BioSpectrum the business of Bio & Health Sciences

Netherlands bolsters e-health initiatives

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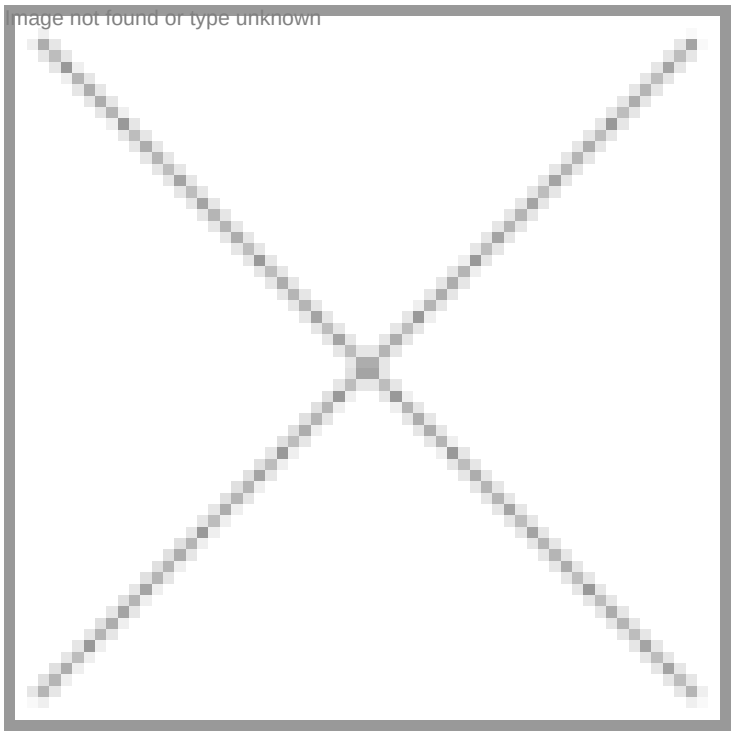
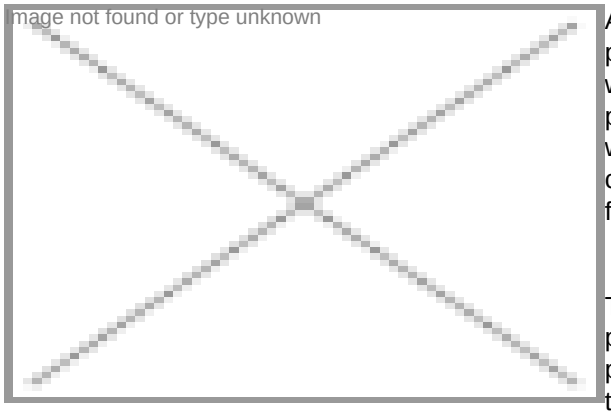


E-health is the healthcare of tomorrow, which is why the Dutch Government is taking more initiatives to make it a reality. BioSpectrum gives a brief snapshot of six high-end innovative technologies which could change patients' quality of life



A visit to the community centers in the Doornakkers neighborhood in the province of Eindhoven, and one would not fail to notice the extent to which e-health services has percolated into the daily lives of the Dutch population. Ms Ayse Artúrk, 59, met with an accident two years ago, which caused an injury to her leg. Old age coupled with immobility caused by the injury, made it difficult for her to physically go to the trainer for exercises and her general practitioner for regular check-ups. E-health

Through a whole menu of ICT services provided by the 'Living Lab' project, which aims at providing e-health services to the elderly population, Ms Artúrk can now, at the click of a button, virtually connect to her physical trainer, sitting in another location of the neighborhood, and her general practitioner for her weekly check-ups rather than physically going to the clinic.

The Dutch healthcare system today faces three major worrying trends – increase in chronic illness and aging population, deficit in nursing and caring staff and above all, public healthcare costs rising faster than the economic growth. In 2010, Netherlands saw €63 billion being spent on healthcare. The Ministry of Health, Wellbeing and Sports is thus looking at a host of e-health solutions which include application tools for elderly care, tools for chronic diseases, applications for interaction

between professionals (tele-dermatology and expert systems) and lastly, initiating electronic health record (EHR). By 2020, e-health services would be available at the national level and in 2012 e-health services for diabetes and chronic heart failure would be available. Collaborative partners for this initiative include Achmea, Menzis, KPN, Philips, Rabobank, and TNO enZIP/VWS.

