

# Risk and Uncertainty in Telecare: The Case of the Finnish 'Elsi'

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## Abstract

In recent decades, technologically mediated 'telecare' solutions have become popular for making the care of ageing populations more efficient, productive and targeted in times of economic austerity and care deficits. While telecare has been implemented in care work, caring has increasingly become a practice of managing risks. This paper draws on ethnographic research on the telecare solution 'Elsi' in a Finnish care home setting and examines telecare as a form of risk management. The 'Elsi' telecare system is based on information gathered from floor sensors and alarms caused by different events, such as falls. The argument is that telecare practices deal in many ways with 'uncertainty work' that produces uncertain knowledge, uncertain entities and uncertain values. Furthermore, these uncertainties produce additional work, which creates more duties for the care worker.

**Keywords:** care work; risk; telecare; uncertainty work

## Introduction

Transcending a fearful vision of "care turned cold" (Pols, 2012: 11), new health care advances have highlighted the promises of technology to improve health, provide a seamless service, empower individuals and encourage the independence of patients (Mort et al., 2009a). 'Telecare' is a prominent new care technology. Broadly speaking, telecare refers to monitoring devices (e.g., phones, alarms, sensors, pendants and video connections) and other information and communication technologies that help people live and age independently at home and support their physical and emotional abilities (Callén et al., 2009; Draper and Sorell, 2013; Milligan et al., 2011; Roberts et al., 2012). Rather than being a particular technological solution, telecare refers to a broad sociotechnical arrangement (López Gómez, 2015)

that consists of different devices, professionals, organisations, institutions and policies that share the goal of providing 'caring at a distance' (Pols, 2012). In home telecare, for example, a range of personal and institutional, and formal and informal resources are mobilised, including not only nurses but also relatives, neighbours and social and emergency services (López and Domènech, 2008a).

In health care policies and the welfare technology industry, telecare is rallied as a way to improve the independence, autonomy and connectedness of ageing individuals (Kim et al., 2017; Sánchez-Criado et al., 2014), free the caregiver from certain tasks and responsibilities (Callén et al., 2009) and provide a means to solve the 'problem' of the ageing population that can



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result in rising health care costs (Kim et al., 2017; Mort et al., 2013a, 2013b; Pritchard and Brittain, 2015). The literature, especially in science and technology studies (STS), has addressed how telecare does not solve problems, but rather enacts particular problems (Pols, 2010). Telecare involves the practice of shaping care, what caring is and how daily life changes for the elderly when telecare is introduced (Pols, 2012; Schillmeier and Domènech, 2010). Telecare has been shown to reshape family and care relationships and identities and to form a new topology of care (Milligan et al., 2010; Mort et al., 2009a). When introduced into homes, telecare can reconfigure the home as a hospital-like site of diagnosis and monitoring for the elderly (Milligan et al., 2011; Mort et al., 2009b; Neven, 2015; Oudshoorn, 2011).

Telecare has also increased the amount of hidden and unrecognised work. Telecare has not resulted in a reduction in work, as promised by care policies and telecare technology providers, but, rather, a shift in relationships and responsibilities (Milligan et al., 2011; Mort et al., 2013a, 2013b) and a reconfiguration of care work and its challenges (Roberts et al., 2012). Telecare implementation has increased both the workload of nurses and the responsibilities of patients (Oudshoorn, 2008, 2011; Pols, 2010; Pritchard and Brittain, 2015; Tirado et al., 2009).

Simultaneously, telecare has increasingly transformed caring into a form of risk management. Research that has conceptualised telecare as risk management have shown that continual surveillance and monitoring are justified on the basis of providing security and safety for the subjects of telecare (Grosen and Hansen, 2021; López, 2010; Mortenson et al., 2015). Telecare as a form of risk management puts the focus on discovering risks, reducing risks and creating risk profiles that easily become the object of care (López, 2010). For example, people with dementia may have a 'risk of disorientation', which means that this risk needs to be taken into account by monitoring and assessing the person's movements (Tirado et al., 2009). Furthermore, the risk of falling is predicted because falling can increase functional decline, morbidity, mortality, nursing home admissions and costs (Draper and Sorell, 2013; Kim et al., 2017).

Uncertainty and indeterminacy are central to telecare's operations (Milligan et al., 2011; Roberts et al., 2012). The research on telecare as risk management recognises that "security is a way of bringing uncertainty into the production of order" (López, 2010: 50) and that "uncertainty is vital to delivering immediate care" (López and Domènech, 2008b: 673). Still, uncertainty has remained underdeveloped as a theoretical concept. Instead, the emphasis has been on prediction – forecasting and precaution – and governing through calculation. Uncertainties, then, become something to detect, manage or erase.

