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Abstract

Electronic Health Records (EHRs) in Long-Term Care (LTC) of older persons are expected to improve resident-centred care by reducing ambiguities in information coordination between LTC workers and organisations. While there are research findings concerning such intended outcomes, we are interested in analysing what sort of other, possibly unanticipated outcomes the use of EHRs in LTC may produce. We argue that the scrutiny of EHRs in LTC requires an understanding of their implementation as socio-technical processes, whereby EHRs are perceived as performative artefacts of LTC rather than technological tools or passive objects. While EHRs have been extensively studied in health-care settings, few studies have concentrated on eldercare settings. We aim to fill these gaps by drawing from a qualitative interview study (n=25) conducted with Finnish LTC workers in 2018. Using thematic content analysis, we analyse how LTC workers negotiate and interpret socio-technical practices of EHR-use at their workplace. Our findings suggest that, along with improving workers' accountability, EHRs are also considered disorganised, unrefined and burdening, thereby disrupting both the intended effects of EHRs and the continuity and the nuanced characteristics of caring.

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1. Introduction

Professional caring is subject to a growing number of accountability requirements mediated by Information and Communications Technology (ICT). In recent years, the development of documentation and communication practices in care work has focused on Electronic Health Records (EHRs). The electronic recording of clinical treatment, daily care activities, residents' moods and other information is expected to reduce errors and ambiguities related to care work and improve the coordination of information exchange between healthcare organisations. The starting point for this paper is the idea that along with these intended consequences, EHRs impact LTC work in many other complex and unplanned ways.

EHRs have been studied extensively in healthcare settings [1, 2, 3, 4] where the anticipated efficiency of their use has been shown to be uncertain [5]. Furthermore, EHRs have been shown to disrupt the complex social and organisational order of healthcare work [6]. From health care settings, EHRs have gradually been extended to LTC and home care for older persons. While there seems to be little research on EHRs in the context of eldercare, using EHRs for 'structured recording' of residents' daily care is encouraged to establish fixed, organisationally appointed information categories to be used for all residents in Finnish LTC and home care [7]. Along with the communication practices between staff, knowledge about LTC workers' experiences of EHRs is crucial in that EHRs also affect the care relations between the care workers and the residents.

ICT = Information and Communications Technology

EHRs = Electronic Health Records
LTC = Long-Term Care
ISH = Intensive Service Housing

By standardising the information recorded and applied in care settings, the relational and individual aspects of caring may be affected.

Campbell and Rankin [8] have written on the need to recognise and confront new controversies in redesigning healthcare organisations instead of only looking for pros and cons of specific technological innovations. The authors suggest that practices ruled by EHRs displace the work processes in which nurse-patient interaction is integral to nurses' judgement and action. In this vein, we argue that the scrutiny of EHRs in LTC would benefit from an understanding of their implementation as *socio-technical processes* amenable to sociological analysis, explanation, and intervention [9].

Following this thought, our analysis departs from the proposition that there is a gap between the anticipated use and actual practices of technology use in LTC, and that implementation of ICTs is often directed from the top down with limited involvement from eldercare professionals [10, 11]. We utilise Akrich and Latour's [12] concepts of *prescription,* to describe what EHRs forbid and allow in LTC work, and *subscription,* to refer to LTC actors' reactions to those prescriptions. In addition to this, we have used the socio-technical analysis of telecare technologies by Pols and Willem's [10] who expand the script theory by showing how technologies may *tame* and *unleash,* or *be tamed* and *unleashed* by, their users in care settings.

Our paper aims to fill the gaps in research concerning LTC workers' experiences of EHRs by drawing from a qualitative interview study (n=25) conducted with Finnish LTC workers in 2018. Applying thematic content analysis, this paper asks *how LTC workers negotiate and interpret the socio-technical practices of EHR-use at their workplace.*

In what follows, first, we describe the extent and context of EHR use in Finnish LTC services. We then explain the theoretical assumptions of socio-technicality in our study and describe our data and methodology. After this, we present the results of the

study under two main categories and six subcategories. Lastly, we draw conclusions from the results.

2. Context

2.1 EHRs in the context of LTC work in Finland

Finland has been among the early adopters of health information technologies. EHR coverage reached 100 % in Finnish public healthcare in 2007, and in 2017 both public and private healthcare was almost entirely arranged using EHRs [13]. In 2018 87.8 % of all eldercare workers in Finland reported using EHRs [14]. There is no earlier research on LTC workers' views of EHR use in Finland. However, in the healthcare sector, physicians' satisfaction of EHRs' ability to support clinical work is relatively low, especially with regard to conducting routine tasks and the amount of training required to learn to use the system [3], reflecting results from other countries [4].

In Finland, LTC of older people consists of nursing home care, LTC wards in hospitals and health centres and assisted living with 24-hour assistance. Our study focuses on the workforce in the last of these, Intensive Service Housing (ISH), which is the most common type of LTC service in Finland. It typically consists of small-scale institutional group homes with 24-hour care available. While ISH is described as a home-like environment in Finnish policy documents [15], the units can be situated in former nursing homes that have an institutional rather than a home-like atmosphere. ISH is targeted at older persons with dementia and extensive care needs. In line with the current policy emphasis on 'putting home first' [16], ISH units aim to guarantee normalised living for the residents.

