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# Chapter 1

## Analysis and Conceptualization of Healthcare Systems and Training in the Context of Technological Innovation and Personalization



**Brenda Bogaert, António Casa Nova, Serap Ejder Apay,  
Zeynep Karaman Özlü, Paulo Melo, Jean-Philippe Pierron, Vítor Raposo,  
and Patricia Sánchez-González**

**Abstract** This chapter will analyse personalization within the context of technological innovation. It will first of all clarify the conceptual terms used in the debate, in particular patient, person-centered and people-centered care and their various uses and limitations. It will then focus on specific issues of personalization and technology

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in emerging areas, notably in interprofessional practices and in medical training. This will allow greater understanding of both the possibilities and emerging tensions in the integration of personalization and technological innovation in healthcare systems from the training stage to its integration in various professional cadres.

**Keywords** Personalization · Person-centered care · People-centered care · Medical training · Interprofessional collaboration

## 1.1 Part I: Conceptual Perspectives—Patient, Person, and People-Centered Care

Personalization is a broad term that implies that the delivery of a medical service will be adapted to the needs of an individual patient. Today the notion has been developed in a number of areas to highlight advances in healthcare, from the development of personalized medicine to changing ideas on the doctor-patient relationship. These conceptions are changing both how we see and value the healthcare act and the patient's and healthcare provider's roles within it. Because of this, value remains an important term used throughout this chapter. While in health economics, value has often been understood in terms of cost, relational values are also advocated for within models such as person-centered care [1]. Embracing this plurality allows healthcare values to be analysed from both an economic and ethical perspective, congruently rather than separately, and it is within this framework that we will discuss value throughout this chapter.

Now that we have clarified our use of the word value, we will proceed with a discussion on personalization within the context of the doctor-patient relationship and in how we conceive of and organize healthcare. We will notably discuss the conceptual differences among patient, person-centered, and people-centered care and the challenges of implementing these different frameworks in the context of technological innovation, before moving onto to other aspects such as medical training and interprofessional collaboration.

### 1.1.1 *Person-Centered Care*

What does the term person (and not just patient) imply for healthcare systems? How does it change relationship and services, as well as healthcare evaluations? Can

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taking into account the value of a person be a way to equilibrate the just and equitable relation between all the partners of a health and care system in the patient's interest? This section will first analyze the conceptual similarities and differences between person and patient-centered care, as these terms continue to be used concurrently and with some ambiguity across a wide variety of disciplines and contexts. We will then discuss thick and thin definitions of the person and how they may affect the conceptions of person-centered care. Finally, we will highlight some ongoing and emerging tensions in various ways that person-centered care has been conceptualized to help navigate its passage between fields as well as to avoid potential pitfalls. Within this discussion, we will also highlight specific issues relating to person-centeredness and emerging technology, specifically personalized medicine and e-medicine tools such as wearable medical devices, as the increased use of these technologies by patients and their healthcare providers present new conceptual and implementation challenges.

For 50 years, contestation of the paternalist model of medicine found support in the form of patient-centered care. The original term can be traced to Balint [2], who sought to encourage a mutual investment between the patient and healthcare providers. He sought to establish what he called an "overall diagnosis" which included everything the doctor knew and understood about the patient. In order to accomplish this, for Balint it was primordial for the patient to be understood as a unique human being. The development of the patient-centered care approach since then has helped take a holistic view of the person and establish a healthcare alliance between the patient and their healthcare provider. Terms such as relationship focused care, client-centered care, user-centered care, and recently person-centered care, have now been introduced. What is the advantage of changing the terminology from patient-centered (or another term) to person-centered care?

Changing from patient to person-centered care has several advantages. First of all, the patient-centered model brought new problems by encouraging a blind spot toward the relations and importance of care givers (from the physicians to nurses, from family to voluntary and patient associations). Person-centered care instead shows that relational values have been missing from current healthcare evaluations. These aspects are incompletely developed in most conceptions of patient-centered care, which effectively center the attention on the patient. Therefore, it seems necessary to build an inflection with person centered-care.

