Medlab conference predicts increasingly equipment-heavy labs and the migration of routine testing from hospitals to pharmacies

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It was a smaller and more intrepid group than usual who joined the GAMBICA pavilion at MedLab in Dubai in January. The more cautious had decided to leave it a year before venturing back, but those who did go were not disappointed. The weather was lovely and co-locating the show with Arab Health (for one year only) improved visitor numbers and as always there was an accompanying conference to ensure that plenty of health and lab staff were there too.

With a whole day devoted to 'Lab empowerment through sustainability, and innovation', and frequent papers of interest to lab staff throughout the four days, there was quite a lot to choose from for conference delegates at Medlab Dubai.

One of the major themes of the conference sessions was how advances in equipment could be used to compensate for the shortage of skilled pathologists worldwide. The unceasing growth in path services is not being met by an equal growth in trained and skilled pathologists with only 3% of UK histopathology departments being fully staffed and 25% of current staff being over 55 years of age. The work of path labs has become more complex, not least because of the growth of cancer cases, the number of medical students becoming pathologists cannot keep pace with the losses.

While there is a growth in the use of university-trained pathologists' assistants, it is improved IT solutions and additional capital investment to implement digital pathology which will make the difference delegates were told.

A doctor from Spain explained how the Catalan region is moving wholesale to digital pathologies. His hospital group had got European funding to provide 24 scanners, and to digitalise 1,200,000 slides per annum with 170 pathologists moving to working on screen and via the internet. With 183 two screen workstations in place the system will eventually be the largest digital pathology network in the world.

Santiago Ramon y Cajal, Professor of Pathology in UAE used a paper on precision medicine to compare the cost of different methods of analysis.

Next generation sequencing (NGS), he said, can reduce the time taken to get together all the necessary results for a cancer patient from two to three weeks to less than 7 days. The application of NGS can also reduce the amount of tissue required and be cost positive if more than three genes are being sequenced with a cost between £400 and £2000 depending on how many patients are being tested per week.

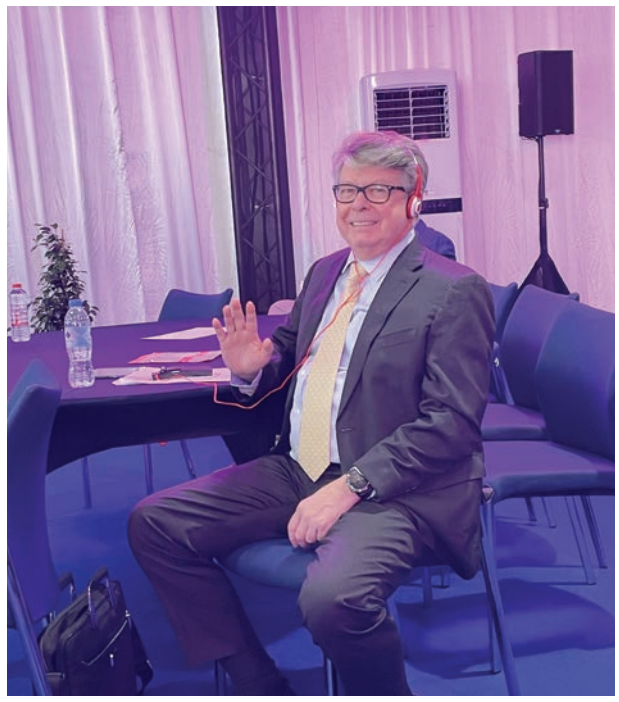
He acknowledged the need for technical and diagnostic quality controls but went into some detail on the different applications of gel electrophoresis and Mass Fix. Mass Fix or miRAMM was said to have higher resolution but be harder to read and interpret than MALDI-TOF but to be able to pick up evidence of disease not seen by use of MALDI-TOF.

The rise of instrumentation

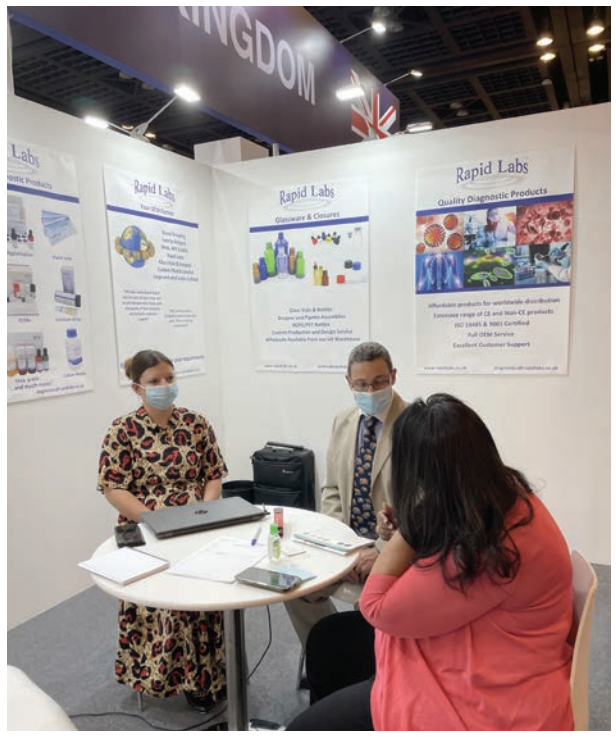
Dr James Donnelly, who is currently based in Abu Dhabi, looked at what's coming next in clinical chemistry and mass spectrometry. He set out this history of biochemistry…