The current set-up of work in ISH also begs attention when studying the use of EHRs in this context. The work is carried out as three-shift work with worker/client

ratio varying between 0.4 to 0.7 [17]. The residents are fragile, often suffering from some degree of dementia and/or other conditions characteristic of old age. The workforce are relatively highly educated with either a secondary (practical nurse) or tertiary (registered nurse) degree in nursing and care work. In addition, the care staff regularly include an auxiliary workforce with either a secondary (activity instructors) or tertiary (occupational therapist, physiotherapist) degree in health and social care work.

The ISH units in this study are representative of the typical set-up of ISH units. They accommodate 12–18 residents and a total of 15–20 nurses per unit, with 2–4 nurses working in a day shift or an evening shift and usually one nurse per night shift. Communication practices between nurses typically include brief face-to-face exchanges of information between shifts. However, not everyone is always present in these exchanges. The employees are expected to read and record EHR information on a regular basis, but very little time is officially allocated to this. Typically, EHRs were are available on mobile devices and sometimes finding the time or a free computer to read or write EHR entries can be challenging.

Care workers in Finnish LTC facilities have recently reported high levels of mental and physical strain compared to health and social care workers in other posts and the workforce in general. The self-reported reasons include insufficient support from managers, few opportunities to influence one's work, and a poor worker-client ratio. These factors, along with a relatively low level of remuneration, are presented as at least a partial explanation for the high turnover rate and prevalent intentions to quit one's job among LTC workers [18].

2.2 Technology in/as practice: studying the socio-technical role of EHRs as part of eldercare work

Our conceptual departure point is based on the idea that 'the technological' and 'the human' are not easily separated from each other but rather intertwine in complex ways. As has been argued by actor-network theorists and posthumanist scholars, instead of objects of use, all non-human artifacts, i.e. man-made objects, devices, systems etc., can be thought of as actants in care relations and practices that reshape the human life-world [19, 20, 21, 22]. In other words, *socio-technicality* cannot be avoided when technology is explored as an aspect of care relations. When humans repeatedly interact with the material and symbolic properties of technology, such as EHRs, the interactions will over time become structured processes [23], whereby the dynamic nature of technological applications and their situated use in care work can be analysed. For a recent commentary on theories on socio-technicality, see Erofeeva [19].

In this study, we describe the socio-technical aspects of EHRs in LTC of older people in two steps. First, this requires attention to the *prescriptions* of EHRs, or in Akrich & Latour's words, to "what a device forbids and allows from the actors" [12]. In our research context this means first of all scrutinising what the intended uses and effects determined in the design of EHRs forbid and allow the other actors to do in the context of LTC work and its daily practices. Second, the understanding of socio-technical aspects of EHR in LTC requires attention to *subscription*. This refers to the actors' reactions to what is being prescribed, meaning that the prescriptions are underwritten, negotiated, adjusted, neglected, and so forth [12]. How EHRs work as actors in the network of LTC of older people depends to a great extent on whether LTC workers know how to use the devices and systems, what their motivation is to use them, whether they choose to use them according to their design, and so on.

Bruno Latour, along with the myriad of proponents of Science and Technology Studies (STS) and actor-network theory, has introduced a variety of descriptive conceptualisations concerning the socio-technical dimensions of human and non-human assemblages [12]. For our study, however, it suffices to continue the line of thought set up by the concepts of prescription and subscription. In addition, and as supporting concepts that help finetune the analysis and reveal the different manifestations of prescription and subscription, we refer to Pols and Willems' [10] concepts of the *taming* and the *unleashing* features of technology. Technologies can tame users to work by its logic or unleash users in the sense of allowing them to find new, technologically mediated solutions to practical problems. The opposite is also true in that while technological prescriptions can be tamed to fit occurring practices or needs, technologies are also always unleashed onto the world in the sense that their prescriptions can never be fully controlled. In the context of our study, the idea of taming and unleashing are particularly helpful to capture the vulnerability that is characteristic to both the human and the material actors involved in care of older people.

Given that LTC of older people is particularly tied to complex and situational vulnerabilities or frail persons, care technologies should not be considered fixed and tool-like utilities but rather as actors that transform certain human vulnerabilities into others—not as something that can reduce or rid us of vulnerabilities as the modern scientific and technological praxis suggests [24]. Technologies inevitably give material answers to ethical questions but cannot remain outside of or indifferent to those questions – as actors of care they take part in forming its ethical dimensions [25].