The Dutch Ministry of Economic Affairs organized a media tour to showcase the latest e-health initiatives and high-end medical technologies that have been developed and are expected to be implemented by Dutch universities, spin-off companies and organizations. A brief snapshot of some of these technologies:

E-Health = Healthcare of the Future

Instantaneous, ultra-sensitive and handy detection of micro-organisms and biomarkers with Lab-on-a-Chip Interferometer Nanotechnology from Ostendum — a spin-off company from MIRA, University of Twente's (UT) Research Institute for Biomedical Technology and Technical Medicine: Ostendum has developed an easy-to-use, ultra-sensitive sensor chip, which in a span of five minutes, detects the presence of micro-organisms which including specific bacteria, virus and even proteins and DNA/RNAs. The technology based on the Lab-on-a-Chip and Interferometer nanotechnology was originally developed at the UT. For instance, this chip takes five minutes to detect an influenza virus while a normal PCR test would take five-to-six hours. The chip takes three minutes to detect proteins released during traumatic brain seizures as compared to the usual eight hours using a PCR test. Validations have been done for herpes viruses, vaccinia virus, influenza A (H1N1) in serum (now saliva test being prepared), traumatic brain injury (TBI) markers and cardiac biomarkers.

Determination of an appropriate cancer therapy using magnetic particles at Medical Cell Bio Physics - a spin-off from MIRA, UT: The 15-member team at Medical Cell Bio Physics in collaboration with Veridex, US, has pioneered the development of a technology which will test and determine the right therapy for cancer by counting the number of circulating tumor cells (CTCs) in the blood. The presence of a high count of CTCs is indicative for poor prognosis and suggests an ineffective therapy if not eliminated after three-to-four weeks of therapy. This technology developed by Dr Leon Terstappen uses immuno-magnetic particles and through its magnetic force attracts the CTCs binded to the blood sample. Depending on the tumor cells, doctors can determine not just the efficacy of the patient's current therapy but also suggest an appropriate cancer therapy if the exist one proves to be inefficient. While, in current practices, the efficacy of a cancer treatment can be determined only after 20 weeks, in this case, the efficacy can be determined within the first week itself.

Bone growth using ceramics from Progentix – a spin-off from MIRA, UT: Progentix has brought in a different facet to regenerative medicine by using synthetic biomaterials for bone growth rather than filing the defect by taking the bone from the human body. The team identified the disadvantages of choosing treatments using bone parts from the human body. Cell therapy too had its own set of limitations. Moreover, for the increasing aging population in the West, such treatments are not viable. The result was the creation of synthetic ceramic, materials patented micro structures, whose chemical properties are acceptable by the body, has the ability to form bones and instruct the body without having to add cells through stem cell therapy or other growth factors.

Early diagnosis of prostate cancer by contrast-ultrasound diffusion imaging from Eindhoven University of Technology, Academic Medical Center, Amsterdam; and Catharina Hospital, Eindhoven: Scientists and doctors have come up with a new ultrasound imaging method for prostate cancer localization called the Ultrasound Contrast Agent (UCA) diffusion. The idea here was to come up with a breakthrough non-invasive imaging technology for men. Local diffusion is estimated by transrectal ultrasound imaging of an ultrasound contrast-agent bolus passing through the prostate circulation after a peripheral intravenous injection. These microbubbles after having being injected to the blood stream are then induced with ultrasonic waves which propels oscillation of the agents in a non-linear manner. Indicator Dilution Curve (IDC) measurement at each pixel is tracked followed by quantification of local UCA dispersion by IDC analysis which in-turn diagnoses whether a patient is suffering from prostrate cancer.

Development of online risk test to detect a patient's risk of developing preventable diseases from the Doctors at Bronovo Hospital, Hague: After five years of intensive research doctors at the Bronovo Hospital, Hague have developed a new and comprehensive online risk test for 28 types of preventable diseases. Launched nation-wide on January 4, 2011, the website requires a patient to fill a questionnaire which takes 30-40 minutes and the results indicate whether the patient is at risk of developing one or more preventable diseases and whether he/ she should go for a screening test. At the end of the result, the website also gives diet suggestions for all the 28 diseases. Follow up of the visit to the general practitioner (GP) is also tracked. Results indicate a gradual change in the number of patients adopting healthy habits like exercising, reduced intake of alcohol and smoking and taking care of their diet. The pilot studies for this test involved 16 GPs and 20,000 patients.

Interventions via internet for psychological patients from Trimbos Institute, Utrecht: Scientists at the Trimbos Institute have come up with e-mental health services for patients suffering from psychological problems, who otherwise could not be traced. Speared by the Innovation Center of Mental Health and Technology (I.COM) the project called 'Mental Vitality' has 16 sub-

projects. Two portals are being developed, one for the youth and the other for adults. These contain an overview of all the online resources for mental problems. A new e-self help intervention – the Mental Vitality Module – is being developed. For people who receive treatment for depression, there will be a new module for relapse prevention. Within the Mental Vitality program, a standardized indication instrument with clear protocols is being developed. Its purpose is to provide appropriate prevention interventions at the right time within the care chain of prevention, treatment and aftercare.

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(The author was in the Netherlands at the invitation of the Dutch Ministry of Economic Affairs)