



# Future Digital Health: An approach to New Digital Workforce Profiles in Healthcare

Fundació TIC Salut & Mcrit Multicriteria Planning



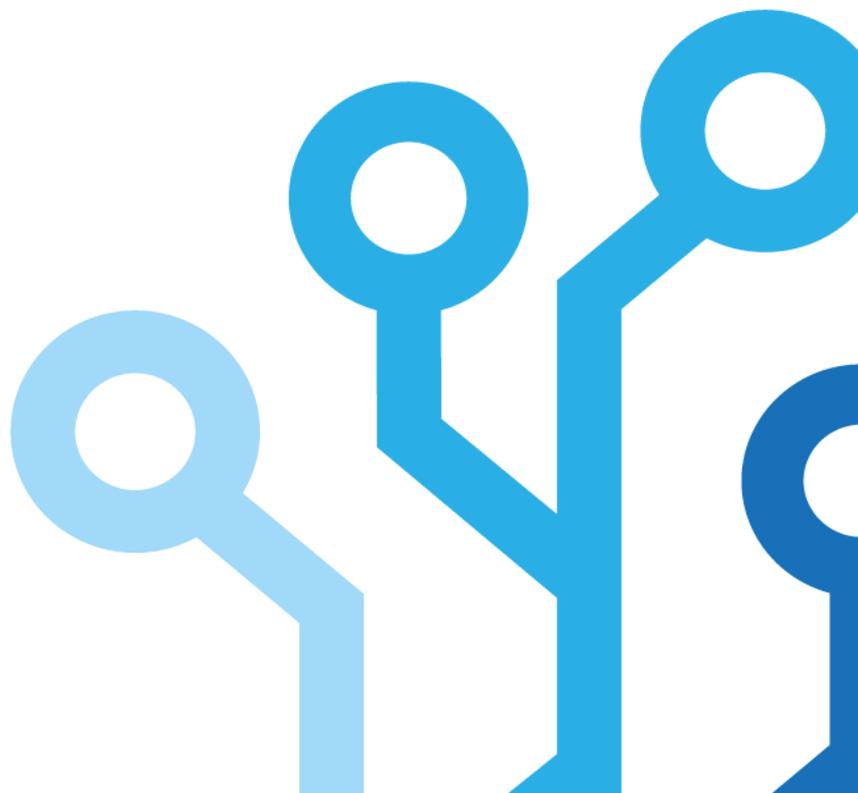
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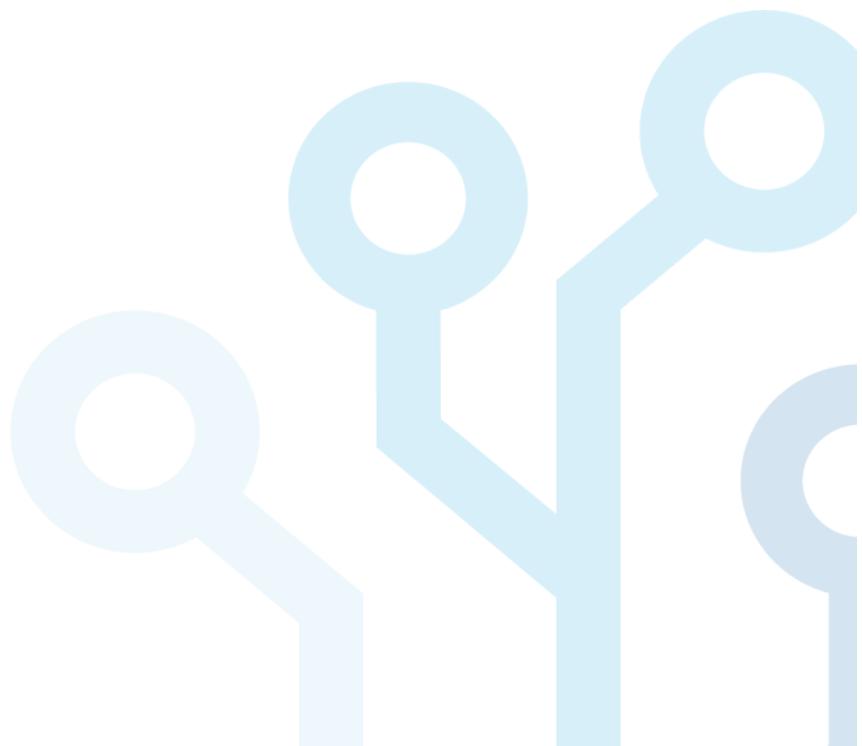
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# 1 Introduction

