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EDITORIAL

eHealth-mind the gap

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Internet of Things (IoT) refers to a network of electronic devices capable of collecting and sharing data through sensors [1]. In the healthcare perspective IoT includes concepts such as electronic health (eHealth), mobile health (mHealth), biometric sensors and wearables visualized in Figure 1 [2,3]. The use and technological advantages of consumer wearables like fitness trackers and smartwatches are increasing rapidly. A wearable can provide objective biometric sensor data such as heart rate, sleep and physical activity [4–6]. The biometric sensor data offer a new way for health professionals to obtain objective measures which in combination with subjective symptoms and other objective findings may help personalize patients care. If we look at a patient's pathway through the disease trajectory biometric sensor information may be used in the preventive setting, at diagnosis, during treatment, rehabilitation, follow-up or in the palliative setting [7]. The purpose could be activity monitoring, self-management, healthcare education, home-based care monitoring or symptom monitoring [4]. First, it is of importance to observe these new devices as both supporting the cancer patient and the health professionals. Naturally, the wearable may also track subjective feelings, behavior and cognitive aspects as reported or noted by patients. The degree of sharing information with the health professionals will ultimately be decided upon by the patient when giving informed consent.

The COVID-19 pandemic have added a new dimension to clinical decision making [8]. When the healthcare system is under pressure due to limited resources such as economy, equipment, staff etc., it is natural, that all new technologies are taken into consideration to solve the challenges. Researchers have highlighted the potential of eHealth in coping with COVID-19 and improve healthcare in general [9], for some countries the lack of infrastructure for telemedicine have become even more evident during the COVID-19 pandemic [10]. We have raised issues related to patients' perspective when considering implementation of new eHealth tools [11]. In general, the present pandemic seems to highlight some of the possible potentials of eHealth not only to overcome COVID-19 but to improve many facets of healthcare including oncological care in a broader context. However, it is still a question what eHealth and specifically wearables may add to cancer care.

Most recently Miyaji et al. has shown, how a wearable activity tracker can be used in a cancer population for patient-generated health data collection [12], a set-up which seems feasible at least in study populations, but has not yet proven clinical implications during treatment. Frequently the focus in cancer studies investigating wearables is on physical activity and have been developed and tested in, e.g. hepatocellular carcinoma [13], finding the tool usable but leaving us behind without knowing if the monitoring by wearables is able to improve the overall content and quality in the life of cancer patients. When Coughlin et al. reviewed the literature, they identified 13 studies describing the use of wearables to improve physical activity in survivors of breast-, prostate- and colorectal cancer [14], concluding that cancer survivors show an increase in physical activity when using consumer wearable activity trackers but also requesting additional studies within the field [14]. One cannot refrain from asking if the results simply reflected the increased surveillance arising from just participating in such studies. Improvement of physical activity is in many aspects of the cancer trajectory an important effect. However, would we expect more from using this technology?

Recently Zhou et al. have outlined how multiple technologies such as natural language processing and optical character recognition are being developed for clinical use, and how such technologies may serve as additional sources for data exploitable for further research [15]. However, there seems to be a lack of uniformity, definitions and frameworks within the work with new technologies in healthcare. A pragmatic guide based on knowledge from drug and nutrition labels for how to put an evaluation framework into practice as suggested by Coravos et al. might be crucial, crafting a connected sensor technology label [16].

Wearables present another and new opportunity for supporting both patients and clinicians working with the care of cancer patients. The wearable technology has various aspects depending on the aim of the use, the target group and benefits achievable by introducing the technology. As always, you may lift your hand and call for more research and regulation. On the other hand, the technology is here, marketed and already being tested among other patient groups, that is, in surveillance of patients in treatment for major depression tracking activity as an indicator of mood level [17–19]. In targeting this schism between the call for evidence and regulation on one side and the intuitively advantages on the other side, we suggest that the use, or exploration of use of

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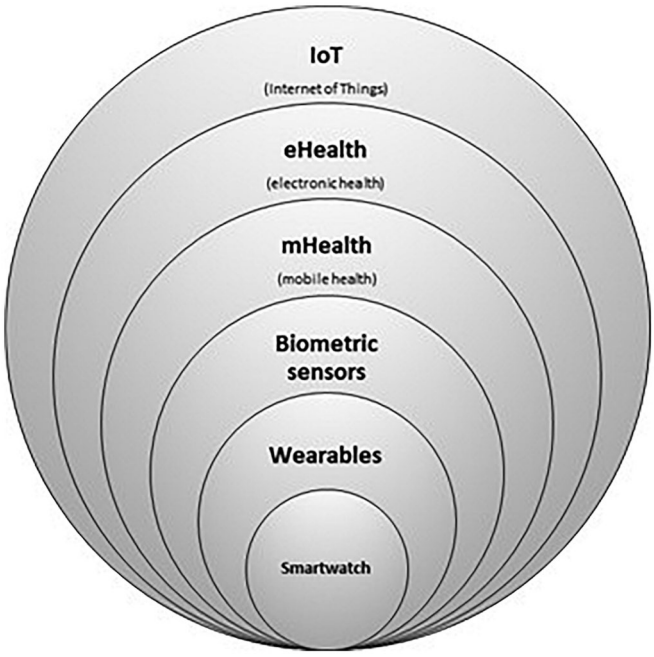

Figure 1. Internet of Things in the healthcare perspective.

such technologies, is close to mandatory in clinical trials, as tools of the future, keeping in mind clear aims and well-defined methods parallel to the use of patient reported outcomes in clinical trials [20].

In conclusion, we need to underscore, that although we do see great possibilities in using wearables in future cancer care, there is a need for guidelines based on evidence illustrating additive, zero or even negative effects. Such guidelines may help finding the path between the availability of these technologies, the need for data in the light of the change between treatment during admissions to outpatient scenarios, and most important such technologies needs acceptance from the patients.

Disclosure statement

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