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The Use of Surveillance Technology in Residential Facilities for People with Dementia or Intellectual Disabilities: A Study Among Nurses and Support Staff

Exploring the benefits and drawbacks.

The proportion of older adults in the world's population continues to rise, with some experts predicting it will reach 22% by 2050,[1] and in many countries this is contributing to a "care vacuum."[2] Residential long-term care facilities are faced with the challenges of caring for expanding numbers of people with dementia or intellectual disabilities (formerly called developmental disabilities)—while simultaneously dealing with workforce shortages.[2] In light of these developments, health care professionals are turning to technology for help, in particular surveillance devices and systems that can monitor and safeguard residents from harm, such as that caused by wandering, excessive locomotion, and hyperactivity.[3,4] The use of surveillance technology—electronic equipment that allows the visual and acoustic monitoring of people or registers their activities (or both)[5,6]—could be a potential solution, aiding or replacing human supervision and reducing staff stress.[7] Another perceived benefit of this technology is that it could increase clients' freedom and autonomy, preserving their safety while serving as an alternative to the more physical forms of restraint traditionally used to manage wandering.[6,8,9]

Several forms of surveillance technology have already been designed for and tested among people with dementia and other cognitive impairments.[6,10] These include video and audio monitoring devices, environmental sensors (such as motion sensors) that can send alerts to staff, tagging systems that use wearable transmitters, and tracking systems that use the Global Positioning System (GPS).[6] Indeed, in a report published in 2009, the Dutch Health Inspectorate estimated that 91% of residential care homes for people with dementia or intellectual disabilities in the Netherlands were using some form of surveillance technology.[11] It cited reduced workloads for staff and more autonomy for clients as reasons for application.

But while many policymakers and providers welcome surveillance technology's potential benefits, it's not known whether this technology fulfills its promises in practice. Moreover, there are potential drawbacks to its use. Some ethicists and patient advocacy organizations fear that surveillance technology could attenuate the care relationship if it's used as a substitute for comprehensive patient care or human contact—a particular concern with regard to vulnerable people for whom human contact is viewed

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ABSTRACT

Background: The use of surveillance technology in residential care facilities for people with dementia or intellectual disabilities is often promoted both as a solution to understaffing and as a means to increasing clients' autonomy. But there are fears that such use might attenuate the care relationship.

Objective: To investigate how surveillance technology is actually being used by nurses and support staff in residential care facilities for people with dementia or intellectual disabilities, in order to explore the possible benefits and drawbacks of this technology in practice.

Methods: An ethnographic field study was carried out in two residential care facilities: a nursing home for people with dementia and a facility for people with intellectual disabilities. Data were collected through field observations and informal conversations as well as through formal interviews.

Results: Five overarching themes on the use of surveillance technology emerged from the data: continuing to do rounds, alarm fatigue, keeping clients in close proximity, locking the doors, and forgetting to take certain devices off. Despite the presence of surveillance technology, participants still continued their rounds. Alarm fatigue sometimes led participants to turn devices off. Though the technology allowed wandering clients to be tracked more easily, participants often preferred keeping clients nearby, and preferably behind locked doors at night. At times participants forgot to remove less visible devices (such as electronic bracelets) when the original reason for use expired.

Conclusions: A more nuanced view of the benefits and drawbacks of surveillance technology is called for. Study participants tended to incorporate surveillance technology into existing care routines and to do so with some reluctance and reservation. They also tended to favor certain technologies, for example, making intensive use of certain devices (such as digital enhanced cordless telecommunications phones) while demonstrating ambivalence about others (such as the tagging and tracking systems). Client safety and physical proximity seemed to be dominant values, suggesting that the fear that surveillance technology will cause attenuation of the care relationship is unfounded. On the other hand, the values of client freedom and autonomy seemed less influential; participants often appeared unwilling to take risks with the technology. Care facilities wishing to implement surveillance technology should encourage ongoing dialogue on how staff members view and understand the concepts of autonomy and risk. A clear and well-formulated vision for the use of surveillance technology—one understood and supported by all stakeholders—seems imperative to successful implementation.