I address this gap by approaching risk management in telecare as 'uncertainty work' (Moreira et al., 2009; Pickersgill, 2011, 2020), that is, as a form of work where uncertainties cannot be avoided, but rather, are used as a resource that is linked to creativity and innovation. I examine ethnographically how uncertainty is one of the key features in the use of telecare. My research questions are straightforward: How is telecare used in care work? And what are the outcomes of telecare use? My research material consists of observations and interviews collected during ethnographic fieldwork in a Finnish care home outfitted with the 'Elsi' telecare system, which functions based on information gathered from floor sensors and alarms caused by different events, such as falls. The article contributes to research recognising telecare as a form of risk management by showing how working with 'Elsi' creates epistemological, ontological and ethical uncertainties that are connected to ways of knowing, to the enactment of new and unforeseen risks and to addressing ethical issues.

This paper proceeds as follows. In the first section, the concept of uncertainty work is presented in detail followed by a discussion of methods. Here, I also outline the characteristics of telecare technology when introduced to institutional care settings instead of private homes. Then, I analyse the epistemological, ontological and ethical outcomes of uncertainty work. Before concluding, I briefly discuss how uncertainty work is connected to the increase in work for care workers in telecare.

## Uncertainty work

The concept of uncertainty is highly relevant in medical sociology and STS. Uncertainty is central to any health care practice (Cribb, 2020; Mackintosh and Armstrong 2020; Strauss et al., 1985), and it has been approached as a theoretical concept, empirical phenomenon and human experience (Fox, 1980). Indeed, the concept of uncertainty has many meanings, ranging from an ‘affective state’ of individuals (Pickersgill, 2020: 85) to a characteristic of the organisation of institutions, systems and infrastructures. In STS, Star (1985, 1989) identified four different sources of uncertainty in scientific work; namely, taxonomic, diagnostic, organisational and technical. Taxonomic uncertainty deals with developing classification systems. Diagnostic uncertainty is related to the application of these systems. Organisational (or political) uncertainty is about creating or maintaining the division of labour, and technical uncertainty comes from instruments and materials that create uncertainty. However, this classification also puts the emphasis on the management of epistemological contingencies and indeterminacy. In contrast, the concept of uncertainty work has captured the productivity of uncertainty, and has emphasised the importance of ontological and ethical uncertainties in addition to epistemological ones.

The concept of uncertainty work builds on the idea that uncertainty is a practical accomplishment. It has been shown that uncertainty work is a mundane and pervasive feature of scientific work and a routinised feature of knowledge production characterised by indeterminacy (Pickersgill, 2011). Uncertainty work produces new epistemological standards, practices and conventions that become “endogenous requirements for ongoing knowledge production, innovation and clinical work rather than forms of external control” (Moreira et al., 2009: 666). However, uncertainty work is not only epistemological, but also ontological, and epistemological and ontological uncertainties mutually structure each other. For example, Pickersgill (2011) has shown how the epistemological uncertainties related to diagnostic tools also co-structure what mental disorders are in an ontological sense. The production of uncertainty is not a reversal, but a

constituent of knowledge and entities (Moreira et al., 2009), a precondition for action and a positive and internal force of organisation and constituting order.

In addition, uncertainty work has normative dimensions and in this way, becomes a form of ethics. When *knowing* and *being* become uncertain, value judgements, moral tensions and normative assumptions come to the fore and must be considered (Mackintosh and Armstrong, 2020; Pickersgill, 2020). In short, with the concept of uncertainty work, it is possible to see the production of uncertainty as a constituent of knowledge, entities and ethics. Thus, the concept of uncertainty work is helpful for examining telecare as a form of risk management beyond the emphasis on prediction and the Finland based telecare system ‘Elsi’ provides an appropriate lens to illustrate uncertainty work in practice.

## The ‘Elsi’ telecare system

Elsi’ is an example of ‘ambient assisted living’ (AAL) technology embedded in Finland’s social care infrastructure (Doughty et al., 1996). AAL is designed for people with cognitive impairments and is used “to detect potentially problematic changes in health or activity” (Mortenson et al., 2015: 514). The phrasing ‘potentially problematic’ already hints at the direction of risk management, of controlling potential, not actual, events. Indeed, “AAL is ultimately about the management of risk” (Mortenson et al., 2015: 526). ‘Elsi’ consists of floor sensors, mobile phones for the nurses and a computer interface. ‘Elsi’ can produce an alarm when someone falls down, gets out of bed, enters the toilet, has stayed in the toilet for “too long” or enters or leaves their room. The floor panels function with the same logic as smart phone touch screens; the pressure detected by the panels is translated from electro-physical information to human behaviour (Grosen and Hansen, 2021).

