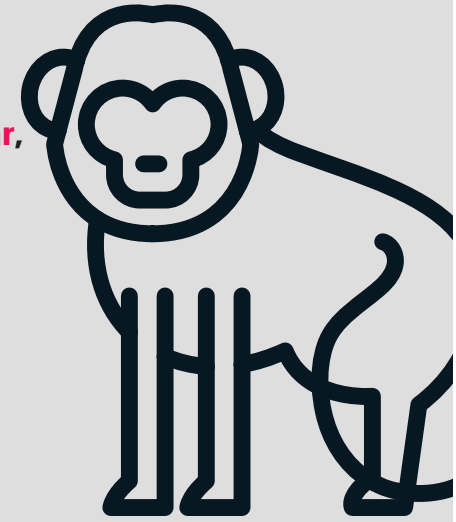
Missed consultations

15m

Patients who miss GP appointments are costing NHS England £216m a year, officials have said.
Data shows more than **15 million consultations** are being wasted because patients fail to show up. NHS England said each appointment **costs an average of £30**.

195

Scientists successfully transplanted a pig's heart into a baboon in an experiment described as a "landmark" breakthrough.
The baboon **lived successfully for 195 days** with a genetically modified pig's heart. The previous record was **57 days**.



$5bn

Facebook founder Mark Zuckerberg and his pediatrician wife, Priscilla Chan, have sold 29 million Facebook shares to raise **$5bn** for an ambitious biomedical research programme. It is called the **Chan-Zuckerberg Initiative** and has the **goal of curing all disease** within a generation.

Less than 50%

Fewer than half of the people eligible for an NHS health check in England have taken up the offer, despite it being free to everyone over 40.
The check-up takes 20 minutes and is carried out by a GP or nurse. It involves tests on blood pressure, weight and height, and is offered **every five years** up to the **age of 74**.

SCIENCE NEWS

PILOT STUDY

Breath test to detect cancer

A clinical trial has been launched to see if a breath test could detect the presence of cancer.

Researchers are hoping to find out if signals of different cancer types can be picked up in patterns of breath molecules.

The Cancer Research UK team will collect breath samples from 1,500 people, some with cancer.

It is the first trial to look at whether this technology can pick up a range of cancers.

"Intuitively, lung cancer seems the most obvious cancer to be detected in the breath," said lead researcher Rebecca Fitzgerald.

"But because of the way metabolites are recycled in the body, many other volatile molecules from other areas of the body end up in the breath too."

They want to find patterns, or "signatures", in the breath molecules from people who are either healthy or who have suspected oesophageal, stomach, prostate, kidney, bladder, liver or pancreatic cancer.

She added: "This is a pilot, so first we're looking at a range of cancers to see if we get a signal and compare the signal to healthy individuals."

→ **bit.ly/BS_NewsFeb01**

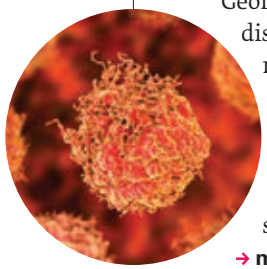
BIOPSY

DIAGNOSING PROSTATE CANCER

Genetic alterations in low-risk prostate cancer diagnosed by needle biopsy can identify men that harbour higher-risk cancer in their prostate glands, according to new research.

The study is the first to report that genetic alterations associated with intermediate- and high-risk prostate cancer also may be present in some low-risk cases.

The study found the needle biopsy procedure may miss higher-risk cancer that increases the risk of disease progression. The researchers said that men diagnosed with low-risk cancer may benefit from additional testing for these chromosomal alterations.



George Vasmatzis, lead researcher, said: "We have discovered molecular markers that can help guide men in their decisions about the course of their prostate cancer care.

"We found that the presence of genetic alterations in low-risk cancer can help men decide whether treatment or active surveillance is right for them."

→ **mayocl.in/2RsmlV6**

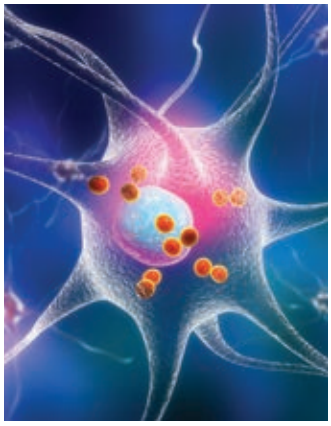
RESEARCH AND DRUG DISCOVERY

TACKLING THE DISEASES OF AGEING

Scientists from the global biopharmaceutical company MSD will come to the Crick next year in a bid to tackle a range of conditions associated with ageing, such as dementia and Parkinson's disease.

A new team of around 15 chemists and pharmacologists will be based at the Francis Crick Institute in London.

Over the next five years, they will be working to develop new understandings of diseases that affect the UK's ageing population.



The scientists, from global biopharmaceutical company MSD, will be based at the Crick while MSD establishes its new discovery science centre and UK headquarters in London.

Although their research projects will be independent from Crick research, the mix of fundamental researchers and drug discovery scientists is hoped to benefit both MSD and Crick scientists.

The MSD team will be fully integrated into the Crick scientific community, and will be invited to attend and deliver lectures to discuss the latest methods and discoveries.

Richard Treisman, Director of Research at the Crick, said: "We look forward to welcoming our new MSD colleagues to the Crick.

"Their specialist expertise in both fundamental research and drug discovery science, coupled with their industry perspective, will open new horizons for Crick scientists and vice versa."

→ **bit.ly/BS_NewsFeb02**

IMAGES: ISTOCK/SHUTTERSTOCK

TRAUMA RECOVERY

LONG-TERM TRAUMA OUTCOMES

Researchers have found that sociodemographic factors are more predictive of worse outcomes than an injury's level of severity.

US researchers followed 1,736 trauma patients over 30 months to determine the long-term functional, physical, and mental health consequences of trauma and the factors associated with them.

Their findings show that long-term sequelae of trauma exceed previous expectations and identified that patient sociodemographic factors (such as female gender and low education) were associated with worse recovery.

This suggests that social support systems are an essential component of recovery.

First author of the study Adil Haide said: "For more than two decades, trauma surgeons and patients have been hoping to change trauma care to be more responsive to long-term outcomes.

"This study shows that with just incremental effort we can fundamentally change how we assess trauma outcomes, enabling a paradigm shift that will benefit our patients and trauma systems."

→ **bit.ly/BS_NewsFeb03**

APPLIED SCIENCE

ADVANCES IN DNA ORIGAMI

New research describes a method allowing for the automation of DNA origami construction – accelerating and simplifying the process of crafting desired forms.

It is claimed that the advances may open the world of DNA architecture to a broader audience.

In recent years DNA origami has enabled the construction of a rapidly growing menagerie of two- and three-dimensional objects, with applications in biomedical and material science.

Lead author Hao Yan said: "DNA origami design has come to the time that we now can draw a form freely and ask the computer to output what is needed to build the target form."

Yan and have created a fully-autonomous procedure to design all DNA staple sequences needed to fold any free-form 2D scaffolded DNA origami wireframe object. Their algorithm uses wireframe edges consisting of two parallel DNA duplexes and enables the full autonomy of scaffold routing and staple sequence design.

→ **bit.ly/BS_NewsFeb04**

WHAT'S HOT AND WHAT'S NOT

HOT

VIDEO GAMES

Researchers are evaluating the feasibility of video game-based "digital medicine" for children with autism and co-occurring ADHD.

HOT

SOUND

Sound changes the way that rodents sense touch, implying they are both processed in parallel in the barrel cortex.

HOT

DEFIBRILLATORS

Secondary school pupils will learn life-saving skills and defibrillator use from 2020 in a roll-out of new government plans.

NOT

NON-SUGAR SWEETENERS

There is no compelling evidence to indicate the health benefits of non-sugar sweeteners (and potential harms cannot be ruled out), suggests a review.

NOT

CANNABIS

Cannabis in Europe has significantly increased in potency over the last 10 years, thus increasing the risk of harm, says a new study.

NOT

CAR PARKING

Four in 10 NHS hospitals in England have increased car parking prices in the last year, data indicates.

ARTIFICIAL INTELLIGENCE

Smart devices and health data privacy

Advances in artificial intelligence have created new threats to the privacy of people's health data, a new study shows.

Led by University of California engineer Anil Aswani, the study suggests current laws and regulations are not sufficient to keep an individual's health status private in the face of AI development.

The findings of the research, which mined two years of data for more than 15,000 Americans, show that by using artificial intelligence, it is possible to identify individuals by learning daily patterns in step data, such as that collected by activity trackers, smartwatches and smartphones, and correlating it to demographic data.

Aswani said: "The results point out a major problem. If you strip all the identifying information, it doesn't protect you as much as you'd think. Someone else can come back and put it all back together if they have the right kind of information."

He continued: "You could imagine [an organisation] gathering step data from the app on your smartphone, then buying health care data from another company and matching the two.

"They would have healthcare data that's matched to names, and they could either start selling advertising based on that or they could sell the data to others."

He stressed that the problem is not with the smart devices, but with legislation around health data privacy.

→ **bit.ly/BS_NewsFeb05**

WINTER PRESSURES

"NHS COPED BETTER THIS CHRISTMAS"

Hospitals appeared to be under less strain over the Christmas period than in previous years, NHS England figures suggest.

Data released for the festive period showed fewer A&E closures and ambulance delays than the same period last year.

Levels of flu and vomiting bug Norovirus also remained low.

NHS England said the improvement was a result of good planning and hard work by staff.

The figures covering a two-week period over Christmas showed there were 32 A&E diverts – where doors are closed to ambulances – compared to 45 in the same period last year.

One in nine ambulance crews faced delays dropping patients off at hospital – a figure that peaked at one in five last year.

An NHS England spokesperson said: "Thanks to the hard work and preparation of NHS staff, the health service is performing better this winter than last."

At the time of publication, figure were only available for England, not the rest of the UK.

UNDER THE MICROSCOPE

This month: Streptomyces sp. myrophorea

That is not a strain of bacteria I've ever heard of.
That's not a shortcoming on your part – details of its discovery have only just been published in the journal *Frontiers in Microbiology*.

Where was it discovered?
In soil from Fermanagh, Northern Ireland, which is known as "the Boho Highlands". It is an area of alkaline grassland and it has previously been claimed that the soil has healing properties.

Why were they looking there?
The search for replacement antibiotics has prompted researchers to explore new sources, including folk medicines. One of the research team, Dr Gerry Quinn, a previous resident of Boho, County Fermanagh, had been aware of the healing traditions of the area for many years.

Tell me more about what these traditions involved.
A small amount of soil was wrapped up in cotton cloth and used to heal many ailments, including toothache, throat and neck infections. Interestingly, the area was previously occupied by the Druids, around 1,500 years ago, and Neolithic people 4,000 years ago.

Have the team been studying this new strain of *Streptomyces*?
Yes – they have found it inhibits the growth of four of the top six multi-resistant pathogens identified by the WHO as being responsible for healthcare-associated infections: Vancomycin-resistant *Enterococcus faecium*, methicillin-resistant *Staphylococcus aureus*, *Klebsiella pneumonia*, and Carbenepenem-resistant *Acinetobacter baumanii*.

What happens next?
It is not yet clear which component of the new strain prevents the growth of the pathogens, but the team is already investigating this and will now focussing on the purification and identification of these antibiotics.

IMAGES: ISTOCK/SHUTTERSTOCK

TECH NEWS

RANDOX

RECORD £50M INVESTMENT

Global healthcare company Randox has announced a record £50m investment to help deliver technologies to better diagnose conditions including cancer and heart disease.

It is to establish three "Centres of Excellence" to enable Randox R&D scientists to work collaboratively with Queen's University Belfast and Ulster University.

→ **randox.com**

LIEBHERR

LAB FREEZER SALES

Following an original order for 450 Mediline laboratory freezers for the Francis Crick Institute in 2017, Liebherr has now supplied the institute with 950 Mediline appliances.

The Liebherr Mediline spark-free models that are used by the Crick are compliant with ATEX guidelines to the highest safety standards that can be awarded.

→ **liebherr.com**

OHAUS

NEW CENTRIFUGES

Two new centrifuges have been added to Ohaus' Frontier 5000 series – the FC5513 and the FC5707.

Both these versatile new centrifuges feature a uniquely designed protective splash-proof front panel and modern "touch-wheel" control on an intuitive interface.

Standard features also include 10 acceleration and 10 deceleration rates, pre-selection of running time from 10s to 99h 59 min or continuous, audible signal at end of each run with melody options and quick spin for short runs.

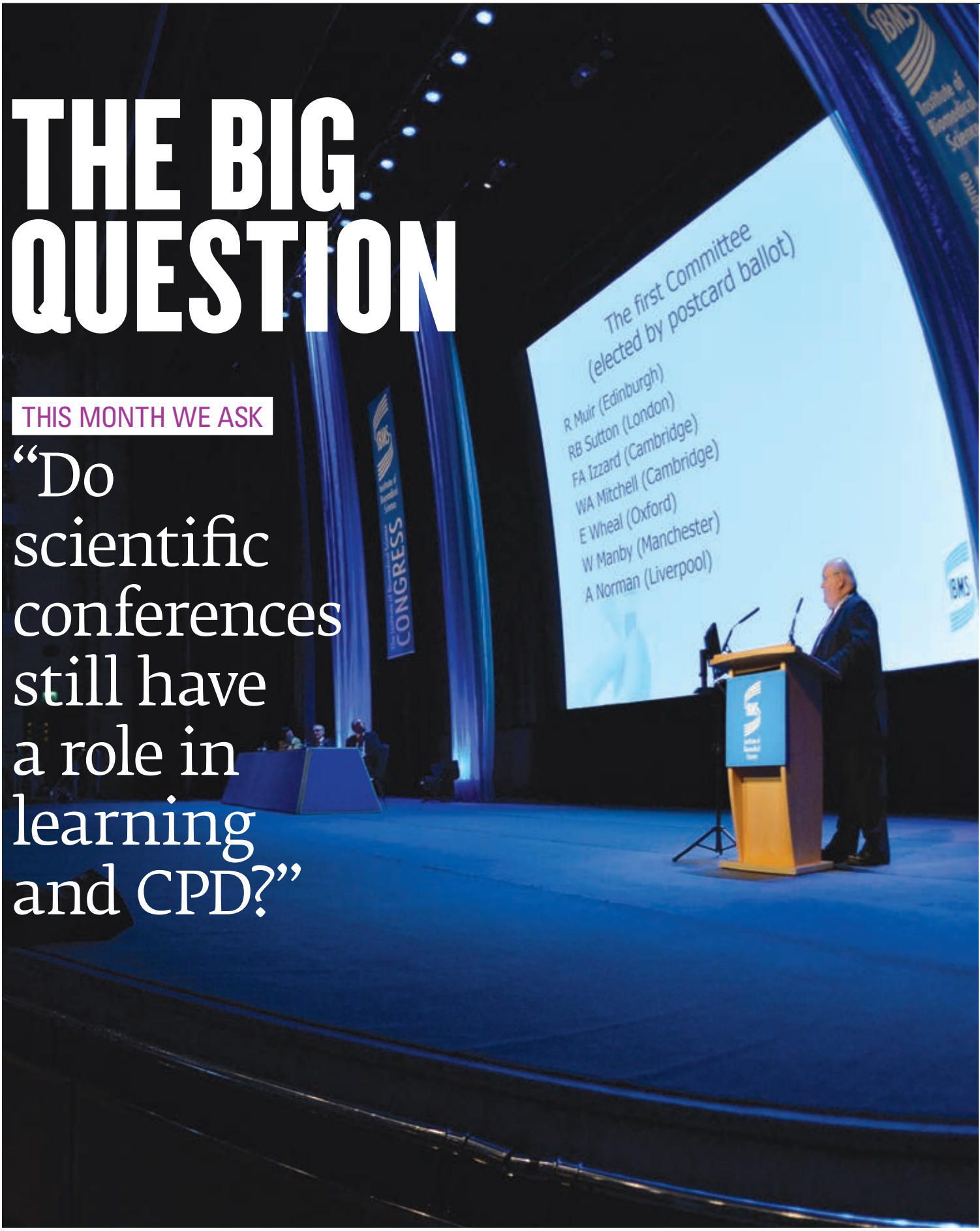
Both units have a compact footprint, which saves valuable lab bench space.

→ **ohaus.com**

THE BIG QUESTION

THIS MONTH WE ASK

"Do scientific conferences still have a role in learning and CPD?"



Nicky Milner

Acting Deputy Head of Allied Health
Anglia Ruskin University

Yes, absolutely, and not just because I am an academic!

Scientific conferences continue to play a vital role in advancing our knowledge across subject areas such as biomedical science. In addition to disseminating research findings, they provide personal and professional development opportunities for networking and sharing good practice, for staff working across all stages of their career. There are very few occasions where colleagues from across the profession have the opportunity to socialise and conferences are designed for this purpose.

Twenty years ago, as a trainee biomedical scientist, I attended my first scientific conference. Even though I did not present a poster or present at the conference, I kept a record of the interesting topics that I learnt about, such as modern diagnostic techniques and globally important infectious diseases. I have maintained professional connections made through networking at subsequent conferences. Reflecting back through my conference history, I realise how this was a transformative educational experience – particularly around building confidence with communicating scientific information to the wider audience.

Social media is widely used to promote conference highlights, for example, Twitter hashtags are used to create a story of events and allow engagement when not attending. This is a quick and easy way to contribute to discussions and it is likely that you will gain followers, thereby building your digital network.

Rajvinder Dhillon

Biomedical Scientist and Colposcopist
Gloucestershire Hospitals NHS Foundation Trust

I believe scientific conferences are of excellent value to biomedical scientists. Exposure to the clinical research of a speciality is interesting to learn, and also helps broaden the career horizon for scientists.

I attended my first scientific conference in 2001, whilst I was studying part-time for my biomedical science degree.

The conference was in California, and I was out there visiting my sister. I noticed the poster in the hospital she worked in advertising a cervical cancer conference where lunch was provided (I love a buffet). I entered the conference as a cyto screener and second-year biomedical science student, and left it feeling inspired enough to want to become a colposcopist. The lunch was a bit disappointing though.

CPD thorough journal-based learning limits the subject, however attendance at conference can enable one to tailor CPD reflections to a specific area of pathology.

I have since attended many scientific conferences, both as a speaker and a delegate. Conferences take pathology outside the laboratory, and enable scientists to critique audits and studies that are presented.

The general face of the NHS will always be front-line doctors and nurses, however, seeing the application of point-of-care testing, and advances in molecular diagnostics serve to remind us of the pivotal role biomedical scientists have in today's healthcare.

Sally Barratt

Senior Biomedical Scientist
Cellular Pathology Department, Leighton Hospital

The cost of attending scientific conferences can be outside the training budget, but a good way of getting around this is to get involved. This can be a learning exercise in itself. Encouraging junior staff to present posters or short talks is satisfying when they come away energised.

I am responsible for equipment, so my first port of call is the trade show. This is a good chance to update my knowledge for any upcoming procurement items. As a training officer, I always found the pamphlets useful for tutorials and reflective learning on alternative technologies. The latest textbooks are on display so I can have a browse at what would be useful for teaching.

Management and training talks have guided me where new regulations have baffled the way forward. Different opinions have broadened my approach and questioned my thinking. The chance to discuss with other delegates and exchange contact details gives an opportunity for follow up.

I usually have specific talks that I am especially interested in, which address a current work issue. If I have any specific technical problems I tackle appropriate speakers over the coffee break and have found myself saving countless hours in method development thanks to their expert knowledge.

Before attending I ask my colleagues if they have anything they want to know, and I pass on what I have learnt by giving a presentation over lunch afterwards.

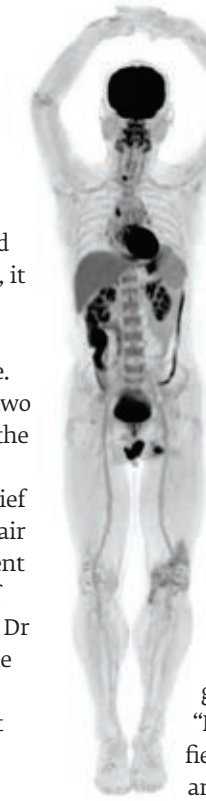
WORLD'S FIRST TOTAL-BODY SCANNER

Dr Ramsey Badawi discusses a medical imaging scanner that can capture a 3D picture of the whole human body at once.

