



Hu Kunping, Managing Director of Reed Sinopharm Exhibitions; **Zhu Qingsheng**, Ex Deputy President of the Ministry of Health and Director-General of the China Association of Medical Equipment; **He Wei**, Standing Committee Member and Vice Secretary-General of the CPPCC and Vice Chairman of the Central Committee of Workers and Peasants; **Li Jiange**, chairman of the Board of Directors of Sun YeFang Economic Science Foundation and Co-President of The National Institute of Finance of Tsinghua University; and **Mike Rusbridge**, Chairman of Reed Exhibitions

Innovative medical plaster enters industrial production

The 'Bedalpatch' plaster can increase autonomy for hospital patients and save time for hospital staff

BEDAL NV has kick-started industrial production for the Bedalpatch breakthrough medical plaster, with a market launch planned from autumn 2015 on.

This development came after the completion of a financing round with the Limburg investment company LRM and a consortium of private investors. Developed five years ago by David De Munter during his hospital treatment for cancer, the patch is designed to allow patients with an intravenous catheter to take a shower independently.

"Hospitals have an enormous benefit here: the use of such a plaster results in a significant cost reduction in terms of labor and materials. The patch also contributes to the daily hygiene of the patient. Less handling is needed to detach the catheter, which is in line with the recommendations for decreasing the risk of infections," said De Munter, who is also the co-founder of Bedal NV.

De Munter, diagnosed with an advanced stage of cancer at 23, collaborated with two other co-founding partners, Alexander Van Damme and Falk Beerten, to launch the innovative healthcare product. The Bedalpatch was patented worldwide. The University Hospital of Leuven and homecare organization Remedus were also closely involved in developing the patch.

Bedal NV, which is supported by the IWT and FlandersCare, is looking to developing derivative products.

Less-invasive endoscopy technologies in China

GLOBAL medical device company Boston Scientific Corporation (NYSE: BSX) has entered into a strategic alliance with Frankenman Medical Equipment Company. The partnership will enable both companies to broaden the adoption of less-invasive endoscopy technologies in China. It will reach more clinicians and patients through the provision of access to training on less-invasive endoscopic technologies and the clinical and economic benefits of these therapies.

The companies will also collaborate in developing and manufacturing products in China to serve the local market. Further, they will jointly commercialize selected products in China.

Under the terms of the agreement, Boston Scientific will become a shareholder of Frankenman, a recognized leader in the China surgical devices market. The former will provide services and expertise to

Frankenman to support its continued growth, development pipeline, and manufacturing capabilities. The transaction is expected to close in the first half of 2015 subject to customary closing conditions.

In alignment with the partnership, CPE China Fund, an entity of CITIC PE and a shareholder of Frankenman, will continue to support the company's growth.

Warren Wang, Boston Scientific Greater China managing director and vice president, noted that more than one million bile duct stone removal procedures are performed as open surgeries in China each year.

"While less invasive endoscopic procedures can lead to better patient outcomes and reduced healthcare costs, access to these procedures is extremely limited. We are excited to cultivate this relationship and leverage Frankenman's local market expertise in China, while simultaneously sharing our proficiency in the endoscopy market to deliver the improved patient outcomes and economic benefits of less invasive care," Wang said.

Weng Zhiqiang, Frankenman founder and chairman, said: "We are excited to collaborate with Boston Scientific, a global medical technology leader, and ensure patients and physicians in China will have access to the minimally invasive solutions. The support from Boston Scientific will help Frankenman further accelerate its development and penetration of the market." (Source: IndustrySourcing.com)

WOULD you agree with these hot picks? It's been nearly half a year since researchers and physicians at University of California San Francisco (UCSF) identified the top trends in healthcare and biomedical science to watch in 2015. The health sciences are constantly pushing toward more effective treatments and cures. The question is: Where will we see the next breakthroughs? These range from basic science to digital health, from aging research to cancer treatments, and from approaches in the lab to access at the hospital.

1. Hacking the Brain

Significant and technological advances are ushering in an era that would have been unimaginable to early brain scientists. Long-lasting implants employing hundreds or thousands of electrodes can be placed in the brain to both deliver stimulation and to "listen" to brain activity for signs of trouble.

"Powerful new tools allow researchers to monitor activity patterns across brain circuits, bringing us closer to understanding how perception, thought and action arise from different circuits," said Phillip Sabes, PhD, professor of Physiology.

Eventually, Professor Sabes said this technology will allow amputees and patients with paralysis to directly control artificial limbs with brain signals, will predict and head off epileptic seizures, and will better treat Parkinson's disease and other movement disorders.

In addition, UCSF scientists are exploring the possibility that brain implants could ease the symptoms of – and perhaps even cure – psychiatric disorders including anxiety, depression, and addiction.

2. Breakthroughs in Teamwork

Scientists are embracing a multidisciplinary team effort to make the most increasingly powerful and opens up new complex ways to tackle problems. This is in stark contrast to the competitive nature of rival scientific labs of the past to be first out of the gate with important findings.

Take genomic research, for example. Since increased risk for many diseases may reside in very rare, difficult-to-find mutations, many researchers have begun assembling large international research groups to freely share data.