3. Data and method

Our qualitative, semi-structured interview data (n=25) was collected in 2018 from care

workers and nurses working in ISH in two Finnish cities. In this paper, we refer to our informants as 'LTC workers', as they represented the typical workforce in LTC: most were practical nurses (n=14) or registered nurses (n=8) some of whom had a managerial role in their unit, the rest were activity instructors (n=2) or occupational therapists (n=1). The gender distribution among the interviewees—23 women and two men—resembled the situation in health and social care. Their ages varied between 26 and 57 years. Approval from the Ethical Committee of University of (anonymized) was acquired before initiating the research, as well as research permits from the cities' housing services departments. The informants were recruited either directly through care unit managers or by a call that was circulated on staff emailing lists. The workers then contacted us independently to schedule their interview. Especially in the former case, the sampling method may have provided us with informants whose participation was not entirely on a voluntary basis. Some of the informants were familiar to one of the two interviewers due to his work experience in some of the units. The majority of the interviews were conducted at the informants' workplaces during their working hours, one on the premises of the University of (anonymized) and one in the interviewer's home.

The interviews were recorded and manually transcribed. They lasted from one to one-and-a-half hours each. Specific themes, such as the coverage of technology used at work, pros and cons of using health information technologies (HIT) and ICT at work, risks of technology use for workers and residents and the impact of technology on recognising residents' situational needs, were introduced using key questions and prompts when necessary (See Appendix I).

The thematic content analysis [26] was carried out so that first the whole interview data was thoroughly read through. The parts covering EHRs were highlighted

and copied to another file, which was re-read highlighting preliminary notions on EHRs as part of LTC work. Eventually, this resulted in 14 empirically closed codes that covered issues such as the different typifications of systemic information, and experiences of the different ways in which EHRs affect LTC work. Finally, using the theoretical frameworks on prescription, subscription [12], taming and unleashing [10], the 14 codes were narrowed down to six and divided into two main categories evidencing how EHRs are situated in/as the socio-technical landscape of LTC work.

4. Results

The thematic content analysis results in categories illustrating the socio-technical aspects of EHRs, as presented in Table 1. It accentuates the ways in which care work is affected by EHRs and how EHRs are again affected by the actors involved in LTC. This is highlighted by the two main categories: (1) 'EHRs prescribing LTC work' and (2) 'Subscription of EHRs by LTC actors', each of which is divided into descriptive subcategories.

Table 1 The socio-technical aspects of EHRs in LTC work

Main category	Subcategory	Example quote
4.1 EHRs prescribing LTC work	4.1.1 Incoherent or dysfunctional EHRs	Right when you've learned one thing there's something else, now it goes like this, this isn't used anymore but that instead, oh but wait now we don't use it anymore anyway, this doesn't work, this version apparently will be updated.
	4.1.2 Unrefined information in EHRs	[...] some nuance may be left out, so that's why our staff has been vocal about the importance of oral reporting.
	4.1.3 Burdening EHRs	Reading everything in EHRs takes a surprisingly long time. […] It's more efficient to talk things through.
4.2 LTC actors subscribing to EHRs	4.2.1 Individual ways and abilities	The recording system works only as well as we record things, it doesn't work if we don't.
	4.2.2 Taming EHRs	I do record information on residents but I also print it on paper, put it on the desk and say go ahead and read this.
	4.2.3 EHRs unleashing care work	The nurses' perspectives differ from each other, for example whether someone can be lifted from their bed or not, so I lean on [EHRs], the factual information is there.

4.1 EHRs prescribing LTC work

4.1.1 Incoherent or dysfunctional EHRs

The first subcategory reveals the reciprocal socio-technical complexity of EHRs and LTC work. LTC work is tamed by EHRs in that the EHRs' logic mediated by the user interface remains unclear to the LTC workers.

> *Informant 11*: […] we've sure struggled with [EHRs]. Right when you've learned one thing there's something else, now it goes like this, now it's done like that, this isn't used anymore but that instead, oh but wait now we don't use it anymore anyway, this doesn't work, this version apparently will be updated.

EHRs include various modules and the software versions change from time to time, complicating their use. This incoherency of EHRs tames LTC workers to use parts of their shift to try and adapt to the systemic logic of arranging care. When the user interface is incomprehensible and its use as part of care work seems arbitrary, both the technological (efficiency) and the caring (attending needs) logics fail.

Along with the user interface, care work practices are tamed by EHRs' technical unreliability.

> *Informant 18*: There was a maintenance break on Sunday. It was to end at noon but it didn't end until 4 pm. The night shift couldn't record anything and we had to correct it. […] It was irritating having to record everything on paper and deal with EHR later. I like to do things right away, medicine for instance. There were falls which should have been documented right away and so it was annoying.

Systemic dysfunctions rearrange care work practices. They reduce the time for caring as LTC workers have to find alternative means for documenting their work and wait for technology to be repaired. This also reveals the vulnerability of technology: attending to ailments does not only cover the elderly residents but also dysfunctional technology, as it requires LTC workers' care and attention. Caring is complex interpersonal work to which EHRs bring a material element that requires care but also allows them new means of communicating their patients' needs. EHRs help improve the interpersonal relations of care, but they can also prescribe LTC work in ways that work against this goal.

