

Specifying Technology to Support The Dialogue of Care

Nicolas A. HINE^(a); nhine@computing.dundee.ac.uk

Christopher MARTIN^(a); cjmartin@computing.dundee.ac.uk

Amritpal S. BHACHU^(b); amritpal.bhachu@canonical.com

(a) School of Computing, University of Dundee, Dundee, DD1 4HN, United Kingdom

(b) Canonical Group Limited ^[1]5th Floor, Blue Fin Building, 110 Southwark Street, London, SE1 0SU, United Kingdom

Abstract.

Telecare is being increasingly deployed as a method of enabling prolonged independence for older people wishing to live in their own homes or in supported living situations. There is a risk that the functionality of the technology deployed does not focus on answering basic questions related to care and well-being, but on gathering data about generic indicators such as vital signs or on evidence of activities of daily living, without really addressing the individual needs of the home dweller. This work looks to enhance the Dialogue of Care between stakeholders, in particular between carers and those in their care. Recognising that the various care stakeholders have very different perspectives of care and their role in delivering care led to the development of an instrument that could be used to capture the information needs of the whole spectrum of different care stakeholders and the associated relevant telecare technology. The case of the need of such an instrument and the development of the instrument itself is outlined through a worked care scenario.

Keywords.

Assistive technology, independent living, older people, older adults, visualization, dialogue of care, well-being

Introduction

As telecare is moving from being a technical and academic concept to begin to be more widely deployed, various systems have been developed to monitor medical and health conditions, primarily intended to support formal carers. Very little work has been reported that supports the more general well-being of older people in their own homes with technology that presents data that narrates the story of their lives as it matters to them and the people that care most about them. Typically the focus of studies in telecare is on technologies and architectures (Liu and Bacon, 2010; Martinez-Lopez et al., 2008) or on supporting the medical aspects of health care (Wortmann et al., 2009) (Pourreza et al., 2010) (Virone and Sixsmith, 2008). Rare examples of technology being used primarily to support informal carers care for relatives or friends have been reported (Mynatt et al., 2001; Rowan and Mynatt, 2005), but it is generally

difficult to find work that considers the use of telecare to support general well-being and quality of life.

Care is mediated by a dialogue between a patient/client and carers. This dialogue depends on information about the condition causing the need for care. Currently most information is gathered in consultations, generally taking place in formal settings such as health centres or hospitals, between a patient/client and a formal carer. Life however happens outside these institutions, centered on the home. As telecare becomes more pervasive, the dialogue can be enhanced with rich data about the effect that treatments and therapies are having on the life, and quality of life, of people with chronic conditions, disabilities, or the impact of ageing on older people. This is a sensitive topic however, as telecare changes the home from being a private space to also being a care space as well as changing the way that care is delivered.

Each individual receiving home-based care has specific care needs, and therefore potentially an individual package of care technology. This was explored practically by Hansen et al (Hanson et al., 2007) when seeking to define a telecare package for six residents of a sheltered housing complex run by Thomas Pocklington Trust near Plymouth. In that study an ethnographic approach was taken to ensure that the telecare system selected was focused on the care needs of the individual. That study highlighted that data alone from telecare sensors does not reliably tell the story about the well being of the older home dweller, and that the data needs to be considered and discussed by the various interested stakeholders.

The proliferation of data should enhance the quality of care. Not only will the data about the condition be richer but, additionally the data about how the treatment is affecting the condition will be richer. This rich picture can be made available to all the care stakeholders, showing them how the condition is affecting the quality of life of the client/patient. In many ways this is new data compared with traditional institutional care models and should allow new forms of care and new care strategies to emerge. (Bhachu et al., 2008)

This depends, however, on the data being processed and made available to the stakeholders in ways that they can comprehend. The goal is for informed discussions to take place where quality of life goals can be explored and aspirations set, leading to treatments and therapies that support those quality of life goals. Eventually, as the pool of data within the health services grows and encompasses more cases, predictions from previous experiences can inform current cases suggesting change in treatments and therapies before the associated health condition changes. For such discussion to take place, all stakeholders must receive the information contained within the data in ways that are relevant and comprehensible to them. Each group of stakeholders and carers use their own language however, when expressing the conditions leading to a need for care and indeed the care process itself (Anselm et al., 2005; Katz et al., 2000; Megivern et al., 2007). The data gathering and analysis is not, therefore, the end of the process, but is the foundation upon which information visualisations are built that fit the needs and interests of the various people involved in a care conversation. To this end, the authors focused on understanding this “Dialogue of Care”, of exploring data visualization interfaces that might be useful within such a dialogue (Gil et al., 2008; 2006; Gil, 2008), and in seeking to develop an instrument that could be used to identify the place of data processing, analysis and visualization technologies in a care scenario.

