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91 – New Technologies to Support Family Doctors

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Introduction

"One day in the future, you will be able to call anyone everywhere in just a few seconds by using a mobile device. Furthermore, this device also will be your computer ... and there's more: As a family doctor you will even be able to check your patient's blood pressure levels with the same device!?!".

Those days are not so far removed from today. Micro-CT-scanners, handheld ultrasonography, wearable microchips that monitor your vital parameters continuously, DNA sequencers in your toothbrush, hyperspectral imagers to detect melanomas in an early stage, the MRI scan (at 15dB) in your kitchen while you bake an egg, the gold nano-bullets in your bloodstream covered with antibodies to look for certain proteins, the thought control through a (Google) helmet for thought sharing, chips implanted in your eye to monitor your blood glucose and other haematologic parameters, you name it, it is or will be available over the coming years.

Personalised Medicine, Precision Medicine

We did a Pubmed search in November 2014 with "technology + primary care" as keywords and we accessed 8186 articles. All articles were written between 1969-2014. When we looked at the results in more detail, we observed that 3450 of them were written in the last 5 years; over forty percent of all the articles. This demonstrated to us the increasing importance of technology usage in primary care. There is a trend that people become more individualised in a global world, people want personal care, a personal doctor, and no mistakes. So they will welcome technology in the doctor-patient relationship.

Body Sensors, Microchips, Nanorobots in Blood, Wearable e-skins

Consider a tiny, wearable sensor that collects data and reports on the status of your body. It will measure vital signs continuously and alert the physician if there is something wrong.

With the help of a wireless transmitter, a microchip will circulate in your bloodstream and if it detects any local infection, it will detect the infection and treatment can be initiated. What if a nanorobot in your bloodstream could detect a problem before the disease manifests itself in your body?

Nanobots, called respirocytes, can keep tissue vital up to four hours even when it is de-oxygenated as in a heart attack or stroke. They can also repair the damaged area and keep away platelets from the damaged area.

Also, with the help of wearable e-skins, when medical assistance is needed, an alert

from patients' e-skin will be transmitted to the medical centre and patients' data will be shared without any effort. No need to call an ambulance, no need to worry about location!

Multi-functional Radiology

It is obvious that radiology plays an important role in the diagnosis of diseases today. Consider doing an MRI scan at home in the future... Furthermore, there may not be a need to run diagnostic tests like MRI scan, CT scan, Doppler USG, etc. One multi functional machine will detect any kind of medical problem, symptom and biomarker. The machine will also be able to detect cancer from its outset.

Telemedicine, Holographic Data Input, 3D Printed Bio-materials and Drugs

In the future, the patients will monitor their vital signs and without the need to attend their health centre, they can inform their physicians.

On the physician side, patients' data will be accessible through means of holographic visuals. Screens and keyboards will be projected through all surfaces in clinics and patient data will be stored only in the cloud drives.

3D printers will be available for everyday use and when the physician offers a medication, the drugs and any patented molecule will be available to be printed at the patient's bedside. When the patient is injured, it will be possible to print a new tissue or simple organ by using 3D printers. Furthermore, with these printers, it will also be able to print humanoid robots. They can serve a sick child, educate an autistic child and can also serve as personal assistant to the elderly.

Augmented Reality

It is known that keeping patient's records in mind is a challenge for a physician! Augmented reality means living a life which is augmented by computer-generated input like audio, video, graphic or data such as FDS. A digital contact lens or Google Glass will be the best assistant to a physician. It will supply information regarding a patients' health status or will help to consult with colleagues from other professions.

Procreation and Contraception

Today, implantable systems can release hormones for up to 16 years as a method of birth control. In addition, another method is by using stents in the ovarian tubes that can be opened and closed simply through creating a magnetic field over the abdomen. You want a baby? Open! No baby? Close!

There will be a day when women get sick and tired of giving birth and request cloning; an extra-uterine device that will function as a womb and designed for home usage. Expecting parents can watch their baby grow. Live. On their bookshelf.

