



Imagining 2029 webinar series:  
Digital Therapeutics, Artificial Intelligence, and  
Virtual Coaches

**An EHTEL Factsheet:  
How Hospitals at Home can Benefit from  
Digital Therapeutics**



This factsheet concentrates on how hospitals at home can benefit from **digital therapeutics**. It offers a brief outline of what digital therapeutics are, how they can be used, and how **artificial intelligence** can underpin them. The factsheet is the first in a **series**. Each factsheet will reflect the content of a **dedicated webinar or workshop** (e.g., in September 2020, a more in-depth coverage of artificial intelligence). It is anticipated that several factsheets will culminate in a more **formal Briefing Paper** towards the end of 2020. This factsheet is based on discussions hosted by EHTEL on Wednesday, 3 June 2020, with the support of EHTEL Innovation Initiative chair, Juan GUANYABENS of **TicSalutSocial (Barcelona, Spain)**, and two European projects – NWE-Chance and vCare.

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## Today's chance to change

Given the experiences with fighting against the coronavirus (COVID-19) in the first half of 2020, **European health systems and especially hospitals** are needing to manage ever more knowledge and increasing amounts of data. Among a wide variety of sources, that data is coming from people's, and patients', homes. **Challenges** relate to e.g., increasing clinical benefits; providing treatment in a variety of locations – in the hospital itself, in new forms of hospitals, at home; and involving healthcare staff effectively in the changes taking place. **Societal values and expectations** are changing, but so too are the **available technologies** e.g., digital health and artificial intelligence. In today's health and care paradigm shift, digital health can help in many places – including in people's homes.

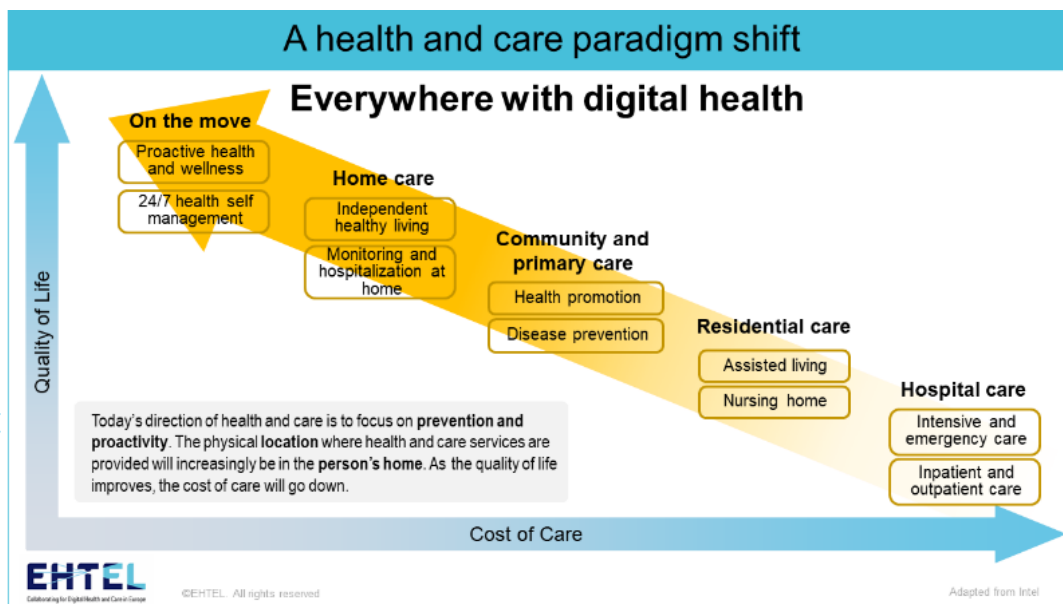


Figure 1: Health and care services will increasingly be available in people's homes (adapted from Intel)

## Digital therapeutics and their use

There is considerable hope that people and patients can benefit from the growing availability of digital therapeutics. The industry-based association, the **Digital Therapeutics Alliance**, defines digital therapeutics in this way (see **References**):

*Digital therapeutics (DTx) deliver **evidence-based therapeutic interventions** to patients that are driven by **high quality software programs** to prevent, manage, or treat a medical disorder or disease. They are **used independently or in concert with medications, devices, or other therapies** to optimize patient care and health outcomes. [...] (p5)*  
(Our emboldening.)

