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Chapter 8. Managing complex patient journeys in health care

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Abstract

Health-care services are increasingly being digitized for greater flexibility and efficient sharing of information. There is also increased awareness among health-care providers that they must consider their services from the perspective of the patient. To offer a coherent patient journey and efficient treatment, health-care providers need a structured overview of their service processes and how these affect the patient journey. This chapter introduces customer journey modeling language (CJML) to support the design, management, and analysis of complex patient journeys. Through two case studies, we describe how CJML has been utilized for a shared overview of patient journeys, improvement work, internal training, and knowledge sharing. The first case study was carried out with DIPS, a supplier of eHealth systems to Norwegian hospitals. Here, CJML was used to support the documentation and rollout of a new generation of tools for surgery planning, a complex and resource-intensive process during which critical information is exchanged over time among a range of actors. The second case study was conducted at Oslo University Hospital. Cross-functional teams used CJML to document the patient journey associated with cervical cancer as the basis for improvement work. The two case studies demonstrate how CJML supports health-care service design through a common understanding of the patient journeys among stakeholders and by visualizing the workflows and actors involved. Although several weaknesses in CJML remain to be resolved, the case studies suggest the benefit of a model-based approach in two regards: first, as an effective communication tool to unite medical, technical, and administrative expertise and second to enhance the patient focus throughout the improvement and digitization of health services.

8.1 Introduction

Health-care services are complex, involving many actors and spanning many sectors. Patients typically face multiple health-care providers, as well as social, labor, and welfare services throughout their treatment (Fig. 8.1). Health institutions have an enormous flow of patients and employees. Hence, providing a holistic patient journey is challenging both within and across health institutions. Securing seamless transitions across institutions (e.g., from hospital to home care) requires coordination. However, patient care plans are often established within each institution. Transitions across institutions are resource-intensive and inefficient, often leading to new examinations that are cumbersome for both patient and health professionals (Øvrelid, Sanner, & Siebenherz, 2017).

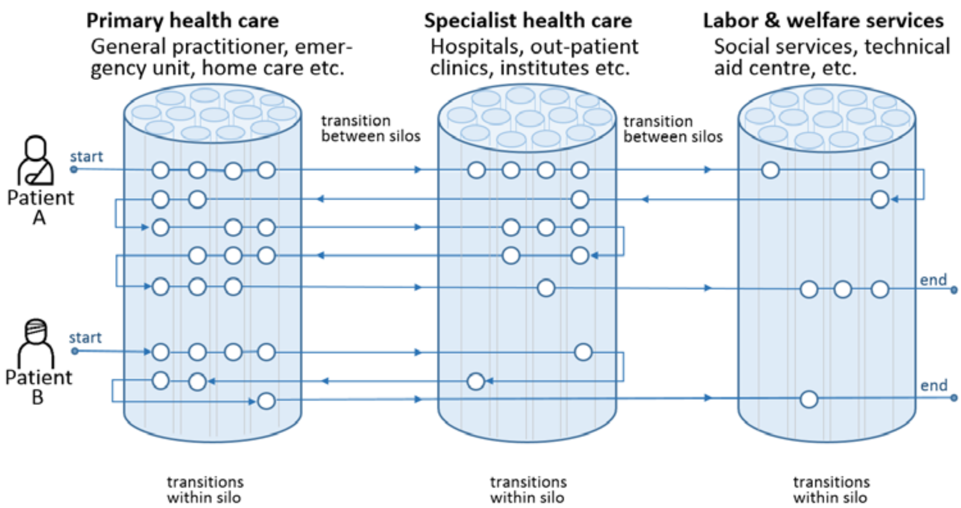

Fig. 8.1. Patient journeys transcend health-care units and welfare services. Source: Author's own illustration (2018).

Today's health-care system can be characterized as being a profession-centric and reactive system where both responsibilities and information flow are fragmented (Bayliss et al., 2008). The patients often become the coordinators of a combination of specific care plans set by individual professionals. The complexity increases even more for patients with multiple diagnoses. Failing to facilitate patient journeys across institutions may result in suboptimal treatment, safety risks, and poor patient experiences; it also drives costs at a national level (Vogeli et al., 2007). The increasing proportion of complex diagnoses and longer life expectancies compound these factors. This threatens the sustainability of health care in Norway, Europe, and internationally (Berwick, Nolan, & Whittington, 2008).

