Chapter 1 : New Diagnostic Technology Can Identify Zika for $1

Since , we have used a 'Horizon Scanning' approach to identify new and emerging diagnostic technologies relevant to primary care. Using intelligence drawn from published research and the diagnostics industry, we use a systematic approach to review the evidence behind new diagnostic technologies.

With really sophisticated devices on the market, it might have its biggest year ever in It will be used to let medical students gain realistic experience in examining patients or to let patients see what would happen to them the next day at the hospital for stress release. As it will measure blood glucose from tears, it is supposed to change diabetes treatment and management. Moreover, Hololens from Microsoft also comes out in which will have a huge impact on fields from medical education to architecture and engineering. It could help medical students do dissections for many hours a day from any angles without the formaldehyde smell. Even the ones with the biggest market potentials like HexoSkin were only traditional shirts with built-in devices in their pockets. But fibretronics are clothing materials with microchips implanted into them. They can react to body temperature or the mood of the wearer, among others. Imagine this in the OR. As the first promising collaborations in this area came out in , expect to see the first tangible results in ! A swarm of devices became available, Amazon launched its Wearable Marketplace and millions of activity trackers were sold. But gaining actionable insights from the constant stream of wearable data is not easy. We need clever algorithms and apps that merge data from several devices and apps, and help us draw meaningful conclusions. It would help lay people put more emphasis on prevention and have a healthier lifestyle. I had experience with Exist. It proved the clear benefits of such a system by making diagnoses and treatment cheaper and more efficient. Since then, they only released teaser videos about animal-like robots and Petman, the humanoid robot. They announced successfully bioprinted liver tissues in and they seemed to be years away from printing liver parts for transplantation. But first, these bioprinted livers could be finally used in the pharmaceutical industry to replace animal models when analyzing the toxicity of new drugs. If it goes through in , I feel printing actual liver tissue for transplantation could become a commercial service within the next decade. All the elements in that image from the smart toothbrush to the digital mirror were partially available in But an array of sensors will reach the general public in making IoT a reality in our homes. The long-term goal is to make these devices communicate and learn from each other. This way we would not have to analyze the data of the devices ourselves, but the device manufacturers could merge their findings and share a digestible report with us when there is something to take care of. The company claims to perform blood tests from one drop of blood in a transparently priced way. Concerns were raised by the Wall Street Journal about the validity of their claims, and we are waiting for Theranos to reveal the details of their medical technologies. These medical technologies and trends will create value and have an impact on our lives and the practice of medicine in News shaping the future of healthcare Advice on taking charge of your health Reviews of the latest health technology The Medical Futurist Webicina Kft.

Chapter 2 : CapitalBio New Diagnostic Technology Co.,Ltd. - Aumet

Diagnostic Technology is a leading supplier of innovative clinical diagnostic and life science products for Australian and New Zealand markets.

What is diagnostic testing? Diagnostic testing involves tests and procedures to confirm the presence of disease and identify the correct tumor type, location, extent and stage. Experienced care team Our diagnostic team includes physicians across many medical specialties, including radiologists, pathologists and geneticists. They have expertise in using advanced, minimally invasive diagnostic tests and procedures to diagnose the disease. Advanced diagnostics A thorough and accurate cancer diagnosis is the first step in developing an individualized cancer treatment plan. When you first visit one of our hospitals, we will perform a complete array of diagnostic tests to accurately confirm your diagnosis and plan your individualized treatment. This initial diagnostic evaluation typically takes about three to five days. The following are some common diagnostic tests: A review of health history Physical examination Laboratory tests blood, urine, etc. Nuclear medicine scans bone scans, etc. Endoscopy Genetic tests Diagnostics plays an important role throughout your cancer treatment: Before treatment, we will accurately locate tumors, stage the disease, and determine an appropriate combination of cancer treatments for you. Tumor molecular profiling helps us identify the right chemotherapy or targeted therapy drugs before treatment, which reduces unnecessary toxicity and identifies an appropriate treatment approach from the start. During your treatment, we will track the size of the tumor, progression of the disease, and your response to treatment, and modify your treatment accordingly. Minimally invasive tools like navigational bronchoscopy and endoscopic ultrasound allow us to find and reach very small tumors without the risks of surgery. After you complete treatment, we will follow up with you to evaluate any symptoms you may have, and schedule regular check-ups to monitor for any signs of metastasis or recurrence. Genomic testing CTCA offers expanded genomic tumor assessment. This tool reveals the DNA alterations that are driving the growth of a cancer. Because genomic testing is a rapidly developing area of medical science, there are currently only a few cancers where such testing is considered to be routine in the evaluation of possible treatment options. Your oncologist will help determine if you are a good candidate for genomic testing. Accommodating your needs We understand that waiting for diagnostic test results can create a great deal of stress. To ease anxiety and help you begin your cancer treatment sooner, we provide reduced wait times for appointments and test results. We also want you to be as comfortable as possible during your imaging tests. Our team uses padding and comfort equipment, as well as a variety of positioning devices, to help you feel more relaxed during scans and procedures.

