

# The Changing Roles of GPS Tracking in Dementia Care

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*Global Positioning System (GPS) tracking is increasingly used in Danish dementia care. In this article, I follow the first-hand experiences of a woman using GPS tracking to care for her husband with Alzheimer's, first at home and then following his move to, and between, nursing homes. In so doing, I trace how the GPS tracker played multiple different roles as it was used for different purposes. To conceptualise these changes, I draw on the idea of care arrangements (Thygesen and Moser, 2010; López Gómez, 2015); I thus understand GPS tracking as one part in an ever-changing constellation of heterogeneous elements that allow for particular possibilities and restraints in care.*

*I show how GPS tracking is a dynamic technology, able to change along with care arrangements. The changing GPS tracking does, however, also add tensions and new expectations, which means it not only is shaped by care arrangements but also shapes them. Based on this co-shaping, I argue that GPS tracking is a sticky technology that clings to the care arrangement. The idea of stickiness is furthermore supported by the way GPS tracking makes itself seem necessary as it articulates risks in particular ways. Drawing on Buch's notion of care as generative labour (2018), I point to how GPS tracking produces new responsibilities that require alert carers. In exploring these tensions and changing roles, I aim to add nuance to the use of GPS tracking and how this technology both can cause and indicate broader changes in dementia care.*

## Introduction

The use of welfare technologies is heavily emphasised in the current provision of Danish care for the elderly (e.g. (KL Local Government Denmark, 2021; Ministry of Social Affairs, Housing and Senior Citizens, 2022). Recently, a public declaration on welfare technologies stated an aim for a *triple-win effect* whereby the increased use of technologies in the care sector can (1) improve the quality of life for those in need of support (2) improve work environments for carers, and (3) lead to better utilisation of public resources (KL Local Government Denmark, 2021). This article is about one of these welfare technologies, namely Global Positioning System (GPS) trackers, which are often used to prevent and respond to situations in which people with dementia get lost. In this context, a GPS tracker is being used not as a navigation system, but rather as a way for care workers and relatives to locate persons with dementia if they go missing.

I am particularly interested here in the roles that this technology plays in care practices. The GPS tracker is a tool that comes with a narrative of offering a simple solution to a complex problem; as one provider explains in their material, they “develop systems that create security and freedom for dementia sufferers, carers and family members” (Stella Care, 2023). But while it offers many promises, GPS tracking in dementia care can also be a cause for concern. Reviews and ethnographic studies point to how both carers and people with dementia worry about privacy violation, lack of consent, data security, efficacy, and stigma (Niemeijer et al., 2010, 2014, 2015; Bartlett, Brannelly and Topo, 2019; Vermeer, Higgs and Charlesworth, 2019). As a result, it appears there are two main approaches to the use of GPS tracking in dementia care: one promises to enhance a type of safe autonomy, while the other raises ethical issues in the areas of security and autonomy. This is therefore a landscape of contrasting promises and perils (for more details on the importance of promises and concerns in health care technologies see Pols and Willems, 2011; Peine and Neven, 2021).

When I began to explore the use of GPS tracking in dementia care, I quickly encountered ways of using GPS tracking which seemed more dynamic and more complicated than the two dominating discourses around GPS tracking made it out to be. An example here was Elsa, who I met shortly after she moved into a nursing home. Elsa enjoyed going for daily walks to the nearby lake and back again. Because Elsa had a dementia diagnosis and sometimes got confused about directions, the nursing home staff asked her to wear a GPS tracker so they could find her in case she got lost. However, with dementia things rarely stay stable. Eventually Elsa was no longer able to make her way safely along the road to the

lake, and the nursing home considered it irresponsible to let her walk unaccompanied. So, to prevent her going out on her own, the GPS tracker was set up to trigger an alarm when Elsa left the nursing home premises. The technology thus changed in its role: from being the extra layer of safety that made it possible for Elsa to get help when she went for a walk on her own, it became a tool to prevent her going out without a care worker walking with her or asking her to stay. Thus, Elsa's example shows two almost opposing ways to use the GPS tracker. Witnessing this made me question what GPS trackers do, and what it means when they change roles.