Hope [27] argues that care is an emotional morality which feeds into the actions of care, for emotion and action are difficult to separate. Yet, digitalization has left nurses with difficulties to express this ethics of care. The effort of writing, Hope [27] points out, is an expression of their care for the patients. The fact that EHRs' affordance does not

allow exchanging this type of information does not prevent LTC workers from doing so. They find alternative ways to exercise their caring mind by writing notes, for instance. Rationalization risks depersonalisation of care. As we have shown in this article, LTC workers are aware of and deal with this risk in various ways.

4.1.2. Unrefined information in EHRs

The second subcategory demonstrates how LTC work is tamed by EHRs in that the nuanced characteristics of care collide with the national policy aim of producing structured data in eldercare work in Finland [7]. According to the official guidelines concerning EHRs, LTC workers are expected to record the multitude of caring functions under fixed (organisationally appointed) themes. The goal is to improve the quality of treatment and to support patient safety by reducing ambiguities in interpretation [7]. This practice known as 'structured recording' was also discussed by the informants.

> *Informant 13*: Recording on paper had many advantages. Looking back, [EHR] is, once you've got used to it, it's a good thing. But recording has been made more difficult now with this structural recording. So, like in hospitals before, everything has to be recorded under headings, always to find the right heading under which to write. And, it doesn't go like this, it's stupid that eating and everything are under different headings, it's somehow so inconvenient and stupid trying to read them.

The quote is an example of how EHRs considerably tame LTC work practices. Although the logic of EHRs and the logic of care might contradict each other, LTC workers gradually adopt EHR to use. Structured recording becomes a part of daily care practices, although not without resistance.

The informants also describe the differing contents of oral and structured reporting.

> *Informant 5*: [In oral reporting] one goes through daily events more. For instance, if a resident vomited today, someone might record that 'a person has vomited after lunch', while, by telling a co-worker, it would be so that 'we noticed the resident rushing into bathroom', or 'their roommate reporting that there's vomit on the floor', and we go and ask the resident her/himself and they tell us they've vomited, so, orally a lot more is reported, more accurately about the situation and what has happened.

Care work does not exclude expressions and use of emotion such as empathy, sensitivity and responsiveness to others' situational needs. This makes it difficult to transform caring into systemic information. By contrast, oral reporting was widely viewed as preferable to reading EHR entries, allowing LTC workers to describe their work in more detail and with a more personal touch to one another. Information in EHRs is described as 'bureaucratic' and 'stiff'in contrast to oral reporting where questions can be asked quickly to learn 'what's up' with a resident. Some informants described the role of oral reporting as attending to the whole personality of a resident.

> *Informant 15*: On paper, a human being can be extremely demanding care-wise, and then in reality there's a smiling and able person equipped with relatively good interaction skills and a sense of humour, a person that fascinates. On paper, one is completely different than in a live situation.

The above quote demonstrates the deficiencies of the information in EHRs (here, 'paper' refers to EHRs). EHRs are seen to provide unrefined health information, which seems insufficient in contrast with LTC workers' professional goal to attend to the whole human being.

> Oral reporting may also positively affect the general atmosphere of an LTC unit.

> Informant 25: [..] official information is recorded, but in oral reporting other information is conveyed a lot better. And it is maybe easier to remember a lot better, and it is easier to talk with residents, saying 'I heard you did this and that',

'was it fun?', and so on, compared to 'I read from the records' [laughs] 'where, you read… where?'.

Above, oral reporting as corporeal face-to-face interaction is seen as an important part of the atmosphere of the ISH unit in that it includes 'other information' that is also more natural to refer to in conversations with the residents. LTC workers are skilled interpreters of situational needs presented as gestures, postures and expressions [29]. This interactional corporeality can mediate a lot of information on residents' wishes, emotions and general well-being and create the potential to care [30, 31]. In light of this, it is problematic to assume that transferring information regarding personal care under systemic structures, could display the care needs of particular vulnerable persons. In line with Bowker and Star [32], our analysis depicts the tension between abstracting away from the local and rendering 'invisible work' visible with EHRs. As the documentation practices and information infrastructure of EHRs originate from medical care, they fit the purpose of LTC work only to a limited degree and encourage workers to employ diverse communication practices to pass on what they think is essential information to their colleagues and residents in ISH units.

4.1.3 Burdening EHRs

The third subcategory depicts another way of how LTC workers' are being tamed by EHRs, and can be read as a consequence of the previous two. It shows how strictly the prescription of EHRs organises their work.

Q: So it's good to have conversations, the main thing is that the information is received…

Informant 12: Yes, of course, but of course the doctor doesn't do anything about anything if it's not in [EHR].

Here, the informant explains how the doctor reacts primarily to systemic information written in EHRs. Moreover, the above should be understood in light of the fact that EHRs have been adopted to LTC from the medical professions where they form and important part of the relationship between the professional and the patient [27]. In a similar vein, EHRs have evolved to handle factual, systemic information in LTC to the extent that in order to make something happen, it needs to be written down. The two sides of the coin with regard to EHRs' factuality are presented well here: the system provides reliable information to determine actions, but it also means that to act is to sit in front of a computer.