Among the usual displays, lectures and workshops at the recent annual meeting of the Radiological Society of North America in Chicago, delegates found it hard to ignore one display in particular – a collection of the first 3D scans of a whole human body.

The ground-breaking images had been produced by a full-sized positron emission tomography (PET) scanner called Explorer. The sensitivity of this new machine is said to be 40 times higher than any other existing PET scanner, which means it can capture images with much more detail and far more quickly. It also emits significantly lower levels of radiation and can follow radioactive-tagged tracers for longer. As a result, it has the potential to open up new avenues for biomedical research and clinical practice.

Explorer is the creation of two British scientists working at the University of California (UC) Davis: Dr Ramsey Badawi, Chief of Nuclear Medicine, Vice-Chair for Research in the Department of Radiology, and Professor of Biomedical Engineering; and Dr Simon Cherry, Professor in the Department of Biomedical Engineering and Department of Radiology.



The seeds of Explorer were sown in 1999 during Badawi's postdoctoral work in Seattle.

"They had a piece of software that simulated PET scanners," he says. "I was playing around with it and wondered what would happen if you made the scanner much longer. It raised the sensitivity, which was interesting."

Five years' later, working at UC Davis, Badawi was sat in an office with Cherry, knocking around ideas for a joint project. "I suggested we should try to build a longer PET scanner, and Simon said if we going to do that we should not take any half measures and just build one that could scan the whole body at one time. I was quite taken aback. It was bold thinking, but it felt right."

Not everybody saw it that way. "We got a measure of ridicule," says Badawi. "Nuclear medicine is a bit of a Cinderella field. It's much smaller than CT or MRI, and the research budgets are smaller.

Most people said it was far too ambitious."

Ambitious, perhaps, but not in terms of the science. "I had realised back in 1999 that it could be done with the technology we had. The difficulty was going to be dealing with the data. You would need quite powerful computers and fast data transport mechanisms. But, intrinsically, there needn't be anything clever on the detector side or even on the electronic side to make it work. It was just a scale-up problem."

The other big hurdle was getting other people to have faith in the idea. "It is so hard to get the momentum going in nuclear medicine, to get people to believe it is worth doing a project of this scale. It took us 10 years to get to get the money."

The turning point was the introduction of a new funding mechanism, which got the idea in front of a panel at the National Institutes of Health, who could see the bigger picture and the promise of the project. In autumn 2015, they awarded Badawi and Cherry a research fund worth $15.5m.

"I think it might be able to help us answer all sorts of questions"

Their first impulse was to build the machine themselves. But, says Badawi, they soon realised that the actual construction of this potentially boundary-breaking device would be less important to them than the result. "We felt it would be better to work with a commercial manufacturer, who would have much better quality control and software than we could. Factors such as those could make all the difference. So we looked for industrial collaborators and settled on United Imaging Healthcare (UIH)."

UIH's commitment to turning the idea into an actual product that they would market swung the decision. "It's one thing to build a one-off and have it sitting in a research basement, but quite another to have it out in the field. We can't think of all the different things you could do with this scanner, but once we get some machines out there, we can answer the key question: does it really make a difference to human health? If the answer is yes, I think there will be a serious impetus for reengineering it to bring the costs down. I can already think of several ways to do that."

The prototype built by UIH produced the full scans that debuted in Chicago. "The results have been exciting," says Badawi. "When you plan these things you have a certain idea of how they might pan out. Often in engineering it doesn't work out the way, but this really has met our expectations so far. I think it might be able to help us answer all sorts of questions."

The key selling points for Explorer are the high-resolution images that allow medical practitioners to detect smaller lesions and low-grade disease, and the faster imaging that means they can scan more patients in any given period. "The low-dose radiation is also important, especially for long-term conditions, such as diabetes or arthritis," says Badawi. "PET scans wouldn't normally offer much, but frequent scanning is now a possibility. It would also be suitable for children and adolescents."

One potential drawback is that the sheer detail of the images might bamboozle doctors and technicians. "These new scans don't really look like normal PET scans. The level of detail is much greater, and we have colleagues wondering how on earth they are going to read them! I imagine we'll start by giving them very high-quality 20-minute scans, then the one-minute scans, which would offer more normal quality. But with this level of detail we need to work out a new normal."

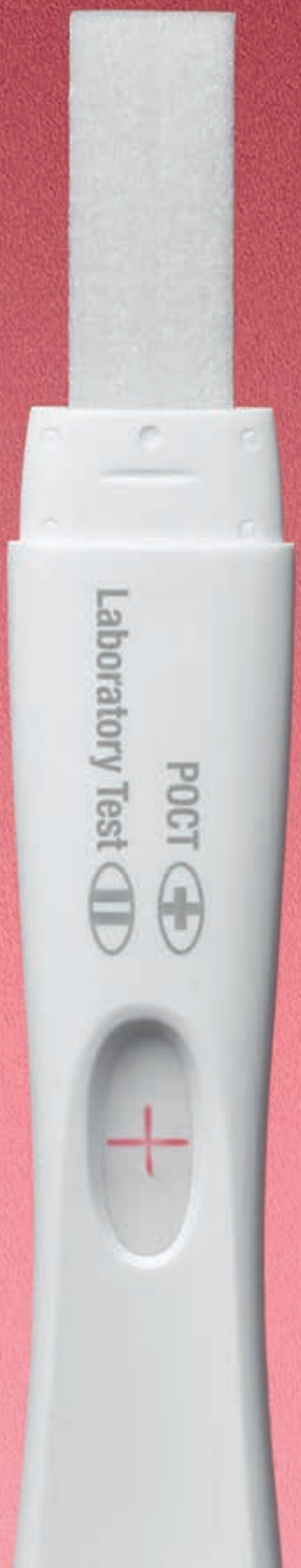
All this work begins later in 2019, when the prototype, currently in Shanghai, is due to be shipped to UC Davis. "Then we can start doing some extensive testing, research and clinical work," says Badawi. "There's some really exciting science to be done." BMS

DR BADAWI

- ✔ BSc in Physics with Astronomy in 1987, MSc in Astronomy in 1988 from the University of Sussex
- ✔ PhD in PET Physics at the University of London in 1998, specialising in normalisation and data corrections for fully 3D PET
- ✔ Postdoctoral fellowship at the University of Washington, Seattle
- ✔ Joined the Dana Farber Cancer Institute in Boston in 2000 – helped to set up their first clinical PET service
- ✔ Moved to UC Davis in 2004.

TESTING TIMES

THE BIRTH OF THE PREGNANCY TEST

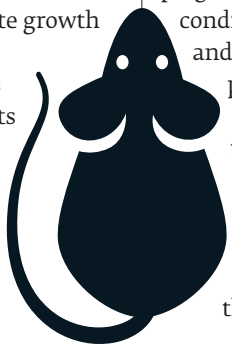


"The mainstream success of the pregnancy test was never based on a drive to replace diagnostics but to bring the diagnosis into the home"

To mark IBMS History Week, **Matt Wilven**, IBMS Communications Officer, traces the history of the pregnancy test and looks at the ever broadening market of home testing.

Pregnancy testing can be dated back to an ancient Egyptian papyrus from 1350 BCE. Their medical professionals asked potentially pregnant women to urinate on bags of wheat and barley, claiming that germination of the grain indicated pregnancy: wheat for a boy and barley for a girl. Surprisingly, when researchers tested this hypothesis in 1963 they found that the test for pregnancy was around 70% accurate. Although, it did not account for the sex of the child, the urine of pregnant women (compared to non-pregnant women) did accelerate growth in these grains.

Throughout the middle ages in Europe, pregnancies (and lots of diseases) were often diagnosed by the so-called "piss-prophets". They claimed to be able to diagnose people on the basis of the colour of their urine (and sometimes the taste). Some were more experimental, mixing wines and alcohols with the urine and observing the results. Again, since alcohol does react to certain proteins in urine, this pseudoscience may have had a moderate success rate.



IMAGES: GETTY

The early tests

In the 1920s, biomedical science finally caught up with curiosity when a number of laboratories across Europe started reporting that there was a specific hormone – human chorionic gonadotropin (hCG) – which is raised in pregnancy and certain other malignant conditions. In 1927, Selmar Aschheim and Bernhard Zondek introduced a pregnancy test based on the presence of this hormone. "The A-Z test" involved injecting a woman's urine into an immature rat or mouse and, three days later, analysing its ovaries for an estrous reaction. If, despite its immaturity, the dissected animal had been in

heat, the woman was pregnant.

Throughout the 1930s and 1940s, hormone-based research expanded and a number of laboratories developed bioassays to identify hCG – injecting urine into rabbits, frogs, toads and rats. The tests were expensive, involved animal slaughter and took long periods of time to complete. For a while, saying "the rabbit died" was a way of communicating that you were pregnant (it seems that it was not quite clear to people that the rabbit died either way).

By the 1950s, Lancelot Hogben's discoveries had led to the African toad, *Xenopus laevis*, being the most used animal for pregnancy testing. They were cheaper than mice, rats and rabbits, the tests were quicker and the animals could be reused. But then, in 1960, Leif Wide and Carl Gemzell developed a haemagglutination inhibition test. This immunoassay used purified hCG mixed with a urine sample and antibodies directed against hCG. The test was much quicker and cheaper than the old bioassays but, at this stage, still relatively insensitive.

Commercially available

In 1966 a radioimmunoassay test for hCG had been developed but the test could not differentiate between hCG and luteinizing hormone (a hormone produced by gonadotropic cells in the anterior pituitary gland which, in females, triggers ovulation and the development of the corpus luteum). This changed in 1972 when Judith Vaitukaitis, Glenn Braunstein and Griff Ross published a paper describing a hCG beta-subunit radioimmunoassay that could specifically measure hCG in the presence of luteinizing hormone - making it useful as an early test for pregnancy.

Until this time, pregnancy testing in the UK could only be performed in pathology laboratories at the request of a medical practitioner. However, after a pregnancy test called Pregnosticon was patented and made commercially available in 1969, high street pharmacists began undertaking haemagglutination inhibition tests at the direct request of the consumer.

In view of this, it was agreed that biomedical scientists could also perform the tests and some set up independent businesses to provide the service.

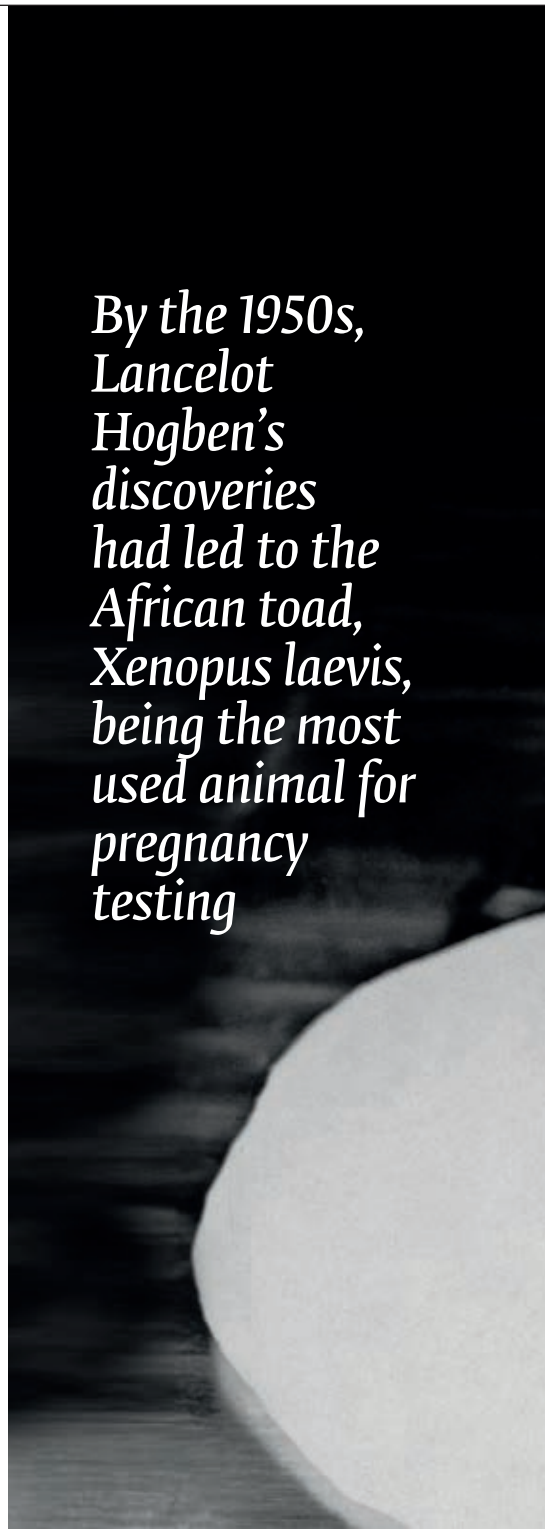
Home diagnostics

By 1978, a two hour (nine-step) pregnancy test could be bought off the shelf and taken home. It included a vial of purified water, a medicine dropper, a test tube and an assortment of compounds including the red blood cells of sheep. Positive results were 97% accurate and negative results 80% accurate. There was still work to be done but the era of home diagnostics had begun.

In 1988, Unipath launched a lateral flow immunoassay called Clearview (the pregnancy test as we know it today). The urine sample came in through a wick and transferred to a strip, mobilising blue latex particles carrying monoclonal antibodies and moving them towards the part of the strip where the results window was. In a positive sample, hCG in the urine would bind to a line of the antibodies, form a sandwich and trap the blue particles so that they could not go any further – forming a pregnancy indicator. The test was up to 99% accurate and gave results in three minutes.

Within a couple of years, the three minute tests had been refined to give results within one minute. More recently, digital versions have been developed but the scientific principles behind the reaction remain largely the same.

The test was up to 99% accurate and gave results in three minutes. This was refined to give results within one minute



By the 1950s, Lancelot Hogben's discoveries had led to the African toad, Xenopus laevis, being the most used animal for pregnancy testing

IMAGES: SCIENCE PHOTO LIBRARY/ALAMY

Testing becomes commonplace

Pregnancy tests cemented their place on the shelves of UK pharmacies in the 1970s when the women's liberation movement embraced the (then complicated) tests because they demystified medicine, empowered women and provided an alternative to the NHS – whose healthcare professionals they often perceived as judgemental and moralistic.

Also, it can't be ignored that abortion had been made legal in the UK in 1967 and, therefore, the pregnancy test came to prominence in a time when earlier knowledge of pregnancy meant more options for a woman.

Unlike the ultrasound (which came to medical practices in the mid-1950s), these pregnancy tests also had the benefit of not personifying the fetus – which was beneficial for some.

It was not until the 1980s and the advance into lateral flow immunoassay technology that the balance of acceptance tipped for good. Advertisements for the tests could now be found in housekeeping magazines next to baby food and in fashion magazines next to contraception. The relatively unobtrusive and uncomplicated pregnancy test suddenly became a commonplace marker on most women's pregnancy journeys.

However, there was still a prevailing sense that a pregnancy was not real until it was confirmed by the healthcare services. Even to this day, packaging for pregnancy tests allow for a margin of error and recommend a visit to the doctor.

This inherent referral to healthcare professionals shows that the mainstream

success of the pregnancy test was never based on a drive to replace diagnostics but to bring the diagnosis into the home at an earlier stage – allowing a woman to experience the discovery on her own or with her loved ones, rather than with a doctor.

New launches

As technology advances, home testing kits become easier and cheaper for medical companies to produce. In the last 10 years, three main types of "direct-to-consumer" medical tests have emerged: blood tests to analyse health markers, DNA "fitness potential" tests and microbiome analyses of the gut.

One of the most successful of the new products is a finger prick blood test which, after being sent off to a laboratory, then provides a report of the geographical history of your DNA – a sort of statistical family tree.

This test is purely commercial and sells on the back of curiosity but, where other types of testing are involved, the transparency of the capital incentive is beginning to raise ethical concerns amongst laboratory professionals.

There was a mixed reception amongst IBMS membership in August last year when news surfaced about HIV self-testing kits being available to buy on the High Street for the first time. Caroline Griffin-Dommersen commented that these tests "should be done in a clinical environment with access to counselling" and Cherie Beckett agreed, saying that the tests could give "low (false) reactives and false negatives in the incubation period". Other members saw the benefits, citing shorter waiting times and people being too scared to go to a clinic.

Other concerns laboratory professionals have raised about private screening companies include that they may be misleading the "worried well" into non-evidence based testing or screening through manipulative advertising tactics.

Women's liberation embraced the tests because they empowered women

Also, that there are potentially large knock-on effects for NHS services when people go to a 10-minute doctor's appointment with a lengthy report from a private company that they don't fully understand. Laboratory professionals are already beginning to call for more regulation with regards to what these companies can offer and how they can offer it.

Inaccurate?

An early study in *Nature* found that up to 40% of the results of home testing kits were inaccurate and the NHS advises that they should not be used as diagnostic tools. Nonetheless, more and more kits are available on the open market and, as the medical profession becomes increasingly focussed on the personalisation of medicine, it is possible that the public will mirror this and become increasingly focussed on discovering their personal medical needs at home.

Yet, despite huge investment in the home testing arena, clever branding and heavily targeted marketing strategies, none of the "direct-to-consumer" medical tests look as though they are about to emerge as commonplace home diagnostic devices. They remain of interest to the few – particularly in the UK where point-of-care testing is free to all. The pregnancy test stands alone in its position as the home testing kit that the majority of people will come into contact with.

The success of the pregnancy test is down to the fact that it is fast, accurate and easy to use, it brings a personal moment into a personal space and it empowers the user by situating them before their options. It has not replaced healthcare services. Rather, it has changed the relationship women have with pregnancy and allowed them to take control of their reproductive healthcare at an earlier stage.

It also answers a fundamental question that we have been asking for thousands of years: "Am I pregnant?" IBMS

IBMS History Week takes place on 18 to 24 February. Any members who were involved in pregnancy testing when it occurred in the laboratory, or those who know about the chemistry involved in the new tests, are asked to get in touch by emailing communications@ibms.org

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NEW IDEAS AND APPROACHES

Jackie Longbone, Deputy Head of Service for Microbiology and Infection at Frontier Pathology, explains the benefits of welcoming overseas PhD students.

The Frontier Pathology Microbiology and Infection Service at Brighton and Sussex University Hospital Trust (BSUH) was approached by Brighton and Sussex Medical School and asked to host some Ethiopian PhD research students. We were keen to support this and were quickly able to encourage participation from the microbiology department at East Sussex Healthcare NHS Trust in Eastbourne.

The request originated through existing links with the Armauer Hansen research Institute (AHRI) and Haramaya University in Ethiopia. They are jointly organising a post-graduate research program in microbiology. They have identified that the students have limited understanding of general microbiology routine procedures due to a lack of well-established diagnostic laboratories in the country.

By September, when the first students, Desalegn and Kedir, arrived for four weeks, we had created a plan, designed to balance some beneficial output from the students for the host lab, along with varied observation and some limited hands-on experience. By spending time in more than one location, it offered the students experience of differing techniques and ways of working within a UKAS framework.

The placements

The first week they were both at the laboratory at Brighton, where they received an induction focussed on health and safety. A tutorial around quality management systems and UKAS accreditation, including audit, was provided. The remainder of the week was devoted to the students completing a small verification, which was of benefit to the department. The students were rotated around for a week each in virology and bacteriology in Brighton and a week in Eastbourne. Each of the students also conducted a witness audit.

Biomedical scientist Harry Chaplow looked after each student one day offering a tutorial. He will use the experience as evidence for his specialist portfolio.

He said: "Part of the rotation through bacteriology included a day looking at faeces specimens being processed on the EntericBio multiplex RT-PCR system, as well as follow-up culture and identification. Both students were interested to see the differences in our methodology for processing faecal samples, the isolates we most commonly isolate, and the difference between PCR methods they have used before and the EntericBio

Below. Desalegn Ayana (far left) with three of the laboratory staff from Eastbourne Microbiology.

system itself, including its absence of an extraction stage."

Projects

We were also able to organise a tour of blood sciences and histology at Brighton, plus a day trip to see the Frontier Microbiology service provided to Surrey and Sussex Healthcare NHS Trust (SaSH). The Brighton and Sussex Medical School was also able to host them for a day.

Each student prepared a talk about their PhD projects, which they presented to the staff at Brighton, Eastbourne and Crawley. They were very well received. Their presentations were: Kedir Bofe: *Epidemiology of Mycobacterium Leprae Infection Among Household Contacts of Previously Undiagnosed Leprosy Patients in Fedis Woreda, Eastern Ethiopia*.