Many studies within Science and Technology Studies (STS) studies have dealt with health technologies and the promises and concerns attached to them (see Pols and Willems, 2011; López Gómez, 2015; Kamp, Obstfelder and Andersson, 2019; Peine and Neven, 2021). A major takeaway from these studies is that technologies rarely do exactly what is expected of them (Mol, 2008; Pols and Willems, 2011; Peine and Neven, 2021). In this article, I address GPS tracking in dementia care by drawing on studies documenting that technologies often do unexpected things. This means that, rather than focusing on the intended use of GPS tracking in dementia care, my main interest is in how the technology *in practice* is used in various and sometimes even contradictory ways. Working with the assumption that people, contexts, and technologies co-shape one another (Oudshoorn and Pinch, 2005; Pols and Willems, 2011; Peine and Neven, 2021), I ask: *how do dementia care and GPS tracking shape one another?* To this end, I have narrowed my focus to the experiences of one woman married to a man with Alzheimer's who wears a GPS tracker. Through her story, I follow some of the roles of GPS tracking in dementia care and address the consequences of these changing roles in terms of providing care.

## Dementia and the Problems of Wandering

Dementia is an umbrella term for a group of illnesses that impact the brain and the way it functions (Agrawal et al., 2021). The most common type of dementia is Alzheimer's disease, which typically involves fading memory, increasing difficulties in finding the right words, and dwindling problem solving abilities, while at the same time challenging the sense of time and space (Alzheimer's Society, 2023). Because the sense of time and space often progressively gets worse over time, concerns tend to arise when a person with dementia moves around. Whereas for a person without dementia, taking a walk is typically linked to benefits such as getting fresh air and exercise, a person with dementia taking an unsupervised

walk outside prescribed parameters is often considered in medicalised terms as being at risk and frequently referred to as *wandering* (Graham, 2017). Wandering is a term used to characterise a wide array of movement types including repetitive pacing, eloping, and exit-seeking behaviour accompanied with temporal and/or spatial disorientation (Algase et al., 2007; Wigg, 2010). Wandering in dementia is a major cause of concern and has been linked to accidents, early institutionalisation, and hypothermia when people with dementia get lost (Cipriani et al., 2014).

At the same time, wandering is a contested term. Many social scientists point to how wandering in dementia is to a large extent defined by social expectations, as it is a type of movement that violates social and cultural norms for how people are *expected* to move (Wigg, 2010; Brittain et al., 2017; Moser, 2019). This way of approaching wandering underlines that it is family members and care workers who define what wandering is and when it is considered a problem (Dewing, 2006). It is common for people with dementia to have anxieties and fears about getting lost and to support ways to prevent it (Brittain et al. 2017). Meanwhile, it has also been documented that people with dementia sometimes fear losing the ability and freedom to walk and move as much as they fear getting lost (Dewing 2007; Brittain et al. 2017). This points to a complicated field around walking and wandering with dementia. Given that wandering implies movement as something pathological, it severely suppresses the idea of walking and moving as something that can be meaningful and perhaps even desired by the person with dementia.

My focus on some of the efforts made to prevent people with dementia from getting lost or hurt while moving around on their own required me to engage with how many types of movement with dementia are a cause for concern. To balance allowing that there can be value in moving around with dementia with recognising the risks associated with moving around alone with dementia, I describe concrete situations when referring to movement with dementia throughout this article. This means that I use terms like *walking* or *cycling* to describe the movement type, while I also try to make the associated risks concrete by describing them in context.

## GPS Tracking in Dementia Care

Family members and professional carers often work hard to manage and prevent people with dementia getting lost or hurt (Wigg, 2010; Moser, 2019). To this end, many different approaches are in use. These include strategies such as exercise groups, visual barriers in front of doors, physical restraints such as locked doors, tracking technologies, alarms, and pharmaceutical strategies such as anti-

psychotic medication (See Neubauer et al., 2018 for an overview). In this article, I focus on GPS tracking and how this technology is used in dementia care. Here, a person with dementia typically wears a GPS tracker as a watch, or as a small device attached to their belt, in their pocket, or on a lanyard around their neck, which makes it possible to share their location with relatives and carers. The GPS tracker is often linked to a geo-fence, which can trigger an alarm when the GPS tracker moves outside of a particular zone. Some types of GPS tracking also enable spoken two-way communication, as it is possible to call the device through an app.

Motion trackers, door alarms, seizure alarms, exit alarms, and GPS tracking have recently been classified together in Denmark as “safety-enhancing welfare technologies” (Ministry of Social Affairs, Housing and Senior Citizens, 2022). This has had the effect of making their use an unbureaucratic process. Whereas nursing homes previously had to apply to the municipality for permission to use GPS tracking, they can now freely decide when it makes sense to use these technologies to support their care work, so long as the person with dementia and their relatives do not oppose their use.