"One of the major drivers of recent progress has been a wholesale shift in culture. Investigators who were once fierce competitors are now finding ways to collaborate with one another in large-scale, multi-site genomic studies," said Matthew State, MD, PhD, chair of Psychiatry.

Two recent collaborative studies of the genetics of autism involved 50 laboratories worldwide and uncovered more than 100 genes linked to the risk of autism. Before this work, smaller efforts had identified only 11 genes that confer a risk for autism.

Nothing succeeds like success, so expect to see more "shared science" in the coming years.

Top 7 Science & Medicine Trends for 2015



3. Diagnosing Disease through DNA

"Next-generation DNA sequencing" allow lab workers to read out the equivalent of an entire genome's worth of sequence in a day DNA – for less than \$1,000. Now this technology has begun to be used as diagnostic tools.

Next-generation sequencing offers unprecedented throughput, scalability and speed that could have untold impacts on studying disease, biology and clinical research, said Charles Chiu, PhD, director of UCSF Viral Diagnostics and Discovery Center.

"We are gradually moving away from using next-generation sequencing exclusively as a powerful research tool and we are starting to use it in the clinic," said Dr. Chiu.

His team used the technology to identify the cause of life-threatening meningitis within 24 hours, saving the life of a 14-year-old boy after all standard diagnostic tools failed. After sequencing all the DNA found in his spinal fluid, from the patient's own DNA to bacteria and viral DNA, scientists were able to identify the culprit as an unusual, but easily treated bacterial infection.

Dr. Chiu is now working on applying

this technology to develop a rapid diagnostic test for the Ebola virus.

4. Rejuvenation through the Blood

Sound straight out of a vampire novel? Well, a recent study led by Saul Villeda, PhD found that infusions of young blood can perk up the brains of older mice. The Sandler Faculty Fellow made front-page news with these findings when his team identified evidence of cognitive improvements in the old mice after they were connected to the circulatory systems of younger mice.

At the same time, a team at Stanford University found that young blood could help rejuvenate heart muscle, too. In fact, young blood seems to improve muscle, liver, heart and brain – discoveries that have spurred a quest for the specific molecules responsible for rejuvenation.

"Today it seems as if everyone is going after molecules in the blood that might help reverse biological aging. There also are factors that can be removed from old blood to slow aging, and we want to explore these, too," said Dr. Villeda. As the search continues, he and his collaborators already have launched a small clinical trial to test

young blood in Alzheimer's disease.

5. Prime Time for Telemedicine

Telemedicine is finding its place in modern medicine, especially in American health care, according to Seth Bokser, MD, MPH, to allow experts to consult remotely via virtual office visits, radiological readings and even remote ICU monitoring.

"Telehealth is the right technology for our times. Americans want high quality, personalized care. Providers and patients alike are beginning to trust information technology with their health," said Dr. Bokser, medical director for IT at UCSF Benioff Children's Hospital.

Additionally, as primary care doctors are retiring, rural areas are struggling more than ever, and community hospitals need cost-effective ways of providing both primary and specialty care.

While nothing can replace an in-person visit, especially when patients are experiencing new symptoms, telemedicine is finally coming into its own.

6. Breaking Down Cancer Categories

Genome-sequencing technology now has broken down cancer as a diverse collection of diseases demanding a wide range and combination of treatments.. Today's powerful sequencing technology is allowing scientists to examine tumors letter by genetic letter, with surprising results. In 2014, a study partly led by UCSF scientists suggested that these new techniques could lead to more accurate diagnoses for as many as one in 10 patients.

"For the first time ever, we're able to pinpoint to important molecular features shared by cancers that affect different tissues. This will have huge implications for therapy as we begin to design treatment plans based on a cancer's molecular signature," said Denise Wolf, PhD, computational biologist at UCSF Helen Diller Comprehensive Cancer Center.

Combined with decades' worth of accumulated clinical experience, such insights are already leading to radical new treatment recommendations.

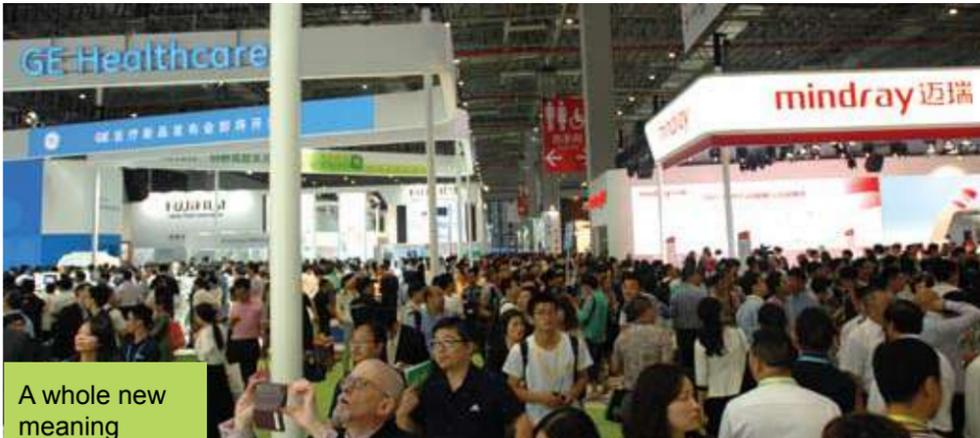
7. Systems Pharmacology

Molecular biology transformed the field of pharmacology by allowing researchers to isolate and purify the particular receptors through which drugs acted. Yet 30 years after first focusing drug research on the molecular level, fewer drugs have since been discovered – and at greater expense.