The research material was gathered through ethnographic fieldwork in a Finnish public care home accustomed to telecare where the majority of residents had been diagnosed with dementia. As such, Finland’s care provisioning provides a good example of how the promises of telecare have been executed. According to Finland’s

Ministry of Economic Affairs and Employment (2015), telecare is the most important care technology for a rapidly ageing population and this paper's ethnographic study provides a useful method for examining how risks and uncertainties are managed in everyday *care* practices (Hillman et al., 2013).

The data gathered consisted of twenty semi-structured interviews with care workers and field notes from participant observations over three weeks in 2019, and some in 2020. Interviews were semi-structured covering themes ranging from the joys and difficulties of care work to the use of new technologies as part of the work. The participants were between 20 and 65 years old and had up to 40 years of experience in care work. Interviews usually lasted 30–60 minutes. The field material was gathered during the test period of a socially assistive robot (see Jaakola, 2020). Even though three weeks is a short period for an ethnographic study, I spent up to six hours per day at the unit and participated in daily life there. In this way, I had the opportunity to compare what was said during the interviews with what was happening in the care home from my perspective and to explore the indeterminacy of telecare's usage. All the interviewee names have been anonymised.

At the care home, a heterogeneous 'shifting ensemble' of "multiple humans and more-than-humans, environments and technologies, politics and practices" (Gabrys, 2019: 723) characterises 'Elsi'. This ensemble includes the users of 'Elsi', pendants for some of the residents, cameras, motion detectors, a 'safe word' system for the staff, wireless internet networks and a private security company patrolling the area. Politically, the 'Elsi' ensemble enforces the logic of austerity politics that frame high costs, personnel shortages and the lack of other resources in care provision as problems and telecare technology as the solution. The company that promotes 'Elsi' promises the provision of "Safety – security – savings" (MariCare, 2020, Home section).

'Elsi's use in a care home unit is a practical example of how telecare is interwoven with 'hands-on' care (Roberts et al., 2012). In an assisted living facility that provides full-time support, there is no one centre where the residents are monitored, which is the usual case with home

telecare. Instead, the nurses were usually responsible for five residents each (overall, there were usually nine care workers for 45 residents) and received alarms on their mobile phones based on the residents' actions. In this case, the residents themselves were usually unaware of the technology, which became clear during the analysis.

Telecare involves epistemological, ontological and ethical uncertainty work. In the following, I first analyse the practical and often tacit knowledge that is needed to manage risks with 'Elsi'. Second, I focus on the ontological consequences of epistemological uncertainty work. Third, I discuss the ethical dimension of uncertainty work.

### **Epistemological uncertainty work: 'Knowing everything' and 'knowing without knowing'**

"Uncertainty related knowledge is constituted, negotiated, institutionalised and continually redefined" (Mackintosh and Armstrong, 2020: 5). These facets of uncertain knowledge are evident in the epistemological work needed to operate 'Elsi'. This work is not a straightforward process of receiving and responding to alarms, but rather, emphasises the methods of investigating the truth behind the alarms. The alarms produced by 'Elsi' need to be interpreted, explained and negotiated before action is taken. This is an important distinction from home telecare, where a call centre operator could code the call coming from a telecare customer (López et al., 2010). With 'Elsi', the coding is more automated according to particular thresholds – the nurses answering the alarms, then, are interpreting pre-existing codes, not doing the coding themselves. In this section, I analyse the epistemological uncertainty work that is needed to identify false alarms and dismiss them. This epistemological uncertainty work leads to contradictions, mainly to ways of knowing termed 'knowing everything' and 'knowing without knowing'.

How nurses identify false alarms is one example of how responding to alarms is also about questioning them (López and Domènech, 2008b: 670). Not all alarms are 'true'; that is, they transmit information that does not correlate with actual events.

A mobile phone could send a fall alert, but the pressure detected by the floor panels may come from something other than a resident who has fallen.

One night, a fall alarm came, and I ran [to the resident's room]. The resident looked at me, surprised, [asking] 'What is it?' No one had fallen. (Sofia)

Sometimes, the alarm does not result in help provision, but in puzzled residents. The workers stressed that although false alarms occurred, they were not common or a problem. However, reactions to false alarms are central when evaluating how telecare works through epistemological uncertainty. Not knowing whether an alarm is true or not is not always a problem, but rather, a resource for working with telecare. Furthermore, undermining ambiguities and anomalies and rendering them unimportant are important facets of uncertainty work (Pickersgill, 2011). False alarms are not an error to eliminate. This would not be the case if prediction was the goal of risk management – to predict a risky event, one has to erase uncertainties. However, this was not the case with 'Elsi'.