Desalegn Ayana: *Molecular Epidemiology of Hepatitis B Virus Genotypes Variants and Mutations among HBV Mono-Infected Individuals and HIV Co-Infected Individuals.*

After their return to Ethiopia, the students prepared a report for their university, including the benefits of their time in Sussex. Being exposed to the routine microbiology benches supported by automation is highly beneficial for the students, they said and listed the benefits. See box, right.

IMAGE: ISTOCK

Valuable experience

Teams in the hosting laboratories also found the experience fruitful.

Specialist biomedical scientist Kelly Olliver said: "It is often both exciting and daunting when we have visitors to the laboratory, ensuring that we as professionals meet their expectations and provide a fulfilling and worthwhile experience whilst still maintaining the needs of our service.

"Frontier microbiology already has strong links with Brighton and Sussex Medical school and it was wonderful to hear that we could further extend those links to AHRI.

"When Des and Kedir arrived, they quickly adapted and began to share their experiences of living and working in Ethiopia, their research was fascinating and we had many conversations over lunch and coffee discussing the numerous challenges including obtaining therapeutic medicine and managing outreach projects, all of which are often taken for granted in the UK. I learned a lot from Des and Kedir and my experience of hosting overseas PhD students extended far beyond the science.

"In our profession it is so easy to get bogged down with routine, it was somewhat refreshing to listen to new ideas and approaches and actually share together some of the amazing and cutting-edge techniques we are fortunate to be a part of. I hope we can continue to learn from each other and am excited about developing our relationship further."

Frontier Pathology and ESHT Microbiology are now looking to host more Ethiopian PhD research students in 2019 and seeking opportunities to develop these links further. BMS

STUDENT BENEFITS

- ✔ Getting familiar with the advances in diagnostic technology
- ✔ Getting exposure from being attached to different individuals using different automations for diagnostic activities
- ✔ Sharing experience on automated and manual approach in diagnosis
- ✔ Learning some techniques which can be applied in the diagnostic laboratory
- ✔ Learning the different systems used to qualify and register a laboratory professional/biomedical scientist
- ✔ Learning the different techniques used to detect AMR and challenges related to AMR
- ✔ Learning how to communicate with different professionals
- ✔ Learning lifestyle and cultural activities.

HEALTH AND HERBS IN THE DARK AGES

Stephen Mortlock casts on eye to the past and documents the agrarian, tribal existence that followed the fall of the Roman empire.

Under constant attack from barbarian tribes, the Romans had been forced to recall their armies from Western Europe to defend Rome. As the Romans left, many of their practices fell into disuse – the Roman Empire had come to an end. People in Europe returned to a more tribal, agrarian existence and the Romans knowledge of public health declined. Europe was entering the "Dark Ages, or Early Middle Ages".

This period, from about 400–1000 AD, when there was no Roman emperor in the West, was marked by an economic and scientific deterioration in Western Europe with frequent warfare and a virtual disappearance of urban life. England became divided into seven self-ruled kingdoms, Kent, Sussex, Wessex, Essex, East Anglia, West Anglia (or Mercia) and Northumbria.

By the end of the 5th century, London was largely an uninhabited ruin. And it was not until 871 AD that Alfred the Great became the first king to rule all of England returning to London (circa 886) to make it habitable once more. Although, progress was stagnating to a certain extent during this period, there were still some great minds exploring the universe and trying to find answers. In Europe, although many books had been destroyed or scattered throughout the land, Irish monks were producing beautiful, vibrant illuminated manuscripts. In England, the Venerable Bede (672- 735 AD) was meticulously recording the Saxon Era during a time of raids from the fierce Northmen, bringing terror with their dragon-boats.

Rudimentary care

The Northmen have long been thought of as fierce, uncouth barbarians, but their famous longboats were marvellous feats of engineering, hundreds of years ahead of their time. The Vikings and the Saxons were capable of exquisite metalwork and metallurgy, with the fine swords and beautiful jewellery found in sites such as Sutton Hoo (in Suffolk) and Ladbyskibet (in Denmark) showing that, even if the progress of empirical and observational science was slowed, craftsmen still pushed boundaries and tried new techniques. In this, they were undoubtedly influenced by ideas that filtered up the trade routes from Greece, Egypt, and even China and India.

But, the study and practice of medicine went into deep decline and although medical services were provided, especially for the poor, in the thousands of monastic hospitals that sprang up across Europe, the care was rudimentary and mainly palliative. People died from simple injuries and wounds, while the rough wool clothes worn by peasants led to numerous and widespread skin diseases. Scarcity of fruits, vegetables and proteins needed for a healthy diet led to maladies of the intestinal tract and scurvy. Winter was especially hard on medieval society, as cold, draughty dwellings would have led to numerous cases of pneumonia. Poor sanitation made typhoid a constant problem, especially in the warmer summer months. It has also been speculated that "spring fever" (*lecten adl*) found in the Anglo-Saxon leechbooks (Old English word *lǣce-bōc,* or book of medical prescriptions) is the spring manifestation of tertian malaria caused by *Plasmodium vivax*. It went by a variety of terms the most universal being "ague", meaning the shakes, and sometimes "fever and ague" referring to the cyclic breaking of a fever.

Diseases

In post-Roman England earthen floored, open-structured wooden homes with thatched roofs would be an ideal way to concentrate malaria in a thinly populated marshland area. There is archaeological evidence and contemporary records that show the spread of tuberculosis and leprosy throughout Europe during this time. It is now believed that Leprosy had entered England by the 4th century, possibly with the Romans, and was a regular feature of life by 1050, it remained the most feared disease of the Middle Ages, until the Black Death, started spreading across Western Europe. Not forgetting the other diseases – smallpox, diphtheria, and measles.

People believed that all disease was either punishment for sin or the result of witchcraft or possession. However, the Holy Roman Emperor Charlamagne (742 -814 AD) decreed that each cathedral and monastery should have a hospital attached to it and establish a school where medicine could be taught. Inside the abbeys monastic medicine flourished, which in some regions often represented the main reference point for health care for all residents (common people, nobles or clergy) during this time.

A rudimentary practice of surgery ("touching and cutting") at the monastic infirmary was usually linked to the management of trauma, including lacerations, dislocations, and fractures. Complicated wounds or injuries may have forced some monks, "the infirmarians", to request the services of more experienced local bonesetters or even barber surgeons.

Other popular healing practices of the Middle Ages that were integrated into the monastic medical routine, including bathing (not otherwise common), preventive bloodletting, and diagnostic examination of pulse, stool, blood and urine. By 900 AD, Isaac Judaeus, a Jewish physician and philosopher, had devised guidelines for the use of urine as a diagnostic aid and the urine flask became the emblem of medieval medicine. Monks remained with the sick and dying patient throughout the day and night, praying

and reading from the Scriptures by candlelight. The point of this vigil was to ensure "proper passing"; on the premises that nobody should be left to die alone. Many monks paid with their own lives when treating the sick.

Plants and herbs

No monastery would have been complete without a medicinal plant garden and a farm, the monks performed extensive land reclamation to create suitable farmland by a progressive control of seasonal flooding of rivers and basins. The plants and herbs they grew were used to treat their patients and much of the information about herbal medicine and related medicinal substances came from *De Materia Medica* an encyclopedia written by Dioscorides, the Greek physician, pharmacologist and botanist, this was widely read for more than 1,500 years. Some plants were used for specific disorders, while others were credited with curing multiple diseases. In many cases, draughts were made up of many different herbs. Medieval medicine was based on the four humeral theories notion of Hippocrates and Galen.

The four "humours" were related to the four elements: blood (air) was hot and moist, phlegm (water) was cold and moist, yellow bile (fire) was hot and dry and black bile (earth) was cold and dry. It was the physician's job to work out how to restore the balance of a person's humours if they became ill, and so plants and herbs were ascribed properties to redress the balance.

A cooling herb would be used if you were considered to have too much blood or yellow bile. Sage (*Salvia officinalis* the name comes from the Latin *salveo*, meaning "I am well") was used by the Romans in medicine and cooking. In the medieval period, sage was described as being "fresh and green to cleanse the body of venom and pestilence". It was also chewed to whiten teeth and used very frequently in cooking along with lots of onions and garlic. So the sage and onion stuffing with the Sunday roast has a medieval pedigree.

"Nobody should be left to die alone. Many monks paid with their own lives when treating the sick"

Camomile (*Chamaemelum nobile*) flowers are good for making sedative and digestive infusions that also combat flatulence. Chamomile tea with dittany (*Dictamnus albus*), scabious (the common name "scabious" comes from the herb's traditional usage as a folk medicine to treat scabies) and pennyroyal was a preferred medieval remedy against poison. Comfrey (*Symphytum officinale*) was often referred to as "Boneset" and grown in infirmary gardens for its power to heal wounds and inflammations and (as its nickname suggests) help to set broken bones.

One cure for headache was to bind a stalk of crosswort (Rubiaecae family) to the head with a red cloth. Chilblains were treated with a mix of eggs, wine, and fennel root. Agrimony was cited as a cure for male impotence – when boiled in milk, it could excite a man who was "insufficiently virile;" but when boiled in Welsh beer it would have the opposite effect.

Asian spices

It should be remembered that Asian Spices in Europe were costly and mainly used by the wealthy. A pound of saffron could cost the same as a horse, while a pound of ginger as much as a sheep. It was Charlemagne who encouraged farmers across Europe to plant an abundance of culinary herbs (eg. anise, fennel, fenugreek, and sage, thyme, parsley and coriander). But after the Crusades (1096 to 1291) the international exchange of goods

IMAGES: SCIENCE PHOTO LIBRARY/ALAMY/ISTOCK

became common and gradually Asian spices (pepper, nutmeg, cloves, and cardamom) became less expensive and more widely available. Spices were used to camouflage bad flavours, odours, and for their health benefits.

Cultivation of spices and herbs however was still largely controlled by the church during this period and they promoted this control through religious herb and spice feasts. Scholars have likened the Catholic Church in its activities during the Middle Ages to an early version of a welfare state: It provided hospitals for the old and orphanages for the young; hospices for the sick of all ages; places for the lepers; and hostels or inns where pilgrims could buy a cheap bed and meal. It also supplied food to the population during famine and distributed food to the poor. This church welfare system was funded through collecting taxes on a large scale and possessing large farmlands and estates.

The end of the tunnel

Disease is as old as mankind itself. Man has always tried to understand natural phenomena and attempted to give his own explanation to it. Although, the rich heritage of the Greeks had largely been ignored or forgotten by medieval Europe, in the early Arabist world the Hellenistic medical teachings and writings of Galen and Hippocrates were embraced and developed being translated first into Arabic and then into Hebrew. The medieval Islamic world produced some of the greatest medical thinkers in history. They made advances in surgery, built hospitals, and welcomed women into the medical profession. Al-Razi (865 to 925 AD) was a Persian physician (and chemist, alchemist and scholar) who was the first to distinguish measles from smallpox.

But in Europe the Middle Ages were a point in time when people were the most pious and God-fearing, the most dogged by evil and tormented by devils, demons and nightmares. Fear and worry dominated earthly life, plagues and disasters were seen as portents for the imminent end of the world. During the 11th century, however, life began to change. Agricultural innovations such as the heavy plough and three-field crop rotation continued to make farming more efficient and productive, so fewer farm workers were needed – but thanks to the expanded and improved food supply, the population grew. As a result, more and more people were drawn to towns and cities but the towns and cities were filthy, the streets open sewers; there was no running water and knowledge of hygiene had almost become non-existent. Dung, garbage and animal carcasses were thrown into rivers and ditches, poisoning the water and the neighbouring areas. So much so that in 1388 the English Parliament passed the first law requiring people to keep the streets and rivers clean. Meanwhile, the Crusades had expanded trade routes to the East and given Europeans a taste for imported goods such as wine, olive oil and luxurious textiles. As the commercial economy developed, port cities in particular thrived. By 1300, there were some 15 cities in Europe with a population of more than 50,000.

"There was no running water and knowledge of hygiene had almost become non-existent"

Scientific thought grew by leaps and bounds and rational explanations were sought for every phenomenon. This situation gave rise to many discoveries in medicine too, as returning travellers brought back scientific medicine from Arabic texts. Hospitals were being built to care for the sick (eg St Bartholomew's in London was opened in 1123 AD). A new era was being born in cities: the Renaissance. BMS

Dr Stephen Mortlock is Pathology Manager at the Nuffield Health Guildford Hospital.
He would like to thank the matron and all the staff at Nuffield Health, Guildford Hospital for their continued support.
To see the article with full references, visit **thebiomedicalscientist.net**

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Enteropathogenic E. coli (EPEC)	*Norovirus GII*
Enterotoxigenic E. coli (ETEC) lt/st	*Rotavirus A*
Campylobacter spp. (C.jejuni, C.upsaliensis, C.coli)	*Sapovirus (GI, GII, GIV, GV)*
Plesiomonas shigelloides	
Salmonella spp.	**Parasitic**
Shiga-like toxin producing E.coli (STEC) stx1/stx2	*Cryptosporidium spp.*
Shiga-like toxin producing E.coli (STEC) O157:H7	*Cyclospora cayetanensis*
Vibrio cholerae	*Entamoeba histolytica*
Vibrio parahaemolyticus	*Giardia lamblia*
Vibrio vulnificus	
Yersinia enterocolitica	

*QIAstat-Dx coming soon, currently available as DiagCORE.
DiagCORE is intended for in vitro diagnostic use in Europe.

Sample to Insight

INCIDENT. RESPONSE. OUTCOME.

Dervilla Gorman and **Naomi DeJager** describe their roles as bronze commanders at Viapath Analytics and discuss their responses to incidents that have affected pathology services.

An incident in the diagnostic laboratory refers to an unplanned event that causes or has the potential to cause a minor or major disruption to the normal provision of pathology services.

Incidents that take place internally within the hospital or laboratory environment have a varied impact on pathology services, which can range from an extended turn-around time of pathology test results to the inability to perform specific tests until the problem has been completely resolved. Hospital systems are put under considerable strain when external disasters occur and, in some instances, the infrastructure devised to minimise disruption becomes overwhelmed.

Natural disasters, the outbreak of an infectious disease, major transport accidents and acts of terrorism are all examples of events which can adversely affect hospitals and their pathology services. It is vital that all laboratories have a strategic system in place to cope with these challenging situations, so that problems are quickly resolved without major disruption and a rapid return to normal services can be achieved.

Strategic responses

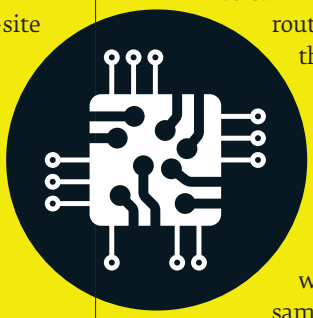
A Gold-Silver-Bronze command structure is used by Viapath Analytics at Guys and St Thomas' NHS Hospital Trust (GSTT) to establish a hierarchical framework for the management of major and minor incidents that can potentially affect the provision of its 24/7 pathology service.

It is the responsibility of the senior biomedical scientist working in the specialist

haemostasis and thrombosis laboratories to take on the role as bronze commander outside of core hours.

The bronze commander is the first point of contact on-site in response to the incident and is responsible for co-coordinating the operational response. They report directly to the Viapath Silver commander and the site nurse practitioner of the host trust, to enable an appropriate response and further escalate if necessary.

Having a bronze commander on-site outside of core hours unites the individual pathology sections that normally work independently of each other (e.g. chemistry, haematology, microbiology). They are personally informed of the incident and get regular updates and support until the incident has been resolved.



Unnecessary pressure is removed from vital sections, such as transfusion, which needs to focus on issuing blood products without being disturbed, as the bronze commander becomes the primary contact for the site nurse practitioner, information technology technician and silver commander, among others.

Methodology

Data analysis of incident reports recorded by bronze commanders over a five-year period (2014 to 2018) with emphasis on the type of incident, the action taken and the final outcome.

Results

IT failure was the most frequent type of incident (43%), followed by analyser breakdown (20%), environmental issues (13%), sample transport issues (9%) and MERS/VHF/EBOLA (7%). The least common incidents were police investigations (1%), broken fridges/freezers (2%), critical staff shortages (2%) and trust major incidents (3%). Following is an analysis of four incidents, outlining the incident, response and outcome.

CASE STUDY 1: TOTAL IT FAILURE

INCIDENT: The laboratory information management system (LIMS) used by blood sciences, cellular pathology, blood transfusion, and microbiology ceased to work in the early hours of Saturday morning. This system provides streamlined tracking and routing of specimens, the verification of key patient demographics and the electronic communication of test results to clinical areas. Central specimen reception was unable to book in samples; samples were being delivered to the laboratory without barcodes and results could not be authorised or accessed by clinical staff.

RESPONSE: The bronze commander informed the site nurse practitioner and the off-site silver commander and contacted the on-call IT support. All pathology sections reverted to paper requests and emergency numbers in order to process urgent tests. The site nurse practitioner issued a clinical alert message to all wards informing them of the situation and asking them to send urgent requests only together with handwritten referral forms in an effort to reduce the workload and to assist with emergency numbers. At 07:30 the bronze commander advised extra staff to be called in to assist central specimen reception and blood sciences. A detailed handover was carried out between bronze commanders at the 09:00 shift change, to allow continued support to blood sciences, and an update provided to staff, silver command and site nurse practitioner at 09:45. The bronze commander maintained regular contact during the downtime, until a server reboot occurred at 15:00. Unfortunately, this was unsuccessful and downtime continued while a conference call was conducted with technical support in USA.

OUTCOME: LIMS connectivity was finally restored at 20:40, after being down for 17 hours and 40 minutes. The problem had been caused by a file running and disrupting the application. All pathology sections were personally informed by the bronze commander, so that they could start clearing the backlog. The site nurse practitioner issued a clinical alert notifying clinical areas that all pathology services were back to normal.

CASE STUDY 2: ANALYSER BREAKDOWN

INCIDENT: Both Roche Cobas e 602 chemistry analysers, which are responsible for tests including renal-liver-bone profiles, broke down before midnight on a Thursday. The biomedical scientists were unable to get them to work and an engineer was unable to attend until the following morning. A high volume of A&E, ITU and other urgent samples had built up needing chemistry tests.

RESPONSE: The bronze commander, in conjunction with the two on-duty chemistry biomedical scientists, decided that one biomedical scientist should relocate and open the "core-hours-only" chemistry laboratory at Guys hospital (1.5 miles away) to process samples while the second biomedical scientist would remain at St Thomas' hospital site to organise the incoming samples. A taxi was organised to take the scientist to Guys hospital site at 01:30 on Friday morning. The normal courier service between Guys and STH was increased in frequency and reversed so that samples were taken to Guys (instead of the

IMAGE: GETTY

usual from Guys). The bronze commander kept the site nurse practitioner and silver commander fully informed and a clinical alert was sent out to alert the wards of a delay in chemistry results.

OUTCOME: The Roche Cobas e 602 chemistry analyser at Guys was set up and processing of samples from both sites commenced by 04:00. A Roche engineer promptly arrived at STH at 08:00 Friday morning to fix the analysers, which were back in service by 11:30.

CASE STUDY 3: EXTERNAL MAJOR INCIDENT

INCIDENT: The trust operator released a speech message via the bleep system to the Viapath bronze commander at 22:30 on a Sunday night, indicating a major incident alert. This was followed shortly by a declared major incident at 22:46. Key staff were asked to report to the emergency department immediately.

RESPONSE: The Viapath bronze commander informed all pathology sections (transfusion, haematology, chemistry and central specimen reception) of the initial alert and on investigation, it was discovered that a terrorist attack had taken place at London Bridge. The off-site silver Commander was informed of the situation and was kept in contact throughout. Four patients needed transfusions due to multiple stabbings and chest injury. Flying squad blood was issued. Additional staff were called in to support transfusion.

OUTCOME: The pathology section most affected by this major incident was blood transfusion. One of the biomedical scientists was sent to A&E to issue blood products to guarantee their correct use and avoid wastage. Although she performed an outstanding service, the situation clearly traumatised her and after the incident was stood down at 05:15, the bronze commander advised her and communicated to the silver commander that she may need counselling to come to terms with her experience. This was arranged soon after the event.