The term *patient journey* (also referred to as *patient pathway*, *clinical pathway*, *patient flow*, and *care pathway*) has become a key topic when addressing the challenges in health care. The national guidelines from the Norwegian Directorate of Health define *patient pathway* as "a comprehensive, coherent description of one or more patients' contacts with different parts of the health-care system during a period of illness" (NDH, 2018). In other work (Meld.St.47, 2008–2009), a *patient pathway* is defined as “the chronological chain of events that constitutes the patient's encounter with various parts of health and care services.” Here, a high-quality patient pathway is characterized by the coordination of these events in a rational manner to meet the patient's diverse needs. The European Pathway Association (EPA) refers to the *clinical or care pathway* to cover terms like *critical pathways*, *care paths, integrated care pathways, case management plans*, *clinical care pathways*, or *care maps*, all used to systematically plan and follow up with a patient-focused care program (EPA, 2018). EPA defines a care pathway as "Care pathways are a methodology for the mutual decision making and organization of care for a well-defined group of patients during a well-defined period". The Norwegian Ministry of Health and Care Services has given recommendations for the administration of clinical pathways across institutions, that is, how systems and routines can ensure the coherent care of patients across institutions, including common procedures for transitions, patient administrative discrepancies, and requirements for ICT systems (NDH, 2016).

Standardized cancer patient pathways (CPPs) were introduced in 2015 by Norwegian health authorities for selected diagnoses. CPPs define fixed schedules for diagnosis, treatment, and rehabilitation. The CPP has a high abstraction level, focusing on patient rights and the timing of treatment. A personal coordinator is assigned as a contact point between the patient and the health service to increase predictability and ensure the efficient flow of information. Research shows that standardized care plans increase the patients' perception of a well-organized and predictable progression without unnecessary delays. Similar standardizations have been implemented for other medical conditions as well. However, these care plans only cover single institutions; several health institutions treat many patients, either in parallel or by being transferred between institutions (e.g., from hospital to home care).

Some patient journeys address only generic procedures and patient administrative steps, while others encompass treatment and medical procedures. Furthermore, patient journeys are used internally by health-care providers or for direct communication to the individual patient.

However, there are different interpretations of patient journeys and various practices for documenting, managing, and verifying quality assurance during patient journeys. Without a common standard for patient journeys, it is left to each institution to define the format, level of detail, and overall modeling approach. This chapter describes a conceptual framework and a modeling language to document and analyze patient journeys.

8.1.1 Organization of the chapter

The rest of this chapter is organized as follows: Section 8.2 addresses key challenges in managing and improving patient journeys, and Section 8.3 describes the modeling language CJML and how it can be applied to document patient journeys. Sections 8.4 and 8.5 provide a walkthrough of two case studies utilizing CJML for (1) training purposes for a vendor of health systems and (2) improving a patient journey in a hospital. Section 8.6 discusses this study’s results, limitations, and future work.

8.2 Challenges

In various strategic documents, Norwegian health authorities have highlighted the importance of collaboration for improving health-care services and patient journeys (Meld.St.9, 2012–2013; Meld.St.47, 2008–2009; NDH, 2014). EHealth entails both new ways to organize services and work flows and changes in digital infrastructure (Bygstad, 2017). The Norwegian Directorate of eHealth is pointing at digitization to improve health-care and patient journeys (NDeH, 2017). EHealth is referred to as a prerequisite for solving major challenges in the fragmented health-care sector. Digital health systems are typically specialized IT silos lacking support for work processes and cooperation across institutions (Scott, Shohag, & Ahmed, 2014). There are three key challenges in managing complex service processes in health care. First, there is no collective understanding of patient journeys. Second, digitization further complicates patient journeys, and third, there is no common, formal method to describe and develop patient journeys. Each of the three challenges will be discussed in more detail below.

8.2.1 Challenge 1: Various interpretations of patient journeys

There are different ways to interpret the term *patient journey*, as described in Fig. 8.1. Hospitals are using patient journeys for the diagnosis, treatment, and follow-up of their patients. In some institutions, the patient journey is communicated directly to the patient as guidance to the treatment they are facing. Other institutions adopt patient journeys as an internal tool for care plans and work processes. Regardless, patient journeys are seen in isolation within each institution, failing to consider the transitions between institutions. *Patient journey* as a term or concept is used slightly differently in a political context, while it may have a specific meaning in medical, technical, administrative, and legal arenas. Hence, there is no mutual understanding or definition of *patient journey*.

For the benefit of the patient and the sector, a patient journey should ideally include systematic and interdisciplinary diagnoses, treatment, and follow-up within and across institutions. For patient journeys to become coherent and comprehensive, coordination within and across health institutions is required; hence, it is important to secure transitions when patients are moving between institutions. A common definition and understanding of patient journeys is needed for collaboration between patient groups, patient organizations, clinicians, and health-care managers to achieve holistic patient journeys (Berwick et al., 2008; de Bruin et al., 2012). In Norway, the Ministry of Health and Care Services is in the process of merging care plans across primary and specialist health-care institutions (Meld.St.47, 2008–2009; Meld.St.9, 2012–2013).