Many different types of **digital therapeutic devices and products** are either available on the market or are undergoing research. Among the wide variety of conditions that digital therapeutics can help people/patients cope with are back pain and rehabilitation; diabetes; cognitive and behavioural disorders, social anxiety, and psychosis.

|                     | WELLNESS & SUPPORT  | DIAGNOSTIC & MONITORING   | THERAPEUTIC INTERVENTIONS  |
|---------------------|---|---|--|
| Overview            | Products that capture, store, transmit health data  | Products that measure and/or intervene  | Products that deliver therapeutic interventions directly to patients   |
| Clinical evidence   | <i>Not typically required</i>   | Required  | Required   |
| Real world outcomes | <i>Not typically required</i>   | <i>Not typically required</i>   | Required   |
| Examples            | <ul style="list-style-type: none"> <li>▪ Lifestyle apps &amp; fitness trackers</li> <li>▪ Telehealth platforms</li> <li>▪ Health Information Technology</li> <li>▪ Consumer health information</li> <li>▪ Enterprise support</li> </ul> | <ul style="list-style-type: none"> <li>▪ Digital diagnostics</li> <li>▪ Digital biomarkers</li> <li>▪ Remote patient monitoring</li> <li>▪ Medication adherence tools</li> <li>▪ Ingestible sensors</li> <li>▪ Connected drug delivery devices</li> </ul> | Digital therapeutics deliver interventions that treat, manage, and prevent a broad spectrum of behavioral, mental, and physical diseases and disorders |

Figure 2: What distinguishes digital therapeutics from other health innovations?<sup>1</sup>

One example in current use is by AliveCor Heart Monitor/Kardiamobile, approved for usage since 2015 by patients for the National Health Service in England who experience heart arrhythmia (see **References** – NICE (2015)).

<sup>1</sup> Source: Digital Therapeutics Alliance – <https://dtxalliance.org>

## Digital Therapeutics supported by Artificial Intelligence

Artificial Intelligence (AI) is a field of interest for many European nations and regions – one example region is Catalonia in Spain. As part of Catalonia’s Ministry of Health, the TICSalutSocial Foundation is working in general to promote the development and use of information and communication technologies and networking<sup>2</sup>. The foundation focuses on **how beneficial AI** can be, as one of those technologies. Key to the foundation’s thinking are the ideas of American cardiologist, **Eric TOPOL** (see [References](#)).

A core, current, area of focus by the Catalonian foundation is **medical imaging**, but the region is also keen to expand its usage and areas of investigation more widely throughout the **health and social care fields**, with a focus on the importance of data, technologies, and human resources.

*“To deploy AI for the health sector, we need good data – clinical, medical, and image data, technology, and talent,”* stated TicSalutSocial’s Juan GUANYABENS.

If used appropriately, AI has the potential to **adjust therapies to the needs of individual users** over time, and so increase the effectiveness of treatment.

We can therefore expect to see many more examples of AI-based digital therapeutics. Ambitiously, when or if merged with AI, digital therapeutics may have more to offer in the field of **clinical trials**, for example. Efforts may have to be made over a substantial period of time, however.

*“Expectations are high, but it will take years for the evidence base to be built,”* said EHTEL honorary member, John CRAWFORD.

## Hospitalisation and Care at Home

Digital therapeutics are, of course, useful in many different settings and locations. Digital therapeutics can offer considerable advantages to hospitalisation and care at home. They include:

- Improving **preventive care** and monitoring people’s and patient’s health status and changes (pre-hospital; in-hospital, wherever located; post-hospital).
- Assisting with **behavioural modifications**, including improvements in **mental health and cognitive conditions** (including in the home, and under conditions of social isolation).
- Supporting **health data collection** (e.g., for more comprehensive, wide-ranging **clinical trials**).