Although work has been done on taxonomies to help in the design of systems for telecare (Singh et al., 2010), the problem of how to match the users to the technology that is available still remains,. The focus of this paper is to concentrate on the care

needs and then to consider the information that is needed to ensure that care is delivered when it is needed. This information is the fundamental first step in specifying exactly what care technology is to be put in place for a specific individual requiring care.

1. Care & Stakeholders

The various stakeholders involved in care have very different perspectives on the care needs of the patient depending on their stake in a given case of care (Bolin and Lindgren, 2008; Milligan et al., 2011). Because of this, the role that telecare may have in enabling a carer to provide care will be very different for the different stakeholders. The differences are fundamentally associated with the information that each stakeholder needs to ensure that care is provided appropriately, and with the ability of each stakeholder to comprehend the significance and meaning of the information that is available from telecare technology. All stakeholders must be consulted in the process of specifying telecare technology to ensure that it meets all the various information and care support needs (Mort and Finch, 2005). This process is complicated by the fact that stakeholders may have only a rudimentary concept of what telecare is and how it can help them to be more engaged in meeting their care responsibilities. In some cases, stakeholders may be somewhat skeptical about the efficacy of telecare and its relevance to them as a carer (Percival and Hanson, 2006).

For this reason, the starting point in fitting telecare technology to stakeholders is to understand the essential demography of the various stakeholders and their perspective on care.

- **Client/Patient/Home-dweller: Cares about his/her Quality of Life (QoL).** A person in need of care is primarily motivated to reduce the impact of the condition on their Quality of Life. A person with a chronic medical condition or a disability, particularly an elderly person, does not expect to be fully healthy, or indeed to be free from pain. They do seek, however, for the condition to have minimal impact on their life, so that they can still choose to be active and independent, sharing time with friends and families. The patient may range from being largely ignorant about their care needs and condition to being highly educated and well able to be involved in the details of their care programme. For this reason, although the concept of self-care is emerging as an important element of home based care, the clients and patients are fundamental actors and their voices need to be heard within the process of telecare deployment (Aronson, 2002). This is particularly important as the technology will be introduced into homes, implying a loss of privacy, visits from strangers sent to maintain equipment, and the installation of technology that does not fit with the existing décor and ambience of the home.
- **Informal Carers: Care about a person:** An informal carer knows the person being cared for personally, as a friend or family member, and generally has care responsibility for a single or a small number of individuals. They care for the person because they care about the person as an individual. This relationship can become complex, particularly as elderly friends and relatives are living longer with chronic conditions. Providing long-term care can have a

devastating impact on the quality of life of the informal carer because they feel an emotional bond and/or an obligation to be always available to provide care (Biggs, 2006; Bonsang, 2009; Gilbert and Powell, 2005). Telecare can provide information that enables informal carers to not only better target care but also to manage their own lives. For some this will give the confidence to relax or engage in leisure activities on the expectation that they will be made aware of changing care needs as they arise rather than being required to be constantly checking that the client/patient is coping or in need. Like the patient, informal carers may range from being largely ignorant about the care needs and condition to being highly educated and well able to be involved in the details of their care programme.

- **Formal Carers: Care for people:** Formal carers have elected to follow a career in care, and as such it can be assumed that they care about people (Bassett, 2002). On the other hand, it can also be assumed that they do not have a personal interest in the well-being of the set of people for whom they have a care role. Care may in fact be associated more with clinical and resource use outcomes than the quality of life change of patients or clients (Kane et al., 2007).. For this reason they can generally take a more objective position on the care needs of an individual than informal carers tend to be able to do. Formal carers will be appropriately educated about the care needs and condition of their clients/patients and accredited or licensed to practice as carers. In this sense they will be trained to understand the significance and meaning of the information gathered from a telecare system.
- **Care Managers: Manage Care:** Whilst some care managers have previously been front-line carers, this is not necessarily the case. For this reason some care managers view care services as a process to be managed and patients/clients as a commodity rather than recognizing that Quality of Life of the patients is the goal of care (Thorpe et al., 2005). The information needs of these stakeholders are very different from both informal and formal carers. They have little interest in individual cases unless those cases indicate an exception to the norm that is of strategic planning interest. The essential purpose of information derived from telecare systems is as anonymized data to assist in the management of care provision and in the strategic planning for resource allocation.
- **Policy Makers: Determine Care Policies:** Care policy has traditionally been a politics led process with research data playing a very small role in the process. (Blendon and SteelFisher, 2009; Hansen, 2011) The richness of data available from telecare systems could compliment that available from electronic patient record systems and provide evidence for effectiveness of policies, trends in care needs within a population and the relative priorities of different care situations. Policy makers may not be experts in care but are heavily dependent on representatives from the care professionals and agencies representing those in receipt of care.
- **Care Funders: Mediate Care:** As new treatments and therapies become available, and indeed the incidence of chronic diseases in the population as a whole increases as a result of a generally ageing population, care funders, particularly insurance companies are re-evaluating care funding provisions (Barlow, 2009; Thorpe et al., 2005) Care mediating agencies such as insurance companies, advocacy groups, charities and private care providers