Keywords: dementia, ethnographic research, intellectual disabilities, long-term care, residential care, surveillance technology

as indispensable.[12-15] Similar concerns have been expressed by professional caregivers, who understand the role of human contact and connection in providing optimal care,[16, 17] and fear that technology could lead to "dehumanized" care.[17] And as Hughes and colleagues noted, there are concerns that the use of surveillance technology "might distract organizations from the need to provide more staff and better training."[13] Moreover, the introduction of new technology could create new risks, such as false-positive alarms, increased alarm fatigue, and equipment failures[15, 18]; and addressing those issues might increase the demands on staff time.[9]

In reviewing the literature, we found scant research exploring how the envisaged benefits and drawbacks of surveillance technology take shape in practice. To learn more, we decided to conduct an ethnographic field study on the ethics of using surveillance technology in residential care facilities, which had two aims:

- to investigate how surveillance technology is actually being used by nurses and support staff in long-term residential care facilities for people with dementia or intellectual disabilities, in order to explore the possible benefits and drawbacks of surveillance technology in practice
- to explore how clients in such facilities experience and make use of the possibilities that surveillance technology offers, in order to assess whether and how surveillance technology might increase the client's autonomy

In an earlier article, we reported our findings on the experiences of clients.[19] Here, we report on our findings with regard to nurses and nursing staff.

METHODS

Design. An ethnographic design was chosen, which involved observing participants and conducting formal and informal interviews with them to gather data.

Table 1. Characteristics of the Selected Care Facilities

Characteristics	Dementia Care Ward in Nursing Home	Care Facility for People with Intellectual Disabilities
Area	Semirural	Urban
No. of units where research took place	7 in total: 6 small-scale living units, 1 large-scale living unit	4 small-scale living units
No. of nursing and support staff involved in the study	22 in total: 6 RNs, 11 nurse assistants, 5 nurse aides	16 in total: 14 support workers, 2 trainee support workers
No. of clients involved in the study	43 in total: 6 clients per small-scale unit, 13 clients in the large-scale unit	28 in total: 7 clients per small-scale unit
Order for surveillance technology	Given by team supervisor and elder-care physician in consultation with family member or proxy	Given by team manager, intellectual disabilities physician, and psychologist in consultation with client or family member or proxy
Physical restraints used	Nursing blankets, bed rails, wheelchair tabletops, wheelchair safety belts, locked doors	Nursing blankets, bed rails, chair safety belts, wheelchair safety belts, seclusion areas, locked doors

Adapted with permission from Niemeijer AR, et al. The experiences of people with dementia and intellectual disabilities with surveillance technologies in residential care. *Nurs Ethics* 2014 Jun 9.[19]

Observing study participants allows researchers to reach a more thorough understanding of both the participants and the culture of the research setting, as it enables researchers to observe behaviors occurring in participants' usual environment. And good insights can be gained into the local or contextual logic of a care practice. "Local logic" has been described as the manner in which the daily actions of caregivers in their work settings occur within a set of considerations that aren't always in accordance with theoretical norms, existing policies, or projected ideals and goals.[20]

Settings. In the Netherlands the same laws and legal jurisdictions pertain to the rights of both of these institutionalized groups, specifically with regard to freedom restriction and surveillance technology. With this in mind, two different residential settings were chosen. One was a dementia special care ward (43 clients) in a nursing home in the north of Holland; the ward consisted of six small-scale living units and one large-scale living unit. The other setting was a residential care facility for people with intellectual disabilities in the southwest of Holland; here research was conducted in four small-scale living units (28 clients). Two of these units housed clients ages 45 and older who had severe intellectual disabilities or dementia or both; and two units housed clients between the ages of 18 and 40 who had moderate to severe intellectual disabilities. In each facility, there were also some shared hallways and larger walking areas that clients might or might not have independent access to. See Table 1 for more details on settings.

Both settings were selected based on the following criteria: they used multiple forms of surveillance technology; surveillance technology was used as an alternative to other means of physical restraint; and the responsible application of surveillance technology was integral to their care policies (the nursing home had a specific surveillance technology protocol; the other facility had a special commission overseeing the use of restraints, including surveillance technology).

Ethical issues. People with dementia or intellectual disabilities may not be able to give valid informed consent to participation in research. This was the case in our study. Therefore, we were specifically instructed by the management of both facilities to stop gathering data if a client showed any signs of stress or disapproval of our presence. All family members and proxies were informed of the research study through information leaflets and were asked to give their consent, which they did.

A preliminary informational meeting about the study was held at each facility for staff. All staff on the participating units were asked twice to provide consent for their involvement in the study. First, during the preliminary informational meetings, all

staff present were asked whether they objected to participating. Nobody objected. Second, during the course of the study, a few days before each shift in which the primary investigator (ARN) was scheduled to conduct research, staff members were individually approached by their supervisors and were again asked to provide consent. During the whole study, only one nurse assistant objected, stating that she preferred not to have someone "looking directly over her shoulder," and consequently a different shift was found for the researcher.

The boards representing clients and their relatives or proxies were also formally asked to give their approval, as were the management teams of both facilities. Once all of these steps had been completed, the medical ethics committee of the VU University Medical Centre gave final authorization for the study. All data were anonymized in order to ensure confidentiality of all participants.