Healthcare is facing an unprecedented change, driven not only by aspects like a high prevalence of chronic diseases and a growing demand of healthcare resources, but also because of a growing penetration of digital technologies and a more connected society. Nevertheless, change driven by digital transformation will only improve health indicators if, first, technology is used appropriately; and second, future workforce profiles in healthcare are adapted to the new requirements of service provisioning.

This article reflects the impact that ATHIKA project results' can have in the future labour market. Using the knowledge and learnings from the training activities performed, this article describes future opportunities to bridge the gap between health and technology workforce within the universe of digital solutions. Specifically, it throws light into the digital transformation trends by describing new profiles and digital skills approach to future professions. As an example, four potential professions are described in an attempt to foresee new profiles future workers...

**Can you identify yourself as any of them?**

## 2 Digital transformation in healthcare

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Healthcare is being transformed the world over, instigated by the fourth industrial revolution and hastened by the COVID-19. The COVID-19 pandemic has been talked about as a “time machine to the future.” In fact, the COVID-19 pandemic has disrupted labour markets globally. The short-term consequences have been sudden and often severe - millions of people have lost their jobs, and others have had to quickly adapt to work remotely from home and / or quickly adopt new technologies and behaviours that are likely to stick.

There's no doubt that COVID-19 has been a terrible scourge, but it's also stamped down on the accelerator for tech areas such as home broadband, collaboration services, cloud applications and services generally, along with remote working. In the health care sector the pandemic forced the adoption of digital technology and communications where often before there was only tinkering and not necessarily by the large national healthcare providers.

Most medical professionals had to adapt quickly, using telephone and online consultations, for instance, in place of patient walk-ins just to stay above water in the midst of the crisis. Public health services had to envision and test applications to closely monitor COVID spread. Digital tools made possible to be agile and flexible when it comes to reorganizing the activity to face this crisis.

According to research by consulting firm STL<sup>1</sup>, barriers to adoption of virtual consultations were lowered as pandemic pressure built and other barriers, such as insurers or governments not reimbursing or underpaying doctors for virtual appointments. Organizational and culture barriers among both patients and providers also broke down and resulted in an acceleration across the broader digital health market, in areas such as remote patient monitoring and population-level analytics.

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<sup>1</sup> The \$300bn COVID digital health dividend. <https://stlpartners.com/research/the-300bn-covid-digital-health-dividend/>

Without this basis, the response would have been much worse, both for patients of the pandemic and for those who were in the usual circuits of the system.

### 3 New trends for workforce in healthcare

Although it is still too early to advance the labour scenario, experts point out, because it has already been seen during the pandemic crisis, the strengthening of the online universe supported by the development of intelligent machines and cognitive technologies. According to McKinsey Consultancy<sup>2</sup> COVID-19 has accelerated three broad trends that may reshape work after the pandemic recedes.

- **Remote work and virtual meetings are likely to continue, albeit less intensely than at the pandemic's peak**

Telework, identified as a great opportunity, but which many were suspicious of, has been imposed in most companies. Virtual transactions such as telemedicine, have also taken off. In the private sector, the current pandemic has pushed many teleconsultation platforms to offer their services during the state of alarm, which has grown their client and physician base. This is the case of TopDoctors in Spain, where almost 500 doctors have activated their telemedicine since the Covid crisis began, and calls from doctors requesting information and the installation of teleconsultation have multiplied by 30<sup>3</sup>.