Chapter 3 : Medical Devices / Diagnostics News from Medical News Today

Medical Devices / Diagnostics News The latest medical devices and diagnostics research from prestigious universities and journals throughout the world. The role of medical devices in health care.

A new tool cuts the time to five hours. Hospitals are beginning to use a new, more potent weapon against sepsis, the devastating condition that kills more than 25 percent of its victims and costs hospitals billions of dollars annually. A new FDA-approved diagnostic test can detect sepsis-causing pathogens directly from a blood sample. Last fall, the U. Food and Drug Administration approved the new technology, developed by T2 Biosystems , for diagnosing sepsis caused by a fungus called Candida. By the end of this year the company aims to have 30 hospitals signed on to purchase and use the technology. Sepsis is a destructive reaction to an infection marked by an overwhelming inflammatory response throughout the body. If left untreated, sepsis can cause organ malfunction and death. Treating a septic patient requires pinpointing the bacterial or fungal organism that is the root cause. Doctors typically give a septic patient an immediate dose of a so-called broad-spectrum antibiotic that kills a variety of different bacteria, and then try to figure out the specific bug at fault by drawing blood and performing a lab test called a blood culture. McDonough cites clinical data that implies that if patients can get the right drug within 12 hours of first showing symptoms, the chance of death can be cut in half. Candida infections in the bloodstream kill some 40 percent of patients. In a recent head-to-head comparison involving 55 patients known to have Candida infections, T2MR detected the pathogen in 96 percent of the patients, whereas blood culture detected it in only 60 percent. The T2MR detector works by measuring changes in the magnetic properties of the water molecules in the sample. After some processing steps, magnetic nanoparticles, equipped on their surface with strands of DNA complementary to strands in the target pathogen, are mixed with the sample. If a given target is present, the particles will attach to it and cluster, causing changes in the magnetic properties of the water molecules in the sample. Applying magnetic pulses elicits a response from those molecules, called T2 relaxation, and by measuring the change in this signal, the device automatically determines whether or not a given bug is present. Six hospitals have begun using the Candida diagnostic test, and 13 more have signed contracts to adopt the technology. Next in the pipeline is a bacteria detector aimed at the bugs not covered by broad-spectrum antibiotics. The company expects to begin testing the bacteria detector in clinical trials by the end of this year. If it can get FDA-approval for this test as quickly as it did for the Candida test, the bacteria diagnostic could be in the market as early as

5. Technology and Tools in the Diagnostic Process. A wide variety of technologies and tools are involved in the diagnostic process (see Figure), but the primary focus of the chapter is on health information technology (health IT) tools.