will all benefit from the data available from telecare systems, particularly the data concerned with the effectiveness of home based care, treatments and interventions.

Given the wide range of interest in the data provided by telecare systems, and the wide range of competencies in interpreting the significance and meaning of the data, a telecare system cannot be implemented with a single rendering of information for all stakeholders. The care of individuals implies data relevant to individuals within managed care services and care policies. For this reason the roles the care stakeholders and the information needs in each individual situation need to be carefully assessed and appropriate technologies specified.

2. Exploring Stakeholder Interests

Because of the complexity of the interactions and interests across the range of possible stakeholders it is difficult to capture all of these interest when seeking to implement a telecare strategy and to deploy telecare in the community. The need to take this stakeholder specific view of the possibilities afforded by telecare was highlighted by Dewsbury et al (Dewsbury et al., 2001) who had observed the often conflicting perspectives of the various agencies involved in care. For this reason, researchers such as Gupta (Gupta et al., 2011) and colleagues have sought novel ways to hear the voices of the stakeholders, encouraging participation through the use of wikis and blogs. Given the novelty of the approach, end users may lack confidence to contribute to a discussion about needs and appropriateness. For this reason techniques such as drama have been explored as a means of demonstrating possibilities to stakeholders and encouraging feedback (Hine et al., 2012; Morgan et al., 2008; Newell et al., 2011) particularly for clients and informal carers who have recently become involved in a long term care situation but have had no previous experience of telecare.

What is still needed however is a method of capturing the various interests in a form that can lead to a system specification. Linskill and Bouamrane (Linskill and Bouamrane, 2012) have proposed a specification model for technology supporting independent living. Their model is essentially task driven and represents the telecare specification process from the care agency perspective, but it does not attempt to address the underlying needs for information about the well being of the older home dweller. Work on integrating telecare and multi-agency single assessment forms is also still in its infancy and

In order to explore the process of specifying a telecare systems that meet the information needs of carers therefore, the authors, working with colleagues in the MATCH project (Gray et al., 2007), and building on their experiences in participating in a number of trial installations of telecare systems (Hanson et al., 2007; Sixsmith et al., 2007) (Bhachu et al., 2012) devised a set of typical and plausible care scenarios. These describe the living situation of the home dweller, their care needs, and the role of the informal carers with an interest in their well-being and build on earlier experiences of the authors in using scenarios to explore the role of telecare technology in monitoring the well-being of older people at home (Sixsmith et al., 2005).

For the purpose of this paper, the authors focused on the scenario “Bert goes to the bookies” where the central character Bert has Chronic Obstructive Pulmonary Disease (COPD), one of the more prevalent chronic conditions frequently leading to acute episodes resulting in hospital admissions (HORTON, 2008).

- Bert is a single man aged 75, he lives alone on the outskirts of a large city near to a local cluster of shops.
- He has a daughter Alice who visits once a month as she lives about an hour and a half drive away. Alice is aged 37 and lives with her husband Dave and her two children Jennifer (2) and Josh (6). Bert’s next-door neighbour Jim is a close friend aged 57 living with his wife.
- Bert has become apprehensive about negotiating the underpass on his normal route to the bookies, as he doesn’t see well in dim lighting and tends to become disorientated. Bert has also been a smoker for 60 years and as a result suffers from COPD. This is exacerbated by exertion, and as a result Bert is concerned that he would not be able to handle a “run in” with an unscrupulous character in the dim light of the underpass. As a result his trips to the bookie are taking longer and becoming less frequent

2.1. Stakeholders & Care Interests

Having identified that in each care scenario there are a variety of stakeholders, the authors sought to identify the specific care interest for each stakeholder in the scenario. This is modeled conceptually in figure 1 below.