CASE STUDY 4: FLOODING

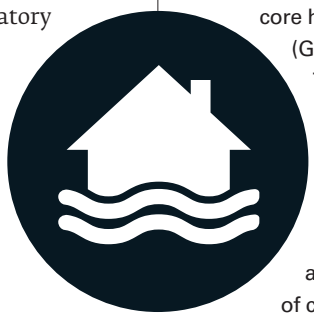
INCIDENT: The site nurse practitioner informed the Bronze commander on Saturday morning that Cellular pathology had been flooded due to a burst pipe on the floor above. The extent of the damage was unknown, because laboratory doors were locked as this department does not require weekend cover.

RESPONSE: The off-site silver commander was contacted, who instructed the bronze commander to assess the extent of the damage. Security staff were authorised to unlock the laboratory doors to allow access to the bronze commander and the rapid response team to clear up the water. Water was still dripping from the laboratory ceiling, but soon stopped. The water was mainly located on the right hand side corridor and only a small area of one of the laboratories was affected, offices and laboratories were mainly untouched. Boxes and bins sitting in the water were relocated. The off-site silver commander and the SNP were informed of the flood location and that it was manageable and had not caused extensive damage.

OUTCOME: The actions of the Bronze commander outside of core hours ensured that damage was minimised, and service delivery could resume with no delay on Monday morning.

Conclusion

A total of 119 incidents with the potential to impact service delivery have taken place outside of core hours over the past five years at Viapath Analytics. Internal incidents occurred in 97% of cases with IT issues being the most problematic and major external incidents occurred in just 3% of cases. This study highlights the advantage of having an experienced bronze commander on-site supporting all areas of pathology when dealing with incidents. It also highlights their important role as a single point-of-contact in resuming normal pathology services in all areas with minimal disturbance.



Dervilla Gorman and **Naomi DeJager** are Bronze Commanders working outside of core hours at Viapath Analytics (Guys & St Thomas' Hospital).

They would like to thank Operations Manager Jacky Cutler for inspiring this article and the haemostasis team at Viapath Analytics for their dedication and commitment as bronze commanders outside of core hours. BMS

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An Unparalleled Experience

President's Introduction

Alison Geddis, IBMS President

Welcome to the launch of Congress 2019. Every President says that Congress represents the high point of their presidency and now I'm seeing the build up to this incredible event I know exactly what they mean.

The following pages represent the product of 12 months of planning, invitations sent to more than 250 of the leading experts in our field and the biggest exhibition investment for our diagnostic industry partners. All this so that we can bring to you the most ambitious Congress we have ever hosted.

The 2019 programme of lectures, presentations and workshops showcases the increasing breadth of biomedical science; this year we will be reflecting the growth of point-of-care testing by devoting a whole day lecture programme to the subject. Another new addition is our first-ever veterinary biomedical science programme that will appeal to everyone – not just those working in veterinary laboratories.

In this endless age of austerity it is too easy to reduce the whole professional existence down to its lowest common denominator, but I think that is a most short-sighted attitude. The lifeblood of a profession is its practitioners and Congress is an unparalleled opportunity for our profession to come together, reconnect with past colleagues and to welcome the younger members of profession. No one ever forgets a visit to Congress so I hope you'll join me to make memories of Congress 2019.

- CELLULAR PATHOLOGY
- CLINICAL CHEMISTRY
- CYTOPATHOLOGY
- EDUCATION & TRAINING
- HAEMATOLOGY
- IMMUNOLOGY
- LABORATORY MANAGEMENT
- BIOMEDICAL SUPPORT STAFF
- POINT-OF-CARE TESTING
- MEDICAL MICROBIOLOGY
- MOLECULAR PATHOLOGY
- QUALITY MANAGEMENT
- TRANSFUSION SCIENCE
- VETERINARY
- VIROLOGY

Multidisciplinary Conference

Congress Plenaries

Monday 23 September

14.00 The Albert Norman Opening Address
Alison Geddis, President, Institute of Biomedical Science

14.20 Consultant Scientists and Consultant Pathologists – an essential partnership
Prof Jo Martin, President, Royal College of Pathology

14.40 Laboratory service redesign: the Scottish ambition
Dr David Stirling, Director of Healthcare Science, NHS National Services Scotland

15.05 Genomic Medicine and its integration into laboratory services
Prof Dame Sue Hill DBE, Chief Scientific Officer for England

16.00 Total digital pathology
Chloe Lockwood, Biomedical Scientist, Leeds Teaching Hospitals NHS Trust and Bashir Hussain, Digital Pathology Project Manager, Leeds Teaching Hospitals NHS Trust

16.35 The science of laughter
Prof Sophie Scott, Welcome Senior Research Fellow in Basic Biomedical Science and Professor of Cognitive Neuroscience, University College London

Congress Keynote Plenary

We want our delegates to hear the views, thoughts and opinions of the best in their field; we want our delegates to leave Congress with a clearer understanding of what is happening in pathology in order to help better manage their services and their careers. Our Plenary programme is the flagship lecture programme that will consider the future of health care provision, evaluate the implications for pathology and examine a particular service delivery model. We will hear consultant biomedical scientists are becoming an increasingly important part of a solution to a workforce problem, and how genomic medicine is being integrated into our laboratory services; we will see the massive diagnostic potential of a digitised pathology service. The intensive afternoon programme will conclude with a seriously scientific but light-hearted talk from the brilliant Professor Sophie Scott on the science of laughter – this is something you cannot afford to miss.

Closing Plenary

Wednesday 25 September

The Importance of Forensic Pathology to Health, Justice and Fictional Crime Writing

Crime and mystery is the second most popular fiction genre (behind romance and eroticism). You may have read her books, you may have seen the television series but now you have the chance to meet the real life forensic pathologist on which the author, Ann Cleeves, has based her pathologist character in the popular 'Shetland' crime novel series.

Dr James Grieve, senior lecturer in forensic pathology at Aberdeen University, and one of the most 'high octane' individuals you are ever likely to meet, has personally dealt with some very high profile and challenging cases in his career that spans more than 30 years. It is a career that has taken him around the world not only to be involved in criminal cases, but also to prevent families going through the same tragedy twice. This is a plenary lecture that the audience will always remember.

Helpline: 01892 779990

Visit congress.ibms.org

The Sunday Programme

We know how difficult it is for staff to be out of the laboratory while still maintaining a service and we want to make Congress accessible to as many people as possible. That is why we are again offering our most popular lecture programmes on two separate days. On Sunday we will be opening the lecture programme with the Quality Management, Education & Training and the Molecular Pathology programmes. More chance to hear the presentation you want to hear and less chance of a programme clash with the scientific lecture programmes. Conclude your Sunday afternoon at Congress by joining us at the ever popular Welcome Evening.

The Sunday programme features:

- Topics that have universal appeal and interest to all biomedical scientists
- Content that is additional to the discipline specific programmes
- An option to attend Congress for delegates who may not be able to attend during the working week
- Even more content and learning value from Congress without impacting on the working week

SUNDAY 22 SEPTEMBER

EDUCATION & TRAINING

13.00 How do T level qualifications fit with apprenticeships and what does this mean for trainers? *Sue Alexander, The Royal Marsden NHS Foundation Trust*

13.30 Involving service users in the student experience *Carol Ainley, Manchester Metropolitan University*

14.00 Qualifications in point-of-care testing *Lee Peters, Abertawe Bro Morgannwg University Health Board*

14.30 How technology is changing the way we learn *Matt East, Talis*

15.45 Developing a career pathway for support workers in sample reception *Dr David Ricketts, Health Services Laboratories LLP*

16.15 Balancing training needs and priorities with limited resources *Wendy Leversuch, Health Services Laboratories LLP*

16.45 Meeting different training needs; what are reasonable adjustments? *Christine Murphy, University of Hull*

Scientific programme sponsor:

Roche

SUNDAY 22 SEPTEMBER

MOLECULAR PATHOLOGY

13.00 From the 100,000 Genomes Project to the Genomics Medicine Service - a year on *Sandra Hing, Genomics Implementation Unit, NHS England and Dr Jane Moorhead, Kings College NHS Foundation Trust*

13.30 Integrating molecular pathology in routine diagnostics *Dr Jane Starczynski, University Hospitals of Birmingham NHS Foundation Trust*

14.00 The impact of next generation sequencing on haematology diagnosis *Gillian McGaffin, NHS Greater Glasgow and Clyde*

14.30 Laboratory challenges of cell based therapies *Kevin Jestice, Cambridge University Hospitals NHS Foundation Trust*

15.45 Role of molecular testing for prognostication and treatment stratification *Dr Richard Byers, Manchester University NHS Foundation Trust*

16.15 How precision medicine is changing the face of pathology

16.45 Molecular pathology and the Genomic Medicine Service; is there a role for labs outside the GLH?

Brendan O'Sullivan, Queen Elizabeth Hospital Birmingham

SUNDAY 22 SEPTEMBER

QUALITY MANAGEMENT

13.00 MHRA 7 day inspection notice: what is the impact and how best to manage it? *Chris Elliott, South Tees Hospitals NHS Foundation Trust*

13.30 The Impact of GDPR on the laboratory *Deborah Crozier, Belfast Health & Social Care Trust*

14.00 Maintaining accreditation through mergers and consolidations – the UKAS expectations *UKAS*

14.30 Maintaining accreditation through mergers and consolidations – the manager's experience *Tracey Chrystal, Gateshead NHS Foundation Trust*

15.45 Quality competency frameworks *Gary Collins, Crosshouse Hospital*

16.15 Continuity and quality – how to learn from a system failure and how to cope *Ian Cocking, Leeds Teaching Hospitals NHS Trust*

16.45 Challenges to a culture of quality *Rashmi Rook, Surrey & Sussex Healthcare NHS Trust*

Biomedical Support Staff Programme

The biomedical support staff programme is now an important and well established part of Congress.

The range of topics and speakers on this programme reflect the growing significance of this section of our workforce and it is hoped that managers and budget holders will see the value of supporting their assistant and associate practitioners to attend this event.

We pride ourselves on being an inclusive profession and our Congress offers a truly inclusive programme; from service reconfigurations, to point of care testing, from apprenticeships to T-level qualifications; these are all issues that impact directly on biomedical support staff.

These lectures are a complete package. Support staff delegates can attend this session at the special afternoon rate or can book a full Congress day and combine it with a programme of morning lectures.

Monday 23 September

13.00 Developing a career pathway for support staff in sample reception
Dr David Ricketts, Health Services Laboratories LLP

13.25 How do T level qualifications fit with apprenticeships and what does this mean for your career? *Sue Alexander, The Royal Marsden NHS Foundation Trust*

13.50 Pathology reconfiguration – what does it mean for pathology support staff?
Dave Eccleston, Royal Liverpool and Broadgreen University Hospitals NHS Trust

14.15 Supervision and independent practice – considerations for the network model
Diane Anderson

14.40 The importance (or role or opportunities) of support staff in point-of-care testing

15.05 The importance of supervisory skills and team leadership for pathology support staff
Joanna Andrew, York Teaching Hospital NHS Foundation Trust

16:00 The pros and cons of doing a degree part-time – from first-hand experience
Chrystalla Ferrier, University of Westminster

16.20 Don't underestimate yourself – what to put on your CV to show your skills
Jocelyn Pryce, Institute of Biomedical Science

16.40 Pathology at the heart of healthcare
Dr Andrew Blann, Editor, British Journal of Biomedical Science

Mary Macdonald Congress Award

In memory of Council Member Mary Macdonald, the Institute is offering 20 free places for non-HCPC registered members to attend the Biomedical Support Staff programme on the afternoon of Monday 23rd September and £60.00 towards travelling expenses for those successful applicants.

Applicants must be members of the Institute in a support staff role (MLA, Associate or Assistant \Practitioner etc), and must complete and return an application by the 29th March 2019. Forms are available on the Congress website.

Visit congress.ibms.org

Monday 23 September

Scientific programme sponsor: Roche

CELLULAR PATHOLOGY

Chair: Dr Tony Warford

09.00 The place for routine histopathology in the molecular age
Dr Guy Orchard, Viapath Analytics, St. Thomas'

09.30 Is molecular pathology more important than morphology?
Dr Philippe Taniere, Queen Elizabeth Hospital Birmingham

10.30 Optimising the pre-analytical phase - morphology
Peter Mooney, UK NEQAS, CPT

11.00 Optimising the pre-analytical phase - ICC/ISH
Sharon Forrest, Liverpool Clinical Laboratories, Royal Liverpool University Hospital

11.30 Optimising the pre-analytical phase - molecular
Brendan O'Sullivan, Queen Elizabeth Hospital Birmingham

LUNCH BREAK

CLINICAL CHEMISTRY

09.00 Haematology basics for biochemists
Colin Mudd, Nottingham University Hospitals

09.15 Serology basics for biochemistry
Jemma Turton, Queens Medical Centre, Nottingham

09.30 Immunoassay interferences *Dr Karen Smith, Nottingham University Hospitals*

10.30 The role of vitamin D in 'non-skeletal' disease: is there a case for taking supplements?
Paul Waller, Kingston University

11.00 Holotranscobalamin in the resolution of B12 deficiency - links to the health and well-being of staff/health economics/ patient perspective
Dr Dominic Harrington, Viapath, Guy's and St. Thomas'

11.30 Intelligent liver function testing
Dr Andrew Fraser, Queen Elizabeth University Hospital

LUNCH BREAK

Lunchtime Session

12.45 Higher Specialist Diploma - drop-in session with examiners
Paul Waller, IBMS Examiner

CYTOPATHOLOGY

09.00 A four nation's perspective on HPV primary screening
Wales: *Louise Dunk Cervical Screening Wales*
Scotland: *Allan Wilson Monklands Hospital, Lanarkshire*
Northern Ireland: *Jackie Jamison, Northern Trust Hospitals*
England: *Helen Burrell Southmead Hospital, North Bristol Trust*

10.30 HPV implementation - international perspective
Jesper Bonde, Copenhagen, Amager og Hvidore Hospital , Denmark

11.15 HPV data - 'pitfalls & perks' of HPV
Stephen Burrows Manchester University NHSFT

BAC British Association for Cytopathology

The cytopathology programme is delivered in conjunction with the British Association for Cytopathology

LUNCH BREAK

Lunchtime Session

12.45 BAC AGM

EDUCATION & TRAINING

09.00 Educating and training the scientist workforce; apprenticeships, PTP, STP, HSST – the legacy of MSC *Alan Wainwright, Institute of Biomedical Science*

09.30 Emerging professions – physicians' associates and assistants
Dr Peter Nicholls, Kent and Medway Medical School

10.30 The economic need and strategic challenges to developing the scientist workforce *David Wells, NHS Improvement*

11.00 Establishing the consultant biomedical scientist role *Sarah May, Institute of Biomedical Science*

11.30 Legislative changes to regulation
Marc Seale, Health and Care Professions Council

LUNCH BREAK

HAEMATOLOGY

Chair: Nichola Lawrence

09.00 Morphology and the diagnosis of the myelodysplastic syndromes *Prof. Barbara Bain, St. Mary's Hospital London*

09.40 How do you use the results of the morphology surveys?
Jon Sims, UK NEQAS, Haematology

10.30 Morphology quiz
Dr Michelle Brereton, Manchester University NHS Foundation Trust and Dr John Burthem, Manchester University NHS Foundation Trust

11.30 Malaria from a consultant microbiologist's perspective *Dr Firza Gronthoud, The Royal Marsden NHS Foundation Trust*

LUNCH BREAK

17.00 Happy Hour in the Exhibition

Visitor and Delegate refreshments sponsored by: sebia

Congress Keynote Plenary

Monday 23 September

14.00 The Albert Norman Opening Address
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14.20 Consultant Scientists and Consultant Pathologists – an essential partnership
Prof Jo Martin, President, Royal College of Pathology

14.40 Laboratory service redesign: the Scottish ambition
Dr David Stirling, Director of Healthcare Science, NHS National Services Scotland

15.05 Genomic medicine and its integration into laboratory services
Prof Dame Sue Hill DBE, Chief Scientific Officer for England

IMMUNOLOGY

09.00 Measurement of uncertainty- application immunology

09.30 Immune response to parasites

10.30 Allergy treatment

11.00 Cryoglobulins

11.30 Development of immunology screening for autoimmune encephalopathies *Dr Ross Sadler, Oxford University Hospitals NHS Trust*

LUNCH BREAK

MEDICAL MICROBIOLOGY

09.00 *Fusobacterium* - can we improve detection *Noora Ahmed, Northern General Hospital Sheffield*

09.30 The host-microbiota axis in skin wound repair *Prof. Matthew Hardman & Samantha Iveson,University of Hull*

10.30 Optimisation of blood culture investigations *Dr Mike Weinbren, Sherwood Forest Hospital*

11.00 Transplant perfusion fluids *Dr Dan Weiand, Newcastle Upon Tyne Hospital NHS Foundation Trust*

11.30 Unusual pathogens in bone marrow transplant patients *Dr Lucia Pareja-Cebrian, Newcastle Upon Tyne Hospital NHS Foundation Trust*

LUNCH BREAK

TRANSFUSION SCIENCE

09.00 Who should be SHOT? Case studies from the SHOT report *Hema Mistry, NHSBT, Manchester*

09.30 Slips, trips and falls - human factors in transfusion errors

10.30 UKTLC Standards - roles, responsibilities, qualifications and training in transfusion *Lorna Toward, Surrey & Sussex Healthcare NHS Trust*

11.00 Extension of roles for biomedical scientists in transfusion *Tom Bullock, NHSBT, Bristol*

11.30 Using IT to improve safety in transfusion *Jenny Berryman, JB Transfusion Ltd*

LUNCH BREAK

VIROLOGY

09.00 Virological tales of tourism

09.30 Sun, sand and sex – a virology perspective

10.30 What can understanding the virome tell us?

11.00 Virus discovery - it's a brave new world

11.30 Insights into the future - emerging viruses

LUNCH BREAK

New Content at Congress

Congress is expanding even further with the addition of two new lecture programmes: Veterinary Science and Point-of-Care Testing (POCT).

The veterinary programme on Tuesday 24 September is something entirely new and will appeal to everyone, not just those working in veterinary laboratories. This really is a fascinating and highly scientific programme with a difference.

Point-of-Care Testing has become main-stream and we are reflecting this by having an entire POCT lecture programme on Wednesday 25 September, during which we will be launching a new POCT qualification.