To spur drug development, many researchers say the focus needs to be on both molecular and systemic impacts. This emerging field, known as systems pharmacology, integrates the behavior of molecules to understand the effects of drugs on the whole organism.

"Scientists can now design molecules with exquisite potency and specificity for particular receptors, and by combining this knowledge with our understanding of whole body systems, there's huge potential for a rebirth of pharmacology," said Brian Shoichet, PhD, professor of Pharmaceutical Chemistry.

Mirroring the energy and excitement of the robust China Healthcare industry



A whole new meaning to crowd sourcing, as trade visitors filled the halls



Just two of the 107 well-attended conferences and fora at the tHIS 2015



Hu Kunping (second from right), Managing Director of Reed Sinopharm Exhibitions, with the winners of the Healthcare China Summit Awards: Shanghai United Imaging Technology – Medical Equipment Company of Outstanding Independent Innovation; Shenzhen Vivolight Medical Device & Technology – Cutting-Edge Medical Equipment Company; Shenzhen Breo Technology – Excellent Marketing Case; United Family Healthcare – Excellent Medical Service Organization; iKang Healthcare Group – Excellent Health Management Institution; and Shanghai Fosun Pharmaceutical Group – Excellent Pharmaceutical Company

VIPs from the government, industry, NGOs and academic sector at tHIS 2015 dinner-reception

WORLDWIDE, the market for ultrasound equipment is marked by unusual stability and projected for a steady level of growth. The United States will remain the industry's top market shareholder, with an anticipated market value exceeding \$2.1 billion in 2019, but GBI Research says that China's more impressive growth rate makes the rapidly expanding Asian nation one to watch.

The healthcare business intelligence provider forecasts the country's ultrasound system's market revenue to climb from \$702 million in 2012 to just over \$1.7 billion in

2019 – representing a Compound Annual Growth Rate (CAGR) of 14% over the forecast period. The ultrasound system segment holds the largest share of the Chinese diagnostic imaging equipment market. Healthcare reforms initiated by the Chinese government in 2009 have proven a key market driver, resulting in a robust increase in ultrasounds systems revenue in recent years.

TE7 touchscreen ultrasound system from Mindray



Ultrasound equipment market growth driven by technological advances



diagnostic evaluations. Due to technological improvements and reductions in the cost of equipment, rapid adoption of POC ultrasounds for diagnostic and guidance procedures within the anesthesiology, critical care and musculoskeletal segments can be expected.

One of the latest POC solutions highlighted at CMEF on the first day of the show on May 15 was the MobiEye 700.

"MindRay's MobiEye 700 is the SUV of mobile DR. It has no limitations. As we all know, the gap between hospital beds is very narrow. It is very difficult to push machines into such a limited space. But there is no such problem for MobiEye 700. The developers were inspired by the praying mantis and adapted bionic-simulate arm structure, which makes MobiEye 700 move flexibly over a wide range flexibly," explained one of MindRay's management executives at the launch.

The goal of 4D ultrasound is to overcome the limitations posed by its predecessor technology and to be more clinically useful as an imaging tool. Advances in ultrasound technology make 4D ultrasound imaging faster and less dependent on the operator's expertise, thus opening up more research possibilities in the fields of data processing and visualization.

Reducing operator can be built in with the proper software. To provide OEM ultrasound manufacturers with superb high-end visualization capabilities and exceptional image results, **ContextVision** (6.2--Z08) is showing its **GOPiCE 2.0** to process and deliver a clearer image than ever seen before. The second-generation 3D/4D image enhancement software is the only product on the market for real-time volumetric image processing for 3D ultrasound.

"With our latest 3D features, we are offering our customers significant enhancements to their imaging systems in a very competitive environment," said Fredrik Palm, vice president – OEM Business, ContextVision (www.contextvision.com).

Another versatile visualization software, **REALiCE**, is able to deliver photo-like images and supports early fetal diagnosis. "For example the new feature Skeletal View that provides excellent visualization of the fetal skeleton and helps review details related to bone mineralization and physical defects," Palm explained.

Increasing Specialization

Radiology departments in China are projected to move towards increasing specialization, as is the practice in North America and the European Union. The trend towards smaller, specialized devices within hospital budgets favors the ultrasound equipment segment.

Costly radiation-based imaging techniques are being replaced with real-time, cost-effective ultrasound imaging. An increasing number of hospital departments will perform their own ultrasound exams, and not send patients to radiology.

POC ultrasound systems, for instance, are significantly less expensive to purchase compared to other modalities, including computed tomography or magnetic resonance. These systems cost well over a million dollars to purchase, according to iData Research, while the average selling prices of POC ultrasound systems are a fraction of that value.