The results suggest that to the nurses, EHRs were more often than not a burdening part of care work and something external in relation to caring. The informants often described caring without devices as 'normal' and 'slow', as opposed to 'speed' or 'coldness' related to use of EHRs. The 'core' of caring is seen to reside somewhere outside EHRs, which is viewed as bureaucratic and 'of no real value for the residents'.

Burdening was also often presented in terms of lack of resources such as time .

> *Informant 24*: I still trust oral reporting more, even though they say read [EHR] by yourselves, but our time means that, if there are two people talking, compared to opening and reading eight or 16 resident records, it just takes a lot of time [to read records] compared to going through them in a 15-minute conversation. And during the 15 minutes we can quickly talk about previous days as well. Reading everything in EHRs takes a surprisingly long time. […] It's more efficient to talk things through.

Above, reading EHR entries are seen as a time-consuming and inefficient way of communication compared to oral reporting. Lack of time not only restricts the proper use of EHRs, but their use itself takes time away from other tasks. In a hierarchic

organisation, this could even lead to professional clashes, as recording the work of registered nurses was sometimes viewed as more important than that of other groups. Lack of resources regarding devices thus leads to lack of time to properly realise the prescription of EHRs. Other expressions of shortages included the lack of organisational resources such as computers and software training to use EHRs. These could be regarded as the key organisational factors preventing LTC workers from realizing the full capacity of EHRs as a part of their work.

4.2 LTC actors subscribing to EHRs

4.2.1 Individual ways and abilities

As the previous subcategories already show, LTC workers' personal ways of working shape the use of EHRs in many ways. The following subcategory demonstrates actors' reactions to what is being prescribed, beginning with LTC workers' individual ways and abilities to use EHRs. The prescriptions, i.e. intended efficiency and accountability, are not always properly realised due to unaccounted for human aspects. The following examples illustrate how EHRs become tamed by human practices because of LTC workers' habits, abilities, errors and refusals to record their work and residents' circumstances to EHRs sufficiently.

> Q: How is a resident's situation described in [EHRs], if you start going through the data?

> *Informant 6*: It depends on how the bi-yearly reviews and such have been written down. If they've been done and everything's up to date, then it should be possible to get information on how the resident should be treated or what are his/her most important needs, but if it's very incomplete, then adequate information isn't necessarily there.

While the LTC workers understood the purpose of EHRs, they often failed to fulfil its intended purpose. EHRs are tamed by care professionals also in that they sometimes simply make errors while recording the information.

> *Informant 13*: […] I wonder if I can say that, in [EHR] one can easily record information for the wrong resident. I also, not so long ago, and someone else too by accident around the same time, wrote down a long text in a treatment plan, so things like this can happen.

The above citation shows how human errors in recording information can disturb caring processes. The prescription of EHRs—to carry important information about residents' care needs—is not met if the information is recorded in the wrong file.

The results suggest that lack of motivation to record information could also disturb the prescription of EHRs.

> *Informant 11*: […] I understand that some things have to be done and you can write decent treatment plans there and so on, but there are many people who don't know how to apply it to daily care work and, to be honest, don't really want to either. So it's a necessary evil.

What is prescribed does not matter if the prescription itself is rejected. When the lack of motivation affects EHR use, on one hand EHRs are tamed by negligence on part of care workers while on the other hand care work is tamed by the resulting incoherencies in the system. This results in further unwillingness or negligence to use EHRs, leading to further incoherency, and so forth. Both the prescription of EHRs (accountability and efficiency) on one hand and the characteristics of care (attentiveness to person-specific needs) on the other become compromised in such socio-technical processes.

4.2.2 Taming EHRs

The deficiencies that LTC workers find in EHRs' prescription may also lead to the modifying of EHRs' prescription, where problems related to technology are avoided by more or less creative means—by taming EHRs to better meet the practices of LTC work.

> Q: Do you record at the end of the shift or?

> *Informant 7*: Yes, usually at the end. I thought that it would be nice if I could record after finishing (a task), although the medications I usually write down right away. If there's something special, I try to write it down manually on paper notes, remember to record blood sugar and so on, or how much medication I gave someone.

Taking notes on paper is frequently used in care work to help remember the contents of care interactions. The prescription of EHRs works best when information is recorded right away, because the daily care tasks in ISH are manifold and complex. They involve dealing with information about residents' health, moods, gestures and other events that may be hard to express in language in the first place, let alone remember and record later. These findings are in line with past studies on nursing in health care settings indicating, for instance, that the lack of contextual information in EHRs is often compensated for with personal paper notes [33, 6, 28].

> Due to time restraints to read and record information on EHRs and the round-the-clock nature of work in ISH, LTC workers find alternative ways to pass information to each other.

> *Informant 22*: I do record information on residents but I also print it on paper, put it on the desk and say go ahead and read this.