Or in Germany where two to seven per-cent of doctors were ready to offer video-consultations (prior to the pandemic), but now it's closer to 60%," said Dr Gottfried Ludewig, Director 'Digitalisation and Innovation', Federal Ministry of Health, Germany. The country's contact tracing app called Corona Warn-App has seen about 17.5 million downloads and Dr Ludewig noted that the app has a connection to laboratories which offer COVID-19 testing, which helps inform people much faster than before after they have been tested<sup>4</sup>.

- **COVID-19 may propel faster adoption of automation and AI, especially in work arenas with high physical proximity**

The common feature of these automation use cases is their correlation with high scores on physical proximity, and McKinsey research finds the work arenas with high levels of human interaction are likely to see the greatest acceleration in adoption of automation and AI.

In this regard it is foreseen that there will also be a greater demand for engineers, specialists in robotics, cybersecurity and blockchain, programmers, experts in digital marketing, as well as professionals from all areas related to preventive medicine.

- **The mix of occupations may shift, with little job growth in low-wage occupations**

The trends accelerated by COVID-19 may spur greater changes in the mix of jobs within economies than we estimated before the pandemic. Markedly different mix of occupations may emerge after the pandemic across the

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<sup>2</sup> The future of work after COVID-19

<https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19>

<sup>3</sup> Profesiones con empleo tras el Covid-19.

[https://cincodias.elpais.com/cincodias/2020/04/03/fortunas/1585936036\\_605235.html](https://cincodias.elpais.com/cincodias/2020/04/03/fortunas/1585936036_605235.html)

<sup>4</sup> COVID-19 has pushed digital health forward, but challenges still persist.

<https://www.healthcareitnews.com/news/emea/covid-19-has-pushed-digital-health-forward-challenges-still-persist>

eight economies. Compared to pre-COVID-19 estimates, it is expected the largest negative impact of the pandemic to fall on workers in customer sales and service roles, as well as less-skilled office support roles.

Demand for workers in healthcare and STEM occupations may grow faster than before the pandemic, reflecting increased attention to health as populations' age and incomes rise, as well as the growing need for people who can create, implement and maintain new technologies.

## 4 Transition to new jobs in a post-Covid-19 scenario

Given the expected concentration of job growth in high-wage occupations and declines in low-wage occupations, the scale and nature of workforce transitions required in the years ahead will be challenging.

According to Mckinsey Post-COVID-19 research, not only a larger share of workers will likely need to transition out of the bottom two wage brackets but also roughly half of them overall will need new, more advanced skills to move to occupations one or even two wage brackets higher.

In this regard, the World Health Organization Global strategy on human resources for health highlights the need to “Harness —where feasible and cost-effective— information and communication technology (ICT) opportunities” as “new ICT tools can be of particular relevance in relation to a number of areas. Namely, e-learning, electronic health records, telemedicine, clinical decision-making tools, links among professionals and between professionals and patients, supply chain management, performance management and feedback loops, patient safety service quality control, and the promotion of patient autonomy”.

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### 4.1 Digital skills for the future healthcare workforce

In order to forecast profiles of future professionals, different areas of knowledge and digital skills are considered. Higher education itineraries, personal (digital) skills and future day-to-day duties are aspects that will shape the profiles of future workforce in healthcare. In 2013, the European Commission launched the results of **DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe**<sup>5</sup>. This project presents a detailed framework for the development of digital competence of all citizens, describing all competences that are necessary to be proficient in digital environments and describes them in terms of knowledge, skills, and attitudes. In the field of healthcare, different initiatives are starting to arise, driven by healthcare authorities to improve the digital literacy of their workforce.

Based on the results of the ATHIKA course<sup>6</sup> “*eHealth opportunities and challenges: IoT, AI and Ethics*” and the DIGCOMP framework, this article describes different domains of knowledge that future professionals will need in order to ensure the integration of digital tools into their day-to-day. A multi-dimensional knowledge approach has been used, to interrelate aspects related to both health and technological.