## Care Arrangements, Good Care, and Sticky Technologies

I approach care practices through the idea of *care arrangements* (Thygesen and Moser, 2010; López Gómez, 2015; Ceci, Moser and Pols, 2020), which helps articulate an understanding of care practices as one element among an ever-changing constellation of heterogeneous elements allowing for particular possibilities and restraints in care (Thygesen and Moser, 2010; López Gómez, 2015). The concept of care arrangements require understanding care as something which coexists with multiple other elements and existing practices (López Gómez, 2015), and which depends on them all working together. An important aspect here is that care arrangements rely on trial and error (Thygesen and Moser, 2010), because finding an arrangement that works requires tinkering – understood as experimentation and changing of small details to arrive at a suitable arrangement (Mol, Moser and Pols, 2010; Winance, 2010). Care arrangements, however, highlight the importance of tinkering not only when integrating a new element into the situation, but as an ongoing process. Thus, the idea of care arrangements calls for GPS tracking to be understood as something situated in the context of the people, objects, places, and practices surrounding it, and something which constantly needs to be adjusted and adapted to fit with the rest of the arrangement. It is a concept which allows us to understand the technology in a larger context; in fact, it stresses that a technol-

ogy can only ever be understood in relation to the factors surrounding it.

A care arrangement typically strives for *good care*. In using the term good care, I draw on Jeannette Pols' work on empirical ethics (2015). A study exploring empirical ethics tries to articulate good care based on how care arrangements put values, strivings, and likings into practice, rather than on the basis of abstract notions and reasoning about the good. As a result, the good care concept allows for multiple *goods* to exist. This does not mean that existing principles should be ignored, but rather that the focus is on how existing principles shape, and are shaped by, practices. For the current article, this requires me to look at how people and devices together shape "problems and proper ways of dealing with these, while making others less obvious" (Pols 2015: 86). Thus, what good care is not a predetermined given, but something that people may experience and shape in different, sometimes contradictory ways (Felding and Schwennesen, 2019).

Care technologies commonly feature in studies addressing care arrangements and explorations of good care (Thygesen and Moser, 2010; Pols, 2015). A key point, supported by research in STS, is that technologies both shape and are shaped by surrounding social factors. Thus while many technologies come with particular expectations or a script for their use (Akrich, 1992), technologies tend to produce unexpected troubles or possibilities when they are let out of their boxes; and they may do this in very different ways depending on context and existing practices (Pols and Willems, 2011). In this article, I make use of the term sticky technology to make this point. In line with Tom Scott-Smith (2018), I use the term *sticky technology* to characterise how a technology can be at once controlling and open, because it comes with predetermined purposes and limitations, but to some extent also is open to new and unexpected interpretations and uses.

## Setting and Fieldwork

This article draws on a series of interviews with a woman I call Karen. She reached out to the research project I work with because she heard we were interested in experiences with GPS tracking in dementia care. Karen had a lot of experience with this technology, as she used it to care for her husband, whom I call Carl. He had received an Alzheimer's diagnosis a few years before the interviews and had started wearing a GPS tracker because of it. Over a year and a half, I followed Karen through a series of five interviews with ongoing email correspondence in between. To gain more context I also visited Carl with Karen, where all three of us chatted together informally. While the first two interviews took place face-to-

face, the rest were, for Karen's convenience, conducted over the phone. Each of the interviews took between 45 minutes and 1.5 hours and was centred around the use of GPS tracking as Carl's Alzheimer's progressed.

The interviews took place as part of a larger collaborative project in which Aarhus University and the Danish Center for Social Science Research (VIVE) were working with a large urban municipality in Denmark, as well as a particular nursing home in the municipality, to address the ethical issues that arise when new surveillance technologies are introduced in dementia care. Through a combination of participant observations and interviews with the staff and residents, as well as participatory-design-inspired workshops with the staff, we explored what challenges and possibilities arise when surveillance technologies like GPS tracking enter nursing homes. Furthermore, we did fieldwork in a broader Danish dementia setting. This included visits to and interviews with advisers at a public dementia support centre, visiting and interviewing a group of people with dementia who meet up regularly in the local area, and a series of interviews with relatives of people with dementia who were using GPS tracking at home or in collaboration with a nursing home. In this process, we gathered insights into many different experiences of using these technologies. Meanwhile, Karen's story stood out as something worth exploring in depth. In this article, I chose to focus primarily on the interviews with Karen, because they make it possible to trace the use of GPS tracking over time. While such a case study is highly specific and narrow in scope, it also provides the possibility to see how individual perspectives change over time (Plummer, 1983) and to develop an understanding of health care in context (Green and Thorogood, 2018).