The nurses have a trait that technology does not, which practical nurse Eila described succinctly as *flexibility*. The workers developed different strategies to determine whether an alarm was false or not. They could also explain what caused false alarms and why. These strategies are examples of epistemological uncertainty work and highlight the importance of improvisation in telecare (López et al., 2010; López and Domènech, 2008b). First, some rooms were said to be more likely to cause false alarms.

One room causes a fall alarm almost daily, even though the resident has not fallen [...] Today, everyone received the fall alarm, and then one [nurse] remarked, 'Same thing every morning; no one has fallen'. (Liisa)

A practical nurse named Liisa described a scenario familiar to her: fall alarms caused by something other than a fallen resident. This was because the floor panels were installed in certain ways in particular rooms. However, it was not only 'rooms'

that could cause false alarms; certain kinds of residents living and moving in these rooms also triggered the alarms. Miranda, another practical nurse, noted:

We have this [...] lady [and] every time she comes – she is big – and walks on the floor, a fall alarm is raised, but she hasn't fallen. (Miranda)

According to Miranda, it was the resident's large size that caused false alarms. This differs greatly from how 'Elsi' should work: not raising an alarm for heavy patients but for risky events. The epistemological uncertainty work in which the nurses discuss and interpret the meaning of alarms, especially the 'unusual' alarms, is an example of triangulation (López et al., 2010), of relating one's own experiences with those of other nurses. Triangulation produces the logic of not reacting to falls instantly or, at least, questioning them based on the room or resident causing the alarm. With triangulation, goals and solutions, such as reacting quickly to falls, are not solely mediated using technology; working with 'Elsi' creates new problems, which lead to new strategies for solving these problems.

Alarms can be dismissed when they are identified as erroneous. However, it became clear during the fieldwork that many other alarms were dismissed. When there are insufficient resources to interpret and respond to all of the alarms – even the critical ones – the nurses have to develop different strategies for separating important and unimportant information. In these situations, some alarms became background noise, even a disturbance, especially during the daytime, when I usually visited the unit. The workers did not always respond to the often-constant alerts on their mobile phones. During an interview with Johanna, she apologised for the continuously 'tinkling' phone. I was surprised because I had thought that alarms were more important than research interviews and should not be dismissed. However, Liisa clarified that it was not always possible to check whether there was something wrong when working with the residents.

This ['Elsi'] tinkles all the time [...], and sometimes, when you're working, you can't even look [at the phone] if there's really an emergency. (Liisa)



Sometimes, other work got in the way of using 'Elsi'. It was obvious that the information gathered by the floor sensors did not always lead to a reaction. There were simply not enough resources to respond to all the alarms at all times. However, it was hard to completely ignore the alarms because they continued ringing as long as no one responded to them. Thus, coping with the constant alarms became tacit knowledge. Dismissing alarms became part of the overall practices of the unit – only quick reactions to falls, which created a distinctive 'vibrating' alarm, were emphasised by the workers and management.

One way to conceptualise the soundscape of continuous alerts and how it relates to the epistemological uncertainty work is with 'refrains'. Refrains are rhythmic series that create a sense of place, familiarity and security, a 'limited pocket of organization' in the midst of fragility and insecurity (Brown and Capdevila, 1999: 36; see also Deleuze and Guattari, 1988). Refrains, such as the rhythmic beeping of the 'Elsi' application, link certain soundscapes to particular events, create chaos from order and paradoxically, order from chaos. In this sense, the constant noise created by the 'Elsi' applications is simultaneously a nuisance but also a precondition for creating order. Considering the resident's weight and false alarms as unproblematic are examples of how refrains create security. Overall, the refrains exemplified two epistemological principles at the unit: 'knowing everything' and 'knowing without knowing'.

The constant beeping of 'Elsi' kept the nurses updated on risky events, such as residents rising in bed. One of the nurses, Nina, stressed how this made it possible to 'know everything' with 'Elsi'.

[The residents] usually wonder, 'How did you get here?' 'How did you know that I was awake?' [I reply] 'I know everything' (laughs). (Nina)

'Knowing everything' led the nurse to be content, even humorous, as she laughed during the interview. According to Nina, the nurses knew what was going on with the residents and how to care for them before the residents themselves knew that something was wrong. Still, the ability to know everything was somewhat exaggerated.