The above citation shows that systemic information is also printed out from EHRs to highlight important pieces of information, rather than relying completely on EHRs as a mode of communication. While, in the previous subcategory, the difficulty regarding the prescription of EHRs was sometimes met with opposition or refusal, here technology is tamed because its prescription does not fit the daily practices of LTC work. In this case, LTC workers' attention starts to focus on the printouts instead of the EHR system itself.

Taming can also occur so that the logic of EHRs is harnessed to work for reasons external to care tasks.

> *Informant 14*: Frankly, sometimes with some residents, it depends on whether their relatives are demanding. If a resident doesn't have relatives or any special issues concerning their health, then it is rare that the information written down is very detailed.

The quote above suggests the rigour of using EHRs may also depend on residents' relatives. Here, the motivation for EHR use is partly defined by them. In other words, EHRs are tamed to fit purposes not prescribed in their design. While being an example of taming EHRs, the quote above is also an example of unleashing EHRs into the life-world of LTC, demonstrating the difficulty to control the actual uses of EHRs.

4.2.3 EHRs unleashing care work

The third subcategory depicts a variety of ways in which EHRs unleash LTC workers to carry out care practices in new ways. This relates to the logic of EHRs in general and to the characteristics of systemic information, such as EHRs' ability to compile what one of the informants described as factual information regarding care practices.

> *Informant 14*: I have to admit that I don't often read EHRs, but rather ask the nurses. But then, if nurses' information seems to conflict with each other, I go and

check what's written in the EHRs, to get a grasp of things. I sometimes feel that nurses' views differ a little bit from each other, for example whether a resident can be lifted up or not, so I lean on [EHRs], the factual information is there.

The use of EHRs unleashes LTC workers in that it provides systemic and factual information on which to rely on in ambiguous situations. EHR entries create a systemic memory on which to rely as 'factual' information in contrast with human memory.

Another important benefit of using EHRs comes from their statutory role as a repository of information. In terms of LTC workers' accountability, EHRs provide them with a safety net.

Q: Are there any differences in recording between workers?

Informant 10: Well some don't record every shift. I record those who I've cared for, who's been given to me, because then I cover my own back, I've done something to a resident, so if something comes up then it's not good not to have any records for the whole day for example.

In the quotes above, EHRs are described as ensuring LTC workers' legal protection concerning the jurisdiction on patient rights as all the recorded information is available for later enquiry. While accountability is prescribed in EHRs to ensure residents' rights and to manage the contents of care work, it also secures LTC workers' juridical positions and structures their activities by providing records of care tasks [see also 3 2].

The extensive records in EHRs also help in carrying out daily care work in general.

Informant 13: It's of course easier now [with EHRs], we get information much more extensively and everything is immediately visible compared to going through papers, […] if a resident for example is taken to a hospital, we see what's been done there, so we get access to information like this which eases our work a lot.

Here, EHRs unleash LTC workers to get a better grasp on their residents' changing situations. If LTC workers have sufficient resources to write and read entries in EHRs and if the devices and systems work, EHRs can unleash LTC workers to take advantage of person-specific information that could otherwise be lost in the vast quantity of information circulating in an ISH setting.

> *Q:* Is recording burdening to you?

> *Informant 14:* Yes, a little. But then again I think it's helpful, when used right, in that I see which residents need something, who doesn't get any attention or any activities.

Here, EHRs are depicted as something that enables a broader understanding of the care of a particular resident. It is also a means of ensuring an equal level of care for all residents. EHRs unleash caring in that they enable insights into how care work is better arranged to suit personal care needs on the one hand and equality of the distribution of care on the other.

Overall, the results regarding LTC workers' subscription to EHRs reveal the complexity of caring as interpersonal work. EHRs bring a material element that requires their care but also allows them new means of communicating their patients' needs while securing their own juridical position as care professionals.

5. Discussion

In this paper, we have presented LTC workers' views on how EHRs impact care work practices in ISH units. The analysis was carried out with a focus on technological prescription of EHRs on the one hand, and the LTC actors' subscriptions to EHRs on the other. To reveal the various manifestations of prescription and subscription, we have referred to taming and unleashing to illustrate the intertwining roles of technological

and human actors' in LTC assemblages.

One aspect of the socio-technicality of care work arrangements is that care practices are tamed by what is prescribed by EHRs. First, our results show how this was depicted in terms of incoherent user interfaces and technical dysfunctions. Second, care practices were prescribed by EHRs in that the logic and characteristics of information in EHRs collided with ideal care work practices of LTC workers as the users of this information. These restrictions caused them to sometimes view the use of EHRs as burdening. The results are in line with studies on nurses' experiences of EHRs in health care settings [1, 4, 33].

Our results also illustrate in which ways LTC work subscribes to the technological and organisational prescriptions of EHRs, which are not realised due to personal habits, tinkering, negligence, errors or lack of skills or resources. Further illustrating how LTC work subscribes to EHRs, our results show in which ways EHRs facilitate person-centered care or otherwise unleash care professionals to work in new, more efficient ways.