Another factor that favors POC ultrasound systems is the cost of the procedure, says medical device and pharmaceutical market research firm: Magnetic resonance scans often cost thousands of dollars, while POC ultrasound procedures are priced in the hundreds of dollars range.

Overall, the growth of the Chinese diagnostic imaging equipment market is primarily driven by rising government investments to improve its healthcare facilities in rural areas, including a new network of Tier 2 county-based hospitals, as well as to expand ultrasound services in metropolitan Tier 3 hospitals.

Rising efforts by domestic players to expand their customer base in China is further fuelling the growth of the diagnostic imaging equipment market. Other factors driving this robust growth are the increasing incidence and prevalence of target diseases, rising patient numbers and rapidly aging population, more affordable and widely available healthcare, and advances in ultrasound technology.



Photo-like images made possible with the REALiCE software from ContextVision

Advances in Ultrasound Technology

Technological advances in ultrasonography have developed faster in recent years owing to improvements in ultrasonic and computer technology. For instance, 3D/4D capabilities are now more widely used obstetrics and interventional radiology because they provide superior imaging over two-dimensional systems.

Portability, higher image resolution and radiation-free needle placement procedures offered by point of care (POC) ultrasound now allow these devices to be used in applications that have not traditionally relied on ultrasound for their

Today's Schedule for 73rd CMEF China

Official Seminars & Conferences	Time	Venue
2015 Asian Medical Image Information and Technology Meeting and the 7th China PACS Meeting	08:30 - 16:30	Room C0-01
Medical Device Globalization Healthy Summit Market Analysis of CE and FDA	08:30 - 17:30	Room M7-02
2nd Hospital Infection Control and Sterilization Management Summit	09:00 - 17:00	Room M8-01
3rd Technology Innovation Forum on Customized Medical Device Manufacturing Services	09:00 - 17:00	
6th Medical Device Industry Innovation and Technology Finance Forum (green channel)	09:00 - 17:00	Room C0-07
9th China Medical Device Internationalization Regulation Forum	09:00 - 17:00	Room M8-04
China Medical Equipment Information Technology Conference	09:00 - 17:00	Room C0-01
Forum on New Surgical Dressing Technology and Materials	09:00 - 12:00	Room C0-08
Meridian Life Science New IVD Raw Material Launches	09:00 - 12:00	Room M6-02
New Technologies and Clinical Charge of Medical Dressing	09:00 - 11:20	Room C0-08
Seminar on POCT New Technology, Risk Control and Inner-hospital Management Regulations	09:00 - 12:00	Room M8-03
The POCT Future and the Strategic Development Relationship International Forum — The Rising of Chinese POCT Industry and the Local Brand	09:00 - 12:20	Room M8-03
Third-Party Maintenance Service and Practice of Medical Equipment across the Taiwan Strait Forum	09:00 - 12:00	Room M7-01
Cooperative Healthcare Cloud Platform Constructive and Technical Conference	13:30 - 17:00	Room C0-04
FibroScan (Endorsed by WHO) Liver Diagnosis Device China New Product Launch & Meeting	14:00 - 17:00	Room M6-03
HEDY Medical Device New Product Release & Investment Fair	14:00 - 17:00	Room M7-01
IEC International Medical Equipment Standards Forum — Facing the Challenges and Impact of Novel Technology and IEC 60601 3rd Edition to the Standards for Medical Equipment	13:30 - 17:30	Room M6-01
International Medical Equipment Standard Forum	14:00 - 17:00	Room M6-01
Seminar on Cloud Platform Construction for Collaborative Medical Treatment	14:00 - 17:00	Room C0-04
Seminar on Equipment and Technology for Central Supply Room and Clean Operating Room	14:00 - 17:00	Room M8-03
TUV SUD: Focus on the Hot Spots of Global Medical Device Regulatory, Powering the Development of Enterprises	14:00 - 17:00	Room C0-08

Growth spurt for China's IVD sector

CHINA is poised to become the largest market in the world for In Vitro Diagnostics (IVD) products, even while emerging as a competitive force for point of care (POC) and lab-based instruments as well as diagnostic kits. Recent annual growth rates have been measured to be as high as 17% annually, but the best indication of this market's significance is that the market continues to attract huge investments from both foreign as well as domestic firms.

Several factors underlie this rapid rise in demand, but perhaps the most significant is that China's quickly aging population means the country is experiencing an explosion of chronic conditions, such as diabetes, heart disease and cancer, which can be diagnosed and monitored using IVD products. These and other issues were addressed at the In-Vitro Diagnostics China Summit, one of the well-attended conferences at THIS.

The IVD market in China, however, remains dominated by transnational firms, with **Roche Diagnostics** in the lead and followed by **Abbott**, **Beckman Coulter/Danaher** and **Siemens** (H8.2-F09). Foreign medical device firms have about 65% share of the market and specialize in higher-end instruments, such as immuno-chemistry analyzers, but also supply reagents, diagnostic test kits, and other testing products.