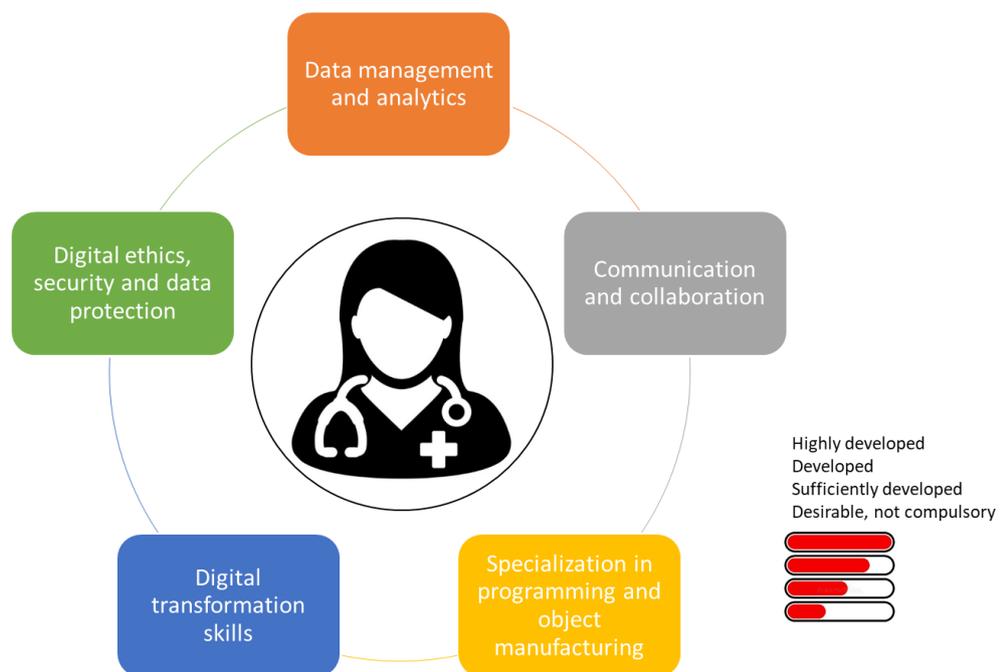
- **Data management and analytics:** Manages data and information from different sources and formats. Analyses and interprets datasets with the help of digital tools, algorithms, artificial intelligence and big data.

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<sup>5</sup> <https://publications.jrc.ec.europa.eu/repository/handle/JRC83167>

<sup>6</sup> <https://athika.eu/course/>

- **Communication and collaboration:** Fosters communication, interaction and exchange of health information and data through digital tools. Promotes network collaboration between different actors. Creates, publishes and shares digital content, assessing the most appropriate context and channel.
- **Specialization in programming and object manufacturing:** Designs, integrates and reworks digital content in various formats. Manufactures objects using digital technology. Uses basic instructions in a computer system to solve simple problems or execute basic tasks.
- **Digital transformation skills:** Understands the foundations and uses digital technology. Identifies personal and professional needs and applies digital solutions. Keeps up to date with digital competence. Solves technical problems.
- **Digital ethics, security and data protection:** Ensures compliance with protocols, regulatory frameworks and regulations on privacy. Applies ethical principles, security and civic criteria in the responsible use of digital technologies-channels, tools and languages- in health.



## 4.2 Future workforce profiles in healthcare

In a near future, where digitalization and technologies are a reality in everyday healthcare practice, new workforce profiles will be needed. Considering the previous digital skills framework as a reference, there is a description next of four profiles of potential future professions in the field of health. For each one, an introduction is provided describing: first, the profile and the rationale; and second, a fictional character including their education, skills and day-to-day tasks<sup>7</sup>.

<sup>7</sup> All characters appearing in this work are fictitious. Any resemblance to real persons, living or dead, is purely coincidental.

## Emily John, Digital Nurse and IT Nursing Manager



### Justification of this new professional profile for the future healthcare

Nursing is one of the most versatile occupations in the healthcare workforce. Emily John has always been very excited about innovation towards improved access to health care, specialised care. She thinks that her profession must evolve into the use of digital technology and generate new scientific learning about data analytics, virtual models of care and co-designing digital solutions with patients, differences across contexts and regions. Emily John is very committed to rethink how nurses interact with and care for patients in a digital world.