Surveillance technology devices. Table 2 provides an overview of the surveillance technology devices used in the research settings. Most devices were used in both facilities, with the exception of acoustic surveillance and GPS technology, which were only used in the facility for people with intellectual disabilities.

Data collection. Data were collected by the primary investigator during two different periods: from April 2010 to July 2010 in the nursing home and from November 2010 to February 2011 in the facility for people with intellectual disabilities. During both periods, the primary investigator had informal conversations with numerous key participants, including nurses and support staff, physicians specializing in intellectual disabilities and elder care, and all other professionals he encountered, as well as clients and families. The informal conversations were intended both to afford a better understanding of staff experiences with surveillance technology and to clarify what had just been observed. The primary investigator also conducted eight formal interviews in the nursing home and five formal interviews (one of the latter was with two parents) in the facility for people with intellectual disabilities. The formal interviews each lasted from 45 minutes to an hour and were transcribed verbatim. The interview guide was based on the researcher's field notes. It was designed to allow key participants to add meaning to the researcher's observations, to elicit participants' perceptions about working with surveillance technology, and to offer participants the opportunity to elaborate on both the meanings they gave to their own actions in certain situations as well as the meanings they thought that others gave. See Table 3 for more details on data collection.

Field notes included not only the researcher's observations but also his reflective comments and information from clients' care plans, which he was given temporary onsite access to in both care settings.

Data analysis took place during the same time periods as data collection and involved the constant comparison method developed by Glaser and Strauss.[21] The data were first read in order to refine the research question and guide further data collection; then the data were reread for the purposes of searching for and identifying patterns; then the data were compared and analyzed for differences and similarities.[21,22] Thus the field notes and the interview transcripts were first coded concurrently, using open codes and writing initial memos. After identifying relevant core themes, focused coding was conducted with the second author (MD), using integrative memos, elaborating on ideas and linking codes and data to each other, in order to allow categories to emerge. To check for variance and consistency among these categories, contrasting examples were examined more closely. Then the dimensions for each category were investigated, to outline how to interpret the participants' perceptions of their reality. Finally, themes were identified and discussed with the second and third authors (MD and BF). The entire analytic process was augmented by feedback and discussion with the other research group members and, through interim reports on findings, with a panel of experts of varying relevant disciplines. (For more on overall methods, see Niemeijer AR, et al.[19])

RESULTS

The following themes on the use of surveillance technology emerged from the data: continuing to do rounds, alarm fatigue, keeping clients in close proximity, locking the doors, and forgetting to take certain devices off. Each theme, with supporting quotes from field notes and interviews, is described further below. (*Editor's note*: In interviews, some participants referred to surveillance technology by the acronym ST.)

Continuing to do rounds. In both facilities, in addition to monitoring clients with surveillance technology, the night nursing staff continued to do rounds, rather than remaining at the nurses' station and checking clients individually when prompted by signals. The practice of doing rounds continued even though management had reduced the number of staff present at night and now viewed rounds as superfluous. This meant that staff had to make some adjustments. For instance, in the nursing home clients were still checked on as regularly as they had been before the introduction of the surveillance technology system, but now the night nurse did it by herself. As one nurse said,

> Previously we used to walk the rounds together, but now during the night you are primarily on your own.

Table 2. Surveillance Devices and Their Use in the Selected Care Facilities

Device	Use
DECT phones	Each nurse or support worker was equipped with a DECT phone, enabling them to communicate with each other and to "listen in" on any room on their unit. An alarm on the DECT phone could be triggered by acoustic or motion sensors present in each room. In the DCW, the DECT phones were used 24 hours per day; in the CFPID, they were used on the day and evening shifts, but not on the night shift.
Motion sensors	Depending on each individual case, these were switched on or off in the client's bedroom.
Acoustic sensors and acoustic surveillance	At both facilities, there were acoustic sensors in each client's bedroom. In the DCW, depending on each individual case, these sensors were switched on or off. There was no central surveillance, but signals went directly to the DECT phones. In the CFPID, the room sensors were on at all times, and at night all clients were under surveillance from a central location. The room sensors transmitted sounds to a computer, and a night nurse listened through headphones.
Electronic bracelets	In the DCW, 8 clients wore electronic bracelets to which the automatic doors were programmed to respond. The bracelets allowed the clients to walk within specific areas with set parameters, known as "living circles." There were 3 living circles: the small-scale living units, the hallway that led to the units, and an extra walking area. Each client was assigned to a specific living circle or circles. In the CFPID, 4 clients wore bracelets that only opened to one extra-large corridor outside the living units.
Automatic doors	At both facilities, each door had an access code that was known only to staff and regular visitors. But the doors were also programmed to open to those clients with electronic bracelets.
GPS tags	In the CFPID, 2 clients had GPS tags sewn into their coats. Each tag was linked to the staff computer in the office area of the living unit. The tags allowed these clients to walk around on their own outside on the facility grounds.
Video surveillance	In the DCW, a camera in the hallway was connected to a monitor in the night nurses' station. In the CFPID, individual cameras could be placed in clients' rooms, and could be monitored from a central location. During the study, one CFPID client with severe epilepsy received video surveillance at night.