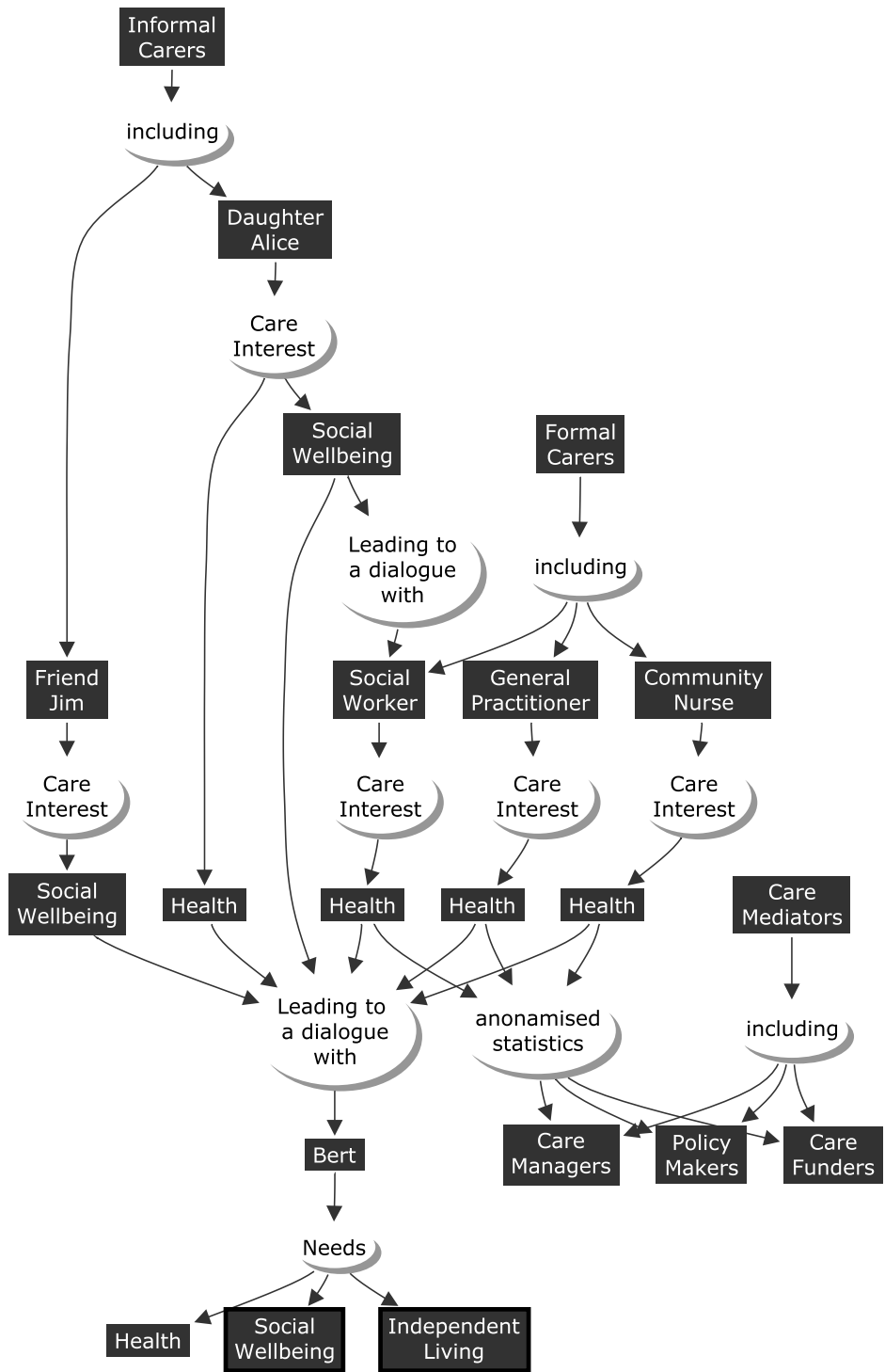


Figure 1. Stakeholders with a care interest in Bert.

2.2. Technology Needs Analysis per Stakeholder

Having identified the key stakeholders in a care scenario, the nature of the specific care interest was explored more deeply from the perspective of the information needed to allow care to take place effectively, and the nature of the telecare that would provide the address the interest by showing the information in a form that each of the different stakeholders can understand and use. For each stakeholder, a key question was identified that was central to the specific care role for that stakeholder. The answer to this question lead to a proposal for specific data to be measured, and a proposal for sensing technology that could yield the necessary data. The raw data from these sensors was then described and, as in many cases this raw data is unlikely to be comprehensible by stakeholders, a proposal for the rendering of the data in a form that would better yield the information required by the stakeholder was made, together with a proposal for the platform to be used to deliver this information.