8.2.2 Challenge 2: Digitization is changing patient journeys

Digital technology is increasingly adopted in health care to improve patient journeys, but may also disturb and complicate service processes and patient journeys currently in use. Today, IT systems in health care (e.g., EHRs) are implemented within individual health institutions like hospitals, home care, GPs, emergency care, physiotherapists, etc. These systems often form silos that hinder cooperation and efficient work processes (Ash, Berg, & Coiera, 2004). To improve the patient journey, cooperation is necessary between GPs and health-care specialists. Standardized messages (PLO messages) have been introduced for this purpose. However, research shows that these messages only enable basic levels of collaboration (Melby, Brattheim, & Hellesø, 2015; Brattheim, Hellesø, & Melby, 2015). PLO messages are not suitable for collaboration across institutions due to the limited structure and standardization of the message content.

The Core Electronic Health Record (Core EHR) is an initiative to achieve a common electronic patient record of key patient information across health-care institutions in Norway. Patient health information is collected at a national level and made available for residents and health-care professionals. Core EHR ensures access to information but does not adapt this information; nor does it provide tools to support work processes within or across institutions.

With digitization, new IT systems and technologies will be introduced and can be used to improve patient journeys by enabling cooperation across health-care institutions. Mobile health applications, welfare technologies, remote monitoring, and sensors are increasingly adopted.

Cooperation will require the integration of IT systems, but the tight integration of legacy health-care systems is not trivial. Nor is it a realistic approach, due to cost and complexity. As an example, the National Health Service (NHS) initiative in the UK aimed to introduce a single EHR connecting 30,000 general practitioners and 300 hospitals. The EHR was years behind schedule and over budget when the initiative was defined as a failure (Syal, 2013). However, to benefit from the advantages of digitization, the use of lightweight IT systems on top of legacy systems is an approach that has shown to be promising for customization to work practices (France et al., 2005; Hertzum & Simonsen, 2013; Øvrelid & Halvorsen, 2016).

Today's physical GP consultations may be replaced by e-consultation and digital diagnosis tools, impacting patient journeys. A new generation of health technologies will continuously influence and enable completely new patient journeys. Digitization and technology come with the potential to improve the efficiency and timeliness of patient treatment and to support cooperation between health institutions and personnel. In light of the foreseen changes in health care, the need to design, document, and manage patient journeys becomes even greater.

8.2.3 Challenge 3: Lack of formal methods to develop patient journeys

Today, there is no common approach to model patient journeys, and it is left to each institution to define its format and level of detail. Finding a suitable format to formally describe a patient journey and its associated tasks and work processes is complex. The task and work processes must be understood by the patient, the GP, specialists, nurses, medical secretaries, and technicians, as well as across institutions. To improve patient journeys and develop new ones, a description at a high level and corresponding descriptions at more detailed levels are required. This is also important to change work processes both within and across institutions and is even more crucial when technology is introduced to support these processes.

8.3 Modelling of patient journeys

Customer journey mapping is an intuitive, visual format to describe a person's experience when using a service. It is one of the most used methods among service designers and user experience professionals (Løvlie, Polaine, & Reason, 2013). Traditionally, the method has been viewed as a "practitioner's tool" rather than a scientific method. A recent survey conducted with users of this method revealed short-comings in scope and standardization of customer journeys both within organizations and across industries (Kaplan, 2016). The lack of a common approach has made it challenging to use customer journeys for documentation purposes and for exchanging results across groups and organizations.

To meet these challenges, a framework for customer journeys was developed to help companies improve their customers' experiences with digital services (Halvorsrud, Kvale, & Følstad, 2016). A domain-specific modelling language for customer journeys, CJML, was developed through the VISUAL project to further substantiate the journey approach with a theoretical foundation. CJML enables detailed and unambiguous modelling of service processes and customer journeys. It consists of terminology, syntax, and a visual notation for analysis of technology-supported service processes that extend over time in various communication channels. CJML has been applied to a variety of service processes within numerous domains, ranging from C2C sharing economy services to B2B services. Overview, background information, and documentation of CJML can be found in a research report (Halvorsrud, Haugstveit, & Pultier, 2018).

CJML targets the part of a service process that is encountered directly by the end user, whether the end user is a customer, patient, consumer, citizen, or employee. The service process is always modelled from the user's point of view. This fundamental "outside-in principle" separates CJML from other graphical modelling languages like UML and BPMN. CJML also supports service processes involving more than one end user, or a network of actors. Health services are characterized by the many actors involved in patient treatment, for example the GP, specialists, and medical secretaries from several institutions. Thus, the traditional, dyadic user-provider model from the service management field becomes insufficient (Tax, McCutcheon, & Wilkinson, 2013).

According to Shostack (1982), there are two states of a service; the hypothetical and the actual. In line with this view, CJML distinguishes the planned (hypothetical) journey from the dynamic, actual journey of a user using the service. These two states can be thought of as "theory" and "reality", respectively. A customer journey in CJML is defined as a sequence of touchpoints involved for a customer (or patient) to achieve a specific goal or an outcome. The start and end of a journey must be defined in line with the purpose of the analysis. Note that the customer journey is not necessarily a process that the user chooses or prefers. It may encompass mandatory or even unwanted aspects, and the outcome is not always desirable.