CFPID = care facility for people with intellectual disabilities; DCW = dementia care ward in nursing home; DECT = digital enhanced cordless telecommunications; GPS = Global Positioning System.
Adapted with permission from Niemeijer AR, et al. The experiences of people with dementia and intellectual disabilities with surveillance technologies in residential care. *Nurs Ethics* 2014 Jun 9.[19]

Several night nurses indicated that they felt they couldn't rely entirely on surveillance technology, and this was one reason they continued doing rounds. One night nurse brought up two more reasons: surveillance technology doesn't indicate how everything is left by the evening shift, and doing rounds kept her busy.

> Certain errors are . . . how can I say this . . . things still go wrong during the evening shift. . . . And ST doesn't tell you if the bed rail is still up or not or other things. . . . It is still human labor, what we do. . . . Plus, it also keeps me busy, you know? You might be able to use [ST] as an aid, but I do not think that is a substitute.
>
> They [the management] assume that you should be able to rely on ST and that the ST system takes over from you as a kind of warning system. But I don't really believe in this idea. No. It is an aid.

Alarm fatigue. There were many instances when the surveillance technology produced a false-positive alarm—it issued a warning even though the client was unharmed and in no danger—and this contributed to alarm fatigue among staff, and sometimes led to staff turning this technology off. For example, at night false-positive alarms sometimes occurred when a motion sensor in a client's bedroom was repeatedly triggered because the client was walking around in the room or visiting the bathroom. In both facilities, when this occurred, the night staff would turn the alarm off and would let the client "walk around leisurely until he is tired enough to go back to bed" or "let him go and have a long pee." Twenty or 30 minutes later, the attending night nurse or support staff would check on the client to see if she or he was done walking or visiting the bathroom; once the client returned to bed, the nurse or staff member would quietly turn the alarm back on.

In the nursing home, one night nurse dealt with alarm fatigue by turning the alarm off, leaving the nurses' station, and positioning herself closer to the client (such as by sitting in the unit's living room). In this case, the alarm was being triggered by acoustic sensors reacting to (sometimes frightened) clients who tended to cry out frequently. As one nurse explained, "Yes, I sometimes do that [seats herself nearer to a client]. This way I'm close by, and otherwise my acoustic alarm would go off the whole time." The nurse also felt that her clients could sense her nearby presence and were somehow calmer than they were when she remained at the nurses' station. But it wasn't always possible to leave the nurses' station, especially when some clients were allowed to roam the ward and when she also had to monitor the cameras.

Keeping clients in close proximity. In both facilities, at times, certain surveillance devices stopped working (notably the electronic bracelets, as well as the camera in the hallway of the nursing home and the GPS tags of one client). This tended to cause staff to keep their clients close by, and also may have kept staff from using surveillance technology to its full potential.

For example, at the facility for people with intellectual disabilities, one client who had a tendency to run off and get lost had a GPS chip placed in his coat. This chip was linked to the office computer in the client's small-scale unit. But the support staff didn't often make use of this technology; it was not regarded as an improvement over the duo bicycle (a bicycle with two side-by-side seats, one for a client and one for a support worker) that they were already using. According to one of the support workers, the duo bicycle was "a fine solution for this running away problem," because this client tended to "run off less when we're cycling." Furthermore, when the support workers were asked to demonstrate how the GPS chip works, the chip failed to emit a signal. One support worker asked another, "The chip is in [the client's] coat, isn't it? Have you turned the signal off?" The second worker said he had not, but there still was no signal. The first worker replied, "Next time then, we don't use it that much and we've got the bike anyway." Fifteen minutes later the client and a support worker used the duo bicycle to visit a therapist. The following week, the GPS chip still was not functioning.

At the same facility, another client wore an electronic bracelet that was programmed to allow her to pass through the living room door into a spacious corridor. But the bracelet didn't always work properly, and when it didn't she couldn't pass through the door. When asked about this, one of the support workers said that the bracelet failure was "a hassle with these things," and added that "it is enjoyable having [this client] more around in the living room."