One of the practical nurses, Katariina, explained that knowing through 'Elsi' was not enough:

I go through all the rooms before the night shift because I don't know whether the TVs are on, if the windows are open or if the customer is in the right position in bed, without any food trays in the way [...] and then we also have a 'silent round' at 12 pm. (Katariina)

'Elsi' did not gather data from all of the potentially risky objects, such as food trays, and Katariina and other nurses performed rounds before the night shift to check whether everything was alright. This is an important distinction from Grosen and Hansen's (2021) research on floor monitoring. While that study showed that the care workers' interpretation of needs transformed to following signals from the monitoring system rather than the use of senses (smell, sight, hearing and touch) or 'doing rounds', it is precisely these senses and sensibilities that 'Elsi' calls into action. In a sense, using 'Elsi' doubles the surveillance to include the sensors of 'Elsi' and the senses of the care worker – the sensors are not reliable enough to replace the senses of the worker.

The epistemological practice of 'knowing without knowing' highlights that it is not the gathering of data but the interpretation of it that is crucial with 'Elsi'. As discussed above, alarms could not always be responded to instantly when laborious tasks were being performed.

I had a fall alarm at 8 o'clock, but I was bathing another resident. [The resident causing the alarm] had dropped something on the floor. (Emily)

Emily has a tactic of 'knowing without knowing'. She 'knows' that the alarm is false without checking or triangulation. The fall alarm was, without hesitation, interpreted as "something" falling on the floor. This was a convenient interpretation for Emily – she could not respond to the alarm because she was working with another resident. This kind of rationalisation could also be called ignorant: for me, a researcher who was an outsider to care work and unfamiliar with many of its premises, the claims of everything being alright and the alarm being erroneous seemed unconvincing. More important, however, is what enables this

interpretation: the possibility of false alarms and dismissing them, the refrains and triangulation that stabilise this work routine and thus, 'knowing without knowing'. The usual refrains create familiarity and security, and it is more likely that everything is going well with the resident than that they actually need help.

'Knowing without knowing' is not really knowing but guessing or betting, which are valid epistemological strategies with 'Elsi'. The epistemological uncertainties do not erode the ability to work, but instead, render it possible. However, uncertainty work with telecare is not only about identifying true and false risks with epistemological know-how; it also comprises ontological constitution work that creates risky entities.

### **Ontological uncertainty work: 'Ad hoc' and 'ghost' entities**

Epistemological uncertainty work is not only about reflecting on existing entities, but is also about bringing them into being (Pickersgill, 2020). In this view, the ontological status of an entity – a risky object, for example – is always an accomplishment. In the previous section, 'knowing everything' produced risks that were unknown for the residents themselves, such as rising in bed, and risks suggested by false alarms proved to be non-existent, which was the case when 'Elsi' alerted the fall of a resident who was actually resting in bed. In this section, I explore this kind of ontological uncertainty in more detail, focusing on how entities are inevitably constituted with 'Elsi'.

The uncertainty work that is needed to manage false alarms does not end with checking in with residents to know whether they have fallen or not. The alarms are not simply true or false; rather, they enact new ontologies. In this way, false alarms are not forms of misrecognition (by the workers or by the floor sensors) or problems with technology or interpretation, but they create new risks. This phenomenon is familiar with home telecare: the call centre operators know that not all events are predictable and, therefore, create new risk codes while monitoring the actions of telecare customers (López et al., 2010: 80).

In addition to checking false alarms as routine and dismissing them, a popular view was that the

imperative to always check what caused a false alarm was more important than the alarm being erroneous. For Ethan, a practical nurse working in the unit, an alarm was always an alarm:

When an alarm comes, you must go and look [for what caused it]. That is the idea; something has happened. If a glass falls down, it can break and explode [and cause something else] [...] An alarm is an alarm. (Ethan)

For me, it seemed odd and vague that falling glass could be a risk that called for a quick response. The approach seemed random. The uncertainty that comes with the possibility of false alarms is not a technological problem to fix or erase; rather, uncertainty is something to embrace. Although the users of 'Elsi' highlighted the importance of preventing and detecting falls, the alarms also created new risks. It was more important to respond to the alarm unconditionally than to rationalise what might have caused it. 'Something', an exploding glass perhaps, was always a risk, according to Ethan.

I call these new risky objects ad hoc entities. They are ad hoc, temporal and "specific to the situation" in two ways. First, ad hoc entities are not recognised on the MariCare company web pages that advertise 'Elsi' as important. They are also not usually identified as risk factors for the older population in a broader sense. Instead, ad hoc entities are produced and enacted when working with 'Elsi'. Second, ad hoc entities lose their properties, such as being risks and posing possible danger or harm, rather quickly. If a glass has not exploded, it is just a glass, after all. Still, there is a possibility that the false risk lingers. Ad hoc entities can, in this sense, become 'ghosts'. I will examine these forms of ontology shortly after clarifying some aspects of working with ad hoc entities.