In this article, I engage with Karen's experiences of using GPS tracking over a long time span. A consequence of this approach was that there were long periods between each interview with little or no contact, but where the research project developed due to other fieldwork activities. To accommodate these time gaps between the interviews, I started each interview by informing Karen about the state of the project and how it had developed before (re)confirming her consent to participate. She approved inclusion of her story, the pseudonyms, and the specific quotes used in this article. Meanwhile, there were also other people involved in her story, such as the care staff, and perhaps most importantly, Carl. While none of these people were directly interviewed, ethical considerations were still necessary regarding them. I asked Karen to share written information about the research project with the nursing home, and later talked to the management in person about the project to ensure they had no objections. With Carl, careful consideration was required. Talking to a person with dementia about an abstract

research project can be difficult if they have cognitive challenges (Ienca et al., 2016; Glavind and Mogensen, 2022). To balance Carl's role as a central figure who was not himself a direct research participant, I relied on a combination of Karen assuring me that Carl wanted his story shared and my having talked to Carl about the research project while visiting him early in the fieldwork process. During this visit Carl was welcoming and expressed, much as Karen had stated, an interest in having his story shared. Ethical approval for the study was obtained from the research ethics committee of the Danish Center for Social Science Research (VIVE).

## Analysis

### *GPS Tracking as Dementia Care*

At the first interview, Karen told me that Carl had made an effort to stay active after he received the diagnosis of Alzheimer's at a relatively young age in his early sixties. Shortly after the diagnosis, he got a new, dementia-friendly, part-time job. Carl had always been a keen cyclist and he continued to cycle nine kilometers from his home to his new job. However, Karen worried that something would happen. She told me that this was why Carl first got a GPS tracker:

The fact that he cycled alone, it made me think what if something happened, then I just thought he would lose it and be unable to remember anything. So, it was important he got one [GPS watch].

Carl saw a lot of sense in getting a GPS tracker. He had previously worked with IT and Karen told me about how initially he was intrigued to get a new gadget. After experimenting with an Apple Watch and the find-my-watch function, Carl got a dementia-specific GPS watch through the municipality. With this device, Karen could see the location of the watch. Karen told me that the watch was useful because it allowed her to follow Carl online. She could check up on him when she was at work herself, and she knew she would be able to find him if he got confused and lost orientation. In this regard, the first purpose of the GPS tracker was as an extra safety measure.

After a couple of years at his part-time job, Carl could no longer keep up with the work because his Alzheimer's had progressed. Instead, he started going to a dementia centre with daily activities. In the beginning, he went every day and



continued to cycle there on his own; as time went on, it got harder for him to keep up, especially with tasks such as changing for sports activities. At home with Karen, things also started to get more difficult. Mornings and afternoons were especially tricky times for Carl to manage alone. For a while, they hired people to help him get ready in the morning and be with him in the afternoons when Karen was at work, but it never really worked. Carl could not understand who all these people coming to their house were. The evenings also started getting more difficult. Carl would usually go to bed early after watching the news, and in the meantime, Karen would sometimes go grocery shopping. She told me that she had on occasion come home to find Carl outside their house with no shoes and little clothes on, looking for her. In response, Carl moved into a nursing home, where the care staff got access to the location of his GPS tracker as well. At the nursing home, Carl had a small apartment on the fifth floor with an amazing view of the city. From here, Carl started to walk. Multiple times a day he walked, oftentimes to the cathedral he could see from his window. Karen told me that, to begin with, the staff at the nursing home would use the call function of the GPS tracker to get Carl to return:

For a long period of time, they would call him. We agreed that when he went out, then they would call him after half an hour and say, "Hi Carl, how about coming home and getting a cup of coffee now?" or something like that. And then he would turn homewards.