Any modelling approach seeks to represent a phenomenon in a simple and objective way, and a level of abstraction and granularity are two basic ingredients. The basic unit of a step in CJML is called a touchpoint. There are two types of touchpoints: *communication points* and *actions*. Communication points are instances of communication or interaction between two or more actors. For example, a patient may receive an SMS reminder about his appointment with the GP the next day, or the GP may receive an epicrisis after her patient has seen a specialist. The second type of touchpoint, actions, are non-communicative events or activities conducted by an actor. For example, a patient may read an information brochure in the doctor's waiting room. Communication points in CJML rely on the Shannon-Weaver model, where a message is transferred from an actor to another through a communication channel (Shannon & Weaver,1963). The graphic notation for a communication point is shown in Fig. 8.2.

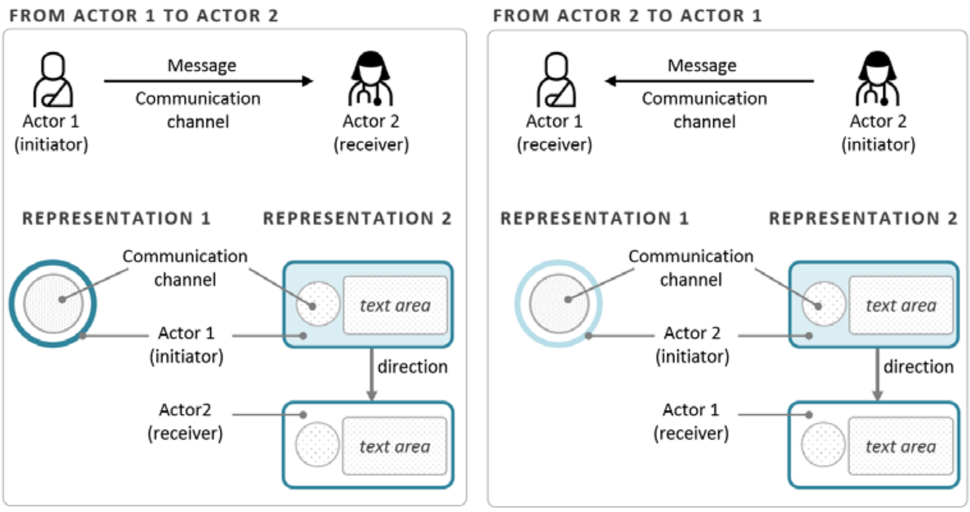

Fig. 8.2. Visual representation of a communication point: from actor 1 to actor 2 (left) and from actor 2 to actor 1 (right). Source: Author’s own illustration (2018).

The two diagram types of CJML are exemplified in Fig. 8.3. The simple customer journey diagram in the upper part consists of interconnected circles representing the communication points (corresponding to representation 1 in Fig. 8.2). The color or contrast of the circles' perimeters signify the actor who *initiates* the communication event. First, the patient meets for an appointment with the GP. The symbol in the circles represents the physical meeting taking place. After meeting the patient, the GP sends a referral to a specialist. This is not shown in the patient journey, as the patient is not involved directly in the referral process. The next step in the patient journey is when the patient receives a letter from a specialist about the future appointment. The day before the consultation at the out-patient clinic, the patient receives an SMS reminder. The following day, he meets for the consultation with the specialist.

The lower part of Fig. 8.3 shows the corresponding swimlane diagram. Each actor's journey is shown in separate swimlanes, containing the relevant touchpoints. The swimlane diagram shows both initiator and receiver of a communication point as a vertical pair. This diagram is more convenient for journeys involving several actors and users. The various phases of the journey may be added to the top of the diagram. In addition, there is a separate swimlane for comments, clarifications, or notes about simplifications in a separate field (bottom).