Why does ontological uncertainty not lead to insecurity? One answer stems from the ways in which new ad hoc entities do not diminish, but enable work through uncertainty. In fact, ad hoc entities are quite usable and practical. When no alarm can, in practice, be false, the ad hoc entities solve the often-awkward problem of uncertainty. Ad hoc entities justify quick reactions to risks that sometimes turn out to be non-existent. In contrast, quick reactions to something that does

not exist can seem unreasonable. Hence, Ethan explained why ‘Elsi’ is a good technology, despite it sometimes being unpredictable. Here, again, uncertainty is a resource, not an obstacle or problem.

‘Ghosts’, which ad hoc entities can easily become, emphasise how uncertainty cannot be solved with ‘Elsi’. There are situations with ‘Elsi’ that produce unclear ontological outcomes. This is especially true with false alarms. When I asked Johanna whether the false alarms were a nuisance, she replied with a firm ‘Yes!’ and continued:

Sometimes, the alarms come late. You can have a toilet alarm, but when you go to check the situation [right away], the customer has already left the toilet. Sometimes, there are delays. (Johanna)

Similarly, ‘Elsi’ sometimes sent alerts for toilet visits from rooms where the resident could not possibly visit the toilet alone:

Sometimes, at night especially, there are these situations, like some years ago, when it [‘Elsi’] can send an alert for a toilet visit in a room where the customer is incapable of moving. I don’t know if [breeze from] an open window could have caused the alarm. However, the windows are seldom open if it’s not summer. (Eila)

In the above situations, an entity of a resident entering the toilet and causing possible danger to their wellbeing is produced while using ‘Elsi’. However, when the information translated by the sensors is delayed or when it is impossible for the resident to be in the toilet, these entities become uncertain.

Eila remembered clearly a scenario from years ago and tried to find explanations and reasons for the ontological uncertainty – they seemed to haunt her still. Maybe the fact that these alarms were produced during night shifts when she was the sole nurse on the floor highlighted the haunting aspect. The uncertainty with these kinds of alarms leads me to term the enacted entities ‘ghosts’. Uncertain ontologies cannot simply be dismissed by workers. Instead, ontological uncertainty haunts them. ‘Ghost’ entities are both present and absent. ‘Elsi’s’ beeping indicates

the presence of someone in the toilet, but the employee is puzzled when there is no one there.

The example of ‘ghosts’ emphasises how the possibility of a resident being in risk becomes something not a danger or a threat, per se, but something more ambivalent. Therefore, it would be misleading to perceive falls, toilet visits or other risks as either predictable events or non-events. ‘Ghosts’, instead, linger between these two states. They are not really there but still have real consequences. Previous research has shown that telecare broadens, directs and limits the gaze of the care worker and creates ‘zones of visibility and invisibility’ (Grosen and Hansen, 2021: 259). In terms of ontological uncertainty work, however, it is unclear what is (in)visible.

The ways in which these ‘ghost’ entities haunt the workers indicate that it is not easy to live and work with ontological uncertainty. Although the workers smoothly switch between different ways of knowing, ontological uncertainty work also produces frustration.

They [the false alarms] are annoying because, of course, when a fall alarm comes, you leave quite rapidly [to check the situation]. And when you notice that it was only the cleaner [who forgot to turn the floor sensors off] [...] of course, it’s a bit irritating [...] but technology is technology and doesn’t always work that way [as planned]. (Helena)

“An alarm is an alarm” for Ethan and “technology is technology” for Helena. These common sense reasonings stress that uncertainty is, if not explicitly positive, at least a central element and a mundane feature of working with ‘Elsi’ and something to accept in spite of the occasional frustration and irritation. The ethical uncertainty work with ‘Elsi’ further emphasises the centrality of uncertainty as a resource.

## Ethical uncertainty work and the value of immediacy

In addition to privacy (Grosen and Hansen, 2021; Kamphof, 2017; López et al., 2010) and autonomy (López and Domènech, 2008a; López Gómez, 2015), immediacy has been shown to be an important value in telecare practices (López and Domènech, 2008b). Valuing immediacy turned



out to be central for working with 'Elsi' as well. At the care home, ethical uncertainty work was needed to value immediacy while dealing with epistemological and ontological uncertainties. In this section, I mainly focus on three characteristics of these negotiations: speed, responsiveness and hurry.

Caring that relies on risk management values speed in performing *care* (Hillman et al., 2013). This was the case with 'Elsi'. However, telecare solutions that provide quick and responsive care can create a conflict of values between immediacy and privacy (Grosen and Hansen, 2021). At the unit, alarms could hamper privacy when there was no clear reason to be alarmed, which was the case with false alarms. This was something that worried Bess, one of the workers, who pictured herself as one of the residents during the interview.