There are several **drivers for hospitalisation at home** e.g.,

- The societal, social, and economic pressures placed currently on hospitals.
- People’s desire to stay in their own homes rather than to be hospitalised.
- The need to protect patients (*“first, do no harm”*).

In terms of hospitalisation at home, EHTEL is pleased to highlight the work of **two initiatives**.

<sup>2</sup> <https://ticsalutsocial.cat/en/about-us/>



## Hospitalisation at Home – the example of Isala Heart Centre – Zwolle, Netherlands/NWE-Chance

For several years, the **Isala Heart Centre** has focused on admitting patients with heart failure to hospital while in their own homes. Their virtual heart centre is all about providing **hospital-level care in the living environment of patients**. It has meant bringing together **healthcare professionals at a distance**, and a **wide variety of point-of-care technologies and sensors**. Over 1,000 home admissions have taken place in the Zwolle region of the Netherlands: **patient satisfaction** has been extremely high; vulnerable patients have benefitted most; and, overall, the service provided has been less expensive.

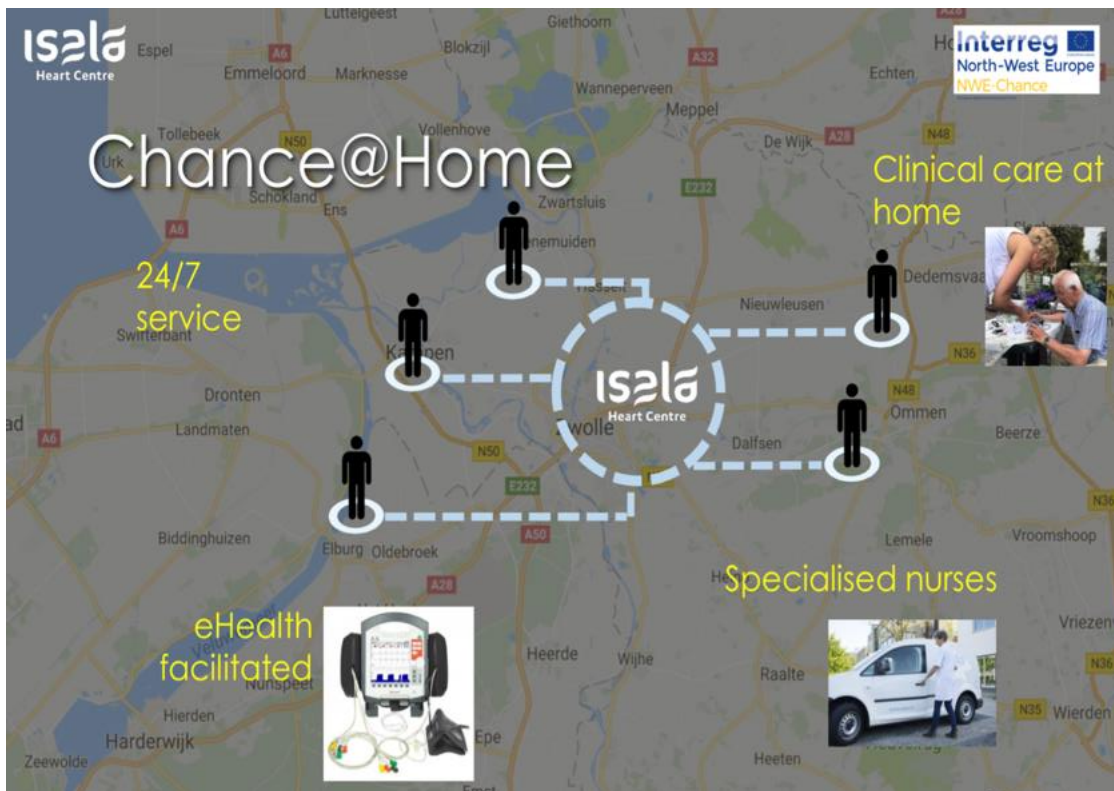


Figure 2: The 24/7 Chance@Home service provided in the Netherlands' Zwolle region