Conclusion

Once upon a time, having medical records and diagnostic images on the physician's computer were a great technological advance. Today, we are talking about nanotechnology, microchips under the skin and magical glasses. It is already known that with the Human Genome Project, it is possible to have personalized drugs according to genomic background. In 20 to 30 years, by altering the genomes of a person, it will be possible to be ageless and disease-free. Family doctors will then also be personal doctors, but with the help of all the technology, there will be more time for a congruent doctor-patient relationship.

Take Home Messages

- Today, at the beginning of the 21st century, lots of promising new technologies are emerging.
- Some of the future technologies include: body sensors, microchips, nanorobots in blood, wearable e-skins, multi-functional radiology, telemedicine, holographic data input, 3D printed bio-materials and drugs.In the future, we expect to print a new tissue or simple organ by using 3D printers and become ageless and disease-free.
- Family doctors will stay forever.

Original Abstract

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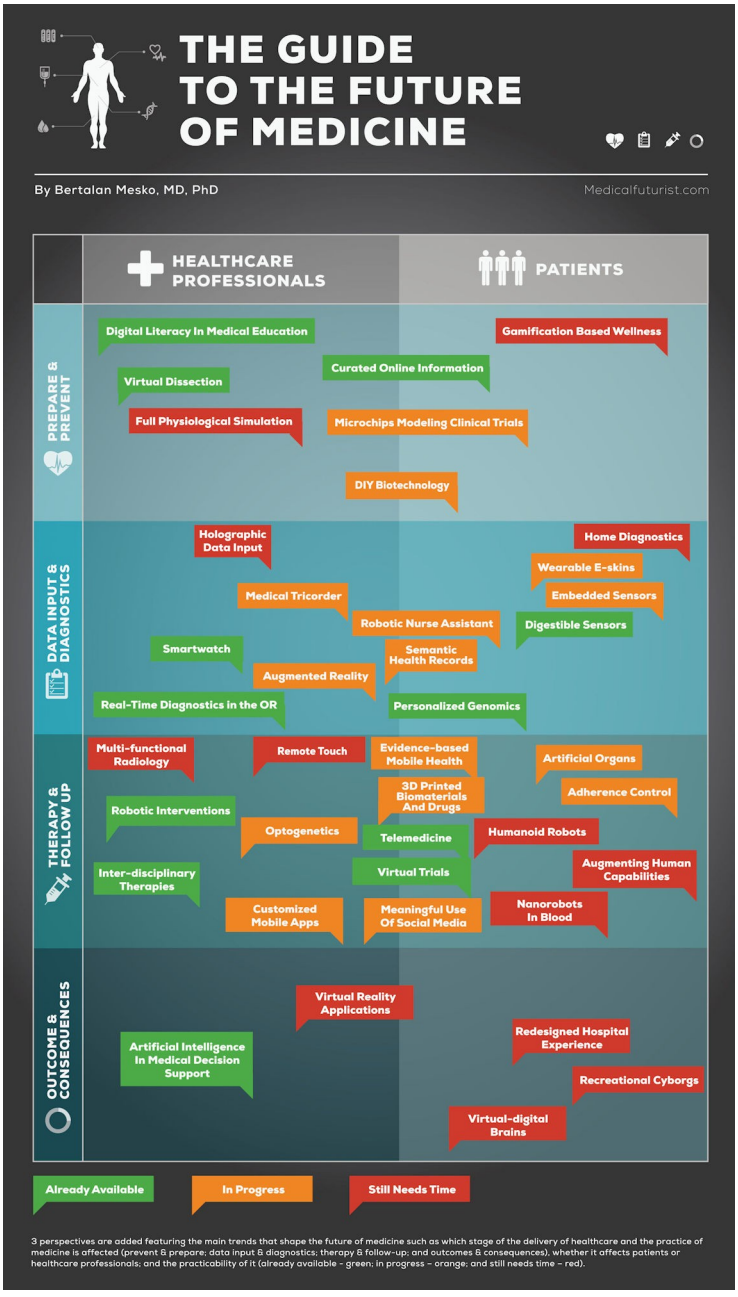

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