Locking the doors. A perceived benefit of surveillance technology is that it can afford clients more freedom of movement. Indeed, in both facilities, surveillance technology was adopted as part of an active policy to reduce the use of traditional physical restraints. But the staff continued to lock certain doors, most often during the night and at the beginning of or during rounds. Sometimes this included all doors—the front door of the unit, the door to the living room, and even the bedroom door. One night nurse considered this practice necessary, protective rather than restrictive:

> If people are for instance walking around in the units, well, then they could do all sorts of things, I mean, coffeemakers, cutlery, food. . . . Everything is accessible, they could empty out the fridge. . . . And there are people amongst our clients who, so to speak, would destroy the whole living room. And if you're busy tending to other clients and you came back and . . . well no, I don't think that this should be possible. So I can imagine why the living room is locked.

A nursing assistant felt that less freedom of movement for clients was a "safe idea," safer than allowing them to wander around in the communal hallway, because then "you wouldn't know where they would be exactly." She added,

> Suppose a client went out of his room . . . and all the doors were open and . . . they started to wander around . . . and you're so busy, you couldn't respond immediately, and suppose someone falls somewhere. They could be lying there, cold on the ground!

Forgetting to take certain devices off. At times, surveillance technology continued to be used even after the original reason for its use had expired. This happened most often with the electronic bracelets and GPS tags, perhaps because they were relatively unobtrusive. As a team supervisor pointed out,

> A bracelet is also different [from] a tabletop, for instance, which is much more visible, in your face, bigger . . . it's more of an obstacle in itself. A bracelet, well . . . clients are far less affected by a bracelet I think.

In the nursing home, one client was originally given a bracelet containing a GPS chip because he tended to wander, and this bracelet let him do so within certain perimeters. But he sometimes slipped through these perimeters (as when a certain door was inadvertently left open) and got lost in the communal halls. When this happened, he became very

Table 3. Data Collection

	Dementia Care Ward in Nursing Home	Care Facility for People with Intellectual Disabilities
Time period	April 2010–July 2010	November 2010–February 2011
Duration of observation of participants	14 weeks 3 days a week 200 hours of observation Participants worked various shifts (day, evening, and night)	12 weeks 2 days a week 140 hours of observation Participants worked various shifts (day, evening, and night)
Additional observation	3 rounds with physicians; 2 information meetings with family; 2 half-hour surveillance technology training sessions for new staff; many shift transfers; daytime activities with clients	Fire safety instruction training for staff; exercise session with clients and physiotherapists; ethics committee meeting; many shift transfers; daytime activities with clients
Formal interviews	1 member of the board representing clients 2 night nurses 1 nursing assistant 1 elder-care physician 2 team leaders 1 occupational therapist	2 relatives of one client 1 night care manager 1 intellectual disabilities physician 1 cluster (regional) manager 1 occupational therapist

Adapted with permission from Niemeijer AR, et al. The experiences of people with dementia and intellectual disabilities with surveillance technologies in residential care. *Nurs Ethics* 2014 Jun 9.[19]

confused or upset (or both). As a result, a decision was made to keep the front door of his living unit locked, but no one thought to take his bracelet off. After this client subsequently fell and injured himself several times, he was put in a wheelchair with a tabletop, to prevent him from standing up and walking off. Three months later, he was still wearing the bracelet and the door was still kept locked. When one of the nursing assistants was asked why all these measures were still in place, she responded that one doesn't "reflect on certain things, you just do them because it has been prescribed as such." According to the elder-care physician,

> The responsible nurse, the physician and team supervisor are supposed to evaluate these measures every once or so. So I can imagine this issue was not in clear view and ignored in evaluation—or not seen as an issue at all.

And the team supervisor stated that "people are such creatures of habit, so that . . . at a certain point it becomes normal . . . that's what I think."

DISCUSSION

Our findings indicate that a more nuanced view of the benefits and drawbacks of surveillance technology is called for. While certain envisaged benefits and feared drawbacks did not emerge in actual practice, other benefits and drawbacks did indeed emerge. We also found that participants tended to incorporate surveillance technology by combining old care routines with new ones. For example, participants continued to do rounds and to lock doors, and they continued to prefer being in close proximity to their clients. They made intensive use of certain surveillance devices (such as the digital enhanced cordless telecommunications [DECT] phone), while regarding other technologies (such as tagging and tracking systems) with ambivalence and either not using them or forgetting to reevaluate such use.

Benefits and drawbacks. In both facilities, with regard to the envisaged benefit of reduced workloads, the use of surveillance technology allowed management to cut nighttime staff. In the nursing home, for example, the staff was reduced from two night nurses to one. Yet in effect the new technology also added to the staff workload. For example, the night nurse continued to do rounds while also carrying the DECT phone and monitoring its signals. This was a skillful way to combine an old routine (personal monitoring) with a new one (electronic monitoring). It also ensured that vital nursing skills were retained rather than degraded.