This said, and in line with Hope's [27] study on nurses' experiences of EHRs, LTC workers' effort to tinker the technology and to supplement its use with paper recording and oral reporting can be understood as their expression of care for their patients rather than ignorance or negligence to abide rules. The results show how LTC workers reshape and tinker the prescription of EHRs by taming them to better fit care work practices.

Ideally, EHRs should act as boundary objects [34] between communities of practice involved in LTC work: as such, they inhabit the intersecting social worlds of nurses, medical doctors, administration, and the units' residents and/or their families, and satisfy the information requirements of each of them. Our results suggest that LTC

workers do their best to code their activities and thereby to situate care work visibly within the memory system of EHRs – the design of which fits this purpose only to a limited degree. Overall, EHRs appeared as something that have been unleashed in LTC settings without the end-users' consultation: once taken into use, it is hard for LTC workers to control the multitude of both positive and negative impacts that are not prescribed in their design. Despite of how EHRs tame LTC workers, the results also show how EHRs have the potential to unleash LTC workers to carry out care tasks in ways that would not be possible without them, such as exchanging information between different care facilities. Through EHRs, the socio-materiality of LTC work is constantly evolving and reshaping, as users tinker with the technology to make it suit their purpose in the best way possible.

The results in this paper suggest that EHRs affect LTC practices in complex and multifaceted ways. On the one hand, EHRs are expected to tackle the ambiguousness of oral reporting of care tasks and produce more systemic recording of care. On the other, the unrefined nature of information in EHR entries causes vulnerability as it can diminish LTC workers' attentiveness to residents' nuanced care needs, as suggested by Hope [27]. Overall, the results suggest the information infrastructure of EHRs does not sufficiently take into account the corporeally mediated, tacit knowledge of LTC work. EHRs cannot therefore contain all aspects crucial for attentive LTC work but only the information that is needed for the smooth running of ISH units.

Care work is about dealing with human vulnerabilities, which can be emotionally burdening. It resembles handicraft work in that many care practices are about contextual and embodied knowledge instead of propositional truths [35]. As one of our informants put it, getting a grasp of 'what's up' with a resident is crucial. Care ethics emphasise the corporeal relations and spatially and temporally particular

vulnerabilities over universal guidelines [36, 37, 29]. Based on our results, we suggest the situated and corporeal character of care work ought to be the primary departure point when introducing EHRs to LTC work.

Keeping in mind the recommendations regarding structured recording, the prescription of EHRs is particularly strong. Along with older persons as service users, LTC workers lack voice in the design of care technologies and the production of nursing knowledge in LTC work. LTC workers are experts in interpreting complex human needs; thus they also have a clear idea of the pros and cons of different technologies applied to their work, and of the vulnerabilities they may create, accentuate or reduce. The conclusion is that experiences of care professionals should be better regarded in the design and management of ICT-mediated care work in order to ensure that the arrangements of socio-technical practices primarily can help support the ideal of person-centred care rather than hampering it. This is a question of how and by whom technologies are designed but also a question of organisational and professional power and autonomy.

References

[1] Cresswell, K.M., Worth, A., Sheikh, A. (2012). Integration of a nationally procured electronic health record system into user work practices. *BMC medical informatics and decision making 12*(1), 1–12.

[2] Greenhalgh T., Potts H., Wong G., Bark P. & Swinglehurst D. (2009). Tensions and paradoxes in electronic patient record research: a systematic literature review using the meta-narrative method. *The Milbank Quarterly 87*, 729–788.

[3] Kaipio, J.; Lääveri, T.; Hyppönen, H.; Vainiomäki, S; Reponen, J.; Kushniruk, A. & Vänskä, J. (2017). Usability problems do not heal by themselves: National survey on physicians' experiences with EHRs in Finland. *International Journal of Medical Informatics 97*, 266–281.

[4] Wisner, K., Lyndon, A., & Chesla, C. A. (2019). The electronic health record's impact on nurses' cognitive work: An integrative review. *International Journal of Nursing Studies 94*, 74–84.

[5] Black, A. D., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., McKinstry, B., ... Sheikh, A. (2011). The impact of eHealth on the quality and safety of health care: A systematic overview. *Plos Medicine, 8*(1), 1–16.

[6] Halford, S., Lotherington, A. T., Obstfelder, A., & Dyb, K. (2010). Getting the whole picture? New information and communication technologies in healthcare work and organization. *Information, Communication & Society*, *13*(3), 442–465.

[7] Finnish Institute for Health and Welfare (2016). Benefits of structured data. Retrieved from https://thl.fi/en/web/information-management-in-social-welfare-and-health-care/standardisation-of-data-and-requirements/structured-information-in-social-welfare-and-health-care/benefits-of-structured-data 27.2.2020.

[8] Campbell, M. L., & Rankin, J. M. (2017). Nurses and electronic health records in a Canadian hospital: Examining the social organisation and programmed use of digitised nursing knowledge. *Sociology of Health & Illness, 39*(3), 365–379.