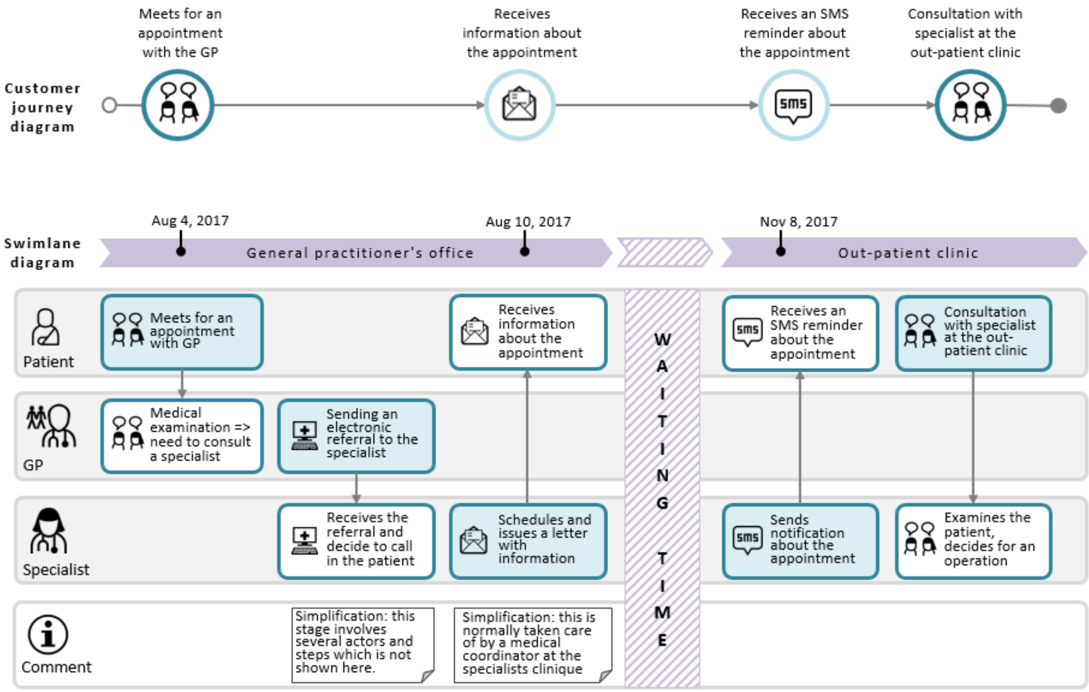

Fig. 8.3. Diagram types in CJML: Customer journey diagram (upper part), in this case a patient consulting a GP and being referred to a specialist. The swimlane diagram (lower part) reveals the network of actors involved in the patient journey. Source: Author’s own illustration (2018).

8.4 Training of surgery planning using patient journeys

DIPS is the leading supplier of eHealth systems to Norwegian hospitals. The company has contracts with three of Norway's four regional health trusts, including five of the six university hospitals. More than 80,000 professionals use DIPS's solutions daily, and it is thus one of Norway's most used computer systems. A case study was carried out in 2015 in relation to documentation and roll-out of a new generation of tools for planning a surgery. Surgery planning often involves several hospital departments, medical experts, and administrative personnel. The process depends on many factors such as the clinical case, hospital size, and health region. Critical and sensitive information is exchanged between actors over days, weeks, and even months. This information exchange takes place electronically through the DIPS system, but also face-to-face, through letters, and via SMS.

The goal was to map the process of surgery planning using CJML and evaluate the usefulness of the diagrams for training and knowledge sharing. The diagrams should reflect the formalized work processes and best practical use of the EHR system.

The target user group was primarily the consultants in DIPS responsible for introducing new software modules to the hospitals. The case study entailed development of two surgery planning scenarios, development of a CJML training module, and finally, an evaluation session with the target group.

8.4.1 Method and approach

Initial planning of the case study revealed the need to develop two typical patient scenarios, one for emergency surgery and one for elective surgery. The scenarios were scoped and discussed during a half day workshop with two medical doctors, a nurse, a DIPS product manager, two CJML experts and a service designer. The clinicians were employed by DIPS and directly involved in the development of the surgery planning module.

The emergency scenario involved a patient pregnant with twins in need of an immediate caesarean operation. The patient contacted the hospital after experiencing contractions and light bleeding. At the hospital, the patient was examined by a midwife and a gynecologist, and they decided on a caesarean section. Preparation for the emergency procedure also involved an anesthesiologist, an operation coordinator, nurses, and pediatricians.

The elective scenario involved an elderly man who visited his GP because of persistent pain in his hip. The GP referred him to an orthopedic outpatient clinic. After examining the patient, the orthopedist recommended a hip replacement. Hip replacement is a process that may span several months involving additional visits to the hospital for preparations and planning with clinicians (orthopedy, anesthesiology, nurses, and ergonomist) as well as operation coordinators and mercantile personnel. Fig. 8.3 in section 3 shows a simplified version of the initial patient journey, from the first appointment with the GP to the visit at the out-patient clinic.

The two scenarios were represented both in textual and diagrammatic form. The final CJML representation was developed through several iterations until all the details were approved and consolidated among the experts. The swimlane diagram was used for these patient journeys due to the high number of actors involved. The CJML representations were extensive due to the high number of touchpoints among the actors (see Fig. 8.4).