The many instances of false-positive alarms at both facilities further added to staff workloads. But experience might help counter this effect. Depending on the client, an experienced nurse might decide to turn a certain surveillance method off, recognizing

that in this case it was ineffective and possibly causing delayed responses to other clients.

The envisaged benefit of greater client autonomy was one of the main reasons both facilities implemented surveillance technology. But study participants appeared to make little use of the tagging and tracking systems. At night they preferred to keep the doors locked, and even during the day they weren't keen on allowing clients more freedom of movement. Participants reasoned that they wouldn't be able to adequately oversee a situation, or might arrive too late, after an adverse incident had occurred. They also worried that having to watch over a bigger area would be problematic. Participants didn't seem to want to consider the potential for enhanced freedom that surveillance technology might offer clients. When electronic bracelets were implemented to increase a client's area of movement, once she or he was perceived to be at risk in these "strange surroundings," participants reverted back to traditional methods of physical restraint, such as locked doors or wheelchair table tops. It's remarkable that, in such instances, participants either forgot to take off the bracelets or didn't see this as a concern, as if all such measures need not be properly evaluated and considered together.

Lastly, the use of surveillance technology did not seem to cause attenuation of the nurse–patient relationship. Participants still continued to do rounds (although obviously, where staff was reduced, this meant the remaining nurse had less time per client). During the day, participants also continued to use the duo bicycle. It seems that increased electronic monitoring will not automatically result in reduced personal monitoring and may even enhance it. Certain mobile devices (such as the DECT phone) can offer staff the advantage of greater flexibility, allowing the nurse to stay in closer proximity to one client while continuing to monitor others.

The local logic of 'safe autonomy.' The manner in which the nursing and support staff in our study incorporated surveillance technology into their care routines indicated that values such as safety and physical proximity were dominant. Facilitating or increasing clients' autonomy, one of the envisaged benefits of surveillance technology, seemed largely secondary to providing proximate and safe care, since participants were reluctant to allow clients more freedom of movement or to increase the physical distance between themselves and their clients.

This reluctant or reserved approach might be explained as a resistance to taking more risks. Several factors may have contributed to this. Equipment or systems sometimes broke or failed to work properly, as did one client's GPS chip; yet the reliability of any new technology is vital to its successful implementation.[23, 24] Indeed, the perception that a new technology increased risks to client safety has been reported as impeding its use.[23] In our study, frequent false-positive alarms for some devices probably made it harder for participants to trust the technology; they frequently stated that surveillance technology was something one cannot rely on completely. Increased caregiver stress and altered logistics may have also caused resistance, as when the technology resulted in staff cuts, leaving a night nurse with more clients and larger physical areas to cover. Yet, despite their reservations, the participants often showed creativity in devising individualized solutions to problems, as when staff dealt with repeated false-positive alarms by turning surveillance off temporarily until an active client was tired enough to sleep.

In a study by Robinson and colleagues, professional caregivers favored client safety over autonomy "due to a fear of litigation."[4] They also felt "that society would regard them as negligent if they didn't operate a locked door policy in nursing homes." This likely reflects the fact that protecting clients' safety is not only an internal professional and institutional mandate, but is also influenced by external, societal pressures.

Ultimately, taking risks is a necessary part of working with surveillance technology, in order to reap its benefits.[9] Thus, how risk and "risky" behaviors such as wandering are perceived by staff is critical to how they are addressed in the facility.[8] For instance, instead of seeing wandering only as a problem behavior that must be controlled, staff might regard it as therapeutic and vital to a client's health, offering exercise and time outdoors.[8] This view allows for what Perske called the "dignity of risk," a necessary component of freedom and autonomy.[25]

Of course, applying the concepts of freedom and autonomy to the actual living situations of people dependent on long-term care is anything but straightforward. Indeed, standard views of autonomy, which emphasize noninterference and independence, have recently come under more criticism as having only limited applicability for this population.[26-28] For caregivers, these concepts are often too difficult or impractical to realize, because care inherently involves some degree of intervention[16] and is about meeting a responsibility rather than an obligation.[29] As an alternative, relational models of autonomy have been proposed that may prove more useful. These emphasize interdependence within the social context of a person's life, while still allowing for interventions aimed at empowerment and freedom.[26, 28-30]

Implementation and the vision of care. In both study facilities, the implementation of surveillance technology was not embedded within a predetermined, internally supported vision of care. This led us to question whether participants' use of the technology would have differed had implementation been so embedded. For instance, none of the participants were consulted beforehand with regard to

surveillance technology. And once it was implemented, they weren't properly informed of its potential risks and benefits. In the nursing home, the instruction and training in working with surveillance technology participants received was limited to one 30-minute session. In the other facility, staff received no instruction or training in working with surveillance technology at all, with the exception of acoustic surveillance. (Using headphones, the night staff listened from a central station to sounds coming from sensors in clients' rooms. They did receive training in how to distinguish among various sounds and what actions to take on the basis of those sounds.)