Now, Isala is liaising with other sites around north-western Europe, e.g., in Belgium and the United Kingdom (Scotland), in the NWE-Chance initiative<sup>3</sup>. **Scaling-up efforts** requires a solid and professional organisation (including a call centre) and integrated technologies (a platform, connectivity, and multi-vendor interoperability). NWE-Chance's **three objectives** are to: build a home hospitalisation **platform**, demonstrate what **home care processes** are needed to support the platform, and set up **a sustainable innovation hub**. The platform is merging the use of various **technologies**, including eCoach and vital signs monitoring. The future challenges lie especially in various **organisational difficulties** and **technological integration**. Isala is keen to understand how digital therapeutics/artificial intelligence can help facilitate hospital care at home.

As Ed DE KLUIVER of NWE-Chance succinctly summed up:  
*"Hospitals of today are not the hospitals of tomorrow".*

<sup>3</sup> <https://www.ehtel.eu/activities/eu-funded-projects/nwe-chance.html>

## Hospitalisation at Home – the example of CCP– Milan, Italy/vCare

**Casa Cura Policlinico (CCP)**, based in Milan, Italy, has also been working to provide **neuro-rehabilitation** therapies to patients so as to ensure continuity of care even into the patients' own homes. CCP's journey on the digital therapeutics' pathway started in 2012 and is continuing a decade later. CCP has used not just commercial solutions but also developed **clinical, evidence-based services**. CCP is now involved in a European-funded project called vCare<sup>4</sup>, which aims at **developing coaching activities for rehabilitation for elderly people**. The clinic has explored digital therapies, including those which can provide counselling, feedback, and activities monitoring. Its staff members have considerable hopes for what AI can offer **virtual coaching** in the future!