Secondly, while initially promising, the implementation of the patient-centered care model has not been wholly successful as it has not radically transformed the focus of the consultation, where the clinical gaze is based on the molecular and cellular basis of disease rather than the patient as a person 3. The reformulation of patient to person-centered care can therefore be seen as an ethical and public policy strategy. First of all, the important word change from "patient" to "person" may be able to focus the clinician's attention from the patient with a disease (understood as a pathology) to the person with an illness (the experience of being unhealthy for an individual). It may also help move care practice toward a respect for and acknowledgement of individuals in the context of their social lives and relationships with others. Although this has already been advocated by in patient-centered care,

the word person necessarily widens the scope of the healthcare plan and the people involved. In addition, as the biomedical focus has been shown to be too narrow to encompass the variety of factors (family influences, environment, patient preferences, etc.) affecting healthcare outcomes, a new concept may enable healthcare institutions, providers, and researchers to rethink how to organize, promote, and evaluate care.

### ***1.1.2 Different Ways to Conceptualize the Person: From a Thin Concept to a Thick Definition***

At this point it will be necessary to specify what “person” means within the approach of person-centered care. It is possible to identify different criteria of the person which go from less to more, from the poorest to the richest, from the most quantitative to the more qualitative, from the most generalizable to the most irreplaceable. This analysis will make it possible to reveal competing uses of the individual in medicine (starting with so-called “personalized” medicine) and question their possible articulations.

- (A) The person may be identified to the physical and objective dimension of the human body and seems to assimilate the person and individual. A person may be the “the smallest denominator” that we can isolate: yesterday it was blood; now the gene and the genome. This physical signature is precise but also really poor in a subjective way, because the genome is more collective (biological relatives) more than a person. Personalized medicine can be found on this level.
- (B) The person can also mean “personality” in a psychological or psychiatric approach. This is an objective way if one wants to measure the qualitative of the subject in quantifiable data, since psychiatry follows somatic medicine. Thus the personality is objectively defined in universal classifications of diseases such as the DSM.
- (C) The person can be defined in the legal sense of the term, as a subject of law, capable of imputation of his acts, according to the ancient distinction inherited from Roman law between things (*res*) and persons (*persona*). This concept of persona makes it possible to establish a contractual dimension in the relationship of care, a contract between two subjects, or a subject and an institution. It also makes it possible to socialize the idea of illness and permits institutions to establish a cadre to protect the patient’s rights.
- (D) The concept of person can be given even greater substance by recognizing persons an ends in themselves. “Things have a price, but only people have dignity,” Kant will say, as we shall see below. This concept opens up the ethical scope of the person, which is protected by medical ethics and bioethics.
- (E) Finally, at the deepest or most consistent level, a final definition of the person makes him or her nucleus of a subjectivity, that of an irreplaceable self. The subject becomes the subject of a life engaged in all the dimensions of what makes a human existence, i.e. also in engaged in relations with others. It

retraces the four dimensions of the person previously identified (genome, psyche, legal and moral status) which it personalizes and unfolds in the perspective of the subject and the aim for his or her life. The person here is not an individual (in-divisible) since he or she is not conceivable without his or her relationships with others. From this perspective, illness becomes an issue of existence with a relational scope: the biological fact of illness (disease) resounds like a biographical event.

### ***1.1.3 Specific Issues for the Conceptualization of Person-Centered Care***

Having elaborated the thin to thick definitions of the “person,” we will now proceed by discussing some conceptualization possibilities and challenges in the person-centered care model.

#### **(a) *Kantian perspectives of rights and duties in person-centered care***

The Kantian principle that we must accept each person as an end, and not as a means, underpins most concepts of person-centered care (level D highlighted above). This idea implies that persons are sources of agency (they have the capacity to capacity to act) and have dignity (they are ends) that must be respected. In healthcare this translates into giving a certain decision making power to the patient, thus promoting greater patient autonomy.