Over 400 Chinese companies are active in the IVD market and hold the remaining 35% share, with **Mindray** (H7.2-E06), **Da An** and **Fosun** among the leading players. Most of these companies are focused on reagents and inexpensive test kits; however, business advisory group Pacific Bridge Medical reports that some are moving into the integrated instrument/reagent sector, specifically in the area of chemiluminescence immunoassay (CLIA).

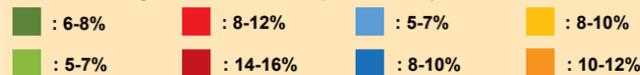


Coapresta 2000 random access coagulation analyzer from Sekisui Medical Technology

Large population, rising number of chronic diseases, increasing healthcare spending & government initiatives propel the Asian immunoassay market



Immunoassay Market CAGR% (2013–2018)



Source: Annual Reports, SEC Filings, Expert Interviews, and MarketsandMarkets Analysis

Mid-size firms are also launching solutions for the world's fastest growing IVD market. One such company is **Sekisui Medical Technology** (H6.2-R52), which introduced its fully automated random access coagulation analyzer "Coapresta 2000".

The IVD market in China is further segmented according to major applications: immunoassay, clinical chemistry, hematology, microbiology, molecular testing, coagulation, self-monitoring of blood glucose (SMBG), and point of care testing (POCT). Currently, the immunoassay application segment holds the largest market share compared to all other application segments of in vitro diagnostics. Clinical chemistry applications come in at second, but market share is declining every year. Molecular diagnostics is in third position and expected to pick up more market share in the coming few years.

Key Directions

Factors such as the continuous technological advancements in the field of diagnostics and an increase in healthcare awareness have made In Vitro Diagnostic testing an indispensable tool in current medical practices.

The advancements in molecular techniques, increasing awareness and acceptance of personalized medicines, rise in the occurrence of chronic diseases, and the need for the diagnosis of such diseases

at early stages are the key factors driving the growth of the molecular diagnostics market. On the other hand, the development of a large variety of reagents and analytical techniques, and inexpensive automated testing known as point-of-care (POC) are the factors leading to the growth in the reagents market.

By application, this market has segments like oncology, infectious diseases, cardiology, bone and mineral, endocrinology, autoimmunity, toxicology, hematology, neonatal screening, and others. Infectious disease is the largest segment with more than one-third share of the total market. This is attributed to the increasing prevalence of infectious diseases along with continuous product innovations and launches.

The oncology diagnostics market is the fastest growing segment in in vitro diagnostic applications. Major players such as Roche Diagnostics, Siemens Healthcare, and Hologic are continuously launching new in vitro diagnostics products for the detection of cancer. In addition, point-of-care (POC) testing is also gaining popularity and is poised to grow at a high single-digit CAGR in the coming years.

Expanding Capability

Abbott, Roche and Siemens have been investing heavily in China's IVD market, particularly in the diabetes and oncology

sectors. Market players such as Thermo Fisher Scientific, Inc., QIAGEN N.V., and ARKRAY, Inc. have established new manufacturing facilities and R&D plants in China, in order to take advantage of the high growth opportunities in the country.

To sustain its leadership position in China, Roche is investing in a diagnostic manufacturing facility that will be fully operational by 2018. The CHF 450-million manufacturing site at the Suzhou Industrial Park will focus on producing Immunochemistry and Clinical Chemistry tests, products that are crucial to clinical laboratory testing.



The Cobas® 6000 series from Roche offers tailor-made solutions for clinical chemistry and immunochemistry testing in medium workload laboratories

China's IVD Reagent Giants

BY strengthening R&D investment and improving product quality, a number of local enterprises are beginning to compete with international giants in China's in-vitro diagnostic (IVD) reagent industry. This evolution of China's domestic IVD reagent sector is being led by five companies. In the Top 5 are Shanghai Kehua Bio-engineering, Shanghai Fosun Pharmaceutical, DAAN Gene of the Sun Yat-sen University, Beijing Leadman Biochemistry, and BioSino Biotechnology and Science.

Three categories of IVD reagents – biochemical diagnostic reagents, immune diagnostic reagents, and molecular diagnostic reagents – accounted for about 65% the market in total in 2012, and the top 5 domestic players have concentrated their resources on these diagnostic fields.

The potential for these companies to increase their share of the market for these IVD reagent categories is huge. Annual per capita consumption of IVD products in China is approximately 5% of global consumption and per capita spending just a tenth that of developed countries whose spending ranges from USD 25-30 per capita. That indicates real room for growth.

Malaysia promotes rubber expertise

TWELVE co-exhibitors join the Malaysian Rubber Export Promotion Council (MREPC) at Hall 6.2, Booth X170 to showcase a wide range of rubber medical devices, especially medical gloves.

Biomax Rubber Industries, Comfort Rubber Gloves Industries, Hartalega, Koon Seng and Latex Partners offer a selection of latex & nitrile examination gloves.

In addition to their latex and nitrile examination gloves, **A1 Glove** and **Adventa Health** also produce surgical gloves.

Qube Medical Products is offering latex examination gloves and high risk gloves, while it's latex examination gloves and surgical gloves for **Titi Glove**.