Here, the GPS tracker started to play a new role. It went from being an extra security measure meant to track Carl in case something happened, to a tool used to prevent him from walking too long or too far. In this way, its role and purpose shifted: from the primary purpose of enabling movement, it now moved to playing a role in limiting it. However, Carl's Alzheimer's got worse, and calling him up on the GPS tracker eventually only confused him. At the same time, Carl started acting in ways that concerned Karen. She told me about how he once filled his pockets with broken glass pieces he found on the street, and she kept being afraid he would steal a bike on the street, as he still seemed preoccupied with the thought of cycling.

In response, the nursing home tried to prevent him walking out on his own by distracting him when he was on his way out, but it did not work. Carl continued his walks. The nursing home did not have enough staff to go out and find Carl every time he left. They talked about how it perhaps was time to move Carl to a nursing home with more resources and more expertise in dementia, but Karen did not like the idea. She felt Carl still was too young and active to be moved to a nurs-

ing home where the other residents would be much older and frailer than him.

In addition to the GPS tracker, Carl also wore a bracelet with a small metal plaque that had his name, the fact that he had Alzheimer's, and Karen's phone number engraved on it. When the nursing home could no longer call Carl through the GPS tracker and get him to walk home, Karen started receiving more calls regarding Carl. These were calls from the nursing home, asking Karen to go and find Carl using the information from the GPS tracker, which they knew she had access to. There were also calls from helpful people on the street who had approached Carl, or who Carl had approached when he was lost, who would call Karen using the phone number on the information bracelet. When reflecting on this period, Karen described it as a time of constant alertness. This was also visible during the first interview, where she actively turned her work phone off, but said she always kept her personal phone on in case she got a call about Carl. When asked how she used the GPS tracker during this time, Karen talked about how she would usually check it on arriving and leaving work. Just in case she needed to go and get Carl somewhere.

Carl was eventually moved to a nursing home with more expertise in dementia. In an interview shortly after the move, Karen explained why:

They couldn't keep having him where he was because, well, especially in the evenings and weekends, they could not, there they did not have the resources to go and find him. He would be out walking, and they could see where he was [through the GPS tracker], but they didn't have the resources to go and find him. And yes, they got very frustrated by that.

She told me that it felt unsafe, especially when he was walking in the evening, when the battery in the GPS tracker was likely to run out. The new nursing home was a building that made it more difficult to get out: there were codes on the elevators and a large walled garden to walk in. Perhaps because of the building, or the better trained and equipped staff, and perhaps because Carl's Alzheimer's had developed, Carl stopped leaving the nursing home shortly after his move there. This meant that the GPS tracker now had yet another purpose. Interviewing Karen half a year after Carl had moved to the new nursing home, she talked about how she got a sense of safety from being able to follow Carl's care through the GPS tracker. She got a notification when the GPS tracker ran out of battery, and, as a new thing, also when it left the geo-fence – a virtual zone around the building that would trigger an alarm when the GPS tracker crossed it. It was only after Carl's move to the second nursing home that the geo-fence function was activated. Karen told me that now she knew when a friend was coming to go for a walk with

Carl, and that she mainly got notifications about Carl leaving the geo-fence when she was expecting to receive these. In this way, the GPS tracker became a way for Karen to track aspects of the care work in a way she described as positive and giving her a feeling of Carl being safe.

## Care Arrangements Shaping the Role of GPS Tracking

### *GPS Tracking in Care Arrangements*

While the GPS tracker was being used in the context of the same person, the role and purpose of the technology changed as Carl's Alzheimer's made for changes in his capabilities and needs. The care arrangements approach means that the GPS tracking must be understood in the context of the people, objects, places, and practices surrounding it. In Carl and Karen's case, this makes it possible to see how the use of GPS tracking was interrelated with elements such as cycling, the information bracelet, the number of care workers at the nursing home, and the view from Carl's apartment on the fifth floor. Furthermore, Carl and Karen's story highlights how tinkering made it possible to try out different solutions for the GPS tracking and to find a care arrangement that worked for them. The various roles taken by the GPS tracker in Carl and Karen's case can thus be understood as part of a bigger picture. These differing roles were a way to adapt to the changing situation, but not by the use of the GPS tracker alone. It was not only the role of the GPS tracker that changed as it went from being an extra safeguard when Carl cycled to his part-time job, to being a way to prevent him from walking too long by calling him through it, to being a way for Karen to track aspects of the care work once the geo-fence was turned on. Rather, the entire care arrangement changed to an extent that included a move and many new people.