However, the implications of the Kantian principle also bring some important challenges to person-centered care, notably because seeing the person as an end also brings some implicit assumptions about both the person’s rights and duties (the contract model highlighted in level C above). Person-centered models are based upon the premise that the person has a “right” to participate in healthcare decision making; however, if patients participate, there is also an implicit assumption that the patient will adhere to the treatment plan agreed in the healthcare alliance (thus implying a “duty” or a “responsibility” to adhere). Indeed, advocacy for person-centered models center on the possibility that they can be more cost-effective as patients will be more likely to adhere to a treatment plan in which they were actively involved. This means that we explicitly invoke patient rights to participate and implicitly patient duties to adhere. It is not clear which priority should be given the most attention in person-centered models, because the discussion centers both on respecting the patient’s choices and reducing costs. The risk of tying together rights and duties is not only a lack of conceptual clarity. If we do not openly discuss these tensions and agree on what exactly we are asking of patients, we could risk ending up with another paternalistic model repackaged as person-centered.

#### **(b) *Paul Ricoeur and Martha’s Nussbaum’s ideas on capabilities and vulnerabilities***

Some concepts by Paul Ricoeur [4] and Martha Nussbaum [5] have been integrated in concepts of person-centered care (level E highlighted above) by recognizing that patients are both capable and vulnerable. The advantage of these conceptions is to move beyond advocacy for individual patient autonomy and to both recognize the person as an end (the Kantian principle) and that people are in need of a facilitating environment due to their specific vulnerabilities as patients. As level E highlighted, it recognizes that the person is a subject of life but is also engaged in their relationships with others. Nussbaum's version of the capability approach for instance defends the idea that individual people should decide for themselves what they wish to be and to do (their capabilities), but she also recognizes that we need others (a facilitating environment) to develop and put into action our life projects. In models such as Entwistle and Watt's person-al capabilities approach [6], healthcare will therefore be organized to not only respect the individual needs, values, or priorities, but it will also encourage the healthcare provider to help cultivate the person's capabilities.

Likewise, Paul Ricoeur's ethical approach defines the person as both capable and vulnerable by showing how our identities are articulated in relationships and mediated via institutions. A central idea of Ricoeur's philosophy is the importance of our narrative identity, which helps us to create cohesion in our lives. Ricoeur's theory of narrative identity has inspired Charon [7] narrative medicine approach as well as the Gothenburg person-centered care model [8]. Applying Ricoeur's intuitions to a person-centered perspective encourages healthcare providers to pay attention to and document patient narration so that they can work with them in the context of their overall lives and to identify what is important to them. In addition, by recognizing persons in the healthcare alliance as both vulnerable and capable, it also signals the interrelationship and interdependency between healthcare providers, patients, and their families.

This approach may be time-consuming and/or costly in at least some temporalities of healthcare organization, as it involves considerable investment in working with patients to cultivate their capabilities and/or to in the use of narrative-based approaches. It also remains difficult to advocate for in the face of realities such as increasing economic pressures on hospitals. However, Ricoeur reminds us that ethics and economics are symbolic mediations of our institutions and must be debated congruently rather than separately to enable creative institutional change [9]. Already quantifying costs and benefits for person-centered care has shown some promising results, both in terms of patient satisfaction [10] as well as reducing overall healthcare costs [11]. However in order to fully realize these ideals, healthcare organizations will need to rethink how healthcare acts can be measured and evaluated [1]. For future research, it will also be necessary to evaluate how costly it may be when we do not take care of the person, patient or caregiver.

### ***1.1.4 Specific Implementation Challenges***

Having highlighted the conceptual challenges inspiring person-centered care, this section will proceed by discussing several implementation challenges, in particular in relation to technology.

(a) ***Integrating medical innovation and increasing complexity into person-centered care models***

Personalized medicine remains an example of the complexity of integrating medical innovation into the person-centered healthcare model. Personalized medicine (also known as stratified medicine) specifically targets and adapts a treatment based on individual characteristics, in particular genomic factors. It is not a question of creating individual medication or strategies for each patient, but rather to establish subgroups that will allow treatment adaptations based upon subgroups of patient profiles [12]. Technology plays an important role in the realization of personalized medicine through the so-called omics technologies, which may allow diagnosis of a disease at the molecular level and to then use that information to develop targeted treatments specifically for that specific patient [13]. As highlighted in level A above, this focus of the person is at its thinnest, as it has shifted attention to the genomic level.