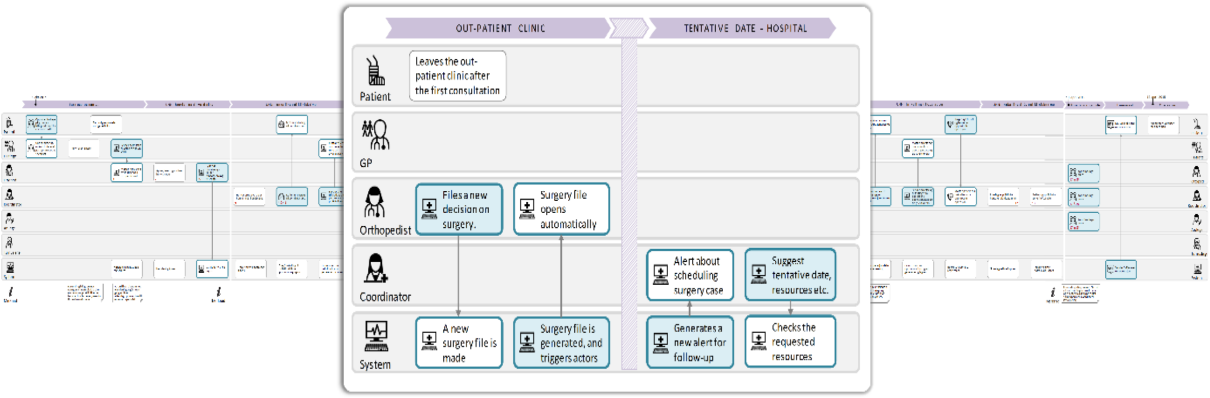

Fig. 8.4. The elective patient journey, representing hip replacement. Source: Author's own illustration (2018).

Most of the touchpoints in surgery planning were formalized and supported by interactions with the EHR system. For example, when the decision for surgery was registered, secondary tasks were triggered and directed to other actors, like an operation coordinator. The system also communicated directly to the patient, sending SMS reminders for the appointments. Consequently, the DIPS system itself was represented as a separate actor. The elective patient journey spanned several months, and a temporal module was added in the upper part to emphasize essential phases with dates, locations and idle periods. Screenshots of relevant graphical user interfaces (GUIs) were also presented and assigned to the touchpoints by a unique ID.

8.4.2 Evaluation

The evaluation workshop was conducted with seven participants, all clinically educated and employed by DIPS. Their main work tasks were counselling and education of customers on new software products. The workshop was organized in the following three consecutive sessions.

1. Introduction to CJML: A presentation of terminology and visual notation was followed by a warm-up exercise with a tangible toolkit, engaging the participants in groups to construct a swimlane diagram based on an e-commerce scenario. 2. Modelling of the emergency surgery: The emergency caesarean scenario was presented step-by-step and provided in textual form to make the participants familiar with the details. Then, the participants were introduced to the swimlane toolkit containing templates for all the actors and touchpoints (see Fig. 8.5a). Their task was to pair all the communication points, assign them to the correct actor swimlane together with the actions, and assemble everything in the correct order. 3. Walk-through of the elective surgery: The hip replacement scenario was presented in the same manner and discussed in plenary. Due to the complexity and the extensive size, the diagram was printed and mounted on a wall. We gathered the participants in a walk-through of the touchpoints and the relevant GUI's, inviting comments, clarifications, and discussions (see Fig. 8.5b).

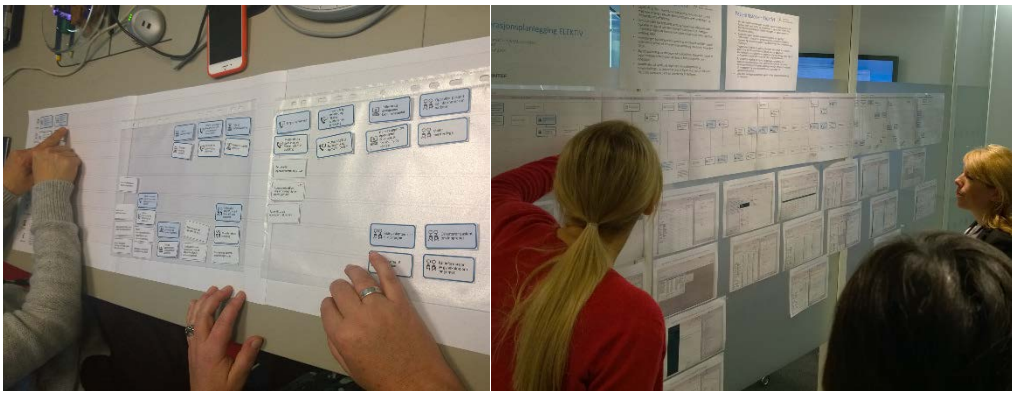

Fig. 8.5.a) Modelling of the emergency case b) walk-through of the elective case. Source: Author's own photo (2018).

The introductory warm-up exercise revealed that the participants had no problem using CJML for modelling simple scenarios. This is in line with previous evaluations, revealing that new users of CJML can create models with a high precision after a brief introduction (Halvorsrud et al., 2016).

Five of the participants answered a questionnaire after the workshop. They commented that CJML has "simple and few figures/shapes" and that "the visualization of the process was clear". The usefulness of CJML was perceived as high, with remarks like "visualization of the processes you assumed to know well" and "aid for clarification during training and test".