I understand these changes as arising when the care arrangement encountered tensions. In response to these tensions, the care arrangement was rearranged. An example of this was when Karen no longer felt she could have Carl at home. After trying to make small re-arrangements, such as getting support in the home, a larger re-arrangement was deemed necessary, and Carl moved into a nursing home. In this way, the care arrangement played an important role in making it possible for the GPS tracker to change roles. Meanwhile, not only was the use of the GPS tracker subject to change, it also made new types of care arrangements possible. I will explore this in more detail later in the article.

## *Continuity Through Change*

Above I illustrated how the care arrangement made it possible for the GPS tracking to play an ongoing role in Carl's care. The continuity of GPS tracking in the care arrangement was entirely dependent on it being able to change roles and have many different purposes. To stay relevant, it relied on a continuing discontinuity in terms of its role. In many ways, this shifting role is a good fit with dementia illnesses, where needs change constantly over time. A tracking device that can change roles to accommodate different needs at different points in time is thus useful in a dementia context.

Furthermore, the nature of most types of dementia makes it difficult for people to learn or familiarise themselves with new things. While Karen and the care workers used the GPS tracker in many ways, what Carl did with it and how he wore it did not change much. Rather, keeping it in place was something Karen took a lot of pride in. They had practised using it from early on. She had quickly determined that wearing the GPS tracker on a lanyard or on his belt was not good enough; they needed it to be in a watch, and Carl got used to wearing the watch constantly. When I visited Carl, Karen asked me not to focus only on the watch. She did not want to pay too much attention to it, as this might disturb the carefully crafted taken-for-grantedness that she had worked to build up around wearing the watch. This points to how creating bonds between people with dementia and wearable technology is a difficult task. The way the purpose of GPS tracking can twist and turn to accommodate how things shift in dementia means it can keep having a relevant position in the care arrangements. This is especially useful when dealing with dementia, where introducing a new wearable technology would be particularly difficult.

## GPS Tracking's Role in Shaping Dementia Care Arrangements

### *GPS Tracking as Something Contributing to Tensions*

I argue that tensions in the care arrangement contribute to the ways in which GPS tracking can change its roles in dementia care. These tensions play a part in reshaping how the GPS tracking is used, an alteration that comes along with many other changes to the structure and priorities in the arrangement. For Carl, however, GPS tracking did more than change its role following the emergence of tensions; in some situations, it also contributed to tensions in the care arrangement. Such a point of tension arose when the care workers at Carl's first nursing

home were no longer able to fetch him home by calling him. Without enough staff resources to send someone to go and get Carl, the care workers were left feeling frustrated. This frustration points to GPS tracking doing something more in the care arrangement. In this case, the GPS tracking seemed to further the articulation of existing tension in caring for Carl. This included that if Carl, a man with little sense of direction and a tendency to do things that might cause him harm – such as filling his pockets with broken glass pieces or walking around without his shoes on – is out alone, it is best to go and find him. That the care staff were unable to go and get Carl without neglecting the other residents pointed to the limits of the particular care arrangement while Carl was at the first nursing home. These are tensions that would have existed without the GPS tracker; however, I argue that the device making Carl's location visible furthered those tensions. In this situation, the limits of the care arrangement (including the role of the GPS tracker in it) meant that the device was no longer helping to solve the problem but helping to build tension leading to a fundamental change in the care arrangement – namely that Carl moved to a different nursing home.

This example shows that although GPS tracking can take on many different roles within a care arrangement, it could not help Carl walk around safely. It did, however, help articulate expectations to the care arrangement. It made visible a problem that the care arrangement was unable to handle in the given situation and increased the existing tension around Carl's tendency to leave the nursing home multiple times a day. This role in increasing tension shows that GPS tracking is not just something shaped by care arrangements; it can also play a role in shaping the care arrangements by articulating and making visible certain expectations for dementia care. As a result, we see that GPS tracking and care arrangements each play a role in shaping the other. This process of co-shaping means that understanding GPS tracking in a care arrangement requires attention to both technology and arrangement.