In order for personalized medicine to integrate the qualities of person-centered models, it will therefore be necessary to widen the perspective to the overall person and to pay greater attention to how individual behaviors may affect treatment efficacy. Personalized medicine will also need to resolve how patients can participate in healthcare decision making in face of increasing specialization and the integration of large amounts of data, as the technical complexity of personalized medicine is already disrupting the practice of medicine by bringing new challenges for the healthcare provider, who is expected not only to master molecular biology but also to have working knowledge of bioinformatics and biostatistics [14]. In this situation, it is unclear how patients will be able to participate in their treatment decisions other than as “sources” of information. Technology may also place some patients in a situation of greater vulnerability and/or dependence and prohibit or discourage them from participating. The risk therefore of integrating personalized medicine in person-centered care is to ignore—or at least minimize—the holistic perspective of the patient, as well as how technology may introduce new vulnerabilities in the healthcare alliance.



(b) ***Healing fractured healthcare infrastructures***

An important issue going forward in person-centered models remains of how to better coordinate and organize care among different specialties. George Engel's biopsychosocial model [15] inspired and provided the methodology for many patient-centered care models to take a holistic view of the patient. The results however have encouraged a certain dichotomy in care organization, such as regulating the biological aspect to the doctor, the psychological aspect to the psychologist, or the social aspect to social workers (such as in level B above) and have thus created a division of labor inside hospitals. Care organization has become fractured among different professionals in the patient's journey [16]. Person-centered models will need to resolve this implementation difficulty in fractured healthcare systems, such as with the designation of a reference person, to better accompany the patient in their healthcare journey. Formulations of person-centered care will also need to pay attention to how technology—from wearable medical devices, shared medical records, or the patient use of digital spaces—have affected care. While the use of technology represents an opportunity for the person-centered perspective to take into account the patient's, healthcare provider's and family's digital literacy, preferences, and vulnerabilities, the question still remains of how it can integrate these attentions across health systems and specialties.

(c) ***Political issues related to person-centered care***

A final issue will need to be highlighted before continuing our discussion onward to formulations beyond person-centered care. As discussed by Kreindler [17], the language and conceptualization of patient and person centered healthcare is not neutral. It has been notably been used to gain negotiating room or to reaffirm political positions. For instance, healthcare managers tend to emphasize the service/system level of person-centered care, using it as a pressure tool to influence employee behavior. On the other hand, professional groups have used PCC language to claim that their practices are patient-centered while others are not, thereby perpetuating ongoing political debates on hospital hierarchies (such as between doctors and nurses). Thirdly, while patient groups use PCC language to advocate for inclusion in healthcare decision making, they also may also use it to further their own interests and influence. It will be important to be vigilant of these political issues in formulations of person-centered care to avoid their deformation by political groups, but also to guard their ethical core (care *with* and *for* the patient). As suggested by Kreindler, this can be done by guiding the conversation and healthcare organization toward shared interests as well as valuing the epistemic contribution of each group in the design of person-centered healthcare programming. We will return to this issue when we discuss interprofessional collaboration in a later part of the chapter. For now, let us move toward an emerging concept being discussed in this debate, people-centered care, to understand what it might bring to this discussion.