Visit congress.ibms.org

16.00 Total digital pathology
Chloe Lockwood, Biomedical Scientist, Leeds Teaching Hospitals NHS Trust and Bashir Hussain, Digital Pathology Project Manager, Leeds Teaching Hospitals NHS Trust

16.35 The science of laughter
Prof Sophie Scott, Wellcome Senior Research Fellow in Basic Biomedical Science and Professor of Cognitive Neuroscience, University College London

Tuesday 24 September

Scientific programme sponsor: Roche

CELLULAR PATHOLOGY

Chair: Sally Barratt

09.00 One step nucleic acid amplification for breast SLN *Leah Tauira, Royal Surrey County Hospital NHS Trust*

09.20 A complex and challenging Mohs case of multiple tumours removed from the face of a child with xeroderma pigmentosum (XP) *Dr Guy Orchard, Viapath Analytics, St. Thomas'*

09.40 Companion diagnostics in lung cancer *Dr Alistair Reid, Liverpool Clinical Laboratories, Royal Liverpool University Hospital*

10.30 Infectious agents in cancer pathology *Naomi Guppy, HSL Advanced Diagnostics*

11.00 Amyloids, - diagnosis and typing *Janet Gilbertson, National Amyloids Centre University of London*

11.30 Wilms' tumour - the role of the histopathology laboratory in patient outcomes *Dr Matthew Griffiths, Nottingham Trent University*

LUNCH BREAK

Chair: Dr Guy Orchard

14.00 Best practice in bone marrow trephines *Dharmesh Mistry, St. James' Hospital, Leeds*

14.30 Best practice in neuromuscular *Phil Thompson, Leeds Teaching Hospital*

15.00 Best practice in non-gynaecological cytology *Dr Behdad Shambayati, Surrey Pathology Services Ashford and St. Peter's NHS Foundation Trust*

16.00 Current trends, research and innovation in cellular pathology

CLINICAL CHEMISTRY

08.15 "Meet the Panel" session *Clinical Chemistry Specialist Advisory Panel*

09.00 Mind the gap *Derrick Eggerton*

09.30 Implementation of the faecal immunochemical test (FIT) *Jamie West, Peterborough City Hospital*

10.30 Waldenstrom's stirs up a storm *Claire Birnie, Aberdeen Royal Infirmary*

11.00 A clinical case of acidosis *Sheri Scott, Nottingham Trent University*

11.30 Acute kidney injury: challenges and the potential of novel biomarkers *Dr Andrew Lewington, St. James' University Hospital, Leeds*

LUNCH BREAK

Lunchtime Session

12.45 Higher Specialist Diploma - drop-in session with examiners *Sheri Scott, IBMS Examiner*

14.00 Update on the diagnosis of phaeochromocytoma/ paraganglioma *Dr Barry Toole, Newcastle upon Tyne Hospitals NHS Foundation Trust*

14.30 Bone turnover markers: background and clinical relevance *Dr Harrish Datta, James Cook University Hospital*

15.00 Pre-natal/pre-eclampsia in pregnancy - NICE guidance: Admission Avoidance Testing vs Clinical Suspicion

16.00 IQC planning

16.30 National audit on globulin gaps *Dr Soha Zouwail, University Hospital of Wales*

CYTOPATHOLOGY

Non-Gynae

09.00 Digital cytology

09.30 Introduction and development of a digital non-gynaecological diagnostic cytology interpretative scheme *Chantell Hodgson, UK NEQAS CPT*

10.30 ASD in Non-Gynaecological Cytology - a candidate's perspective *Dr Behdad Shambayati, Cytopathology SAP & Surrey Pathology Services Ashford and St. Peter's NHS Foundation Trust*

11.00 ASD Histology Reporting from a cytopathology candidate's perspective *Gary Player*

11.30 Interstitial lung disease *Huzaifa Adamali, Southmead Hospital, North Bristol Trust*

LUNCH BREAK

14.00 Current status of molecular in cytopathology *Robbie Wilson and Jackie Jamison, Northern Trust Hospitals, Belfast*

14.30 Let's start small: training in molecular cytology *Perry Maxwell, Queen's University Belfast*

15.00 EBUS ROSE *Dr Anthony Maddox West Hertfordshire Hospitals NHS Trust*

16.00 Salivary gland cytopathology *Dr Cynthia van der Horst, NHS Greater Glasgow & Clyde*

16.30 Cell blocks: head and neck cytopathology *Dr Ivan Robinson, Derby Hospitals*

BAC British Association for Cytopathology

LABORATORY MANAGEMENT

09.00 Managing health and well-being through change

09.30 Service mergers – how to manage the planned and unplanned consequences *Allan Wilson, Monklands Hospital*

10.30 TUPE – what does it mean and how does it apply? *Gary Owen, Unite the Union*

11.00 Extending practice beyond laboratory science *Sara Pallant, East Suffolk and North Essex NHS Foundation Trust*

11.30 The future shape of pathology services *Denise Cook, Berkshire and Surrey Pathology Services*

LUNCH BREAK

14.00 Generation X, Y, and Z: different language, different values, new approach needed? *Sarah May, Institute of Biomedical Science*

14.30 New risk and safety standards – what will this mean for 15189 accreditation *Dr David Ricketts, Health Services Laboratories LLP*

15.00 Choosing a LIMS and IT system – lessons learned the hard way *Judith Bates, NHS Wales Health Collaborative*

16.00 Whistleblowing and duty of candour: the legal obligations *Paul Seath, Bates Well Braithwaite LLP*

16.30 Managing adverse incidents in the workplace *Vin Poran, HSE*

HAEMATOLOGY

Chair: Dr David Gurney

09.00 IPF in ICU patients to determine mechanisms leading to thrombocytopenia *Usman Ali, Homerton University Hospital*

09.30 Automated platelet aggregometry *Dr Aine McCormick, Viapath Analytics, St Thomas'*

10.30 Genomics and rare disease hunting *Dr Sarah Westbury, University of Bristol*

11.00 FVIII inhibitors *Sean Platton, Royal London Hospital*

11.30 Current issues in antiphospholipid antibody detection *Dr Gary Moore, Viapath Analytics, St Thomas'*

LUNCH BREAK

Chair: Rev Dr Gordon Sinclair

14.00 Haematology cell counter's IQC material must be designed for a specific analyser *Streck*

14.20 New International Council for Standardization in Haematology (ICSH) guideline for internal quality control policy for cell counters *Richard McCafferty, St. James' Hospital, Dublin*

14.40 Open forum discussion 'Is a badged IQC matrix truly 3rd party?'

15.00 Pre-analytical variables *Dr Ian Jennings, UK NEQAS Blood Coagulation*

16.00 Functional iron deficiency: new developments in its understanding and potential future diagnostic tests and treatments *Dr Wayne Thomas, University Hospitals Plymouth NHS Trust*

16.30 Case studies - leukaema diagnosis *Dr Radovan Saso, The Royal Marsden NHS Foundation Trust*

17.00 Happy Hour in the Exhibition

Visitor and Delegate refreshments sponsored by: sebia

IMMUNOLOGY

09.00 Complement - standardisation and assays *Fiona Nash, Lancashire and Lakeland Regional Immunology Service*

09.30 Clinical interpretation of complement assays *Dr Adrian Heaps, Royal Victorial Infirmary, Newcastle*

10.30 Biologicals in gastroenterology

11.00 Autoimmune liver disease *Dr Ted Davies, Princess Royal University Hospital*

11.30 Treatment of liver disease using phages *Prof John Campbell Scottish National Blood Transfusion Service*

LUNCH BREAK

14.00 H+I - technology update *Neil Marsden, St. James' University Hospital, Leeds*

14.30 H+I - cord blood transplantation *Dr Irina Evseeva, Anthony Nolan Trust, London*

15.00 H+I - cord blood banking *Dr Roger Horton, Anthony Nolan Cord Blood Bank, Nottingham*

16.00 Newborn screening for SCID

16.30 Challenges of flow cytometry in a leading HSCT centre *Helen Watson, Newcastle Upon Tyne Hospitals NHS Foundation Trust*

MEDICAL MICROBIOLOGY

08.15 Drop in Session - Meet the Microbiology Advisory Panel Members

09.00 Staphs in pets

09.30 Antimicrobial stewardship in veterinary practice – what drives antibiotic use? *Dr Tim Nuttall, University of Edinburgh*

10.30 AMR in anaerobic bacteria *Trefor Morris, UK Anaerobe Reference Unit*

11.00 Dental and oral microbiology. How clean is your mouth? *Dr Riina Richardson, University of Manchester*

11.30 *Candida auris;* where are we now? *Dr Andy Borman, National Mycology Reference Laboratory Bristol PHE*

LUNCH BREAK

14.00 Alternative or novel therapies *Dr Mike Hornsey University of Surrey*

14.30 Antimicrobial resistance *Prof. Mark Fielder, Kingston University, London*

15.00 *Mycoplasma genitalium* *Dr Suneeta Soni, Claude Nicol Clinic, Royal Sussex County Hospital*

16.00 GC antimicrobial resistance (case study) *Dr Emma Paige, Leeds Teaching Hospital NHS Trust & Leeds Sexual Health*

16.30 Sonic microscopy *Rhian Harris, Royal Glamorgan Hospital*

TRANSFUSION SCIENCE

09.00 Neonatal alloimmune thrombocytopenia (NAIT) *Joe Leung, Gwynedd Hospital*

09.30 Blood brothers - a case study of twin-to-twin transfusion syndrome (TTTS) *Lesley Davies*

10.30 So you think you know ABO? - ABO in transplants *Martin Maley, NHSBT, Newcastle*

11.00 Rh blood group system - Rh CE *Shane Grimsley, International Blood Group Reference Laboratory, NHSBT*

11.30 Exploring the 'minor' blood group systems *Malcolm Needs, IBMS Transufusion Science Panel*

LUNCH BREAK

Lunchtime Session

12.45 Antibody identification workshop *IBMS Transfusion Science Specialist Advisory Panel Members*

14.00 Techniques in transfusion - past, present and future *Jill Caulfield, South of Tyne Laboratories*

14.30 Causes and dealing with pan-reactivity *Tom Bullock, NHSBT, Bristol*

15.00 The role of the advanced therapies unit in the generation of advance therapy medicinal products *Dr Laurence Pearce, NHSBT, Bristol*

16.00 Disease association with blood groups *Malcolm Needs, IBMS Transfusion Science Panel*

16.30 Personality association with blood groups *Martin Maley, NHSBT, Newcastle*

VETERINARY

09.00 Essays in One Health *Prof Dominic Mellor, School of Veterinary Medicine, University of Glasgow*

09.30 Veterinary forensic pathology *Dr Harriet Brooks-Brownlie, University of Bristol*

10.30 Antibiotic armageddon - veterinary impacts

11.00 Emerging staphylococci & MRSA - one health paradigm *Dr Andrew Robb, Glasgow Royal Infirmary*

11.30 From camels to bats - what emerging zoonotic virus might be next? *Prof Anthony Fooks, Animal and Plant Health Agency*

LUNCH BREAK

Lunchtime Session

12.45 Parasitology workshop

14.00 Veterinary parasitology *Dr Martha Betson, University of Surrey*

14.30 Infectious diseases in exotic species *Prof Julian Chantrey, University of Liverpool*

15.00 Risk factors for canine cancer

16.00 Histopathological insights into feline TB *Conor O'Halloran, Royal (Dick) School of Veterinary Studies, University of Edinburgh*

16.30 Animals as diagnoticians - what can we learn?

VIROLOGY

09.00 The expected causing the unexpected *Cathryn Skea, Great Ormond Street Hospital for Children NHS Foundation Trust*

09.20 The **P**athway **O**f **C**haotic **T**ravel. The unexplored journey of a biomedical scientist! *Louise Davies, Wales Specialist Virology Centre*

09.40 Cytomegalovirus - case study *Adam Waugh, Royal Sussex County Hospital*

10.30 Controversies on treatment of chronic hepatitis C *Dr Johannes Vermehren, University of Frankfurt*

11.00 Hepatitis B – universal vaccines and controls

11.30 Zoonotic hepatitis E: animal reservoirs and foodborne transmissions *Dr Nicole Pavio, ANSES (French Agency for Food, Environmental and Occupational Health & Safety)*

LUNCH BREAK

14.00 Virus associations with dementia *Dr Charlotte Warren-Gash, London School of Hygiene and Tropical Medicine*

14.30 Virus associations with childhood deafness *Dr Peter Maple, University of Nottingham & Sharon Wood, CMV Action*

15.00 Virological complications of haemopoietic stem cell transplantation *Prof. Paul Moss, University of Birmingham*

16.00 Infectious disease

16.30 The last days of smallpox, tragedy in Birmingham *Prof. Mark Pallen, Quadram Institute*

Wednesday 25 September

Scientific programme sponsor: Roche

CELLULAR PATHOLOGY

Chair: Ashley Ballard

09.00 Histopathology reporting - two years on *Dr Jo Horne University Hospital of Southampton*

09.30 How image analysis will change histopathology reporting *Dr Alexander Wright, St James University Hospital, Leeds*

10.30 The impact of immune check point therapy on the treatment of cancer *Prof. Bharat Jasani, Targos Molecular Pathology Gmbh, Germany*

11.00 Signalling pathways in cancer *Dr Will Howat, Abcam*

11.30 Lynch syndrome diagnosis, screening, aetiology and epidemiology *Prof. Gareth Evans, University of Manchester*

LUNCH BREAK

14.00 Interactive session *David Muskett, Salford Royal NHS Foundation Trust*

14.30 UK NEQAS - EM pilot

15.00 Introduction and development of UKAS-accredited proficiency testing of ISO-accredited laboratory requirements *Chantell Hodgson, UK NEQAS - CPT*

CLINICAL CHEMISTRY

08.15 Higher Specialist Diploma - drop-in session with examiners *Dr Nigel Brown, Wansbeck General Hospital*

09.00 High-sensitivity troponin: current guidelines, benefits and challenges *Dr David Gaze, University of Westminster*

09.30 High-sensitivity troponin: an emergency department perspective *Prof. Richard Body, University of Manchester*

10.30 Point-of-care testing - ketones *Andy Kerry, Royal Alexandra Hospital*

11.00 Investigating hypoglycaemia when laboratory medicine is the icing on the cake *Dr Mars Skae, Royal Manchester Children's Hospital*

11.30 Lipid screening - current practice and evolving treatments *Prof. Tim Reynolds, University Hospitals of Derby and Burton*

LUNCH BREAK

14.00 Early development of AMACR inhibitors as anti-cancer agents *Dr Matthew Lloyd, University of Bath*

14.30 How to get a method accredited for a drug you don't know about *Dr Nigel Brown, Wansbeck General Hospital*

15.00 Micro plastics and human health *Dr Stephanie Wright, Kings College London*

CYTOPATHOLOGY

Gynae

08.15 Interactive discussion: The ups and downs of HPV primary rollout - what have we learned so far? *Allan Wilson, Monklands Hospital*

09.00 Recruitment of women for cervical screening *Jesper Bonde, Hvidore Hospital, Copenhagen*

09.30 Patient perspective of HPV primary screening - Jo's Trust *Hannah Dwyer, Jo's Trust*

10.30 HPV Vaccination Programme *Dr Kevin Pollock, Glasgow Caledonian University*

11.00 The Ripple Effect: colposcopy and primary care services following HPV primary rollout *Rajvinder Dhillon and Dr Julia Palmer, Gloucestershire Royal Hospital & St. Georges; Sheffield Teaching Hospitals*

11.30 Future of the National Cervical Screening Programme *Ruth Stubbs,PHE Screening*

LUNCH BREAK

14.00 Sperm morphology *Dr Matt Tomlinson, University of Nottingham*

14.30 Attaining ISO15189 for andrology *Stephanie Brooks, The Hewitt Fertility Centre, Liverpool Women's Hospital*

15.00 Andrology QC and MOU *Steve Harbottle, Cambridge IVF, Addenbrooke's Hospital*

BAC British Association for Cytopathology

HAEMATOLOGY

Chair: Saida Solkar

09.00 Case studies - leukaemia diagnosis

09.30 Clinical pathway management for anaemia *Dr Derralynn Hughes, Royal Free London NHS Foundation Trust*

10.30 Rare anaemias-diagnosis and management *Dr Momin Ahmed, Royal Free London NHS Foundation Trust*

11.00 Dilemmas in haemoglobinopathy diagnosis - case studies *Daniel Monteiro, Viapath, Guy's and St. Thomas' Hospital*

11.30 Thalassaemia major – new treatment technologies

LUNCH BREAK

14.00 Analysis of eicosanoids in exhaled breath condensate by liquid chromatography and mass spectrometry in patients with sickle cell disease *Jibril Abukar, Homerton University Hospital NHS Foundation Trust*

14.30 IBMS qualifications and advanced practice *Nichola Lawrence, University Hospitals of North Midlands NHS Trust*

15.00 Career development in haematology

IMMUNOLOGY

09.00 ANA classification - myopathies *Dina Patel, NEQAS, Sheffield*

09.30 ANA classification - NEQAS perspective *Dr Bill Egner, NEQAS, Sheffield*

10.30 Common variable immune deficiency (CVID) diagnosis: a case study *Tonya Bacon, Queen Elizabeth Hospital, Woolwich*

10.50 Dendritic cell, monocyte and lymphocyte (DCML) deficiency - case study *Penny Feather, Northern General Hospital*

11.10 Anti-MDA5 antibodies in dermatomyositis with interstitial lung disease (ILD): case study *Sarah Gibbs, Berkshire and Surrey Pathology Services*

11.30 Breaking news in immunology *Dr Graeme Wild, Sheffield Teaching Hospitals*

LUNCH BREAK

Chair: Chris Scott

14.00 Patient experience *Patient Societies*

Visitor and Delegate refreshments sponsored by: sebia

Closing Plenary

The Importance of Forensic Pathology to Health, Justice and Fictional Crime W

Crime and mystery is the second most popular fiction genre (behind romance and eroticism). You may have read her books, you may have seen the television series but now you have the chance to meet the real life forensic pathologist on which the author, Ann Cleeves, has based her pathologist character in the popular 'Shetland' crime novel series.

Dr James Grieve, senior lecturer in forensic pathology at Aberdeen University, and one of the most 'high octane' individuals you are ever likely to meet, has personally

QUALITY MANAGEMENT

08.15 EQA and the patient's journey *Deena Patel ,UK NEQAS Immunology, Immunochemistry & Allergy*

09.00 MHRA 7 day inspection notice: what is the impact and how best to manage it *Chris Elliott, South Tees Hospitals NHS Foundation Trust*

09.30 The impact of GDPR on the laboratory *Cathy Cole, Belfast Health & Social Care Trust*

10.30 Maintaining accreditation through mergers and consolidations – the UKAS expectations *UKAS*

11.00 Maintaining accreditation through mergers and consolidations – the manager's experience *Tracey Chrystal, Gateshead NHS Foundation Trust*

11.30 Quality competency frameworks

LUNCH BREAK

14.00 Continuity and quality – how to learn from a system failure and how to cope *Richard Haggas, West Hertfordshire Hospitals NHS Trust*

14.30 Quality control materials: how best to use them and why they can improve your service *Clare Morris, The National Institute for Biological Standards and Control (NIBSC)*

15.00 The importance of human factors training on quality *Karon Cormack, NHS Lanarkshire*

MEDICAL MICROBIOLOGY

09.00 Implementing molecular gastrointestinal (GI) across Wales *Michael Perry, UK Anaerobe Reference Unit*

09.30 *Campylobacter* infections in the UK: a three-year surveillance study using WGS *Craig Swift, Campylobacter Reference Service, PHE Colindale*

10.30 Infection control - VHF high-level isolation *Alison Sykes, Newcastle upon Tyne NHS Foundation Trust*

11.00 Implementing pathogen genomics *Cath Arnold*

11.30 Role of WGS in *Salmonella* epidemiology *Prof. Jay Hinton, Wellcome Trust*

LUNCH BREAK

14.00 Total laboratory automation; does it work? *Dr Andrew Berrington, City Hospitals Sunderland NHS Foundation Trust*

14.30 WASPLAB implementation *John Mallon,NHS Greater Glasgow and Clyde*

15.00 SMART testing *Dr Kathy Walton and Jennifer Collins, Newcastle Upon Tyne NHS Foundation Trust*

POINT-OF-CARE TESTING

Chair: Dr Sarah Glover

09.00 A new qualification in POCT *Lee Peters, Abertawe Bro Morgannwg University Health Board*

09.30 Challenges delivering training and assessment in POCT services *Rhys Tassell Cambridge University Hospitals NHS Foundation Trust*

10.30 Accreditation of POCT services *Ben Courtney, UKAS*

11.00 Lessons learned from implementing POCT in diagnostic radiology services *Martine Harris, Mid Yorkshire Hospitals NHS Trust*

11.30 POCT supporting sustainability and transformation plans *David Ryder, University Hospitals of Morecambe Bay NHS Foundation Trust*

LUNCH BREAK

14.00 The importance of software developments in POCT services *Nicky Hollowood Harrogate and District NHS Foundation Trust*

14.30 Challenges of establishing a POCT service *Emma Scrivener, Harrogate and District NHS Foundation Trust*

14.45 How POCT is introduced and controlled in primary care *Helen Archer Cwm Taf University Local Health Board*

15.00 A national approach to delivery of POCT services *Annette Thomas Cardiff and Vale University Health Board*

TRANSFUSION SCIENCE

09.00 Stocking and use of O-negative red cells

09.30 Stocking and use of platelets

10.30 Therapeutic red cell exchange *Karen Madgwick, North Middlesex University Hospital*

11.00 Therapeutic plasmapheresis/ exchange

11.30 Therapeutic photopheresis - T cells *Paul Boraks, Addenbrooke's Hospital NHS Trust*

LUNCH BREAK

14.00 Challenges in supply of blood in Africa *Lilian Boateng, Liverpool School of Tropical Medicine*

14.30 Blood buses - delivering transfusion in the community *Catherine Lorenzen, East Kent Hospitals University NHS Foundation Trust*

15.00 Moving blood and samples for transfusion - cars, bikes and drones *Chris Elliott, South Tees Hospitals NHS Foundation Trust*

VIROLOGY

09.00 Summary of One Health *Prof Sally Cutler, University of East London*

09.15 An audience with... Gp Capt Andy Green, Consultant in Communicable Disease *Gp Capt Andy Green, Consultant in Communicable Disease*

10.30 The demise of cattle plague *Prof. Peter Roeder, Taurus Animal Health*

11.00 Eradication of measles - progress and challenges

11.30 PHE Field Epidemiology Service - how we use the data you provide *Iain Roddick, Field Epidemiology Service, PHE Cambridge*

LUNCH BREAK

14.00 Containment level 3 - virology

14.30 Monkey pox in the UK *Dr Tim Brooks, PHE Porton Down*

15.00 The PHE Fever Service *PHE Porton Down*

Visit congress.ibms.org

Writing

dealt with some very high profile and challenging cases in his career that spans more than 30 years. It is a career that has taken him around the world not only to be involved in criminal cases, but also to prevent families going through the same tragedy twice. This is a plenary lecture that the audience will always remember.