I'm only moving in my bed and it ['Elsi'] 'beeps' that I have fallen and alerts all the nurses even though I would like to be [alone]. ['Elsi'] is good, but it also annuls privacy. (Bess)

How is the conflict between immediacy and privacy solved at the unit? An answer might stem from the ad hoc and 'ghost' entities discussed above. An important distinction from 'trotting', a metaphor that implies running around without a clear destination, is how 'Elsi' makes the more precise allocation of work possible:

When we are faster, we can prevent possible dangers. [...] If ['Elsi'] alerts a fall, we can react quickly and know where to go. (Johanna)  
['Elsi'] has changed the [working atmosphere] to a more secure one; you don't have to trot around anymore. (Susanna)

Responsiveness secures immediate care. This might sound paradoxical when the possibilities of dismissing alarms and false alarms with the enactment of ad hoc and 'ghost' entities are taken into account. However, it is precisely the diversity of possible reactions to alarms and the ontological outcomes of this that justify fast responses to alarms, also the false ones, and the possible privacy intrusion, when it turns out that there was no reason to be alerted. There is no need to run around when one 'knows everything' or 'knows

without knowing' what is going on and who needs help.

However, reacting to the alarms quickly and unconditionally also produced friction. This was evidenced during an interview with Nina.

Again, the mobile phone constantly receives alerts throughout the interview. Nina reacts only to the last, vibrating, alarm [...]. Someone has fallen. Nina specifies that the resident must have fallen because she has taken 'drugs' today (some strong medicine, I suppose). At first, however, Nina thinks that the alarm came from a nearby room, where a man starts to moan and yell. Nina does not go to check the situation in this room, but goes to help her 'own' resident. About ten minutes later, another nurse goes to check the situation in the nearby room. (Fieldnote)

Although Nina heard groaning from the nearby room, she responded to 'Elsi's' alarms. As previously mentioned, one nurse was usually responsible for five residents during (daytime) shifts, and these residents were specified in the nurses' mobile phones. There was no rule about caring only for one's assigned residents, but still, 'Elsi' seemed to promote this kind of routine. Based on the previous sections, however, it was clear that the alarm could have been false. In contrast to 'Elsi's' beeping, the sounds of the nearby resident moaning were very real. Still, the vibrating phone decided who was given priority, and the resident close by received help later. Nina did not question this 'order' and did not even seem to recognise it.

Why was the fall alarm responded to much more quickly than the noises coming from the nearby room? One answer might stem from the way in which 'Elsi' could be used to supervise not only the residents but also the nurses. The reaction times to fall alarms were sometimes supervised by management. This established omnipresent surveillance. As the nurses did not know when and how information on their actions was gathered, it was better for them to work as if they were always being watched (cf. Foucault, 1977; López, 2010). Indeed, it was sometimes the fear of constant surveillance that made caring more immediate with 'Elsi'.

Yeah, it is good that somebody keeps an eye on [the nurses] and that people have this kind of fear that somebody is watching (laughs). You must react [to the fall alarm]. (Liisa)

Valuing immediacy while caring with 'Elsi' – while also possibly being "kind of afraid" – often meant hurrying for the care workers. The interviewees had mixed feelings about hurrying. For some, "a little bit of hurry" was a good thing – it kept the worker alert and prevented them from "hanging around at the office" too much – but for Anneli, the feelings of hurry were frustrating.

Well, the constant lack of time is frustrating, whether it is real or made up. Nevertheless, I often have the feeling that I don't have time to do everything I want to do [at work]. [...] Of course, you can affect the feelings of hurry [...] by having the patience to stop at least for a little while and [not] think about the next task. (Anneli)

Interestingly, Anneli blamed herself for not remembering to stop and take a break every now and then. The hurry may have not even been "real" but "made up" by the worker. In this reasoning, it is the worker's responsibility to not have the frustrating feeling of hurry, while 'Elsi' promotes immediate responses. Thus, responsive care creates hurry. The interviewees, however, did not see this as a downside of 'Elsi', its tendency to create 'ghosts' that could undermine any effort to respond quickly, for example, but as their own fault. This raises the question of whether 'Elsi' creates additional work, rather than simply helping the nurses. When the work input becomes fast and responsive, the result is not more free time, longer breaks or the possibility of spending more time chatting with the residents, being present or playing a game. Instead, at the unit, time saved resulted in washing laundry, preparing meals, cleaning or doing the dishes. Some of the nurses criticised the constant increase in tasks that had little to do with nursing.