TG Medical and **Top Glove** specialize in a wide range that includes latex & nitrile examination, surgical, household, high risk, colored, flavored (mint), cleanroom and industrial gloves. **Shieldtex** rounds out the baker's dozen with its examination gloves.

MREPC, an agency under the Ministry of Plantation Industries and Commodities, acts as a link between buyers/importers and rubber product manufacturers in Malaysia.



Quick disconnects on media bottles improve laboratory safety

ADDITIONAL quick disconnects to media bottles enhances the user experience when using laboratory equipment by making it easier to exchange consumable products, so count on Colder Products Company (CPC) to be the first to offer 45mm caps with integral quick disconnect couplings. These caps from the BQ45GL series will fit any glass or plastic bottle with a 45mm neck opening and GL threads.

CPC (H6.1-J47) is the leading provider of quick disconnect couplings, fittings and connectors for life sciences, industrial and chemical handling markets.

The 45mm caps provide three options for quick disconnect couplings to meet various needs. Each option includes a factory-installed and sealed quick disconnect coupling, hydrophobic vent and hose barb to attach a dispense tube.

"Laboratory safety has always been a concern, but it is even more important now with potentially bio hazardous waste products in the lab," said Bob Komma, business development manager for medical markets. "The BQ45GL caps provide a secure seal so that even if the bottle were to be inadvertently knocked over, none of the internal fluids would be spilled."

The easy connect/disconnect feature encourages lab technicians to replace or refill these bottles in the proper location. By providing a proper seal to bulk reagents or other media bottles, evaporation of liquids is prevented. The evaporation of liquids can have an adverse effect on these fluids potentially changing the chemistry of the fluid which may influence the final test being performed.

The BQ45GL caps, manufactured with HDPE and polypropylene resins that ensure strength and chemical compatibility for a variety of reagent and solvent materials, are ideally suited for use with analytical laboratory equipment or in vitro diagnostic (IVD) machines.

Bioprinting in 3D

Looks like candy, but could regenerate nerve cells



The little gray box that could: 3D tissue-printing machine is used to make synthesized nerve tissue

THE printer looks like a toaster oven with the front and sides removed. Its metal frame is built up around a stainless steel circle lit by an ultraviolet light. Stainless steel hydraulics and thin black tubes line the back edge, which lead to an inner, topside box made of red plastic. In front, the metal is etched with the red Bio Bot logo. All together, the gray metal frame is small enough to fit on top of an old-fashioned school desk, but nothing about this 3D printer is old school. In fact, the tissue-printing machine is more like a sci-fi future in the flesh – and it has very real medical applications.

Researchers at Michigan Technological University hope to use this newly acquired 3D bioprinter to make synthesized nerve tissue. The key is developing the right "bioink" or printable tissue. The nanotechnology-inspired material could help regenerate damaged nerves for patients with spinal cord injuries, says Tolou Shokuhfar, an assistant professor of mechanical engineering and biomedical engineering at Michigan Tech.

Shokuhfar directs the In-Situ Nanomedicine and Nanoelectronics Laboratory at Michigan Tech, and she is an adjunct assistant professor in the

Bioengineering Department and the College of Dentistry at the University of Illinois at Chicago.

"We wanted to target a big issue," Shokuhfar says, explaining that nerve regeneration is a particularly difficult biomedical engineering conundrum. "We are born with all the nerve cells we'll ever have, and damaged nerves don't heal very well."

Shayan Shafiee, a PhD student working with Shokuhfar opens the red box under the top side of the printer's box. Inside

the plastic casing, a large syringe holds a red jelly-like fluid. Shafiee replenishes the needle-tipped printer, pulls up his laptop and, with a hydraulic whoosh, he starts to print a tissue scaffold.

At his lab bench in the nanotechnology lab at Michigan Tech, Shafiee holds up a petri dish. Inside is what looks like a red gummy candy, about the size of a half-dollar.

"This is based on fractal geometry," Shafiee explains, pointing out the small crenulations and holes pockmarking the jelly. "These are similar to our vertebrae – the idea is to let a nerve pass through the holes."

Making the tissue compatible with nerve cells begins long before the printer starts up. Shafiee says the first step is to synthesize a biocompatible polymer that is syrupy – but not too thick – that can be printed. That means Shafiee and Shokuhfar have to create their own materials to print with; there is no Amazon.com or even a specialty shop for bioprinting nerves.

The team is extending the application of this material for nerve cell printing. "Our work always comes back to the question, is it printable or not?" Shafiee says, adding that a successful material – a biocompatible, graphene-bound polymer – may just melt, mush or flat out fail under the pressure of printing. After all, imagine building up a substance more delicate than a soufflé using only the point of a needle. And in the nanotechnology world, a needlepoint is big, even clumsy.

He is also hopeful that the material will have use beyond nerve regeneration.

Although widespread medical use of bioprinting is probably a decade or two away, in this lab, the future sits on a tabletop in a little gray box.