The Exhibition

The UK's largest free-to-attend showcase featuring many of the leading companies and organisations displaying and demonstrating instrumentation, equipment & professional services.

A. Menarini Diagnostics
AB Scientific
Advanced Instruments
Agilent Technologies LDA (UK)
Alpha Laboratories
Association for Quality Management in Laboratory Medicine
Atom Scientific
Beckman Coulter UK
Becton Dickinson UK
Biocartis NV
BioConnections
Bio-Medical Laboratory Supplies
bioMérieux
Bruker UK
Cellpath
Cepheid UK
Cirdan Imaging
City Assays
CliniSys Solutions
Cosmos Biomedical
Dedalus Healthcare
Diagnostica Stago UK
DiaSorin
Don Whitley Scientific
ELITech UK
Elkay Laboratory Products (UK)
EUROIMMUN UK
Genial Compliance Systems
Genmed.Me
Greiner Bio-One
Health Service Laboratories
Helena Biosciences Europe
Hologic
HORIBA UK
IKA England
Immunodiagnostic Systems
International Scientific Supplies
InterSystems
Launch Diagnostics
Leica Biosystems
Luminex
Mast Group
Medical Wire & Equipment
Medline Scientific
National Institute for Biological Standards and Control
NHS Blood and Transplant
Nikon UK
Nova Biomedical
Olympus KeyMed
Ortho Clinical Diagnostics
Oxford Biosystems
Oxford University Press
PFM Medical UK
Pro-Lab Diagnostics
Public Health England
Pyramid Innovations
QIAGEN
Radiometer
Randox Laboratories
R-Biopharm Rhone
Roche Diagnostics
Sakura Finetek
Sarstedt
Sciamed
SciLabware
Sebia UK
Serosep UK
Shimadzu UK
Shuttlepac
Siemens Healthineers
Solmedia
Sterilab Services
STRATEC Biomedical UK
SYNLAB UK
Sysmex UK
TCS Biosciences
Tecan UK
Technidata UK
Technopath
TEMPUS600 UK
The Binding Site
Thermo Fisher Scientific
Tosoh Bioscience
UKAS
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Viapath Group
WEQAS
Werfen
Woodley Equipment Company
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Delegate Rates

Helpline: 01892 779990

Congress Delegate Fees (4 Days 22-25 September 2019)

IBMS Members	Young Persons/ Retired Members	Non Members
Premium Early Booking Discount (registration & payment by 31 March 2019)		
1 Day: £115	1 Day: £90	1 Day: £130
2 Days: £230	2 Days: £180	2 Days: £260
3 Days: £320	3 Days: £240	3 Days: £355
Early Booking Discount (registration & payment by 30 June 2019)		
1 Day: £160	1 Day: £125	1 Day: £180
2 Days: £320	2 Days: £245	2 Days: £355
3 Days: £415	3 Days: £330	3 Days: £460
Full Rate (registration & payment from 1 July 2019)		
1 Day: £200	1 Day: £160	1 Day: £225
2 Days: £400	2 Days: £310	2 Days: £450
3 Days: £520	3 Days: £410	3 Days: £595

Congress Delegate Fees (1, 2 or 3 Days + 22 September 2019)

IBMS Members	Young Persons/ Retired Members	Non Members
Premium Early Booking Discount (registration & payment by 31 March 2019)		
1, 2 or 3 Days + 22 September	1, 2 or 3 Days + 22 September	1, 2 or 3 Days + 22 September
Add: £75	Add: £55	Add: £105
22 September ONLY	22 September ONLY	22 September ONLY
(Half Day): £95	(Half Day): £75	(Half Day): £125
Early Booking Discount (registration & payment by 30 June 2019)		
1, 2 or 3 Days + 22 September	1, 2 or 3 Days + 22 September	1, 2 or 3 Days + 22 September
Add: £80	Add: £60	Add: £110
22 September ONLY	22 September ONLY	22 September ONLY
(Half Day): £100	(Half Day): £80	(Half Day): £130
Full Rate (registration & payment from 1 July 2019)		
1, 2 or 3 Days + 22 September	1, 2 or 3 Days + 22 September	1, 2 or 3 Days + 22 September
Add: £100	Add: £80	Add: £130
22 September ONLY	22 September ONLY	22 September ONLY
(Half Day): £120	(Half Day): £100	(Half Day): £155

Biomedical Support Staff Programme Fees (Monday 23 September 12.00 - 17.00 ONLY)

IBMS Members	Young Persons / Retired Members	Non-Members
Premium Early Booking Discount (registration & payment by 31 March 2019)		
Half Day: £60	Half Day: £45	Half Day: £70
Early Booking Discount (registration & payment by 30 June 2019)		
Half Day: £80	Half Day: £60	Half Day: £90
Full Rate (registration & payment from 1 July 2019)		
Half Day: £105	Half Day: £80	Half Day: £115

Your Delegate Fee Includes:

Admission to all lecture sessions, scientific posters, the exhibition, lunch (not 22 September), morning and afternoon refreshments and a copy of the Biomedical Science Congress Handbook.

- Premium Early Booking Discount (book before 31 March 2019)
- Early Booking Discount (book before 30 June 2019)
- Discounted rates for young persons (DOB after 21.09.1994 and also an IBMS Member) and retired members.
- All rates include VAT

Congress delegate registration also includes an opportunity to attend the social networking functions once the Scientific Programme has finished:

- Come Together Welcome Evening @ The Brasshouse (22 September)
- Join us @ The Jam House (23 September)
- Congress Commingle (24 September)

How to calculate your delegate fee:

1. Choose the day(s) you wish to attend the Biomedical Science Congress. (There are three full days of discipline specific content from 23 – 25 September plus the option to add the programme of Sunday 22 September).
2. You can add the Sunday programme to your 1, 2 or 3 day registration. Simply add the relevant rate to your booking to arrive at your total delegate fee (including 22 Sept) – see the Congress Delegate Fees table above.
3. It is also possible to attend the programme for Sunday 22 September only – see the Congress Delegate Fees table above.

Helping more members to come to Congress – the Jen Johnson bursary

The Jen Johnson bursary, in memory of Council member Jen Johnson, exists to help more members have the opportunity to attend Congress, the event she was so passionate about.

For Congress 2019, the bursary will provide twenty successful applicants a grant of up to £1,000 (including VAT) to help them attend IBMS Congress.

To be eligible for the Jen Johnson bursary applicants must:

- Be a current IBMS member in the grades of Licentiate, Member or Fellow.
- Be enrolled on an IBMS qualification at the time of application (see T&C point 9).
- Use the bursary towards Congress 2019 delegate fees, accommodation and travel.
- Submit a 500 word supporting statement outlining their motivations for attending Congress and how it will benefit them and their team/workplace.

An application form and how to apply are available on the IBMS website.

THE INTERNATIONAL CONVENTION CENTRE (ICC)

The ICC is within easy reach of Birmingham International airport and in walking distance of Birmingham New Street station.

If travelling by road please use the postcode B1 2EA for your satnav. There is a car park at the venue.

TRAVEL INFO

DISCOUNTED DELEGATE RATES

Act Early to Take Advantage of Discounted Delegate Rates:

Premium Early Deadline: 31 March 2019
Early Booking Deadline: 30 June 2019

Helpline: 01892 779990

Visit congress.ibms.org

BOOKING INFO

VIRGIN TRAIN TRAVEL

Delegates and visitors attending the IBMS Biomedical Science Congress are eligible for a 25% discount on Virgin train travel to the conference when booking an advanced fare.

To find out more and to book your travel to the ICC visit www.virgintrains.co.uk/icc

25% DISCOUNT

THE SOCIAL CALENDAR

The social programme is a valuable opportunity for all attendees to mix in an informal atmosphere.

Sunday 22 September:
'Get Together' Welcome Evening

Monday 23 September:
Join us at the Jam House

Tuesday 24 September:
Congress Commingle

CONGRESS HELPLINE 01892 779990

The IBMS Congress Helpline is here to assist with any delegate issue such as:

Delegate Rates & Discounts
Booking Deadlines
Multiple / Group Bookings
Booking Conditions
Exhibition Only Registration

Or any other question regarding your registration.

GAIN VALUABLE CPD

The full programme of Congress lectures has IBMS recognition for CPD and can be added to your CPD e-Portfolio online.

IBMS Institute of Biomedical Science
Continuing Professional Development

MEMBER ENGAGEMENT

A look at the topline results from this year's IBMS member engagement survey.

The IBMS recently undertook qualitative and quantitative research to understand what members really value about the IBMS, what members engage with and to understand what bonds them to the Institute. We commissioned Research by Design, a leading market research agency in the membership body sector. Over 2,000 members contributed and we would like to say a big thank you to everybody who took part.

We are still digesting the feedback and identifying our next steps, which we will communicate to you throughout the year. However, in the meantime, we wanted to share a few of the main findings with you.

Understanding your challenges

Members identified a multitude of challenges in the profession, with several really standing out.

"I feel IBMS takes the concerns of its members seriously and is a good active voice for the profession"

You told us that the things which were affecting you most were:

Retaining staff (44%), changes due to laboratory mergers/acquisitions (44%), limited opportunities and support for career progression (44%), managing time and workloads (42%) and recruiting qualified staff at the required levels (42%).

Understanding the challenges members face will enable us to develop new initiatives (such as webinars, publications, or events) aimed at supporting you in your workplace.

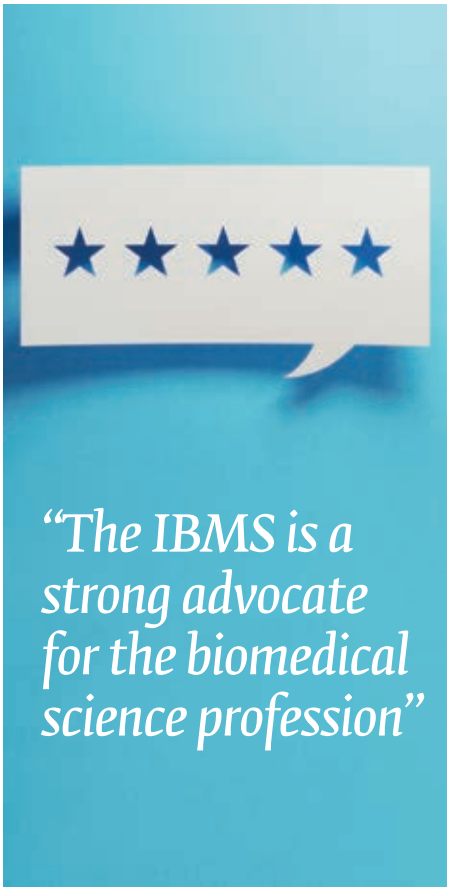
Reasons for joining and staying

Supporting career progression and being part of the professional body for biomedical science are the key drivers to membership for more than six in 10 members. Keeping up to date/enhancing knowledge and accessing IBMS qualifications are also cited by many. The majority of members suggest they are likely to renew their membership, citing the wish to remain part of the appropriate professional body for biomedical science and keep up to date with the profession.

Overall perception

In 2012, when we last undertook a large scale membership survey, 50% of members agreed that we perform very well or well as a membership body. In 2018 this fell slightly to 48%. Whilst we are pleased to have maintained roughly the same levels of satisfaction in very challenging times, it leaves a growing number of members who don't agree. This decline in satisfaction is something that we are committed to turning around and the survey is the first step in helping us identify what we need to change.

Students, Fellows and those members who are involved with Council, committees and advisory panels rated the IBMS more positively, compared to other members.



Value for money

In 2012, 63% of members believed their membership offered value for money.

This fell to 59% during 2018.

The survey indicates that fewer Licentiates and Members working in the NHS perceive their IBMS membership as value for money.

The most popular words to describe us, were "professional" and "informative". Looking forward, members would like to describe us as "supportive" "forward-thinking" and "leaders in their field".

Benefits

The most valued member benefits are qualifications and training (46%), publications (42%), and the CPD scheme (40%). Congress was also well praised as an event that delivers much learning and opportunity to network.

However, the survey demonstrated that a number of members, particularly students and associates, were not aware of our full range of benefits. So we are looking at ways to improve how we communicate our benefits to members, encourage uptake and look at what new benefits we could offer.

CPD scheme

Whilst members value the CPD scheme and rate its delivery positively, proportionally fewer are satisfied with it. Some of the concerns relate to personal preferences for the old points-based system over the current reflective practice system and others were to do with the perceived lack of user friendliness and other technical issues.

As so many members join and renew because of a desire to enhance their knowledge through CPD, it is important to us that we provide a scheme that members are satisfied with. Over the coming months we will be looking in more detail at your feedback and putting in place plans to address your concerns.

One message was very clear to us from your feedback – the majority of members would be interested in more online learning activities that align to their career pathways. Strategy 2020 already makes provision for better use of technology through e-learning, so we will continue to explore options in this area and inform members of our progress and ideas.

Member engagement

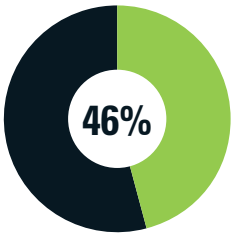
By creating meaningful relationships

SURVEY STATISTICS

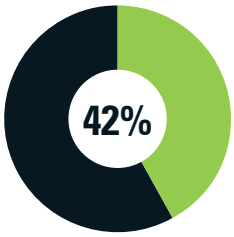
2,000+
The number of members who took part in the survey

42%
said recruiting qualified staff at the required levels was their biggest issue

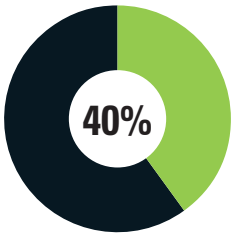
44%
said retaining staff was their biggest challenge



of respondents value qualifications and training



of respondents value publications



of respondents value the CPD scheme

"I am proud to be part of a professional body that supports its members with qualifications, CPD and professional advice"

with our members and providing them with the most relevant services, we hope to ensure our own long-term growth through an increase in renewals and upgrades – with members also more likely to recommend membership to their work colleagues.

This relationship starts when a member joins and includes any further interactions with us or our membership community. Hopefully, by forming these meaningful relationships and providing the best services we also create engaged members who are aware of the profession and its place in the "bigger picture"; people who are passionate and proud to be associated with our organisation.

In the IBMS survey, our member engagement levels came out relatively poor – with fewer members feeling that they could see what we are trying to achieve. Locally and regionally, there appears to be little desire to engage with our IBMS branches. Whilst two fifths of members feel they could get more from the Institute. The bond members have with the IBMS is typically around career progression and CPD. However, nearly half of members suggest all biomedical science students and those working in the profession should be encouraged to join the IBMS, which correlates with the desire that many have for the Institute to act as the voice of the profession.

Over the coming months we will be looking in detail at the membership survey and developing plans aimed at improving our relationships with members and providing them with the level of engagement that they require.

Future priorities

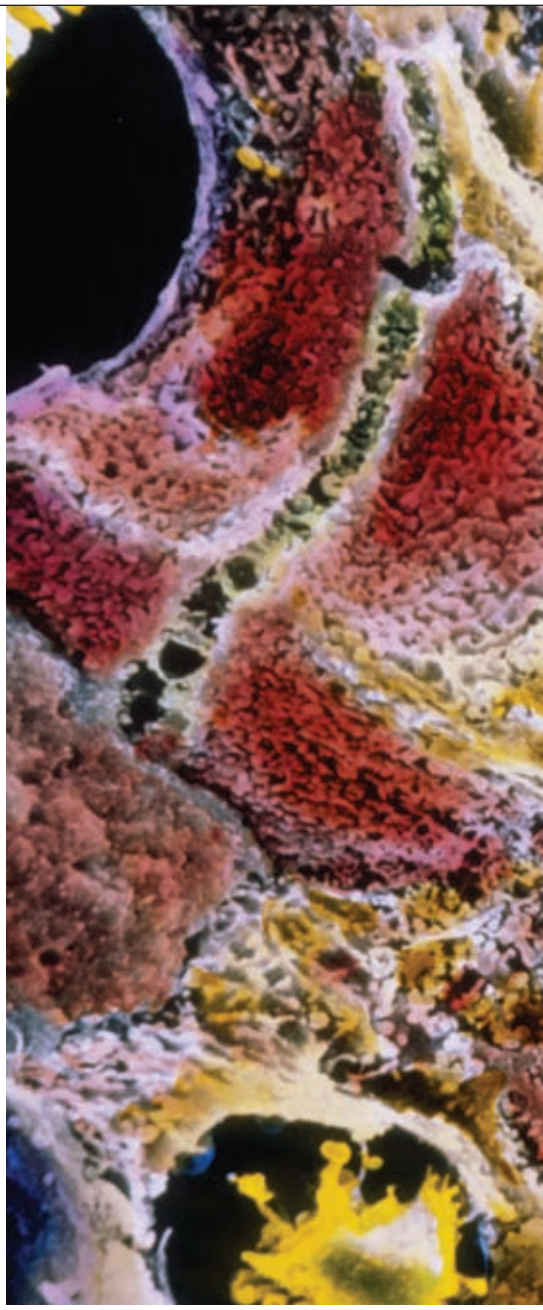
Prioritising the accessibility of qualification paths and professional development opportunities are key priorities for students, associates and licentiates. Providing a high quality CPD scheme is also a priority for Licentiates and Members, whereas acting as a voice of the profession is important to Members and Fellows.

Next steps

Work is already underway to translate the findings into actions. Some of the feedback will be easier to address than others. Council and IBMS staff are currently digesting the feedback and developing plans to ensure that we do more of what we're doing right, and look at ways of improving where we need to. We will communicate these plans of action throughout the coming year via the website, e-newsletter, *The Biomedical Scientist* and through our social media channels.

If you have any questions about the survey, contact Lynda Rigby, Executive Head of Marketing and Membership, via **lyndarigby@ibms.org** BMS

IMAGES: ISTOCK



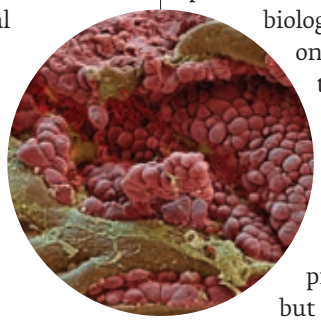
British Journal of Biomedical Science, Issue 1 2019 – synopsis

Editor **Andrew Blann** outlines the content of the latest issue, which opens with a synopsis of all the articles published in 2018, with the subtitle "What have we learned?" This review-type article is the subject of a JBL exercise. Notably, six of the eight published articles involve methods in molecular genetics.

HEPATITIS C

Hepatitis C infection is a serious problem is many parts of the world. El-Bendary *et al* (pages 11-16) studied 1,460 patients, of whom 108 had cleared their infections naturally (i.e. without the need for anti-viral drugs) and 1,446 uninfected family members.

Certain chemokines (such as CCL2 and CCL5) and their receptors (e.g. CCR2) are important in our ability to counter several viral threats, colleagues in Egypt show that certain SNPs in the genes for these molecules are linked not only to those who have succumbed to the infection, but also those who had resisted a chronic infection.