We have to do so much non-nursing work – dishwashing, doing the laundry – which takes a lot of time. I would rather give this time to the residents and do something with them: go outside, play a game, or just sit with them. (Pirjo)

Added to the additional work related to 'Elsi', the amount of work seems to increase rather than decrease, when immediacy is valued. As discussed above, the workers had to consider whether 'Elsi's alarms could be trusted and what the other workers thought about the alarms, especially the unusual ones. This demonstrates triangulation as an additional mode of work. Furthermore, doubling the surveillance is also a form of additional work. Although regular checking rounds were thought to be replaced by the all-seeing view that 'Elsi' enabled, the workers did not eliminate the 'just in case' patrolling. In fact, 'Elsi' could necessitate routine check rounds when it produced false alarms.

## Conclusion

In this paper, I have applied the concept of uncertainty work to ethnographic data to understand how telecare technology is used in institutional care work as a form of risk management, and what the outcomes of this kind of technologically mediated care might be. I have shown how telecare technologies that ought to provide fast, targeted and pre-emptive care operate through different uncertainties. Uncertainty work in this context leads to outcomes, which I identified as epistemological, ontological and ethical uncertainties. First, the strategies of 'knowing everything' and 'knowing without knowing' were examples of epistemological uncertainty as they were both justifiable, albeit contradictory, ways of knowing. Second, the enactment of ad hoc and 'ghost' entities were examples of ontological uncertainty as they showed how risks are not only recognised and answered but also enacted on purpose or unexpectedly. Third, the possibility of valuing immediacy – that is, speed and responsiveness, at times leading to hurry and frustration – was an example of ethical uncertainty as it illustrated how values, such as immediacy and privacy, can produce ethically contradictory outcomes. Furthermore, different uncertainties are mutually constituted. For example, when the existence of risky entities is uncertain, 'knowing without knowing' becomes a legitimate epistemological strategy. Likewise ad hoc entities justify immediate reactions to risky entities that sometimes turn out to be non-existent.

As my analysis reveals, the nature of uncertainty as an often implicit and mundane resource and an outcome of telecare practices makes it clear that uncertainty is not an obstacle or something to be eliminated, but rather, something to embrace. While the analysis focuses on uncertainty, it is important to note that prediction is also focal for risk management – most of the alarms were, after all, ‘correct’, with ‘Elsi’. However, caring with telecare requires collective and innovative strategies that differ from predicting the future. Keeping knowledge, entities and ethics unclear is itself a form of risk management. While prediction puts the focus on signals, coding, information as data flow and risks known in advance, uncertainty emphasises the worker’s skills and the proliferation of new and often unknown risks.

The results are in line with earlier research that has shown how telecare is not a straightforward solution to existing problems but creates new problems (e.g., Mort et al., 2013b; Pols, 2010, 2012; Schillmeier and Domènech, 2010). However, instead of highlighting risk management leading to dehumanising effects, such as the erosion of dignity for care receivers (Pritchard and Brittain, 2015), insecurity and decentred care (Grosen and Hansen, 2021) or maintaining the sociotechnical system rather than caring for older people (Hillman et al., 2013), this paper highlights the aspiration to care for individual residents. However, due to uncertainties, it is not necessarily care needs that are tended to. Rather, false alarms place focus on the resident’s size or ‘ghosts’, for example. Due to different uncertainties, the focus is not on maintaining the risk management system, such as answering alarms unconditionally, but on the care worker’s senses, capabilities and responsibilities.

The different forms of uncertainty work have both productive and disruptive consequences. Due to epistemological uncertainty, alarms can

be interpreted with different strategies, such as dismissing them. This enables care workers to be creative and innovative. However, it seems that ‘Elsi’ does not straightforwardly decrease the amount of work. Rather than saving resources through prediction, working with ‘Elsi’ creates additional work, such as triangulation and increased surveillance. The occurrence of different uncertainties does not induce a proliferation of insecurity (cf. Grosen and Hansen, 2021). This is due to the additional work undertaken by care workers. In this way, the responsibilities of care organisations and political institutions are potentially decreased when telecare technologies become mundane features of care work.

The politics that emphasise telecare as the solution to scarce care resources make it difficult to recognise the additional work that telecare technologies co-create. Emphasising austerity requires that risk management is based on saving resources while predicting the future. While resources might be saved budget-wise, this is not necessarily due to using telecare technology, but the outcome of dealing with the uncertainties that are co-created with telecare. Therefore, it is important to recognise the different uncertainties that come with risk management in telecare practices. Furthermore, more focus should be put on the additional work that the epistemological, ontological and ethical uncertainties create in future research on telecare practices.

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