



2084

- EDITORIAL, *C. LOVIS*
- HOSPITAL OF THE FUTURE, *M. KEEN*
- FUTURE MEDICINE, TODAY'S HEALTHCARE, *S. HEINEMANN*
- LET'S CHANGE BEFORE WE HAVE TO, *M. CABRER*
- SMART CONTRACTS IN HEALTHCARE, *S. JANIN*
- PATIENT HEALTHCARE PORTALS, *M. PETERSEN*
- LABS OF THE FUTURE
- FUTURE OF AUGMENTED REALITY IN HEALTHCARE, *D. MADISON*
- CHALLENGES, OPPORTUNITIES OF TOMORROW'S RADIOLOGIST, *D. HILMI*
- UTILITY OF ARTIFICIAL INTELLIGENCE IN RADIOLOGY, *R. VIDAL-PEREZ*

TOP HEALTHCARE TRENDS
2018

THE FUTURE OF MEDICINE
BOOK, *P. BRONSON ET AL*

VISIONARY LEADERSHIP,
D. CORTESE ET AL

WOMEN IN RADIOLOGY,
S. BAKER

ROBOTICS: A CHANGE

MANAGEMENT CASE STUDY,
L. ROBSON

AWARD-WINNING 'DOCTORS'
ASSISTANTS', *S. MCNALLY
ET AL*

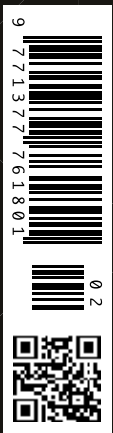
3D PRINTING AT THE JACOBS
INSTITUTE: AN UPDATE,
P. MARCUCCI

DEEP INTEROPERABILITY IN
HEALTHCARE *C. BUCKLEY,*

VIRTUAL REALITY CLINIC: A
CASE STUDY, *B. WIEDERHOLD*

MACHINE LEARNING FOR
BRAIN TUMOUR DETECTION,
D. CORONADO

ARE RANKINGS THE BEST
WAY TO DETERMINE
HEALTHCARE SYSTEMS?
A. LAYLAND ET AL



The lab of the future

Technology is changing the face of medical laboratory operation

As healthcare technology advances, medical laboratories need to keep ahead of the curve on trends for optimal operation and interoperability. HealthManagement.org looks at key areas where changes are happening at full tilt.

Point-of-care testing for lab scientists

There have been great strides in Point-of-care testing (PoCT) in the last ten years. Developments in the current healthcare environment is likely to see further PoCT as the drive towards decreasing care costs continues. PoCT tech is implemented in two ways. Firstly, Small Mobile Devices, often hand carried, can support medical laboratory personnel with both qualitative and quantitative data. Additionally, laboratory instruments are decreasing in size and complexity increasing their potential for analysis in critical care as well as immunology.

“ AUTOMATION IN MEDICAL LABS HAS RESULTED FROM PRESSURES TO PRODUCE QUICKER RESULTS, LOWER COSTS AND IMPROVE PATIENT CARE ”

The adoption of personalised screening and assessment guidelines for patients with higher cancer risk

A recent study that analysed the medical records of 741 patients has concluded that family physicians need to adopt explicit risk assessment criteria to identify, and to optimally care for, those at increased risk for cancer. This would result in not just improved quality of care but also reduced costs. Findings conclude that detailed family history information is insufficient to permit cancer risk assessment in more than two-thirds of patients, which means that individuals at moderate or high cancer risk are often not identified. Published by the Journal of the American

Board of Family Medicine, the study highlights that laboratories can play an important role in supporting physicians in these risk assessment efforts. Panels of traditional tests and key clinical data can be offered to build a cancer risk profile that is easy for physicians to understand and explain to their patients.

Lab automation

Automation in medical labs has resulted from pressures to produce quicker results, lower costs and improve patient care. A current development is specimen separation automation. The inadvertent mix of blood with plasma is a continual problem for medical laboratory scientists and separating these two elements can be a complicated process. Automation in this area is increasing efficiency.

Labs add value to physician practices through education

A major shift on the horizon is that personalised cancer care will begin in the primary care physician's office, not with cancer specialists. In addition to ordering traditional cancer diagnostic tests, primary care physicians (PCPs) will be ordering genomic-based tests that they are far less familiar with. A key component of this shift will involve laboratories educating physicians, nurse practitioners and physician assistants in various areas. One core area will be identifying patients and their families at increased risk of cancer, and how to personalise cancer screening and assessment guidelines. Laboratories will also add value by explaining the clinical utility of new genomic-based tests and how they can help the PCP identify patients at higher risk of cancer. Also significant, will be education in non-invasive alternatives to biopsy procedures that pose their own risks of infection and complications. PCPs will be

allowed to play a role in active surveillance, an area now dominated by cancer specialists who may bring a bias towards aggressive treatment for all cancers.

Biobank service expansion

Biobanks preserve biological specimens for use in the future for Research and Development, transfusion and transplants. While biobanks are most widely used for blood banking, their use is expanding to include tissues, seeds and cells. Biobanks are becoming essential tools not only for medical laboratory scientists but biotechnologists and environmental scientists as well.

“ THE ADVANTAGES OF DRONES ARE NOT ONLY THEIR TRANSPORT VERSATILITY BUT ALSO THAT SAMPLES ARE NOT ADVERSELY AFFECTED BY ENVIRONMENTAL CONDITIONS ”

Laboratories as genomics resource for clinical consults

One of the biggest challenges facing laboratories in the future will be shifting the lab's role from clinical service to providing relevant genomic information to assist clinical consultants to fulfil their role in this new age of genomic medicine. The challenges that labs will face in offering panels of new tests for early cancer detection are many, and new offerings will likely affect every function of the lab. While developing test menus, labs will not only have to evaluate pricing and return on investment, but they also will require more staff and new skill sets for interpreting test results and reporting results beyond entering results into laboratory information systems. Labs will also need to stay up to date with the latest advances in these technologies and their

applications. Next-generation sequencing (NGS), for example, has been quickly adopted by major academic medical centres, but reimbursement reality is still limiting its acceptance in community healthcare systems. It is only a matter of time before labs will need to integrate NGS diagnostic tests as well. The real value of new genomic test menus can only be achieved by influencing the management of patients and related clinical outcomes, which is anticipated to be achieved through this shift in the healthcare landscape.

Drone deployment for specimen transport

With their ability to carry small quantities of samples without having to navigate streets and traffic, the increase of drone use is expected. The advantages of drones are not only their transport versatility and adaptability but also that samples are not adversely affected by environmental conditions during journeys.

Drones have already been used successfully in the developing world to transport medicines and medical supplies to areas that would be difficult to reach otherwise. ■

KEY POINTS



- ✓ Medical labs need to keep on top of HIT trends for up-to-date operation and interoperability
- ✓ PoCT is impacting on lab operation
- ✓ Automation in specimen separation practice is increasing efficiency
- ✓ Biobank use is expanding to tissues, seeds and cells as well as traditional blood banking
- ✓ Drones are being employed for lab material transport to remote areas
- ✓ Lab personnel will play a key role in building panels of tests and data to build a cancer risk profile that is easy for physicians to understand and explain
- ✓ Future laboratories will shift the lab's role from clinical service to providing relevant genomic information to assist clinical consultants



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