Received Sep 23; Accepted Jul 6. This article has been cited by other articles in PMC. Despite intrinsic advantages of new health technologies, its introduction can be disruptive to existing routines, and it is thus important to understand how these innovations are perceived by the different groups involved in its regular use. Methods This study was based on semi-structured interviews with patients, lab technicians, health care workers and managers involved with diagnosis and care of Tuberculosis TB. The interviews had their content analyzed in order to abstract the different perspectives for the various actors. Results For patients the changes were not perceived as significant, since their greatest concerns were related to treatment and the stigma associated with TB. The professionals in general welcomed the new technique, which dramatically decreases the workload, time and reliability of diagnosis, in their view. However, we noted difficulties with the concomitant implementation of new IT technology for recording and reporting test results, which negatively impacted the time necessary to get lab diagnosis to physicians. Conclusions Through this analysis we detected some bottlenecks in the surrounding environment, not necessarily linked to the technology itself but which could hamper considerably its advantages. Tuberculosis, Diagnosis, Qualitative research Background Tuberculosis TB is a curable disease with high treatment success rates. Nevertheless, it figures among the top ten causes of death worldwide, with 9. The emergence of drug-resistant forms of TB, particular to rifampin, a highly effective drug used worldwide, and their rapid spread in Asian, African and East European countries are a particular concern [1]. Early detection of both the sensitive and resistant forms of the disease reduces loss in quality of life, morbidity, deaths and prevents the transmission of drug sensitive and resistant TB. However, a major obstacle in the control of TB is the delay in diagnosis. The provision of diagnostic services is inadequate due to the organization and infrastructure of the health services network, and to limitations of the technologies currently used, such as sputum smear and culture for Mycobacterium tuberculosis MTB. The sensitivity of the former is low especially among patients with HIV co-infection and children and requires two patient visits to the clinic to provide the material: Sensitivity of smears is even lower in paucibacillary forms of pulmonary disease, as in children and in patients infected with TB and HI. It should be noted R. Brazil is among the 22 countries with the highest TB burden. The National TB Control Program Programa Nacional de Controle da Tuberculose â€" PNCT recommends the use of culture and drug sensitivity tests if appropriate for diagnosing TB when specimens are difficult to obtain, in cases with a high probability of resistance and in those with usual negative smears [3]. In practice, Brazil has more than one third of new TB cases reported without bacteriological confirmation. After a century of virtual stagnation, new technologies for the detection of MTB are being developed, mostly based on molecular methods. The new test has been considered a milestone for the global control of TB, because of its high sensitivity and specificity both for detecting MTB and resistance to rifampin [2], as well as its ability to deliver results in less than two hours. The Brazilian Ministry of Health approved the incorporation of this method in March , after an implementation pilot study in two high TB-incidence cities, Manaus and Rio de Janeiro. It consists of a GeneXpert instrument, personal computer and net disposable cartridges. The system combines sample preparation in cartridges and the amplification and detection of nucleic acid DN in a fully integrated and automated instrument for analysis Fig.

Chapter 5 : New Diagnostic Technology to Be Tested on ISS

New more efficient diagnostic technology will be adapted for use aboard ISS (Credits: ESA). Just one drop of blood is enough to diagnose a broad variety of diseases such as diabetes, heart malfunctions, kidney or liver damage.