Tolou Shokuhfar and colleagues at Michigan Tech are working on 3D bioprinting tissue that could help regenerate nerve cells (Sarah Bird, Michigan Technological University)

H6.2-M17 ERX. Series Adjustable Handles

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H7.2-E03 PBC Piston Pumps

PULSSAR TECHNOLOGIES
HIGH PRECISION PUMPS



Revolutionizing Healthcare in the Age of IoT

Wireless sensor-based systems are making it possible to radically reduce costs and improve health by increasing the availability and quality of care

NOWHERE does the Internet of Things (IoT) offer greater promise than in the field of healthcare, where its principles are already being applied to improve access to care, increase the quality of care and most importantly reduce the cost of care. As the technology for collecting, analyzing and transmitting data in the IoT continues to mature, more and more exciting new IoT-driven healthcare applications and systems emerge.

IoT-related healthcare systems today are based on the essential definition of the IoT as a network of devices that connect directly with each other to capture and share vital data through a secure service layer (SSL) that connects to a central command and control server in the cloud. The emergence of the IoT, in which devices connect directly to data and to each other, is important for two reasons:

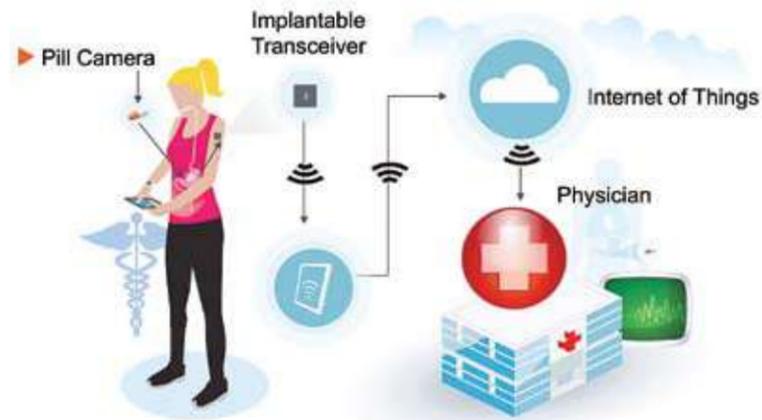
1. Advances in sensor and connectivity technology are allowing devices to collect, record and analyze data that was not accessible before. In healthcare, this means being able to collect

patient data over time that can be used to help enable preventive care, allow prompt diagnosis of acute complications and promote understanding of how a therapy (usually pharmacological) is helping improve a patient's parameters.

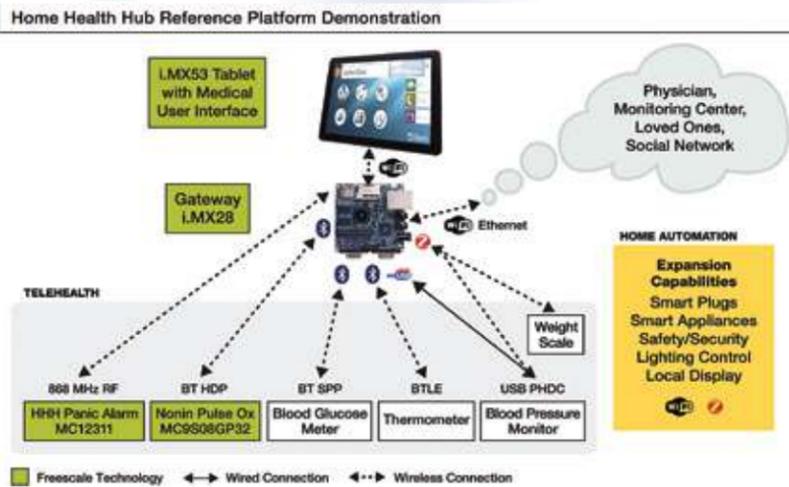
2. The ability of devices to gather data on their own removes the limitations of human-entered data – automatically obtaining the data that doctors need, at the time and in the way they need it. The automation reduces the risk of error. Fewer errors can mean increased efficiency, lower costs and improvements in quality in just about any industry. But it's of particular interest/need in healthcare, where human error can literally be the difference between life and death.

IoT in Action in Healthcare

The IoT plays a significant role in a broad range of healthcare applications, from managing chronic diseases at one end of the spectrum to preventing disease at the other. Here are some examples of how its potential is already playing out:



Freescale's second-generation gateway manages data from smart energy, consumer electronics, home automation and security systems – in addition to healthcare



• Clinical care – Hospitalized patients whose physiological status requires close attention can be constantly monitored using IoT-driven, noninvasive monitoring. It replaces the process of having a health professional come by at regular intervals to check the patient's vital signs, instead providing a continuous automated flow of information. In this way, it simultaneously improves the quality of care through constant attention and lowers the cost of care by eliminating the need for a caregiver to actively engage in data collection and analysis.

• Remote monitoring – Small, powerful wireless solutions connected through the IoT are now making it possible for monitoring to come to patients instead of vice-versa. These solutions can be used to securely capture patient health data from a variety of sensors, apply complex algorithms to analyze the data and then share it through wireless connectivity with medical professionals who can make appropriate health recommendations.