### *Changing Expectations to Care Work*

Karen often talked about how the GPS tracker made her feel safe. This was despite having experienced situations where it was painfully obvious that the GPS tracker was insufficient to prevent Carl from walking around in town alone. That the GPS tracker made Karen feel safe was further illustrated at the second nursing home; here, with Carl no longer going out on his own, Karen still took it as a good sign whenever she saw the GPS tracker was charged. In fact, about a year after Carl moved to the second nursing home, the care workers considered removing his GPS tracker. This arose in the context of an update to the GPS tracking system

across the municipality, which meant that Karen would no longer be able to access Carl's location. The manager of the nursing home called Karen to discuss this with her. Karen preferred Carl to continue to wear the GPS tracker regardless of this change, which she told the nursing home manager. Later, during an interview with me, she elaborated on this. Karen reflected on how the loss of access to Carl's location felt like a process of giving up control, but that she still much preferred that he continue to wear the GPS watch. Although he no longer went out for walks on his own, it still felt safer that he wore the GPS tracker. She told me that you never knew what happened with Alzheimer's. Perhaps he might start going out again.

Annemarie Mol (2008) writes about how measuring blood sugar values in diabetes has changed the expectations of what good values are. She argues that "technologies do more than is expected of them. What is more: they also change expectations" (49). GPS tracking in dementia appears to do something similar. It offers a sense of safety by providing a location. It appears that knowing the location of a person with dementia becomes valuable in itself, even when it is difficult to act on the information or when the person no longer goes out walking. In the case of Karen and Carl, there came a point where the GPS tracker no longer played a role in supporting Carl's autonomy. As Carl no longer left for unaccompanied walks, it also played no role in terms of security. However, for Karen, the GPS tracker still gave a feeling of safety, and she was against removing it. Karen's decision to move Carl from the first to the second nursing home had not only been about scarce resources and limited staff; it was also linked to how Karen felt uncertain about the GPS tracker and feared it might run out at night and Carl might go out untracked. In Karen's case, this points to how GPS technology links good dementia care to ensuring continuous tracking. When the GPS tracking was at risk of interruption, it fed into the need for a major change in the shape of moving Carl.

## A Sticky Technology

Based on how GPS tracking shapes and is shaped by care arrangements, I suggest that GPS tracking is a sticky technology. In line with previous work with the term sticky technology (Scott-Smith, 2018), I use the term to underline how GPS tracking is used in various ways, but still fulfils its overall aim of contributing to safety in dementia care. However, I also apply the concept of a sticky technology to emphasise a further aspect of GPS tracking. In his work on therapeutic feeding, Scott-Smith primarily uses the term sticky because its links to *viscosity* can indicate something that is both liquid and firm and that there in fact exists a spectrum between the two (2018:4). Meanwhile, I pick the term sticky to emphasise GPS

tracking's *adhesive* properties and to underline that GPS tracking is a technology that attaches itself to the care arrangement. This stickiness is present at both ends of the co-shaping I have teased out. First, it is sticky when the technology can change roles and thus stay present in the changing care arrangement. Here it is a technology able to stick with the care arrangement despite changes in settings and needs. Second, there is a sticky property to the way GPS tracking shapes expectations about dementia care. Using GPS tracking articulates some of the risks and uncertainties related to dementia, and in turn, it renders the sense of extra safety offered by the technology particularly attractive or particularly sticky. By making problems visible in particular ways, GPS tracking reinforces its own necessity. Who would not want there to be a GPS location if a person with dementia was missing? In this context, a sticky GPS tracker means that it is difficult to stop using the technology once it is in place.

I also saw this sticky tendency when talking to nursing home employees. It was common to give a GPS tracker to new residents with dementia who they considered at risk of leaving the nursing home unaccompanied. They would often be aware of the work and expense required to keep a GPS tracker in the care arrangement, yet they also found it complicated to remove a GPS tracker even when it no longer seemed necessary. It would typically be the occupational therapists and physiotherapists who evaluated whether a resident could benefit from wearing a GPS tracker and when it no longer served a purpose. Two therapists I interviewed told me that removing a GPS tracker always felt risky. What if something happened to a resident who left after they removed the GPS tracker? As a result, they hardly ever made such a decision alone, but much preferred to do it as a group. During another interview, an occupational therapist similarly told me that removing a GPS tracker was a process: they would typically start by "pausing it [the GPS tracker] or keeping it on for safety's sake", then re-evaluate later. As a result, GPS trackers readily entered care arrangements, while removing them often took a long time.