For instance, algorithms can be developed that periodically scan EHRs for diagnostic errors or clinical scenarios that suggest a diagnostic error has occurred. An example of the former would be cases of patients with newly diagnosed pulmonary embolism who were seen in the 2 weeks preceding diagnosis by an outpatient or emergency department clinician with symptoms that may have indicated pulmonary embolism e. An example of the latter may be patients who are hospitalized or seen in the emergency department within 2 weeks of an unscheduled outpatient visit, which may be suggestive of a failure to correctly diagnosis the patient at the first visit Singh et al. In both of these instances, health IT systems need to incorporate user-friendly platforms that enable health care organizations to measure diagnostic errors or surrogate measures. For health IT systems that are used by multiple health care organizations or across multiple settings inpatient and outpatient , common platforms for measuring diagnostic errors will permit comparisons of diagnostic error rates across organizations and settings. Improving the identification of diagnostic errors is an important recommendation of this committee see Chapter 6 , and health IT vendors should facilitate efforts to do so by developing tools that enable organizations to more easily determine the rates of diagnostic errors, especially those that are common and that have serious implications for patients e. Fit Within Clinical Workflow The diagnostic process is not a single task, but rather a series of tasks that involve multiple people across the health care continuum. Clinical workflow, or the sequence of physical and cognitive tasks performed by various people within and between work environments, affects the diagnostic process at many junctures Carayon et al. A critical element of workflow is health IT: Effective integration of health IT into the clinical workflow is essential for preventing diagnostic errors. However, integrating health IT into the clinical workflow is made more difficult by the wide range of workflows used by different individuals participating Page Share Cite Suggested Citation: Improving Diagnosis in Health Care. The National Academies Press. According to HIMSS, there are more than 50 physician specialties, and each of these specialties has its own software needs, including the unique software needs of the other health care professionals involved in that specialty e. Each specialty may have different tasks that require a range of software interface designs HIMSS, As a result, health IT systems need both flexibility and modularity so that they can be tailored to specific workflow needs. Additionally, the time spent implementing and maintaining health IT systems may negatively impact workflow and even contribute to error IOM, a. For instance, EHR systems may become temporarily inaccessible because of software updates or network failure. Beyond supporting patient care, clinical documentation also needs to meet requirements outside of the clinical care setting, including billing, accreditation, legal, and research purposes Hripcsak and Vawdrey, Clinical documentation is used to justify the level of service billed to insurers, to collect information for research or quality improvement purposes, and to inform a legal record in case of litigation Rosenbloom et al. A number of clinicians have expressed concern that clinical documentation is not promoting high-quality diagnosis and is instead primarily centered around billing and legal re- Page Share Cite Suggested Citation: Intensive care unit residents and physicians spend substantially more time on clinical review and documentation after EHR implementation Carayon et al. For example, extensive clinical documentation for justifying payment, facilitated by the copy and paste feature of EHRs, can contribute to cognitive overload and impede clinical reasoning. A major goal of using data collected within EHRs for legal, billing, and population-wide health management has led to a profusion of structured clinical documentation formats within health IT tools. Clinicians need to be able to record information efficiently and in ways that render it useful to other health care professionals involved in caring for a patient. Tools, such as speech recognition technology, have been developed to assist clinicians with clinical documentation, with varying degrees of success. Though several studies have found that voice recognition technology can improve the turnaround time of results reporting Johnson et al. This includes high implementation costs, the need for extensive user training, decreased report quality due to technology-related

errors, and workflow interruptions Bhan et al. Another technology that may help address the challenges of clinical documentation is natural language processing Hripcsak and Vawdrey, When the task is sufficiently constrained and when there is sufficient time to train the system, natural language processing systems can extract Page Share Cite Suggested Citation: Additional technologies, particularly data mining, hold promise for improving clinical documentation in the future. These technologies also hold promise for improving clinical decision support, discussed below. A number of studies have shown that clinical decision support systems can improve the rates of certain desirable clinician behaviors such as appropriate test ordering, disease management, and patient care Carayon et al. Diagnostic decision support tools can provide support to clinicians and patients throughout each stage of the diagnostic process, such as during information acquisition, information integration and interpretation, the formation of a working diagnosis, and the making of a diagnosis Del Fiol et al. Box categorizes health IT tools according to the tasks they assist with in the diagnostic process El-Kareh et al. Tools such as infobuttons can be integrated into EHRs and provide links to relevant online information resources, such as medical textbooks, clinical practice guidelines, and appropriateness criteria; there is evidence that infobuttons can help clinicians answer questions at the point of care and that they lead to a modest increase in the efficiency of information delivery Del Fiol et al. CDS can also facilitate the ordering of the diagnostic tests that help clinicians develop accurate and timely diagnoses. In its input to the committee, the American College of Radiology stated that structured decision support for image ordering and reporting is critical for reducing diagnostic errors Allen and Thorwarth, The Protecting Access to Medicare Act, passed in , includes a provision that requires clinicians to use specified criteria when ordering advanced imaging procedures and directs the Department of Health and Human Services to identify CDS tools to help clinicians order these imaging procedures.

Chapter 6 : New Sepsis Detector Shrinks the Diagnosis from Days to Hours - MIT Technology Review

new diagnostic technologies,, CEO SUMMARY: By combining total lab automation with Lean techniques in a comprehensive makeover of its microbiology lab, one of the largest labs providing hospital acute care and community microbiology services in North America achieved major benefits.