The first stakeholder to be analysed was the client/patient, in this case Bert. This analysis identified two aspects to the care that Bert has for his own well-being. Initially, Bert is concerned for his quality of life, specifically in maintaining his independence and his habits, as evidenced by his desire to continue to be able to go to the bookies. His primary concern is for his safety and the unease that he feels about the potential danger that he senses on the journey from his home to the bookies and back. He does however recognize that his chronic health condition is a major constraint on his ability to respond should a dangerous situation occur, so for that reason he cares about his own health and would seek to have the condition alleviated if it affects his ability to get to the bookies. He has an interest in understanding his condition, at least in general terms, so that he can have an informed discussion with his carers, particularly his daughter Alice, on whom he depends to support him in his conversations with the formal carers. For this reason, he has agreed to give up smoking because, should his condition deteriorate, he would not be allowed to have oxygen at home. To help him to do this, he has allowed Alice to be aware of whether and when he smokes at home.

This exploration is modeled in Figure 2 and Figure 3 below.



Figure 2. Bert's independence needs.

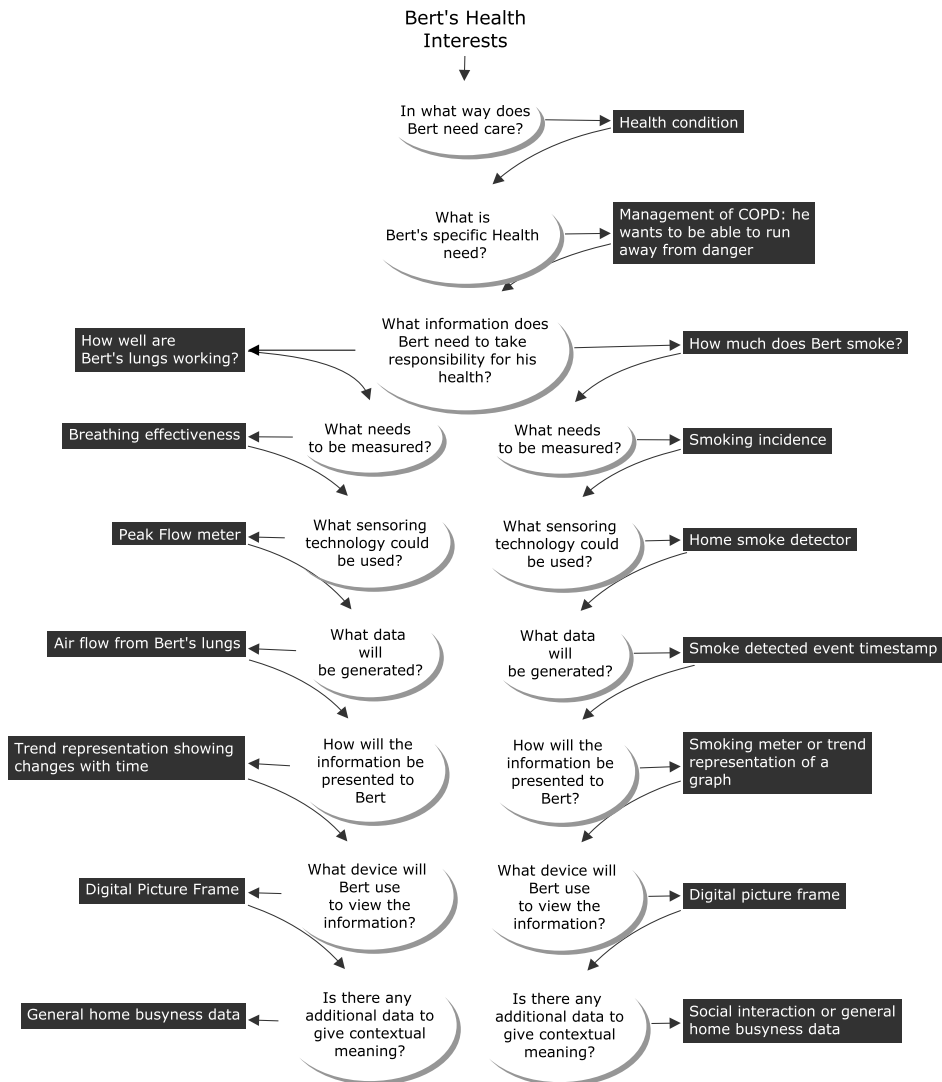


Figure 3. Bert's perspective on his medical care needs.

The next group of stakeholders to be explored were the Formal carers. Specifically in Bert's case these were the family doctor who is a local General Practitioner (GP), a community nurse who undertakes home visits and is specifically concerned with the care and management of Bert's COPD, and a social worker, brought in on the advice of Alice who is concerned for Bert's emotional and mental well being should his condition deteriorate and he lose the social interaction that he experiences at the bookies.