**Education:** Nursing degree in digital health, Master's degree in health data science. Training in new and dynamic nursing practices and inter-professional experience.

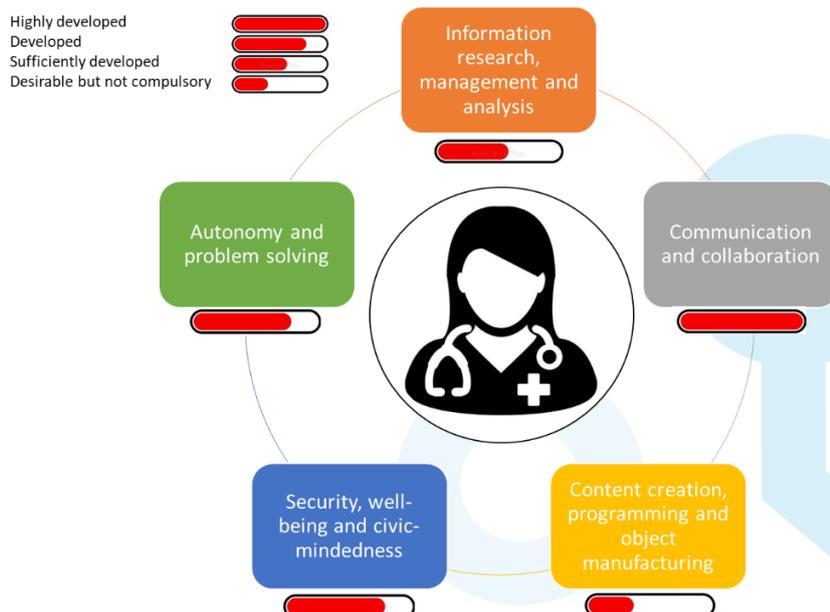
**Skills:** This profile is trained in nursing but has worked and learned in fields such as computer science and specific aspects of engineering. They understand how to apply data science to create new nursing knowledge to support practice. She knows how to lead the development of new models of patient care that enable the use of digital technologies. She also uses AI technologies regularly to support and extend the nursing role in improving cognitive functions, decision making and potentially improving job performance.

### Their day-to-day:

- Instead of taking patient's vital signs manually, patients will be equipped with a wearable wristband that will record key vital signs. Saving time and resources. Only in an abnormal case will produce an alert.
- Instead of asking about the patient's symptoms, she will be able to update them periodically on tablets available in the centres and collect important personalised diagnostic information.
- Clinical practice assistance tools will support physical examinations, administering wound care or dressing changes that the nurse can perform. Assistive tools will also support drawing blood.
- Requesting and recommending care options to physicians for a patient via collaborative platforms.

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### Professional development:



## Peter Weaver – Virtual Hospital Manager



### Justification of this new professional profile for the future healthcare

Non-face-to-face care is here to stay. This model brings together the centre's team of professionals and available technology to support patients remotely. This remote care is carried out through non-face-to-face care channels such as video, telephone or asynchronous messaging. This whole system, in the future, will be managed as a virtual hospital separately from the hospital centre we all know today. Peter is able to manage all this flow of information, patient data, visits and professional agendas. Peter is in charge of the correct functioning, together with his team, so that the virtual hospital functions as an independent unit, complementing the work of the on-site hospital centres or even replacing them completely in the distant future.