Do you think the diagrams can be useful to see the entirety in the end-to-end journey of all actors?

- Yes, but perhaps best for certain parts of the patient journey, so that a person can focus on what is most relevant for his/her responsibilities."
- "Yes, a good visual presentation, easily understood by users of the EHR system in combination with the screenshots."
- "The diagrams are useful to understand the entire process and the responsibilities of every involved actor."
- "Both yes and no, may result in complex flow charts."
- "Absolutely. Having activities in dedicated swimlanes opens up for nuancing and shows the complexity."

Do you think the diagrams are suitable to achieve a common understanding of surgery planning? To whom could it be useful?

- "Yes. On a general level it gives a good overview of who does what and how DIPS is supposed to be used."
- "Training of end users. Internally in DIPS for developers and consultants."

- "It can be useful for everybody involved in the process. This is often a problem. People make choices without seeing how others are affected."
- "Yes, because they visualize other actors' activities and their effect (or lack of effect)."
- "The actors often focus only on their own tasks – it is useful to see the totality for all actors, especially for understanding the patient's experience."

Do you think the diagrams are useful for training?

- "Yes, but it requires introduction and understanding of the model."
- "Yes, in a very simplified version."
- "Yes, by connecting the diagrams to screenshots of the system."

8.4.3 Lessons learned

In conclusion, the CJML diagrams of surgery planning were perceived as easy to understand and useful, especially for achieving a holistic picture of the patient journey and the actors' activities. Specifically, the direct coupling of touchpoints with the corresponding GUIs of the system was a helpful way for actors to understand their own tasks while maintaining a holistic view of the total journey. Currently, DIPS is considering how CJML may support their training and e-learning modules in a real setting, as the new module for surgery planning is being implemented in Norwegian hospitals.

8.5 Improving the patient journey for cervical cancer

Oslo University Hospital (OUH) is the largest hospital in Scandinavia with 1.2 million patient treatments annually. A case study was performed as part of a large project concerning the CPP of cervical cancer in 2016. Previous efforts had targeted only parts of the patient journey or the supporting IT systems. The project had strong involvement from clinical, administrative, and technical personnel at OUH. The project goal was to establish documentation of the end-to-end patient journey, as existing documentation was fragmented. One of the major goals was to reduce the waiting time from GP referral to treatment start date at the hospital. The patient journey for cervical cancer is known to be one of the most complex CPPs. One assumption was that a potential success with this CPP would be beneficial to many other improvement efforts.

8.5.1 Method and approach

The case study consisted of three parts. First, during a planning phase a core team developed and documented a detailed model of the patient journey. In a follow-up workshop, bottle-necks in the patient journey were identified together with suggestions for improvements. Finally, the feedback collected during the workshop was systemized and prioritized for further action.

The focus was to establish a best-practice journey for a typical patient. The core team started with the patient contacting her GP. They started with a draft patient journey diagram that detailed the touchpoints directly targeting the patient. The draft diagram was then adjusted in several iterations. The key performance indicators prescribed in the CPP were outlined in a separate axis, as they have both legal and medical implications for the hospital. The customer journey diagram (Fig. 8.6) was successful in creating an intuitive overview of the patient journey and identifying points that needed further clarification. The preparation process also revealed several misunderstandings within the team about what was part of the CPP and what was not.

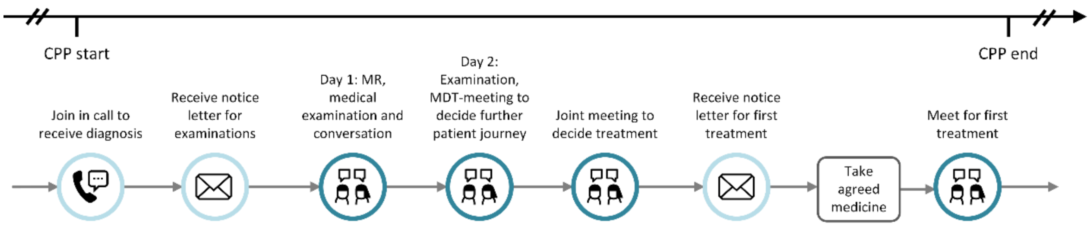

Fig. 8.6. Part of the cervical cancer patient journey. Source: Author’s own illustration (2018).

After validating the patient journey, the team identified the underlying medical and technical processes supporting the patient journey. Materials from previous process modelling initiatives were reused at this point. A swimlane diagram was used to illustrate all the actors' touchpoints (Fig. 8.7). The actors included a local and a regional hospital, as well as laboratory functions.