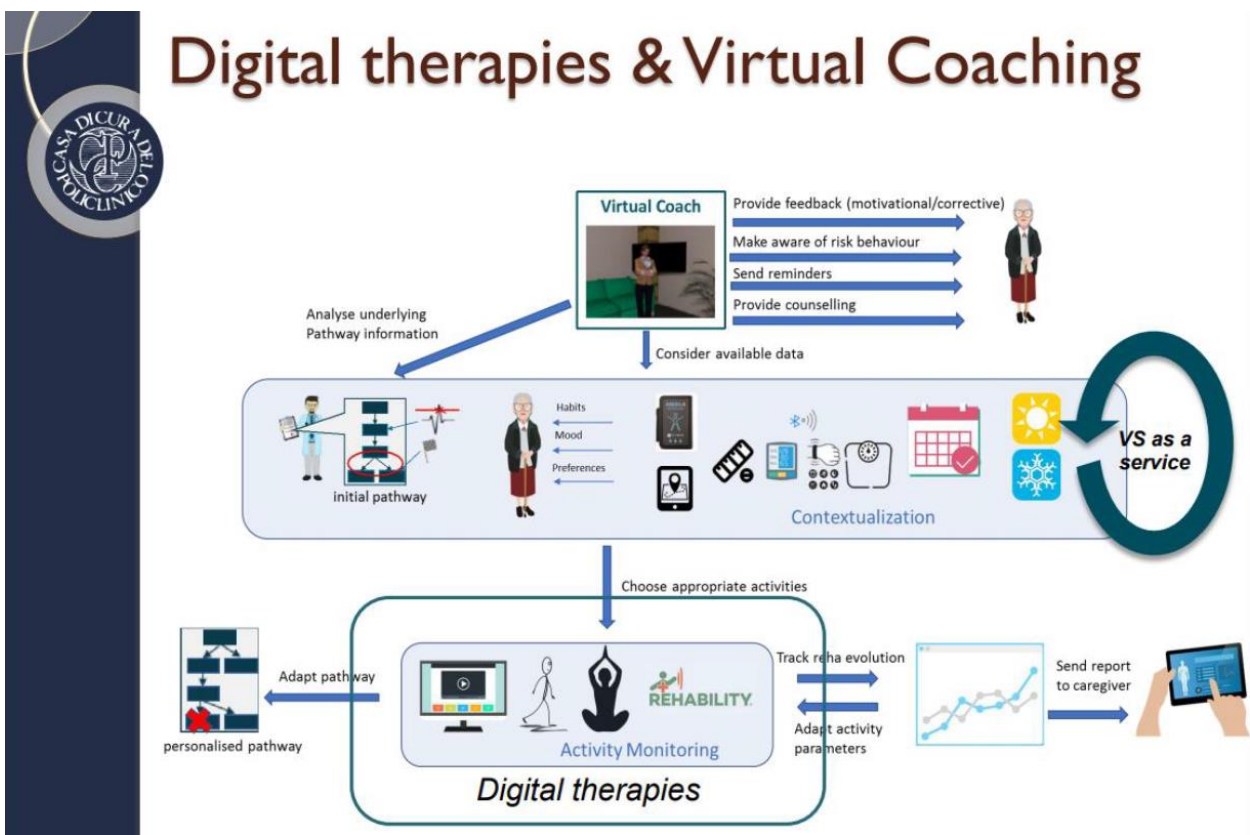


Figure 3: Virtual coaches in vCare – digital therapies and virtual coaching

<sup>4</sup> <https://vcare-project.eu/category/news/>

## Current and future directions in digital therapeutics, artificial intelligence, and virtual coaches

In discussions, many other EHTEL members and friends have proposed various **other hospital at home examples** in e.g., Denmark, Belgium (especially in Flanders), Germany, the Netherlands, Romania, and the United Kingdom (both in England and Scotland). There were also expressions of interest to investigate further a number of technologies, such as **gamification** and **virtual reality**.

Among **remaining challenges** identified by EHTEL members and friends include: the organisation of contemporary health and care systems; how to shift from piloting to committed roll-out; the lack of “clinical buy-in” and/or “hand-over” from medical professionals; difficulties with producing evidence of benefits; the exploratory character (still) of many relevant technologies, their potential intrusiveness, and the lack of trust of their usage especially in intimate (e.g., domestic) settings.

As John CRAWFORD, EHTEL honorary member, reflected:

*“There is the perennial challenge of technological adoption, and innovation more generally”.*

Particularly highlighted in comments was what one commentator called **the “Bermuda Triangle”**, when patients are ‘lost’ between hospitals (managed by health authorities) and homes (where towns or communities take more responsibility). Clearly, **national, regional, and local levels of governance** all need to be included in discussions on future ways forward.

Hospitalisation at home, and the support offered by **digital therapeutics, including those supported by AI**, are nevertheless likely to be areas on which there is considerable focus in the future.

The crisis presented by the 2020 coronavirus pandemic, and the opportunities for enhancing organisational and technological solutions, is paramount. Thus, between 26 May - 11 June 2020, the European Commission opened up five calls for expressions of interest, one of which was specifically on **“Medical technologies, Digital tools and Artificial Intelligence analytics to improve surveillance and care at high Technology Readiness Levels”**.<sup>5,6</sup> Time is of the essence in finding reliable support for good care. Rapid sprints, agile responses, and research scrums are likely to prove to be essential.

Future EHTEL webinars will lead to the production of more factsheets and briefing papers. In the field of digital therapeutics and artificial intelligence, the next upcoming webinar will be on **digital therapeutics and interacting with human beings**. Among other related topics are **health data ecosystems for integrated care**, and **real-life data fit for the European Health Data Space**.

<sup>5</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_887](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_887)

<sup>6</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/sc1-phe-coronavirus-2020-2b>

## References

These six easily available pieces of literature are useful for anyone wanting to find out more about the topics covered in this factsheet. This list of references is by no means comprehensive.

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For more information about EHTEL's Innovation Initiative and its work on digital therapeutics:  
Contact the EHTEL Secretariat - [communication@ehtel.eu](mailto:communication@ehtel.eu).



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