As a result, patients with chronic diseases may be less likely to develop complications, and acute complications may be diagnosed earlier than they would be otherwise. For example, patients suffering from cardiovascular diseases who are being treated with digitalis could be monitored around the clock to prevent drug intoxication. Arrhythmias that are randomly seen on an EKG could be easily detected, and EKG data indicating heart hypoxemia could lead to faster detection of cardiac issues. The data collected may also enable a more preventive approach to healthcare by providing information for people to make healthier choices.

An example of an enabling technology for remote monitoring is the Freescale Home Health Hub reference platform, which captures patient data from a variety of sensors and securely stores it in the cloud, where it can be accessed by those engaged in the patient's care. Data aggregation devices like this will soon become commonplace and will not only collect healthcare data but also manage other sensor networks within the home.

• Early intervention/prevention – Healthy, active people can also benefit from IoT-driven monitoring of their daily activities and well-being. A senior living alone, for example, may want to have a monitoring device that can detect a fall or other interruption in everyday activity and report it to emergency responders or family members. For that matter, an active athlete such as a hiker or biker could benefit from such a solution at any age, particularly if it's available as a piece of wearable technology.

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IoT in Healthcare: The Time Is Now

The long-predicted IoT revolution in healthcare is already underway, as the examples here make clear, and those are just the tip of the proverbial iceberg, as new use cases continue to emerge to address the urgent need for affordable, accessible care. Meanwhile, the IoT building blocks of automation and machine-to-machine communication continue to be established, with the addition of the service layer completing the infrastructure. (Source: Freescale – freescale.com/healthcare)

DID YOU KNOW?

Chengdu Health Capsules Use IoT

CITTI (Chengdu Internet of Things Technology Institute), a state-owned, USD160-million enterprise established by the Chengdu city government in Sichuan, has built Health Capsules that allow low-cost remote checkups. The pilot project, which began in 2012, allows doctors diagnose and prescribe medication, and patients can print prescription and purchase medicine from the capsule. All the doctor-patient interaction videos, clinical data and electronic prescriptions are stored in the capsule database server, states CITTI (www.citti.com.cn/EN).

As the first-ever organization specifically established to develop IoT medical systems, CITTI aims to build a chain of clinics through system and technological innovation that will expand healthcare access away from traditional hospitals and into people's homes.

By building a strong and stable centralized platform, CITTI hopes to scale up the system, analyze and create a new model of healthcare services as well as a new model of intellectual industry. The system could potentially be a significant source of Big Data and provide medical information about testing, infectious disease and vectors.

CITTI is just one example of how China could lead the world in IoT development. The Ministry of Information and Technology estimates China's IoT market – including devices that communicate via infrared sensor, RFID and other Machine-to-Machine (M2M) technology – will hit USD 80.3 billion by 2015 and then double to USD 166 billion by 2020.



Three generations of CITTI's Health Capsules

H6.2-
H19

FibroScan (Non-Invasive Liver Diagnosis)



H7.2-
406

EDGE Radiosurgery Suite



H8.2-
H26

Rosa Digital Mammography

HEDY Medical Device Co., Ltd.

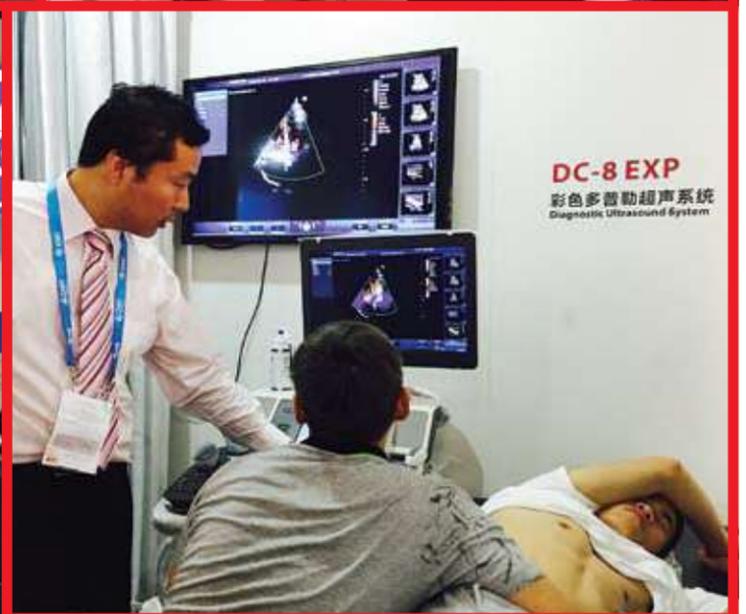


H7.2-
E06

M9 Premium Compact Ultrasound System



TThere was no stopping visitors from attending the first-ever The Health Industry Summit (THIS) on the first day of the event in Shanghai's humongous National Convention and Exhibition Center. Not even inclement weather... after all, isn't rain a sign of good fortune to come? No need to cross your fingers, since tHIS 2015 got off to a great start and huge interest in new technologies presented at CMEF



From top left
Philips ready to present latest technology to China
Steady rain, but a steady flow of visitors, too
Shinva holds the interest of visitors eager to know what's new
Boson showcases the iLab Ultrasound Imaging System
GE breaks down revolutionary technology of the Revolution CT
Mindray has an eager visitor try out a highly flexible POC ultrasound system