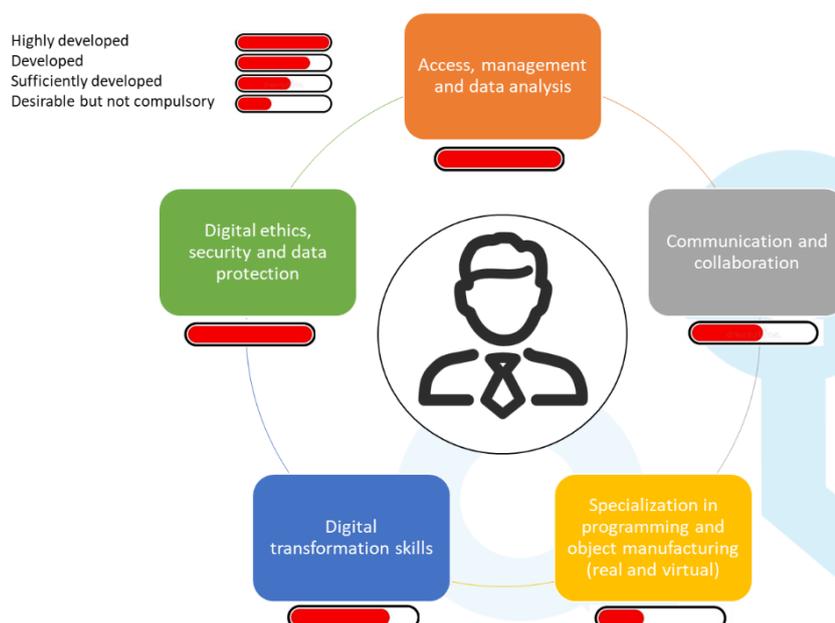
**Education:** Graduate in clinical biomedical engineering. Master's degree in data analysis and platform architecture. Master's degree in project management. Expert in virtual hospital environment operation.

**Skills:** Knowledge of organisation and time management. Programming, web architecture and data analysis to devise, design and evolve the hospital's virtual space. Solving incidents in the information technologies of the virtual hospital. Communicating with patients and professionals to mediate their relationship. Create training content in multimedia format that both patients and professionals can access within the virtual space.

### Their day-to-day:

- Help the patient in the accompaniment of self-management of appointments.
- Intermediary and facilitator between patient and professional helping both to access the Electronic Health Record where all the patient's medical history will be kept.
- Teaching and training patients in the use of video calls.
- Scheduling and controlling the agendas of professionals.

### Professional development:



## Bernard Coleman - 3D printing surgeon and specialist



### Justification of this new professional profile for the future healthcare

New technical profiles specialising in 3D printing will emerge as a consequence of the use of 3D printing in surgical planning and preparation. Bernard is an expert in the design and mechanical functioning of the parts he creates. He designs and manufactures solutions will aim to facilitate the task of surgeons by introducing mediator parts in surgical interventions or in specific cases, 3D printed parts can completely replace organs and tissues of the human body. His work aims to reduce the need for organ donation and help improve the quality of life of the ageing population by replacing worn parts or helping to repair them where possible.

**Education:** Degree in medicine. Postgraduate speciality in surgery. Master's degree in mechanical design of body parts/substitutes with 3D printing

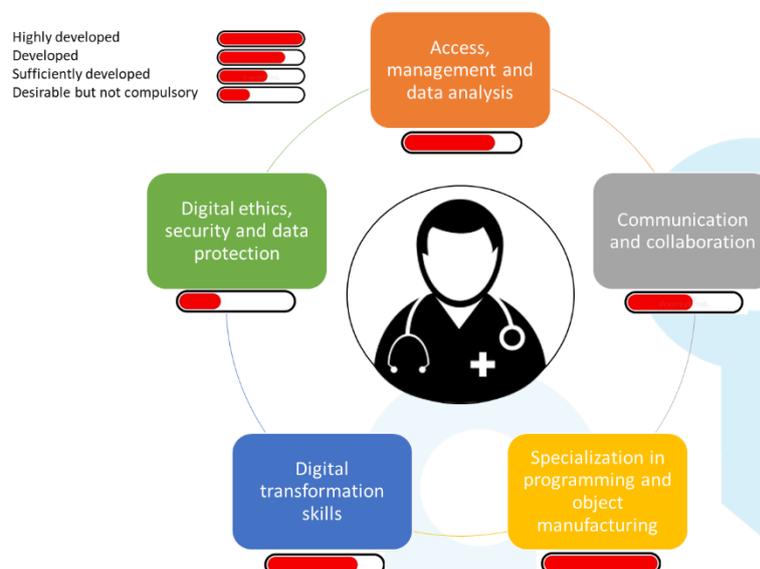
**Skills:** Knows the anatomy of the human body. Has performed/participated in surgical interventions. Has training in biomechanical functioning of joints of the human body. Understands the functioning of organs and tissues of the human body. Can think of solutions that partially replace or, if possible, completely replace a function of the human body. Specialist in the design and creation of bio-functional parts using 3D printing.