### 1.1.5 *People-Centered Care*

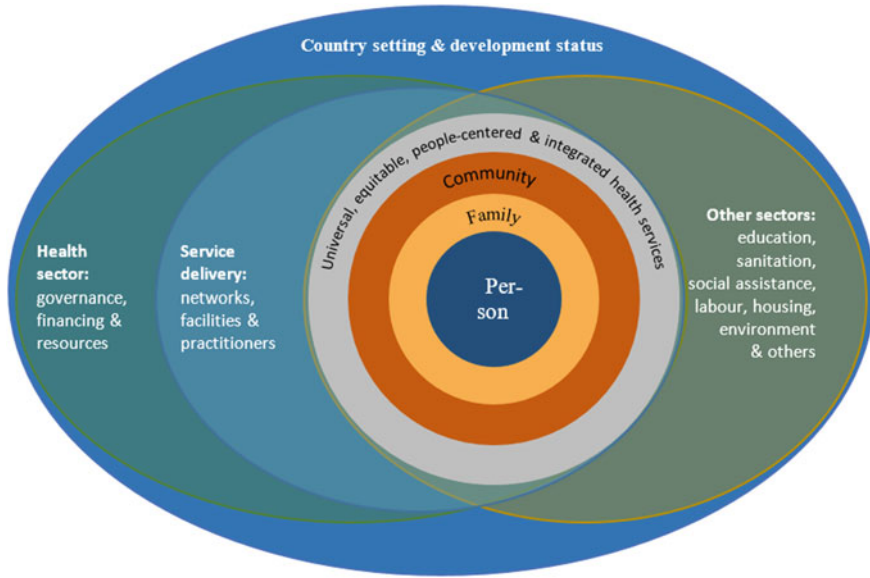
This section will clarify what a move from person-centered to people-centered care implies for health systems. It will also discuss its implications in terms of healthcare innovation and cost-effectiveness. To start with, putting people at the centre of health services is a core aspect of health systems. It implies that services are organised around people's needs and expectations to make them more socially relevant and responsive whilst also producing better results [18, 19]. Good governance places people, rather than care providers, at the center of health systems [20, 21]. One of the core principles of good health governance is responsiveness so that institutions and processes can serve all stakeholders [22, 23] but also, as one of the three goals of the health system, to meet people's legitimate non-health expectations about how the system treats them [24].

People-centred care focuses on health needs, enduring personal relationships, comprehensive, continuous and person-centred care, responsibility for the health of all in the community along the life cycle and responsibility for tackling determinants of ill-health. In this model, people are partners in managing their health and that of their community [19]. According to the WHO [19, 25], people-centred care is focused and organised around people and their needs, rather than around diseases. Therefore, disease prevention and management are seen as necessary but insufficient to address people and communities' needs and expectations [26].

People-centred care is defined as an approach to care that intentionally adopts different stakeholders (individuals, healthcare providers, families and communities) perspectives as participants *in* and beneficiaries *of* trusted health systems that respond to their needs and preferences [26, 27]. People-centred care requires *people* empowerment, through education and support, to help citizens take more responsibility and participate in their care. In this conception, people should act as partners both in managing their health *and* in their community [19]. This approach may benefit individuals and their families, health professionals, communities, and health systems [26].

The main advantage of a conception built on people-centred care is that health will be understood as more than just healthcare. It recognizes that there is a wide range of social determinants (physical environment, social and economic factors, health care, and health behaviours) that influence how long and how well we live [28, 29]. For instance, a study by the Institute for Clinical Systems Improvement [30] has pointed out that the healthcare dimension (access to care and quality of care) only accounts for 20% of population health, emphasizing the need for investments on other social determinants dimensions.

To provide the context for people-centred and integrated health services, the WHO [26] has developed a conceptual framework representing the relationships between the different parts of the health ecosystem (Fig. 1.1). The proposed framework acknowledges the importance of intersectoral action in tackling the structural determinants of health and the close collaboration required between different sectors (health, social care, education) and other local services.



**Fig. 1.1** WHO conceptual framework for people-centred care and integrated health services (Adapted from WHO 26)

From the individual and family perspective, the potential benefits of this concept include increased satisfaction with care and better relationships with care providers, improved access and timeliness of care, empowerment through improved health literacy and decision-making skills that promote independence, shared decision-making with professionals, increased involvement in care planning, the reinforcement of the ability to self-manage and control long-term health conditions, and better coordination between different care settings [26].