Nurses and support staff appeared unwilling to take risks with surveillance technology, perhaps because they didn't trust it to be reliable.

As a result, staff members held different views about how to work with surveillance technology: for example, the night nurses felt that continuing to do rounds was essential, while management saw this as superfluous. Another result was that, despite usage protocols, there was a lack of regular evaluation for certain technologies, as when electronic bracelets remained in place long after the reason for use expired. This finding is in keeping with the Dutch Health Inspectorate's 2009 report, which concluded that few to no residential care facilities for people with dementia or intellectual disabilities in the Netherlands had formulated a vision of care for or conducted a risk analysis of surveillance technology, and that neither registering surveillance technology in a client's care plan nor evaluating such technology was customary.[11] Although an embedded implementation of surveillance technology wouldn't automatically ensure desired outcomes, experts agree that for the implementation of any care innovation to be effective, it should take into account the perspectives and prevailing values of all stakeholders.[31,32]

Limitations. One possible limitation is that we found no notable differences in how surveillance technology was used by participants at the two facilities, even though the client populations were quite different. It may be that how surveillance technology is applied depends less on the care setting and more on how it is viewed and understood by those using it.

Another limitation may have been the potential effect of the researcher's presence on staff behaviors. Initially, the nursing and support staff in both facilities seemed acutely aware of his presence, often making remarks such as, "What are you observing then?" But after several visits, the researcher's presence seemed to become part of the normal routine. To facilitate this, the researcher did not take notes in the presence of staff members, but instead did so in a separate private area after each shift.

A third limitation was that data collection was confined to two residential care settings in the Netherlands, thereby limiting the extent to which the findings are generalizable. That said, our study did not focus on frequency and statistical variance; rather, it focused on the extent of variation in which the observed situations occurred and on how exemplary these situations were.[21,22,27] We believe the experiences our study participants described are probably common among staff in similar facilities elsewhere; but further study, especially in other settings, is warranted.

CONCLUSIONS

Our findings indicate the need for a more nuanced view of the benefits and drawbacks of surveillance technology. The nurses and support staff in this study tended to incorporate surveillance technology into existing care routines and to do so with some reluctance and reservation. They also tended to favor certain technologies over others, for example, making intensive use of certain mobile surveillance devices (such as DECT phones) while demonstrating ambivalence about others (such as the tagging and tracking systems). Client safety and physical proximity seemed to be dominant values for our participants; this suggests that the fear that surveillance technology will cause attenuation of the care relationship is unfounded. On the other hand, the values of client freedom and autonomy seemed less influential, as reflected by the ways participants used surveillance technology. Participants often appeared unwilling to take risks with the technology, perhaps in part because they didn't always trust it to be reliable.

Recommendations. Before any institution decides to invest in and implement surveillance technology, the management should determine—in consultation with all its employees—what the institution aims to achieve with surveillance technology; what organizational and practice conditions must be met; and what the potential risks and benefits are, both for the institution and for each individual client. Nursing homes and residential care facilities for people with intellectual disabilities, in particular, should also explore through ongoing dialogue how staff members view and understand the concepts of autonomy and risk. This will help not only

in incorporating surveillance technology into clients' care plans, but also in enhancing staff engagement. Most facilities already conduct periodic risk assessments as a matter of policy, and surveillance technology should be included in such assessments. In short, a clear and well-formulated vision for the use of surveillance technology—one understood and supported by all stakeholders—seems imperative to successful implementation. ▼