### Their day-to-day:

- Working together with surgical specialists and detecting the treatment needs of each patient.
- Design of 3D printing solutions of body parts or surgical intervention helpers.
- Participate and collaborate in operating rooms supervising the correct placement of the designed pieces and/or placing them if necessary.
- Creating new key elements, from splints to support a baby's collapsed airway to custom-made orthopaedic implants and super-precise reconstructions.

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### Professional development:



## Rebecca Willie - Public health urban planning specialist



### Justification of this new professional profile for the future healthcare

New relationships between public health and urban planning are more and more demonstrated. Urban planners must include a public health perspective into urban planning and use of spaces. Rebecca works at the Urban Metabolism Office at the City Hall. She takes a proactive approach to Urban Health and Urban Metabolism to better understand the impact of various urban factors on Health. She is in charge of Urban Health Impact Assessments (HIAs).

**Education:** Degree in Architecture. Postgraduate speciality in Urbanism and Urban Planning. Master's degree in public health.

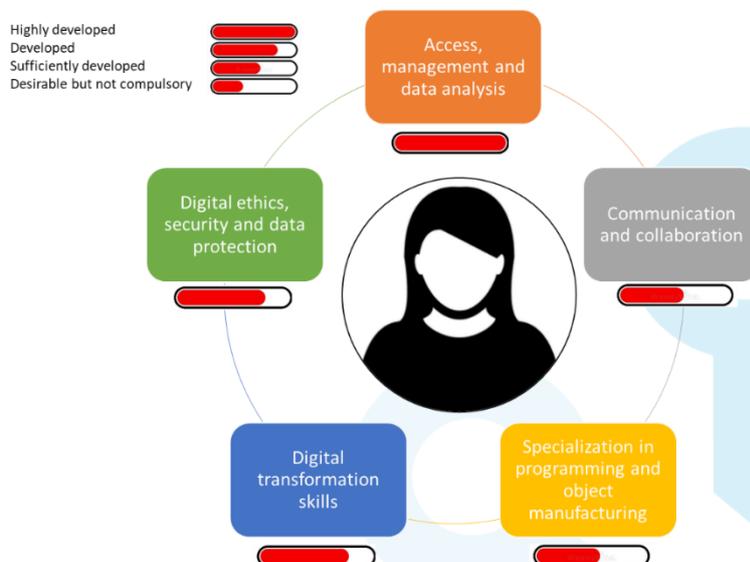
**Skills:** Screening: Identify plans, projects, or policy decisions for which and HIA would be useful. Scoping: Plan the Health Impact Assessment (HIA) and identify what Health risks and benefits to consider. Assessment: Identify affected populations and quantify Health impacts of the decision. This includes an exploratory analysis and creation of health data set profiles (clinical, economics) and healthcare environmental data analysis, which may include big data infrastructures and clinical decision support systems.

### Their day-to-day:

- Design New Solutions: Design and conceive urban planning solutions to maximize and minimize negative Health effects. This include the conceptualisation of integrated care and definition of technological roadmaps (eHealth & mHealth).
- Reporting: Present results to decision makers, affected communities and other stakeholders, considering the needs of different kinds of audiences.
- Monitoring & Evaluation: Determine the HIA's impact on the decision and Health status including the analysis and assessment of the interoperability and safety of systems, data and healthcare devices.

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### Professional development:



## 5 Conclusions

Healthcare is facing an unprecedented change. A growing penetration of digital technologies and a more connected society are drivers which have to be considered in a health scenario of high prevalence of chronic diseases and a growing demand of healthcare resources. Workforce profiles need to be adapted to this new reality of digital health, and this article describes future opportunities to bridge the gap between health and technology workforce within the universe of digital solutions.