### ***1.1.6 Innovation in Healthcare and People-Centered Care***

Having conceptualized people-centered care and its advantages to help move forward by incorporating a community perspective, this section will focus on how citizens' needs and expectations be furthered through innovation. According to Santana et al. [31], people-centered healthcare systems need to be responsive to their specific contexts and identify priorities while encouraging innovation (PCC). For instance, the World Health Organization's (WHO) Health Innovation Group considers that health innovation can develop and deliver new or improved health policies, systems, products, technologies, services and delivery methods to improve people's health [32]. For its part, the Copenhagen Health Innovation [33] considers health innovation includes merging knowledge, development and technological opportunities with

practice to improve the quality of life for patients and citizens. Finally, the Health Innovation Group [32], considers that health innovation comprises: (i) developing and implementing new or improved health policies, systems, products and technologies, as well as services and methods services that improve people's health, (ii) responding to unmet needs by employing new ways of thinking and working with a special focus on the needs of vulnerable populations, (iii) adding value in the form of improved efficiency, effectiveness, quality, safety and/or affordability, (iv) the ability to serve as preventive, promotive, therapeutic, rehabilitative and/or assistive care.

In a context of training and education, innovation can help match the needs of health and social care sectors with study programs aimed at: (i) the identification of needs and challenges in the health and social care sectors; (ii) the development of ideas for solutions and interdisciplinary innovation projects; (iii) testing ideas in close collaboration with practice (organisations, health services, institutions); (iv) the analysis of solutions, creating a basis for implementation decisions; and (v) implementation support [33].

Organisations can also make changes in their working methods, use of production factors and output types, improving productivity and performance using different types of innovation, including product, process, organisational and marketing [34]. Innovation can occur at various levels, with new or changed products or services, technical innovations can be technology-based (e.g., electronic medical records), process-based (e.g., care coordination), product-based (e.g., shared decision-making tools), or administrative (e.g., changing workflows, organisational structure, or human resource management) [35].

The vast majority of health systems in Europe have an essential public service component, namely through national health services. Public sector innovation in these contexts will involve creating, developing and implementing practical ideas to achieve a public benefit [36]. According to Paul and Per [37] this includes service innovation, service delivery innovation, administrative and organisational innovation, conceptual innovation, policy innovation, and systemic innovation.

Mulgan [36] argues that in the public sector, innovation can translate into new ways of managing organisations (such as public-private partnerships), new practices of rewarding people (such as performance-related pay), new ways of communicating (for instance, through ministerial blogs), policy or service innovations and innovations in other fields (e.g. e-voting) and international affairs (e.g. prepayments for new vaccines). According to him, some innovations warrant systemic change, such as creating a national health service or the move to a low carbon economy.

Concurrently, Hernandez et al. [38] have proposed a PCC framework defined as (1) effective leadership, (2) internal and external motivation to change, (3) clear and consistent organisational mission, (4) aligned organisational strategy, (5) robust organisational capability, and (6) continuous feedback and organisational learning. Several methodologies within this framework can be proposed, such as improving coordination and access to healthcare and services [39, 40] through a mixed methodology such as product/service, service delivery, process, administrative and organisational, conceptual, policy or systemic initiatives which can help integrate different stakeholders (health professionals, persons and communities, etc.). One promising

methodology is also developing Health Labs to improve healthcare quality and facilitate cost containment [41].

Regardless of the implementation strategy, however, key questions that should be asked in a people-centered perspective include what is required support its implementation (including staff and infrastructure costs per person and at the aggregate level), what is the impact on service utilization (such as prevention of visits to urgent care and unplanned stays), what is the impact on self-management and care prevention, and how improvements in physical health and medicine can be optimized [41].

While we could find no systematic review that focuses explicitly on PCC and innovation, the cost-effectiveness of person-centred health systems can be evaluated via a value-based approach [42]. Examples of this include value-based healthcare, as introduced by Porter [43], value for money as defined by Smith [44] and Fleming [45] and economic evaluation [46]. All of these represent frameworks that can help evaluate costs and consequences for the questions raised relative to PCC and Health Labs. However, they also lead to new questions about how to feasibly evaluate people-centered care on the ground. One again it returns to us questions of value and how we can be responsive to people's needs and expectations.