## The Productive Potential of a Sticky Technology

Elana Buch's concept of care as generative labour (2018) is useful in terms of understanding and further articulating what the sticky property of GPS tracking means for dementia care. Buch draws on the feminist theorisation of care as reproductive labour, which sees care as reproducing both life and inequalities. However, Buch extends her concept to how the different and often chaotic care practices necessary to support life also come with the potential to form particular persons,

relations, policies, and economies. With her concept of generative labour she aims to highlight “the ways in which moral imagination, interdependence, and social inequality are generated over and over, in new and not-so-new forms, in the same intimate moments and processes that generate life”(Buch, 2018, 18)

This way of thinking about care makes it interesting to ask; what are the productive potentials of using GPS tracking in dementia care? What type of persons, social relations, and structures does care work with this type of tracking bring into being? GPS tracking is used when a person is unable to take responsibility for their own safety; in such a situation, the technology offers extra safety by making it possible for a carer to take the responsibility. In this way, the device can attribute responsibility to whoever receives the information or notifications from it.

However, for the attribution of responsibility to work, alertness is necessary. Karen described how she went through a period of constant alertness: she would check the location of the GPS tracker multiple times every day. In combination with the many calls she received from people who encountered Carl in town and contacted Karen through the phone number on the information bracelet Carl wore, this meant she always felt she needed to be ready to react. The GPS tracker makes it possible to exchange alertness and the ability to react for safety. It creates reactive windows in which carers can take responsibility for a person with dementia. However, these windows stand in sharp contrast to structural issues such as workforce shortage at Danish nursing homes. In this way, GPS tracking produces and rewards alert carers, while it does little for the carers who are unable to react –as was the case at Carl’s first nursing home.

In their work in a high-tech Danish care centre, Grosen and Hansen (2021) point to how sensor floors underpin an understanding of good care work as relying on quick responsiveness. This seems to indicate a broader change in care work, as welfare technologies create new responsibilities by providing digital information that carers need to see and react to in order to provide good care. GPS tracking opens up a similar approach to good care, foregrounding the ability to react in time. Karen’s experiences with GPS tracking at home and in nursing homes show how GPS tracking links good care to alertness. As a result, GPS tracking plays a role not only in providing dementia care, but also in shaping the moral imagination around care, as it makes a particular type of safety desirable and available (for some).

On multiple occasions, Karen underlined that she considered a GPS watch to be a very good and helpful technology. For Karen, the technology was a good fit, in multiple ways. As Carl had started wearing a GPS watch while he was still living with Karen, she had already made a workflow for charging the watch and she



knew how to adjust the settings when Carl moved into the nursing home. Karen had no problem with using app-based technology and was mobile enough to go and find Carl. This placed Karen in a position where she was able to tinker with the technology and, in collaboration with carers at the nursing homes, could make it work to achieve multiple different purposes. While she, at times, felt under strain and encountered tensions when using the GPS tracker, Karen's story is of a caregiver with many resources at her disposal.

As argued earlier, the GPS tracker shapes expectations about care. At the same time, the technology can only help fulfil those expectations when the care arrangements include substantial resources. Therefore, GPS trackers may end up reproducing inequalities in care arrangements with scarce resources. This makes it highly relevant to explore how other people experience GPS tracking and the roles it acquires. I argue that GPS tracking throughout its many different roles feeds the need for a sense of safety. Does the overworked care worker also experience this? What about the person wearing the tracker? Tracing more GPS tracking trajectories would help further understand the technology and what type of care it produces.

## Conclusion

Framed as a safety-enhancing welfare technology, GPS tracking is increasingly available in Danish dementia care. In this article, I have pointed to how GPS tracking does more than expected. Drawing on the idea of care arrangements, I follow Karen's experiences of using a GPS tracker to care for her husband, Carl, with Alzheimer's. Through Karen's story I illustrate how GPS tracking both is shaped and takes part in shaping the care arrangements it becomes part of. Building on this co-shaping, I argue GPS tracking is a sticky technology. It is sticky, both because of its ability to stick with a changing care arrangement, and because it is a technology that is difficult to remove once it is in place. At the same time, GPS tracking is a technology that, on a surface level, produces and rewards alert carers. However, productive alertness is dependent on resources. If carers are unable to react to a GPS tracker because they are understaffed and may neglect others if they react, this alertness is quickly turned into a technology that while seeming to support safety, never moves beyond pacing care workers who are unable to react. It is important to be aware of how GPS tracking both shapes new responsibilities and requires resources to lift them, especially in a context where introducing it into a care arrangement is filled with promises, readily available, and difficult to

remove. Without such resources, GPS tracking may contribute to more care disparity as it only benefits care arrangements with the right pre-existing conditions.

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