As far as the doctor is concerned, telecare offers a significant advance in care possibilities as it allows the doctor to not only monitor the specific treatment and its effect on the symptoms of Bert's COPD, but also on the effect of those systems on Bert's ability to get to the bookies. In the past this type of data was only available as a

verbal report from a patient, and was notoriously unreliable. The specific exploration of the information needs and associated technologies for the GP are shown in Figure 4 below.

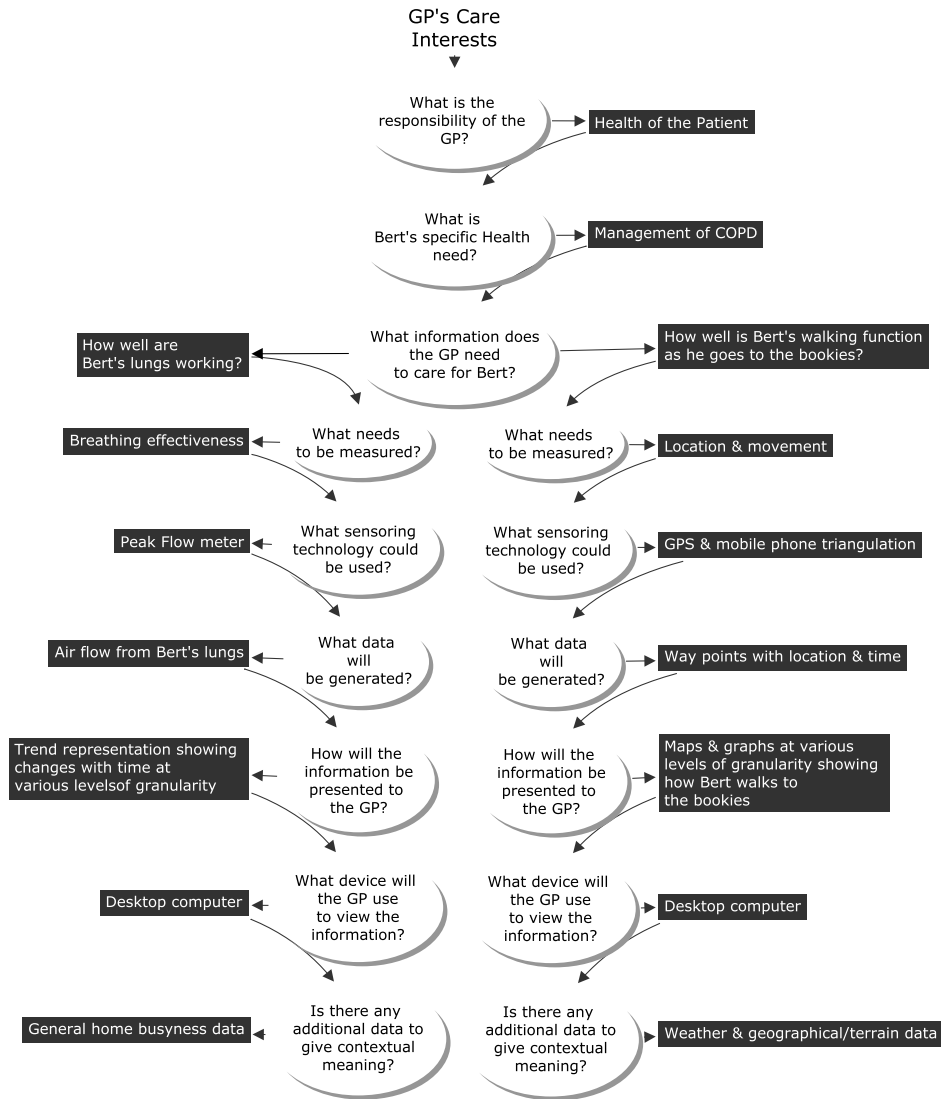


Figure 4. General Practitioner's care interests and information needs

One cause for concern expressed by formal carers about telecare is the reliability of home gathered data, both from the perspective of correct operation and reading of instruments in the home, and the calibration of equipment used in the home. For this reason, Bert receives visits from a COPD nurse. The frequency of these visits is agreed but can be altered in response to the data related to the state of the COPD. For this reason, the care information needs of the nurse mirror that of the doctor, but the information rendering and delivery platform reflect the reality of the mobile nature of home visits. This is reflected in the model shown in figure 5 below.