## **1.2 Part II: Systemic Analysis of Personalization and Technology in the Context of Interprofessional Collaboration and Medical Training**

Having clarified emerging conceptual perspectives of personalization, this section will seek to analyze the implications of personalization in different areas of healthcare practice. It will start with an analysis of the issues surrounding integration of personalization and technology in the context of medical training. Using the example of surgical training, we will show the concrete possibilities of personalization and technological innovation when integrated into training. We will then focus on inter-professional collaboration, seeking to show how personalization can be integrated into healthcare system design and training, enabling professionals to better work together with and for their patients.

### ***1.2.1 Personalization, Technology, and Medical Training***

Technology allows personalization in several different medical areas, including in education, promotion of healthy lifestyles, rehabilitation therapies planning, and surgical interventions planning and performance. First of all, technology helps inform citizens about healthy habits and treatments. Person-centered care and health promotion are intertwined [41] and a growing evidence base suggests that integrating these approaches can improve health outcomes [47], whilst maintaining health care

quality without increasing costs [48, 49]. To this end, several platforms have risen to allow and facilitate digital health promotion. These platforms focus on customization thanks to the incorporation of intelligent recommendation systems [50]. Technology, such as big data, wearables, or 3D printers, also enables the advancement of clinical techniques and research.

New technologies also have the potential to improve training of healthcare professionals. Previous research has proposed a definition of patient-centered medical education that is centered on patients, with patients and for patients, to ensure current and future doctors remain sensitive to all of the needs of the people they care for [51]. Education of medical professionals is now a key challenge in European Healthcare systems. Current pedagogical needs in medical education are closely related with (1) ethical concerns on learning and training in real patients and working with animals and (2) reconciling time devoted to learning with clinical practice, taking into account the European Work Time Directives.

The incorporation of technology into medical training can notably integrate these concerns, in particular to build the capacity of surgical planners with minimally invasive techniques. They allow the clinician to make the best decision for each individual patient and to incorporate visualization techniques showing the original images, structures of interest, and/or surgical tools useful for the clinician. Their use in soft tissue surgeries is not yet fully extended (it is still a great challenge), but in trauma, dental and intraoperative radiotherapy interventions, we can find different solutions in clinical routines in hospitals and healthcare centers.

Technology-enhanced learning (TEL) also plays an important role in the transformation of medical learning processes, in particular by improving future healthcare professionals competencies through simulation. Whilst its focus has mainly been simulation for technical skills [52], cognitive skills are also among the key competences required for surgeons [53]. Simulation in medical education is the preferred route to address both pedagogical needs, and the learning curve can be shortened by learning outside of daily clinical practice. For instance, training on simulators has correlated with improved operative times and a greater efficiency of movement for different techniques.

Moreover, and without question, medical simulation through technology has the potential to replace the use of animals as human surrogates in medical training and to personalize as much as possible the pedagogical path to the needs of trainers. Examples such as the project MIS-SIM (Minimally Invasive Surgery Simulator Scenario Editor) empower teachers to create their own training scenarios rather than be constrained to a predefined set of tasks, allowing them to adapt to the needs of their students. As a simulator allowing users to create and share with the community virtual tasks personalized to the training needs of learners, it also allows users to engage with virtual reality based learning tools whilst remaining in complete control of the learning process.

### ***1.2.2 Models of Collaborative Practice: The Doctor, Nurse, Midwife, and Patient***

Having discussed the opportunities for personalization and technological integration in the context of medical (and in particular surgical) training, it will now be important to move into the field in order to understand how personalization can be facilitated through collaborative practices. As highlighted at the beginning of the chapter, in order for person or people-centered care to be achievable, it must integrate the shared contributions and expertise of different healthcare professionals. As highlighted by the Independent Nurse-Midwifery Practice, collaboration can be understood as “a process whereby healthcare professionals commonly manage the care” [54]. In other words, it includes the interaction of at least two professionals or disciplines organized in a common effort to solve or discover common problems with as much as patient participation as possible [55].