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REFERENCES

1. World Health Organization. *Ageing and life course: interesting facts about ageing*. 2012. http://www.who.int/ageing/about/facts/en/#.
2. Astell AJ. Technology and personhood in dementia care. *Qual Ageing* 2006;7(1):15-25.
3. Hope T, et al. The structure of wandering in dementia. *Intl J Geriatr Psychiatry* 1994;9(2):149-55.
4. Robinson L, et al. Balancing rights and risks: conflicting perspectives in the management of wandering in dementia. *Health Risk Soc* 2007;9(4):389-406.
5. Frederiks BM, et al. De juridische en ethische aspecten van domotica in de zorg voor mensen met dementie. *Tijdschrift voor ouderen-geneeskunde* 2009;34(5):181-5.
6. Te Boekhorst S, et al. Quality of life of nursing-home residents with dementia subject to surveillance technology versus physical restraints: an explorative study. *Int J Geriatr Psychiatry* 2013;28(4):356-63.
7. Niemeijer AR, et al. Ethical and practical concerns of surveillance technologies in residential care for people with dementia or intellectual disabilities: an overview of the literature. *Int Psychogeriatr* 2010;22(7):1129-42.
8. Wigg JM. Liberating the wanderers: using technology to unlock doors for those living with dementia. *Sociol Health Illn* 2010;32(2):288-303.
9. Zwijsen SA, et al. Surveillance technology: an alternative to physical restraints? A qualitative study among professionals working in nursing homes for people with dementia. *Int J Nurs Stud* 2012;49(2):212-9.
10. Bharucha AJ, et al. Intelligent assistive technology applications to dementia care: current capabilities, limitations, and future challenges. *Am J Geriatr Psychiatry* 2009;17(2):88-104.
11. Inspectie voor de Gezondheidszorg [Dutch Health Inspectorate]. *Toepassing van domotica in de zorg moet zorgvuldiger*. Den Haag; 2009 Oct. DLZ/KZ-U-2966570. http://www.btsg.nl/downloads/Toepassing_van_domotica-IGZ.pdf.
12. Alzheimer's Society. *Safer walking technology*. 2013. http://www.alzheimers.org.uk/site/scripts/documents_info.php?documentID=579.
13. Hughes JC, et al. Ethical issues and tagging in dementia: a survey. *Journal of Ethics in Mental Health* 2008;3(1):1-6.
14. Hughes R. Electronic surveillance and tagging people with dementia. *Int J Palliat Nurs* 2008;14(2):74-6.
15. Perry J, et al. Assistive technology, telecare and people with intellectual disabilities: ethical considerations. *J Med Ethics* 2009;35(2):81-6.
16. Niemeijer AR, et al. The ideal application of surveillance technology in residential care for people with dementia. *J Med Ethics* 2011;37(5):303-10.
17. Savenstedt S, et al. The duality in using information and communication technology in elder care. *J Adv Nurs* 2006;56(1):17-25.
18. Schikhof Y, Mulder I. Under watch and ward at night: design and evaluation of a remote monitoring system for dementia care. In: Holzinger A, ed. *HCI and usability for education and work*. Berlin: Springer; 2008. p. 475-86.
19. Niemeijer AR, et al. The experiences of people with dementia and intellectual disabilities with surveillance technologies in residential care. *Nurs Ethics* 2014 Jun 9 [Epub ahead of print].
20. Hak T, et al. Kwalitatieve medische sociologie: nut en noodzaak. In: Goethals A, et al., eds. *Kwalitatieve medische sociologie*. Amsterdam: SISWO/Netherlands Institute for the Social Sciences 1997. p. 5-20. http://www.siswo.uva.nl/pdf1/kms.pdf.
21. Glaser BG, Strauss AL. *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine Publishers; 1967.
22. Patton MQ. *Qualitative research and evaluation methods*. 3rd ed. Thousand Oaks, CA: Sage Publications; 2002.
23. de Veer AJ, et al. Successful implementation of new technologies in nursing care: a questionnaire survey of nurse-users. *BMC Med Inform Decis Mak* 2011;11:67.
24. Margot-Cattin I, Nygard L. Access technology and dementia care: influences on residents' everyday lives in a secure unit. *Scand J Occup Ther* 2006;13(2):113-24.
25. Perske R. The dignity of risk and the mentally retarded. In: Wolfensberger W, ed. *The principle of normalization in human services*. Toronto National Institute on Mental Retardation; 1972. p. 194-200.
26. Agich GJ. *Dependence and autonomy in old age: an ethical framework for long-term care*. 2nd and rev. ed. Cambridge, UK; New York: Cambridge University Press; 2003.
27. Hertogh CM, et al. Truth telling and truthfulness in the care for patients with advanced dementia: an ethnographic study in Dutch nursing homes. *Soc Sci Med* 2004;59(8):1685-93.
28. Hertogh CMPM. Between autonomy and security: ethical questions in the care of elderly persons with dementia in nursing homes. In: Jones GMM, Miesen BML, eds. *Care-giving in dementia: research and applications*. East Sussex, UK: Routledge; 2005. vol. 3. p. 375-90.
29. Tronto JC. *Moral boundaries: a political argument for an ethic of care*. London; New York: Routledge; 1993.
30. Moody HR. *Ethics in an aging society*. Baltimore, MD: Johns Hopkins University Press; 1992.
31. Leonard KJ. Critical success factors relating to healthcare's adoption of new technology: a guide to increasing the likelihood of successful implementation. *ElectronicHealthcare* 2004;2(4):72-80.
32. van den Ende T. *Waarden aan het werk: over kantelmomenten en normatieve complexiteit in het werk van professionals*. Amsterdam: SWP Publishing/Universiteit voor Humanistiek; 2011.