- 1920s - Biochemistry adopted
- 1940s-50s - Assay menu grew
- 1960s and 70s - Scalability through automation
- 1970s to 90s - Democratisation of techniques
- 1980s onwards - Improvements in quality management
- 1980s onwards - New uses for established assays for example, Point of Care Tests

He described the current era as the time of the 'rise of instrumentation'



Dr James Donnelly



In the early days, manual assays were used and spectrophotometer reagents were prepared in labs. Early industrial scale labs were very labour intensive and chaotic and to try to improve quality, labs implemented six sigma, "but humans can only be efficient up to a point" he said.

He pointed out that over time equipment costs tend to stay stable or reduce and generally quality and productivity improves, whereas the cost of labour, particularly skilled labour always goes up. Therefore, technological advancements are key to keeping costs down in a lab.

Because of increasing demand for lab services it is inevitable, Dr Donnelly thinks, that labs will consolidate to achieve economies of scale and scope and that the hub and spoke model of labs will grow quickly.

"Because of the shortage of skilled staff, there will be big pushes in the future to use pharmacists and physicians collaboratively to manage patients. Physicians can now view test results and adjust medication without ever seeing the patient."

He expects to see a move to high co-pay health plans, which will be cheaper to buy but will require the patient themselves to pay for a proportion of their treatment. This, he felt, has beneficial effects in encouraging patients to better self-manage their conditions.

Pointing to the growing inequalities in health based on race, religion, income and region he predicted a lack of access to primary care will be likely to affect a growing proportion of the population, even the wealthy.

By 2026 there will be a shortage of between 15,000 and 135,000 primary care physicians in the US so upwards of 30,000,000 patients will not have access to a physician, irrespective of insurance. There is also a corresponding decrease in brick and mortar hospitals and beds.

"People don't like going to the doctors but they do like going to the shops," James said. "Pharmacies are shops and they offer a natural solution to the shortage. Pharmacists already do tests and collect specimens in the USA and could be used to provide remote lab services." He noted that pharmacists felt they had missed out on the Nurse Practitioner revolution and wanted to ensure they got the benefit of the new wave in medicine.

"With the increase in chronic illness, all this means a need for empowerment of patients to take more responsibility for their own care. The new need is to get them in front of someone who can do a test and give them a result - the pharmacist. Some of the major chains are already showing that they are keen to step up and serve patients in this way."

He sounded a note of warning however, reminding delegates of the case of Elizabeth Holmes who was recently found guilty of fraud for stating that her company Theranos had low cost tests available which had minimal specimen requirements. While her claims were false, she very effectively demonstrated the size of the potential market and a number of other companies are now rushing to produce what she claimed she had.

One example is 'Tasso', a collection device for blood samples which can be used without skilled staff and is said to be 'relatively painless'. A capillary collection device is also being developed which can apparently obtain sufficient specimen to do 35 assays in less than one minute. The intention is to draw, spin and test at a pharmacy by professional staff with minimal training. James felt sure that dispersed collections and testing will come but that there will remain a need for large central laboratories.

"Labs will continue to grow in size and scope of testing, provided that the costs of testing are better than more distant referral centres. Clients and patients will need convenient fast testing in order to take on empowerment and responsibility."

Professor of clinical biochemistry, Khosrow Adeli, who works at the hospital for sick children part of the University of Toronto set out his reasons for believing that Point of Care Testing (POCT) is an inherently ideal tool in paediatric healthcare settings. Labs are against POCT he said, but doctors want it and both are growing. "Speed of turnaround and low quantity of sample required make POCT essential especially in treating neo nates. One drop of blood can do 11 tests."

"Children are not small adults, they are physiologically different and change clinical status rapidly and can rapidly experience respiratory failure so it's important to measure blood gases, and they have a large surface area to volume ratio so can be at risk from dehydration and hypo-glycemia, both of which can be suitably detected by POCT testing. POCT testing is growing and in sub-Saharan Africa it is now routinely used for HIV testing and sickle cell disease.

According to Professor Adeli the benefits include:

- Reduced time to diagnosis
- Reduced length of hospital stay
- Improved acute condition outcomes
- Improved acute condition management
- Improved economic efficiency
- Improved staff satisfaction

Medlab is just one of the overseas exhibitions at which GAMBICA manages a UK pavilion. If you would like to come with us on a future trip, get in touch. Jacqueline.balian@gambica.org.uk