Practices based on interprofessional collaboration have the potential to reduce the cost of healthcare services while also improving patient outcomes and patient experience [56]. Effective communication and collaboration enables quality of care, notably by contributing to patient safety, reducing the length of hospitalizations, and enabling healthcare and social services to work together [57–62]. It also helps to increase confidence and respect among healthcare professionals, reducing competition and conflict, and in so doing enables healthcare professionals to share their knowledge and skills [56, 57, 63–66]. Interprofessional collaboration enables healthcare professionals to understand one another better and helps in constituting a respectful environment for team members [56, 57, 63, 65, 66]. It enables professionals in the healthcare team to be in their professional roles, helping them to take common decisions and share the responsibility of providing care [56, 67], in particular through accountability, coordination, communication, assertiveness, autonomy, mutual trust, and respect [68].

In order to be achievable on the ground, it will be necessary to think how to provide tools from the training stage [69]. A report by the Institute of Medicine has defined five core competencies necessary for healthcare professionals, including patient-centered care, interdisciplinary teamwork, evidence-based practice, increased improvement and quality in practices of care, and informatics [70]. Medical, nursing, and midwifery students should receive the necessary education on how they can collaboratively work with one another and with their patients. Unfortunately, in current education methods, healthcare professionals use a discipline-specific method rather than favor an interdisciplinary approach.

In the field, there are also various obstacles to facilitate effective collaboration, notably role ambiguity, confusion, irregular hierarchical relationships, education differences, gender and cultural differences. While systems and processes have been designed to simplify communication and teamwork, these practices are not necessarily intuitive and must be learned and applied by all team members. Therefore, hospitals and education institutions should integrate these models into the initial and ongoing education programs of nurses, midwives, doctors, and other healthcare



service providers to instill a practice that can be used on the ground [71] to change existing working cultures, especially in critical care [70].

Healthcare law from the United States in 2010 contributed to the renewal in the education of healthcare professionals and in the development of new interprofessional care models. The American Institute of Medicine notably recommended nurses to be leaders of the healthcare team working in cooperation with other healthcare professionals. Based upon these new conceptions, nursing education should therefore prioritize leadership, teamwork, and cooperation skills [72]. The University of Virginia Center of Academic Strategic Partnerships for Interprofessional Research and Education (ASPIRE) has developed a model to overcome difficulties in interprofessional education by focusing on practical tools, leadership, and relational factors [73]. Improvements in patient safety and quality of care were observed in practices in which this model was applied [73].

However, despite these promising developments, there still remains a gap between the goals and the reality of practices in higher education. For instance, while the Turkish Council of Higher Education (CoHE) states that by the end of their undergraduate education, students should have already developed these kind of collaboration skills, the curriculum is currently organized as a one-profession education. To mitigate this difficulty, students from different healthcare areas should come together more often and receive education together in order to acquire the required skills and professional standards needs for accreditation [74].

Another methodology which can help facilitate collaboration is simulation. As one of the most important determinants of the ability to transfer what students learn in the laboratory to the clinical environment, it can also reduce the reality shock they experience once in the field [75]. The most frequently used simulation methods include anatomical models, task trainers, role-play, games, computer assisted instruction (CAI), virtual reality, low-fidelity to high-fidelity mannequins, and standardized patients [76]. Promising results have been observed in these simulation activities in developing team members' attitudes toward collaborative care [77].

To conclude this section, healthcare services require different professional groups to work together to increase the quality of care and patient satisfaction, in order to reduce costs as well as medical errors, and to increase employees' work satisfaction and efficacy. For this reason, developing collaboration-based practice skills remain a priority in healthcare training. The use of technologies such as virtual reality and computer assisted instruction can help facilitate this goal; however collaboration will also need to be prioritized across trainings and professions to facilitate its implementation on the ground.

### 1.3 Conclusion

Complexities such as surgical training and interprofessional collaboration have shown that technology and the political, economic, and ethical issues concerning personalization go hand in hand and must be dealt with congruently rather than



separately. What this chapter has shown us is that healthcare implementation and training will need to be designed with and for all actors concerned, should it be the clinician, patient, family, or the community, in order to ensure that it responds to their needs and priorities. Only then can we realistically talk about the integration of technology and hope to advance toward personalized healthcare systems from a patient, person, and people-centered perspective.

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