LUNG CANCER

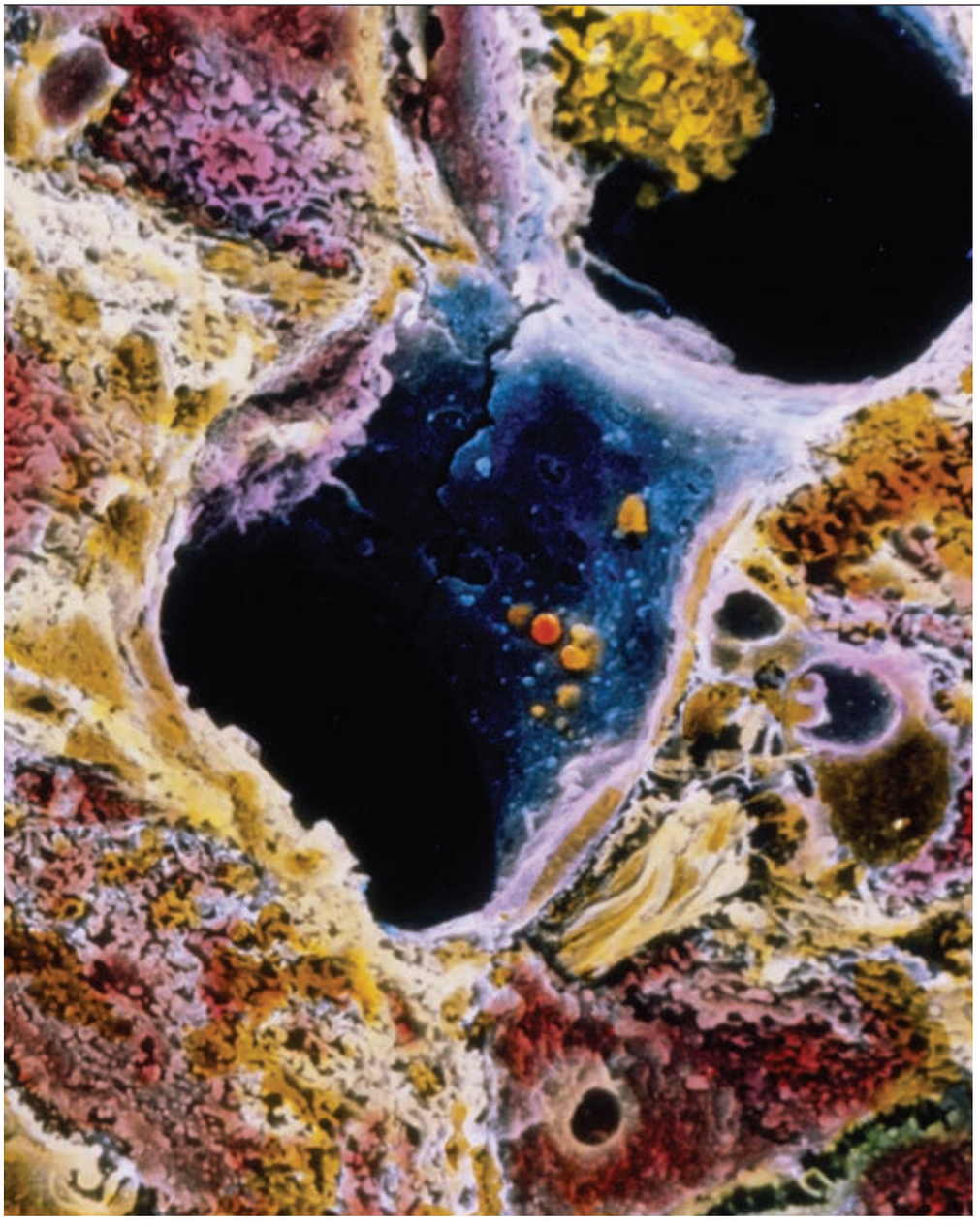
MicroRNAs are slowly but steadily coming to the fore in biomedical science. Wang and colleagues (pages 17-23) demonstrate a role for miR-935 in non-small cell lung cancer. Not only do they report low levels in malignant versus healthy tissue (that are linked to tumour stages and metastases), that these low levels predict five-year survival, but also present a fascinating series of cell biology and animal model data on how this may link directly to the nuclear events in carcinogenesis.

LIVER CIRRHOSIS

Liver cirrhosis brings many problems, such as jaundice, but also encephalopathy. Tan *et al* (pages 24-28) present data indicating that prealbumin, cholinesterase and retinal binding protein can help identify patients at risk of this complication.

SEPTICAEMIA

Although they have their place in our defence from microbes, excessive reactive oxygen species are cytotoxic. Our colleagues Kumar *et al* (pages 29-34) present data on the potential pathogenicity of nitrogen-based toxins in the organ damage often found in patients with sepsis. Whilst their laboratory markers (inducible nitric oxide synthase, nitrite) are at present far from routine, one day they may be so.



IMAGES: SCIENCE PHOTO LIBRARY

IMMUNE SYSTEM

The immune system may be divided into the adaptive and the innate. An important part of the latter are toll-like receptors (TLRs), some of which initiate specific anti-viral responses, examples being TLR3 and TLR4. Sghaier and colleagues (pages 35-41) hypothesised that variants in the genes for these TLRs would link to infection with hepatitis B and C viruses (HBV, HBC), and their effect on the inevitable liver disease that follows.

They found that variants in *TLR3* and TLR4 are linked to different aspects of the infections, liver cirrhosis and hepatocellular carcinoma, giving weight to the value of these SNPs as biomarkers. As *Klebsiella pneumoniae* is a recognised pathogen with an increasing history of antibiotic resistance, rapid and accurate detection is important. Dou *et al* (pages 42-45) present data on a new multiplex method, focussing on ribosomal RNA, to improve both sensitivity and specificity for the diagnosis of potential infections.

SINGLE NUCLEOTIDE POLYMORPHISMS

The issue concludes with two other *In Brief* reports. Shasttiri *et al* (pages 46-48) show that a certain SNP in *KIF14* (Kinesin family member 14) is linked to breast cancer, and to the clinical stage and histological grade of the disease. Their data suggests that this SNP may be useful in determining those at greatest risk of most severe disease, and so warrant focussed clinical care. Similarly, Eba and colleagues (pages 49-51) present data on two SNPs in the genes for chemokine stromal derived growth factor and a signal-tranduction regulatory G protein in coronary artery disease. Presence of certain variant SNPs seem to protect/predispose to this condition, but not to the extent of the disease.

Notably, six of the eight published articles involve methods in molecular genetics

CPD

One of these articles is the subject of a Journal-based learning exercise for those seeking to improve their continuing professional development profile. BMS

Andrew Blann is the Editor of the *British Journal of Biomedical Science*

HOW TO... MAINTAIN ACCREDITATION

Ben Courtney, UKAS Accreditation Manager, and **Delia Geary**, UKAS Technical Manager, give practical guidance for compliance with ISO 15189:2012 and maintaining accreditation.

The deadline for transitioning from CPA accreditation to ISO 15189:2012 accreditation by UKAS was set for the end of September 2018. Over 97% of previously CPA-accredited laboratories transitioned in time, with most of the handful of laboratories that were not able to meet the deadline having since progressed. This was a monumental effort by all involved and the laboratories deserve huge credit for their efforts.

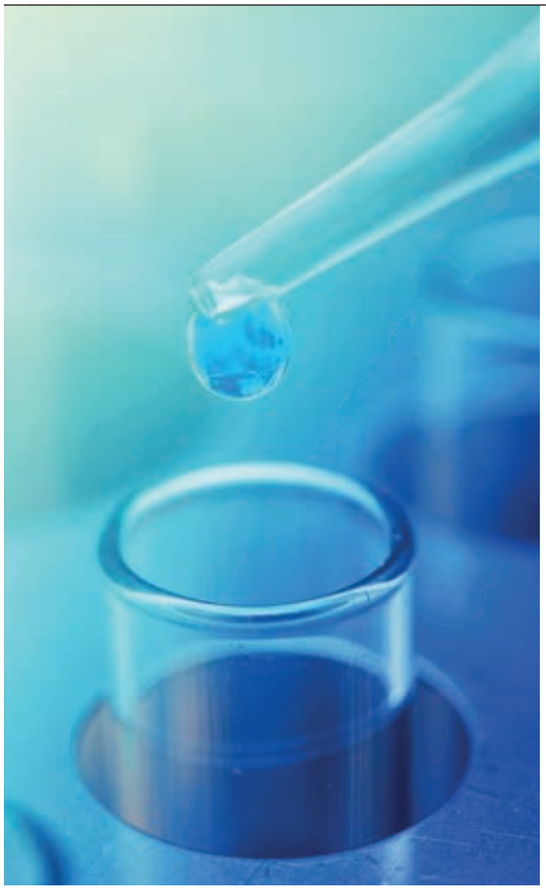
As the vast majority of medical labs in the UK are now UKAS accredited, attention turns to how laboratories can ensure they successfully maintain accreditation, particularly in light of on-going changes proposed by NHS England and NHS Improvement. There are broad themes of non-conformity when maintaining/extending or making changes to accreditation; whilst there are still trends to technical issues, primarily the risk to a laboratory's accreditation is more around organisational issues, understanding of the accreditation process and extensions to scope (ETS).

Organisational issues

With sustainability and transformation plans come ETS and changes of legal entity. UKAS has published *Technical Bulletin - Medical Laboratories: Maintaining UKAS Accreditation During Periods of Change,* which is available to download from the UKAS website.

Advice from UKAS would be to inform their Assessment Manager of any change at the earliest opportunity. By doing so, UKAS can establish the impact and whether an assessment is required – whether this involves a change to the plan of the next surveillance visit or the need to apply for an extension to scope. Using changes to legal entity as an example, informing UKAS of the change well in advance means that UKAS can perform the assessment before the change is due to go live, providing the

IMAGES: ISTOCK/SHUTTERSTOCK



laboratory with time to clear any findings raised during the assessment with no break in accreditation. Critical to a change of legal entity is ensuring that the organisation to whom accreditation is being transferred is prepared to accept all contractual, legal, financial and other obligations which relate to both the current and historic accredited activities. Where this can be confirmed, UKAS will request that the relevant application form is submitted (available from the UKAS website) accompanied by the supporting evidence requested.

Accreditation process

The objective of surveillance visits is for UKAS to ensure an accredited laboratory is meeting requirements for accreditation on an ongoing basis. UKAS is required to advise the laboratory when they are due for an assessment visit (called a laboratory's profile month). Assessments must take place in or before this month and only in exceptional circumstances can this be delayed. Although UKAS tries to find dates that are mutually acceptable, laboratory staff leave cannot be regarded as an exceptional circumstance. An objective of accreditation is to provide continued confidence in accredited laboratories and it makes sense that such confidence can be demonstrated to be maintained when laboratories are at a perceived weakness (i.e. low staff numbers). As such, staff being on leave or sick by itself would not be justification for postponing a visit.

The most effective surveillance visits are those where the assessment team is well informed prior to an assessment, which is why pre-visit documentation is requested. Providing information in a timely way ensures an appropriate assessment that is most likely to add value. It follows that any changes, however trivial they may seem, are made clear to the Assessment Manager at the earliest opportunity so that the assessment can be suitably planned. As part of the UKAS Agreement, laboratories are required to inform UKAS of such changes and a judgement can be made as to whether (at a minimum) the focus of the assessment needs to be changed, or whether an ETS is required.

Extensions to scope

A laboratory's schedule of accreditation is the official and detailed statement of activities for which the accredited body has accreditation. If a laboratory requires its schedule to be changed or updated, UKAS offers the ETS process.

To help clear up any confusion as to what is and what is not an ETS UKAS will shortly be issuing guidance (available from the UKAS website) as to what constitutes an ETS. Ultimately though, Assessment Managers are there to advise on matters such as this and it is worthwhile having this discussion regarding a change (however small) to ensure that accreditation is not put at risk.

Technical Issues

Whilst each organisation and UKAS assessment visit is different, there are identifiable themes in technical findings raised at assessments; in particular, measurement uncertainty, traceability and verification of assays have consistently been areas to improve on throughout the CPA to ISO 15189 transition process and beyond. Best advice for laboratories would be to regularly review each of these areas to evaluate if changes need to be made and to perform this review based on clinical risk. For instance, whilst measurement uncertainty must be reviewed at regular intervals, it makes sense to conduct an additional review if there was a significant change that brought the validity of any assigned measurement uncertainty values into question, such as a change of skill mix in the laboratory.

Summary

Whilst it is sometimes useful to discuss with other laboratories the various approaches they take to meet accreditation requirements, it is understood that this can sometimes be commercially confidential information.

It's also worth bearing in mind that each organisation has its own unique set of circumstances, meaning that the 650 different UKAS ISO 15189 accredited laboratories could be satisfactorily meeting requirements in 650 different ways.

The key to maintaining accreditation is close liaison with the Assessment Manager and awareness of risk. Any change may risk the scope and indeed status of a laboratory's accreditation and it is always worthwhile seeking reassurance from UKAS as to what the boundaries are. BMS

MY IBMS NEWS

IBMS COUNCIL ELECTIONS

YOUR CHANCE TO SHAPE THE FUTURE OF THE IBMS

The IBMS prides itself on being a professional body that is run by its members for its members. It is currently looking for corporate members who will use their professional knowledge, leadership skills and experience to set the strategic direction of the Institute, shaping its future and ensuring it continues to meet its members' needs.

Nominations for corporate members to participate in the 2019 elections to Council are now invited, as there are vacancies for two National and five Regional members as follows:

National Members

Two vacancies - three-year term

Regional Members

Five vacancies - three-year term

- Irish Region
- Scotland
- South West
- West Midlands
- Yorkshire.

→ Find out more about becoming an IBMS Council member and fill in the online application form at www.ibms.org/elections. Deadline for return of nomination forms: 5.00 pm on Friday 1st March 2019.

PRESIDENT'S PRIZES

Continuing the coverage of winners from around the country

COVENTRY UNIVERSITY

Waleed Abdi was awarded the IBMS President's Prize at Coventry University in November.

His interest in improving healthcare services and integrated care modules led him to successfully apply for the highly competitive NHS Graduate Management Training Scheme in his final year at Coventry receiving a job offer in April. Waleed is currently based at University Hospitals Coventry and Warwickshire) for the duration of the scheme and will also undertake a MSc in Healthcare Management at the University of Birmingham.

Pictured with Waleed are Yvonne Elliott, Coventry University, Gary Reynolds – Chair of the IBMS Birmingham Branch and Ceri Harrison (Best Developed Regional Placement Student).

JEN JOHNSON BURSARY

Apply for funding to attend congress

The Jen Johnson Bursary aims to fulfil the late Council Member's desire for more members to be able to attend IBMS Congress.

It is awarded in memory of Jen Johnson, who sadly passed away in March 2016.

The bursary was launched in 2017 and provided 12 successful applicants with a grant up to £1,000 to attend IBMS Congress that year.

For IBMS Congress 2019, due to the high-level of applicants previously received, the number of bursaries has been increased to provide grants for up to 20 people.

Jen dedicated 14 years to the IBMS Council, where she served as Chair of Membership Committee and Honorary Treasurer. She was awarded IBMS Life Membership for her outstanding contribution to the organisation and profession.

Applicants are asked to submit a short statement that describes why winning the Jen Johnson Bursary and attending Congress is important to them.

Applications must be made online and the deadline is Friday 29 March 2019.

→ bit.ly/BS_Bursary

BIRTHDAY HONOURS

IBMS MEMBER IS HONOURED

IBMS member Jeanie Martin is a biomedical scientist in the histocompatibility and immunogenetics laboratory at Belfast City Hospital.

In December, she was awarded an MBE by Prince William the Duke of Cambridge at Buckingham Palace, for the Queen's 2018 Birthday Honours.

Jeanie began work in 1964 as a Scientific Assistant in veterinary research.

She gained a solid knowledge of all biomedical science disciplines before moving to Northern Ireland Blood Transfusion Service to specialise in haematology and blood transfusion.

She began working in tissue typing in 1976 and is proud to have been involved in lab work providing a 24-7 service from 1977 until 2002.

Most of this time was during the Troubles conflict in Northern Ireland.

Jeanie said: "I can appreciate that in Northern Ireland in the 1970s and 80s, people were coming to work through roadblocks, and bomb scares were common.

"These problems lasted for quite a few years, but people carried on and went to work as usual, especially NHS staff. Patients need our help, and that's what you remember each day."

Jeanie became a lab manager in 1989. After a brief retirement in 2011, aged 65, she returned to work initially in a temporary capacity but then as interim Clinical Lead of the laboratory, where her expert knowledge of tissue typing has been essential.

A new head has been appointed and Jeanie will be leaving laboratory work in 2019 after 54 years.

PHE VACANCY

Virology medical editor

Public Health England (PHE) is looking for a second medical editor to edit UK Standards for Microbiology Investigations (SMIs) for virology.

The post is an honorary appointment with a three-year term of office and PHE is seeking applicants from the IBMS membership.

Applicants should have experience in editing scientific literature and currently working within clinical microbiology.

They will be expected to have an understanding of clinical or medical microbiology and the ability to provide editing across a wide range of diagnostic microbiology.

Applicants should be able to demonstrate the ability to edit a number of UK SMIs to tight deadlines. The editor will work directly with the standards unit team.

The job description, person specification and further information have been published online. The deadline for applications is 15 February.

→ **bit.ly/BS_MedEd**

NHS FUTURE

IBMS comments on 10-year plan

The IBMS has responded to NHS England's 10-year plan to modernise services.

The 136-page plan was published in January after ministers announced that the budget will be increased by £20bn a year by 2023.

The report states that digital technology will be used to support the NHS in delivering high-quality specialist care more efficiently.

It says: "By 2021, pathology networks will mean quicker test turnaround times, improved access to more complex tests and better career opportunities for healthcare scientists at less overall cost."

It also adds that by 2023 new diagnostic imaging networks will have been introduced that will enable the rapid transfer of clinical images.

IBMS President Alison Geddis said: "Biomedical science has a central role to play in delivering the high quality pathology services that underpin the NHS Long Term Plan.

"The IBMS is encouraged that cancer diagnosis is at the forefront. However, we call for the government to ensure that other, equally important, diagnostic pathways are considered. The right tests performed at the right times can greatly enhance patient outcomes and lead to a healthier population.

"Whilst we welcome any significant funding for the NHS in England, we hope that the government will address our members' fears that an increasing workload without the corresponding increase in staff numbers puts more pressure on biomedical science staff working in laboratories."

EVENTS AND TRAINING COURSES

A wide range of training courses, CPD and local events and activities is listed below. Members are advised to contact organisers for further information. A full list is available on the IBMS website.