[9] Loos, E.; Haddon, L. & Mante-Meijer, E. (2008). Introduction. In L. Haddon, E. Mante-Meijer, and E. Loos (Eds.) *The Social Dynamics of Information and Communication Technology (*pp. 15-22*)*. New York, NY: Routledge.

[10] Pols, J. & Willems, D. (2011). Innovation and evaluation: taming and unleashing telecare technology. *Sociology of Health & Illness 33*(3), 484–498.

[11] Stokke, R. (2017). "Maybe we should talk about it anyway": a qualitative study of understanding expectations and use of an established technology innovation in caring practices. *BMC health services research*, *17*(1), 657–669.

[12] Akrich, M. & Latour, B. (1992). *A Summary of a Convenient Vocabulary for the Semiotics of Human and Nonhuman Assemblies.* Cambridge, MA: The MIT Press.

[13] Reponen, J.; Kangas, M.; Hämäläinen, P.; Keränen, N. & Haverinen, J. (2018). Tieto- ja viestintäteknologian käyttö terveydenhuollossa vuonna 2017: Tilanne ja kehityksen suunta. [Use of ICT in health care in 2017: Status and development.] Finnish Institute for Health and Welfare.

[14] Anonymised.

[15] Ministry of Social Affairs and Health (2013). Laatusuositus hyvän ikääntymisen turvaamiseksi ja palvelujen parantamiseksi. [Quality recommendation for securing good ageing and service improvement.] Sosiaali- ja terveysministeriön julkaisuja 2013:11.

[16] Anttonen, A & Karsio, O. (2016). Eldercare service redesign in Finland: Deinstitutionalization of Long-term care. *Journal of Social Service Research 42*(2), 151–166.

[17] Alastalo, H. (2018). Vanhuspalveluiden tila – seurantatutkimus 2014–2018. [The state of eldercare services – a longitudinal study 2014–2018.] Finnish Institute for Health and Welfare.

[18] Kröger, T.; van Aerschot, L. & Puthenparambil, J.M. (2018). Hoivatyö muutoksessa. Suomalainen vanhustyö pohjoismaisessa vertailussa. [Care work in transition. Finnish eldercare work in Nordic comparison.] YFI julkaisuja 6. Jyväskylä: Jyväskylän yliopisto.

[19] Erofeeva, M. (2019). On multiple agencies: when do things matter? *Information, Communication & Society, 22*(5), 590–604.

[20] Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory.* Oxford, NY: Oxford University Press.

[21] Latour, B. & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts.* Princeton, NJ: Princeton University Press.

[22] Mol, A. (2002). *The Body Multiple: Ontology in medical practice.* Durham, NC: Duke University Press.

[23] Gherardi, S. (2012). *How to conduct a practice-based study: Problems and methods.* Cheltenham, UK: Edward Elgar Publishing.

[24] Coeckelbergh, M. (2013a). *Human Being @ Risk. Enhancement, Technology, and the Evaluation of Vulnerability Transformations.* Dordrecht, Netherlands: Springer Science & Business Media.

[25] Latour, B. (1992). Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts in Bijker, W. E., & Law, J. (1992). *Shaping technology/building society: Studies in sociotechnical change.* MIT press.

[26] Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development.* London, UK: SAGE.

[27] Hope, T. (2019). New Information Systems Supporting the Emotional Aspect of Care. In M. Toivonen and E. Saari (Eds.) Human-Centered Digitalization and Services. Singapore: Springer, 225-241.

[28] Keenan, G., Yakel, E., Dunn Lopez, K., Tschannen, D., Ford, Y.B. (2013). Challenges to nurses' efforts of retrieving, documenting, and communicating patient care information. *Journal of the American Medical Informatics Association 20*(2), 245–251.

[29] Twigg, J. (2000). *Bathing. The Body and Community Care.* London, UK: Routledge.

[30] Turkle, S. (2011). *Alone Together: Why We Expect More from Technology and Less from Each Other.* New York, NY: Basic Books.

[31] Hamington, Maurice (2004) *Embodied Care. Jane Addams, Maurice Merleau-Ponty, and Feminist Ethics.* Urbana and Chicago: University of Illinois.

[32] Bowker, G. C., & Star, S. L. (1999). *Sorting Things Out: Classification and Its Consequences.* Cambridge, MA: The MIT Press.

[33] Chao, C.A. (2016). The impact of electronic health records on collaborative work routines: a narrative network analysis. *International Journal of Medical Informatics 94*, 100–111.

[34] Star, S.L & Griesemer, J.R. (1989). Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-1939. Social Studies of Science 19(3), 387-420.

[35] Coeckelbergh, M. (2013b). E-care as craftsmanship: virtuous work, skilled engagement, and information technology in health care. *Medicine, health care and philosophy 16*(4), 807–816

[36] Sevenhuijsen, S. (1998). *Citizenship and the ethics of care: Feminist considerations on justice, morality and politics.* London, UK: Routledge.

[37] Tronto, J. C. (1993). *Moral Boundaries. A Political Argument for an Ethic of Care.* New York, NY: Routledge.