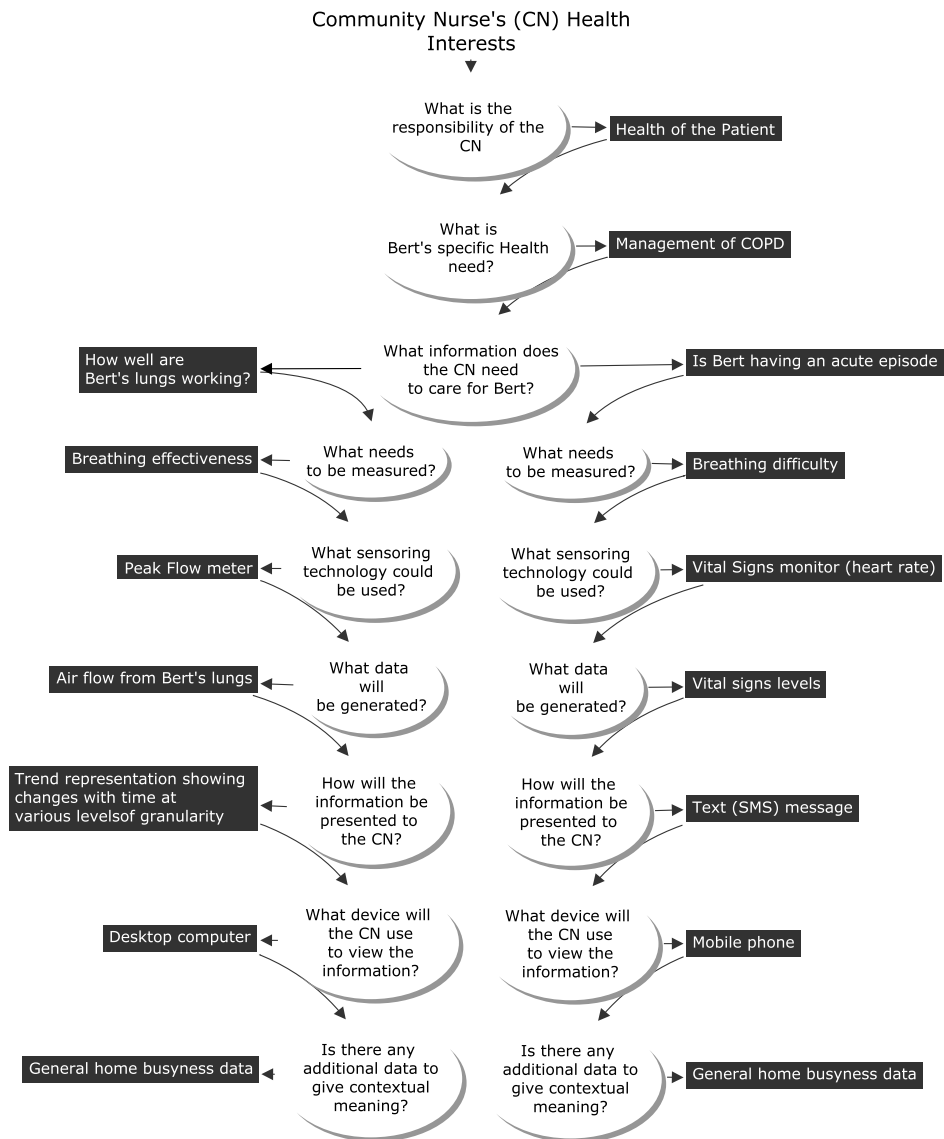


Figure 5. Community Nurse's care interests and information needs.

The focus of the information needs of the social worker are in the visits to the bookies as an essential social element on Bert's life rather than the medical condition affecting those visits.