DATE	TITLE	VENUE CONTACT
February		
4 Feb-1 Mar	**Introductory course in gynaecological cytology**	Harrow I LNWH-tr.lrctcbooking@nhs.net
11-15 Feb	**Introduction to the Principles and Practices of working safely at ACDP Containment Level 3**	Porton Down I nadp.training@phe.gov.uk
13 Feb	**UK NEQAS Cellular Pathology Technique tissue preparation techniques workshop**	Gateshead I chantell.hodgson@nhs.net
14 Feb	**UK NEQAS Cellular Pathology Technique tissue morphology and recognition workshop**	Gateshead I chantell.hodgson@nhs.net
27 Feb	**UK NEQAS Reproductive Science 24th Annual Participants' Meeting**	Manchester I repscience@ukneqas.org.uk
March		
5 Mar	**POCT governance and quality event**	Reading I info@thornhillhealthcareevents.co.uk
6-7 Mar	**Beginners immunohistochemistry course**	Sheffield I l.baxter@sheffield.ac.uk
12 Mar	**UK NEQAS Cellular Pathology Technique Mohs workshop**	Gateshead I chantell.hodgson@nhs.net
13 Mar	**UK NEQAS Cellular Pathology Technique BMT workshop**	Gateshead I chantell.hodgson@nhs.net
14 Mar	**UK NEQAS Cellular Pathology Technique renal workshop**	Gateshead I chantell.hodgson@nhs.net
19-21 Mar	**BMS/cytoscreener update course in gynaecological cytology**	Harrow I LNWH-tr.lrctcbooking@nhs.net
21-22 Mar	**2019 Spring Conference: Global views, local problems: Innovative solutions to AMR and infection challenges**	Birmingham I ecarruthers@bsac.org.uk
29 Mar	**Blood Sciences short course**	London I c.ferrier@westminster.ac.uk
April		
2-3 Apr	**European Histopathology Forum**	Leamington Spa I michael.2.fulleylove@gsk.com
5 Apr	**Blood Sciences short course**	London I c.ferrier@westminster.ac.uk
7-11 Apr	**Microbiology Society Annual Conference 2019**	Belfast I conferences@microbiologysociety.org
8-12 Apr	**Pre-exam course in gynaecological cytology**	Harrow I LNWH-tr.lrctcbooking@nhs.net
8-12 Apr	**BMS/cytoscreener update course in gynaecological cytology**	Harrow I LNWH-tr.lrctcbooking@nhs.net
10 Apr	**UK NEQAS Cellular Pathology Technique immunocytochemistry staining beginners workshop**	Newcastle-upon-Tyne I chantell.hodgson@nhs.net
11 Apr	**UK NEQAS Cellular Pathology Technique immunocytochemistry intermediate/trouble shooting workshop**	Newcastle-upon-Tyne I chantell.hodgson@nhs.net
12 Apr	**Blood Sciences short course**	London I c.ferrier@westminster.ac.uk
13 Apr	**Biomed online learning courses 2019**	Online I c.e.ronan@gre.ac.uk

DATE	TITLE	VENUE CONTACT
17 Apr	**Medical laboratory assistant - introductory course**	Harrow I LNWH-tr.lrctcbooking@nhs.net
May		
2-3 May	**Focus 2019**	Glasgow I focus2019@acb.org.uk
8 May	**UK NEQAS Cellular Pathology Technique non-gynae cytology beginners/refresher workshop**	Gateshead I chantell.hodgson@nhs.net
9 May	**UK NEQAS Cellular Pathology Technique non-gynae cytology intermediate workshop**	Gateshead I chantell.hodgson@nhs.net
10 May	**Blood Sciences short course**	London I c.ferrier@westminster.ac.uk
17 May	**Blood Sciences short course**	London I c.ferrier@westminster.ac.uk
24 May	**Haematinics and white blood cell disorders**	London I c.ferrier@westminster.ac.uk
June		
6 Jun	**IBMS Registration Portfolio Workshop**	London I c.ferrier@westminster.ac.uk
19 Jun	**UK NEQAS Cellular Pathology Technique special staining beginners/refresher workshop**	Newcastle upon Tyne I chantell.hodgson@nhs.net
20 Jun-20 Jul	**UK NEQAS Cellular Pathology Technique specialist workshop A**	Newcastle upon Tyne I chantell.hodgson@nhs.net
July		
8-12 Jul	**Electron Microscopy Summer School**	Leeds I katejermey@rms.org.uk
15-17 Jul	**Light Microscopy Summer School**	York I katejermey@rms.org.uk
18-19 Jul	**Getting the most from your confocal course**	York I katejermey@rms.org.uk
26 Jul	**Train the Trainer**	London I c.ferrier@westminster.ac.uk
August		
7 Aug	**UK NEQAS Cellular Pathology Technique tissue preparation techniques workshop**	Gateshead I chantell.hodgson@nhs.net
8 Aug	**UK NEQAS Cellular Pathology Technique tissue morphology and recognition workshop**	Gateshead I chantell.hodgson@nhs.net
8 Aug	**UK NEQAS Cellular Pathology Technique non-gynae cytology beginners/refresher workshop**	Gateshead I chantell.hodgson@nhs.net
9 Aug	**UK NEQAS Cellular Pathology Technique non-gynae cytology intermediate workshop**	Gateshead I chantell.hodgson@nhs.net
14 Aug	**UK NEQAS Cellular Pathology Technique special staining beginners/refresher workshop**	Newcastle upon Tyne | chantell.hodgson@nhs.net
15 Aug	**UK NEQAS Cellular Pathology Technique specialist workshop B**	Newcastle upon Tyne I chantell.hodgson@nhs.net
September		
4 Sep	**UK NEQAS Cellular Pathology Technique immunocytochemistry staining beginners workshop**	Newcastle upon Tyne I chantell.hodgson@nhs.net
5 Sep	**UK NEQAS Cellular Pathology Technique immunocytochemistry intermediate/trouble shooting workshop**	Newcastle upon Tyne I chantell.hodgson@nhs.net
9-13 Sep	**Flow Cytometry course**	York I katejermey@rms.org.uk
October		
15 Oct	**UK NEQAS Cellular Pathology Technique Mohs workshop**	Gateshead I chantell.hodgson@nhs.net
16 Oct	**UK NEQAS Cellular Pathology Technique BMT workshop**	Gateshead I chantell.hodgson@nhs.net
17 Oct	**UK NEQAS Cellular Pathology Technique renal workshop**	Gateshead I chantell.hodgson@nhs.net
November		
13 Nov	**UK NEQAS Cellular Pathology Technique non-gynae cytology beginners/refresher workshop**	Gateshead I chantell.hodgson@nhs.net
14 Nov	**UK NEQAS Cellular Pathology Technique Non Gynae Cytology Intermediate workshop**	Gateshead I chantell.hodgson@nhs.net

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JOURNAL-BASED LEARNING EXERCISES

IBMS CPD

Please select your choice of correct answers and complete the exercises online at: **www.ibms.org/cpd/jbl**

DEADLINE WEDNESDAY 1 MAY 2019

The first case of severe acute hemolytic transfusion reaction caused by anti-Sc2.

Lemay AS, Tong TN, Branch DR *et al. Transfusion* 2018; **58** (11): 2506–12. Doi:10.1111/trf.14867. Assessment No: 020219

01	When first described, anti-Sc1 was named anti-Bu^a.
02	The allelomorph to the antigen Bu^a was originally named Sm.
03	Sc2 and Sc4 are both low-prevalence antigens. Sc1, Sc3, Sc5, Sc6 and Sc7 are all high-prevalence antigens.
04	The *ERMAP* gene is located on chromosome 1q, adjacent to the *RH* genes.
05	Alloanti-Sc1 and -Sc2 are usually IgG, and fix complement.
06	This example of anti-Sc2 was unusual in that it induced robust phagocytosis in a monocyte monolayer assay (MMA).
07	The patient had shown possible signs of a haemolytic transfusion reaction (HTR) nine years prior to this episode, and the presence of an anti-Sc2 was identified two years after that.
08	Re-crossmatch of all the units transfused at the time were compatible.
09	Prior to the suspected HTR at the age of 18, the patient experienced several febrile, non-haemolytic transfusion reactions.
10	At the age of 20, four units of blood were crossmatched for the patient, and one was found to be incompatible. This unit was found to be Sc2+, and the patient's plasma also reacted with two other examples of Sc2+ red cells.
11	There have been two reported cases of HDFN caused by anti-Sc2, and in both cases a transfusion was required by Day 2 after the birth.
12	The Reference Laboratory tested this patient's plasma against a range of what they described as low-prevalence antigens, but did not originally include an example of Sc2+ red cells.
13	There was an unanticipated re-exposure to the donor who had caused the reaction nine years earlier, and a nearly identical response was witnessed, with a positive serological reaction.
14	In the MMA, there is no higher level of phagocytosis in the proinflammatory state.
15	Anti-Sc7 has been associated with a mild delayed HTR.
16	On this occasion, when the patient had the severe acute HTR, she had received less than 50 mL of blood.
17	The normal reference given in the paper for unconjugated bilirubin was <14 mmol/L.
18	At age 21 years, the patient transferred to an adult facility with notes on anti-Sc2 having been previously detected, but without any details on the previously experienced transfusion reactions.
19	The MMA used a cut-off of 5 phagocytic index as a measure of potential for clinical significance.
20	The adult facility looking after the index patient had five other patients with anti-Sc2. All had been heavily transfused, but none had a history of an HTR due to their anti-Sc2.

Grading of prostate cancer: a work in progress.

Kweldam CF, van Leenders GJ, van der Kwast T. *Histopathology* 2019; **74** (1): 146–60. DOI: 10.1111/his.13767. Assessment No: 020719

01	In order for a grading system to be successful, four criteria must be met.
02	Histopathological grading of prostate cancer remains the strongest prognosticator of disease recurrence and death.
03	The capture of the complex architectural heterogeneity of prostate cancers in five drawings by Gleason proved to be a very attractive concept for pathologists.
04	Initially, prostate cancers were mainly graded using the universal four-tiered Broders system published in 1916.
05	Although several studies demonstrated the prognostic potential of cytonuclear grading, the lack of interobserver agreement and its sensitivity to variations in pathology processing reduced its routine applicability.
06	It was decided during the 2014 International Society of Urological Pathologists (ISUP) consensus conference to consider any cribriform pattern as a Gleason grade 3.
07	Several studies demonstrated the prognostic potential of cytonuclear grading. The interobserver agreement and its sensitivity in pathology increased its routine applicability.
08	The Gleason grading system has been modified twice during two ISUP consensus conferences.
09	In 2005, the ill-formed gland pattern was added to Gleason grade 4.
10	By 2000, Gleason patterns 1 and 2, typical of low-grade transition zone carcinomas as encountered in transurethral resections, were hardly reported any more in biopsies.
11	Notably, among Gleason score 8 cancers, the question of whether the highest Gleason grade was 3 + 5 versus 4 + 4 proved only mildly predictive of recurrence.
12	Grading of prostatectomy specimens follows slightly different rules compared to biopsy grading.
13	In grade 3 Gleason grading, the density of the neoplastic glands is defined by both the amount of intervening stroma or presence of intervening benign glands.
14	Gleason grade 4 subpatterns include papillary pattern lined by columnar tumour cells, complex fused glands with irregular cribriform areas, and abortive glands consisting of structures with glandular shape, but lacking a lumen.
15	Gleason grade 5 pattern represents carcinoma areas always detectable at low power (4x magnification).
16	Prostate cancer includes the variant classical ductal (endometrioid) carcinoma.
17	The most common grade 5 patterns include comedocarcinoma, showing a necrotic central plug surrounded by fused gland and solid area of cells with signet ring-like appearance.
18	It has not been common practice to be very conservative when assigning a Gleason grade 5.
19	Recognition of intraductal carcinoma of the prostate (IDC-P) as a strong independent prognosticator has taken several years.
20	Sauter and colleagues developed an 'integrated quantitative' Gleason score (IQ-Gleason) which was based entirely on percentages of Gleason patterns 3, 4 and 5.

REFLECTIVE LEARNING

01	With more and more transfusion laboratories using either electronic issue or an "immediate spin" crossmatch, how concerned should we be about missing antibodies to low-prevalence antigens? Give reasons for your decision.	01	Reflect on the potential development of screening in prostate cancer.
02	Why is the carrier molecule (human erythrocyte membrane-associated protein), which is an erythroid transmembrane adhesion/receptor protein, considered to be part of the immunoglobulin superfamily?	02	Review the opportunities immunocytochemistry offers.

HERE TO HELP

CELEBRATING SUCCESS

Chris Ward, IBMS Head of Examinations, celebrates some of the achievements of members who have obtained Institute qualifications in the last year.

The names shown on the opposite page are candidates who have passed our higher qualifications, but we also want to take this opportunity to send our congratulations to anybody who successfully passed an IBMS qualification during 2018. This includes over 300 who passed the Specialist Portfolio in their chosen discipline and the more than 150 who passed the Certificate of Expert Practice in Leadership and Management, Quality Management, Molecular Pathology or Training.

Candidates and managers alike recognise that Institute qualifications aid professional and career development opportunities and, in these times of financial constraint, are an affordable, flexible way of supporting staff, especially in comparison to academic qualifications.

This is reflected by the fact that last year saw an increase in uptake across our wide-ranging portfolio of qualifications that are suitable for practising biomedical scientists who are at differing stages in their careers, from those who are just starting out, to those who are (or are endeavouring to be) advanced and consultant practitioners.

Our qualifications encourage critical thinking, questioning attitude, reflective practice and the development of greater autonomy and are both developed and assessed by IBMS expert practitioners and

academics in collaboration with, where appropriate, colleagues from the Royal College of Pathologists.

They represent a considerable commitment of both time and effort and demonstrate that those who have successfully passed have a comprehensive understanding of complex scientific, technical and managerial subjects.

Those who undertook them will recognise that achievement of an Institute professional qualification provides peer and as well as wider professional recognition.

It demonstrates that they can apply their knowledge, competence and personal autonomy, as well as transferable skills and qualities in their chosen discipline that may not be easily demonstrated through an academic qualification.

Successful achievement of the Specialist Diploma allows individuals to upgrade to Member (MIBMS) status. Success in the Higher Specialist Diploma, the Advanced Specialist Diploma (ASD) in Histopathology Reporting or the ASD in Specimen Dissection or Non-Gynaecological Cytology, along with the pre-requisite Diploma of Expert Practice (DEP) qualification, provides eligibility for upgrade to the highest level of Institute membership, Fellowship (FIBMS) status.

Those who are successful in these qualifications represent the future leaders of the biomedical science profession. Several individuals who have gained the prestigious FIBMS status through the achievement of the HSD are now members of one of the eight Institute advisory panels which, as was described in last months' edition of the *The Biomedical Scientist*, play an invaluable role in supporting the work of the Institute.

Congratulations to all those who passed an Institute qualification in the last 12 months. BMS

If you want more information on any IBMS qualifications, visit ibms.org. For information about upgrading your membership, contact mc@ibms.org

EXAMINATION PASS LIST 2018

The following members were successful in Institute examinations during 2018:

Higher Specialist Diploma

Cellular Pathology

Aneela Arshad - Queen Victoria Hospital, East Grinstead
Louise Greenhalgh - Lincoln County Hospital
Catherine McNulty - Wythenshawe Hospital, Manchester
Matthew Wickens - North West London Pathology.

Clinical Chemistry

Andrew Connor - Diana Princess of Wales Hospital, Grimsby

Haematology

Sheetal Karunanandarajah - NEQAS Haematology (Watford)

Immunology

Sarah Gibbs - St Peter's Hospital, Chertsey
Emma Sarhani - South of Tyne and Wear Pathology

Leadership and Management

Olivia Geling - Royal Surrey County Hospital, Guildford
Katie Kitchman - Hull Royal Infirmary
Gordon Marr - Western General Hospital, Edinburgh

Medical Microbiology

Kelly Olliver - Royal Sussex County Hospital, Brighton
Helen Penycate - Royal Gwent Hospital
Craig Pownall - Noble's Hospital, Isle of Man
Owain Dafydd Thomas, University Dental Hospital, Cardiff

Transfusion Science

Emily Brock - Wythenshawe Hospital, Manchester
Karen Fitzpatrick - Antrim Area Hospital
Helen Owens - NHSBT Newcastle
Ola Yahaya - University Hospitals of Morecambe Bay NHS Trust

Certificate of Expert Practice

Medical Microbiology - Mycology

Rebecca Jones - Queen Alexandra Hospital, Portsmouth

Diploma of Expert Practice

Histological Dissection

Cassandra Cretney - Whiston Hospital
Sarah De-Vaux Balbirnie - Ipswich Hospital
Catherine Dunning - Singleton and Morriston Hospitals, Swansea
Fiona Hedley - University Hospitals of Leicester NHS Trust
Marta Jamroziak - St Mary's Hospital, Paddington
Joanne Keating - Great Ormond Street Hospital
Sarah Lee - St George's Hospital, Tooting
Danielle McCluskey - Manchester Royal Infirmary
Marianne McInotosh - Queen Elizabeth Hospital, Glasgow
Norma McKay - University Hospital, Crosshouse
Claire Pace - Maidstone Hospital
Syed Rassool - Addenbrooke's Hospital, Cambridge
Gillian Robson - Victoria Hospital, Kirkcaldy
Nicholas Southgate - West Herts NHS Trust, Hemel Hempstead

Immunocytochemistry

Sharon Anderson - The Royal London Hospital
Simon Heath - Royal Sussex County Hospital, Brighton

Non-Gynaecological Cytology

David Cook - Epsom and St Helier Hospital NHS Trust, Carshalton
Leonie Glinski - Royal Cornwall Hospital, Truro
Kavitha Knight - Queen's Hospital, Romford
Tendai Mangoma - John Radcliffe Hospital, Oxford
Sarah O'Flaherty - Cheltenham General Hospital
Dhaval Pandya - Independent Pathology Partnership, Basildon
Claire Plank - Watford General Hospital
Sarah Reeves - William Harvey Hospital, Ashford
Sara Shakes - Dewsbury District Hospital
Winnie Tang - Watford General Hospital
Karen Williams - Worcester Royal Hospital

Diploma of Specialist Practice

Annabelle Pope - Chaucer Hospital, Canterbury

Advanced Specialist Diploma

Cervical Cytology

Karen Patterson - Antrim Hospital
Chris Teather - Leeds Teaching Hospital
Antonia Tweed - Leeds Teaching Hospital

Specimen Dissection – Lower GI Pathology

Rhian Bowden - ABMU Health Board
Maalaviya Kumanan - Queen's Hospital, Romford

Histopathology Reporting

Sarah Gibson - Royal Victoria Infirmary, Newcastle Upon Tyne
Kathryn Kay - Sheffield Teaching Hospitals
Preeti Kothari - Colchester Hospital

Falkland Islands Government

BIOMEDICAL SCIENTIST – MICROBIOLOGY

The Falkland Islands Government is looking for new colleagues to join its existing team of friendly and experienced Health Service professionals.

Would you like to work in a multidisciplinary laboratory as a Biomedical Scientist in a unique and vibrant community in a stunning natural environment? If so, come and join our friendly team of experienced health service professionals in the beautiful Falkland Islands.

The role will involve investigating and interpreting growth from the full range of clinical specimens received and participating in the laboratory's quality assurance and quality control activities as well as contributing to staff training in microbiology.

THE PERSON

We are looking for someone with:

- **A BSc in Biomedical Sciences or related subject**
- **Health and Care Professions Council (UK) registration**
- **An Institute of Biomedical Science Specialist Diploma in Medical Microbiology (or equivalent)**
- **At least 3 years' experience working in a clinical Microbiology laboratory**
- **Familiarity with laboratory based quality management systems**
- **Experience of working with LIMS systems within a laboratory framework**

How to Apply

For more information on the post and how apply online to join our team in a unique and breath-taking location, with penguins, dolphins and the wilderness just next door to your office, **please visit our recruitment website: www.jobs.gov.fk**

Applications close at 20.00 UK time on 8th February 2019.

Applicants seeking secondment or interchange opportunities are welcome to apply.

MY LAB

REMOTE AND RURAL HEALTHCARE

Chloe Clapham, Clinical Laboratories Quality Manager at Balfour Hospital, gives a guided tour of her Orkney lab.

Orkney consists of over 70 islands off the north-eastern tip of Scotland. Famed for its breath-taking wildlife, unspoilt beaches, wild weather, and Neolithic heritage, Orkney is a prime example of "remote and rural" healthcare.

The multidisciplinary laboratory, located at Balfour Hospital, is staffed by a dedicated and flexible team of seven biomedical scientists and four medical laboratory assistants, who work to maintain a continual service in ever-changing and difficult circumstances. Simple tasks – such as sample transport, ordering, recruitment and service engineer visits – are a few examples of how this remote locale adds an additional layer of complexity to providing a diagnostic service.

Serving a population of around 22,000, the laboratory provides biochemistry, haematology and microbiology services to the hospital, as well as GP surgeries (six on Orkney mainland and nine on the islands scattered towards the horizons).

Daily samples are received via small passenger ferries and even smaller propeller aircraft. In the dark winter months travel disruptions are the norm, with flights grounded due to high winds, ferries cancelled due to stormy seas and the closure of the Churchill Barriers, which link the south-eastern islands of South Ronaldsay and Burray to the main island. When the wind does drop, thick fog can roll in, grounding flights and cutting the islands off from the Scottish mainland.

Measures are in place to actively ensure that the service is maintained. Orders are placed far in advance as prolonged delays or re-ordering can result in service limitations, such as running one analyser to conserve reagents, or extending on-call services in the event of a reduced point-of-care repertoire.

In extreme cases, samples may have to be referred to Aberdeen, 180 miles away, by aircraft. Consequently, staff receive additional training in order to troubleshoot and repair analyser problems. However, since the implementation of a Managed Service Contract in 2016, duplicate analysers and a new point-of-care service provide much needed resilience to lessen these risks.

As a multidisciplinary service, all staff receive comprehensive on-site training in biochemistry and haematology. With a staff base largely consisting of non-transfusion specialities, the laboratory delivers a pioneering blood transfusion service whereby samples are sent via air to the Scottish National Blood Transfusion Service (SNBTS) in Aberdeen.

This can result in delays ranging from a few hours to two days, and once SNBTS staff have tested samples, blood components are electronically issued on site by Orkney biomedical staff. Approximately 50 samples a month are referred for testing and the laboratory holds group O blood only, with a total of 14 O negative, 14 O positive and four emergency O negative units. There is also a small stock of FFP, cryoprecipitate and octaplas. If required, blood is crossmatched in Aberdeen and transported to Orkney.

The challenging and varied nature of specialising in remote and rural pathology combined with island living makes working at NHS Orkney a truly unique experience. BMS

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