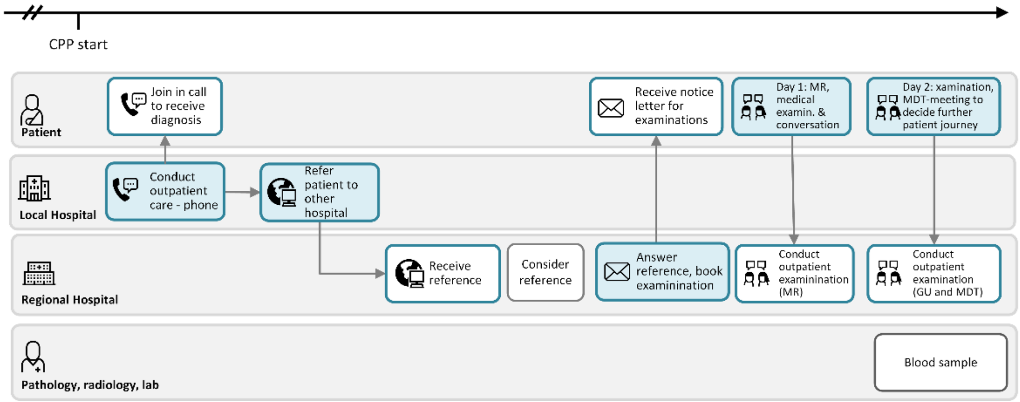

Fig. 8.7. Swimlane diagram showing the network of actors involved in the first part of Fig. 8.6. Source: Author’s own illustration (2018).

A workshop was conducted with about 40 participants involved in various parts of the patient journey. They were doctors, nurses, coordinators, laboratory personnel, and technicians. In addition, a former cancer patient participated in the workshop.

In preparation for the workshop, the patient journey established during the planning phase was printed and mounted on two walls. A generous amount of space was reserved around every touchpoint in the printed journey to allow for additional input from the participants in the form of post-it notes.

The workshop started with a plenary walk-through of the patient journey. The participants were then divided into seven groups to discuss the patient journey in detail. Their task was to identify pain points, bottle-necks, and possible places for improvement. The various types of input were documented using dedicated colors. The groups presented their findings in plenary while positioning their input at the relevant place in the journey (see Fig. 8.8). The workshop ended with a plenary discussion of the annotated patient journey and the method used during the workshop.

Fig. 8.8. a) Analysis of the patient journey in groups. b) The printed patient journey. Source: Author's own photo (2018).

8.5.2 Lessons learned

The core team found CJML useful for achieving a common, detailed description of the patient journey. Also, they found it useful for identifying all the hospital departments involved in the journey and how they cooperate. However, they found CJML insufficient to model detailed workflows and to identify the coupling to applications and systems. For these purposes, traditional tools like the BPMN language (OMG, 2011) was preferred.

The workshop participants gave very positive feedback on using CJML for modelling the patient journey. They found it easy to understand and suitable for detailed documentation of the patient journey. Having a common description of the patient journey was considered particularly valuable in improving the patient journey. The material produced during the workshop was later organized and processed. It resulted in a prioritized list, and some of the suggestions resulted in new improvement projects in selected areas of the journey.

The case study was a supplementary activity to the larger project for improving patient journeys at OUH. In conclusion, to make use of CJML on a regular basis, two shortcomings would need to be resolved: 1. Lack of graphical tools to share and publish diagrams; and 2. Limitations in the expressiveness for coupling the touchpoints to information flow and underlying IT processes.

8.6 Conclusion

Patient journeys are complex in several ways. Unlike most user or customer journeys, patient journeys originate from conditions or situations that people prefer to avoid. Furthermore, most patient journeys take place over an extended period and involve many actors and communication channels. The CJML approach is new within health care, but considering the challenges and radical changes foreseen in the health sector, a language for detailed and unambiguous modelling of service processes and patient journeys is beneficial.

We have introduced the formal modelling language CJML for application in the health sector. CJML draws on a service science perspective to support development of new services, as well as analysis of existing services, through a common terminology and visual notation. Through the case studies, we have exemplified how CJML has been used successfully by groups of professionals with a diverse background to achieve a common, detailed model of patient journeys. This resonates with results from a formal evaluation, revealing that new users can adopt CJML quickly and model customer journeys with a high precision (Halvorsrud, Haugstveit, & Pultier, 2016).

Elements of CJML have been used with success on other cases in health care, e. g., for the development and implementation of digital cooperation and support at a new hospital in the Oslo municipality (Ausen et al., 2017) and to study response center services in Norwegian municipalities. CJML helps identify needs and develop new and innovative services (Svagård et al., 2016).

The visual notation of CJML enables efficient communication for cross-functional work involving clinicians, technical- and administrative personnel. A common, formal method to describe patient journeys spanning institutions, disciplines, and systems is important for developing patient journeys in the future, particularly for securing seamless transitions across institutions.

The feedback collected during this study has provided us with valuable insight and ideas for improving CJML. We have disclosed areas where the expressiveness of the language should be improved, for example coupling of touchpoints with information and media content, as well as coupling to IT infrastructure. Finally, for more practical use of the language there is a need for graphical tools to construct, share and publish diagrams across groups and organizations.

8.7 References

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