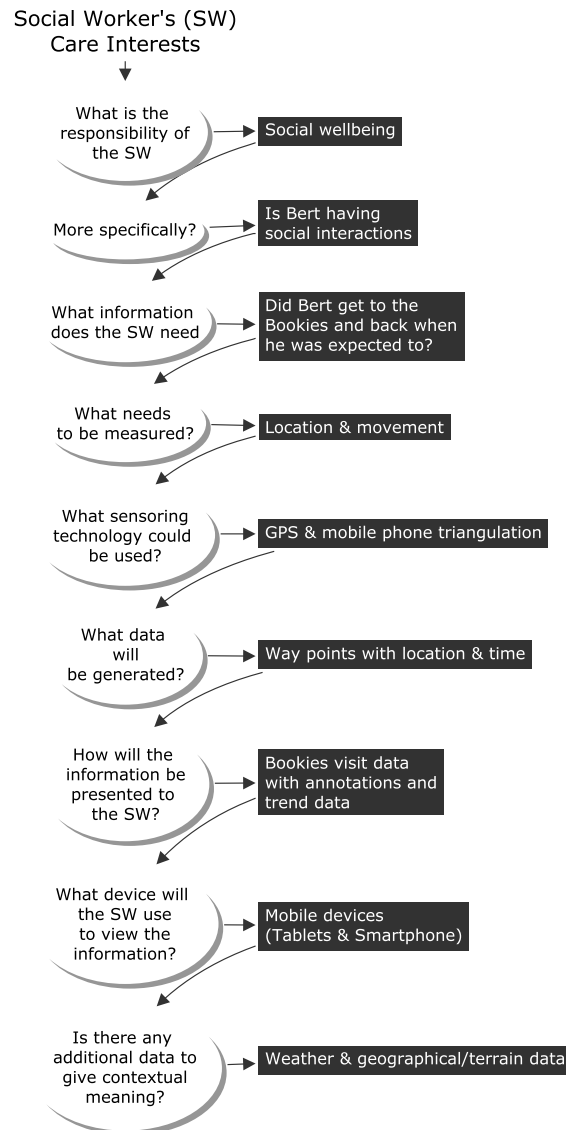


Figure 6. Social Worker's care interests and information needs.

The analysis then considered the information needs of the informal carers and the presentation of this information. The person most involved in Bert's care, and the person who cares most about him, is his daughter Alice. She is not able to visit frequently but is concerned by sudden changes in his chronic condition as well as the longer term effects of changes on his well-being. For this reason she is seeking a way to be regularly but unobtrusively updated about his on-going condition, so she has chosen to have a summary posted to an electronic picture frame. This is placed in her bedroom so that the information is not public but is readily available to her. This not only reports the trends in his COPD and his visits to the bookies, but also his smoking behavior. In addition, she can receive notification of any acute or emergency events

covering both his COPD status and his general health as a text alert or call to her mobile phone. This is modeled in figure 7 below.



Figure 7. (Daughter) Alice's care interest & information needs.

Traditionally community care was not only enacted within families but also in the casual encounters between friends. Old men are unlikely to share details of their medical conditions with friends, but they do have a social interest in the well-being of their social group. For this reason, the care relationship between Bert and his friend Jim is focused exclusively on the visits to the bookies. Jim knows that visiting the bookies is a key indicator of Bert's well being. Should Bert not visit the bookies for several days it would be a clear indication that he is not well. In this case therefore Jim would receive a text message on his mobile phone allowing Jim to seek further contact with Bert in order to support him as appropriate and needed. This is modeled in figure 8 below.

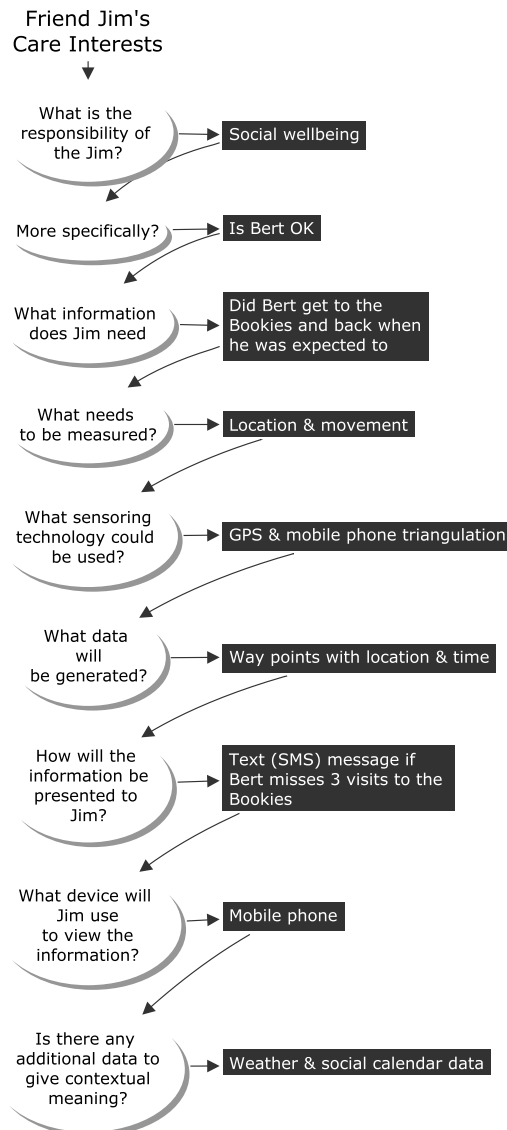


Figure 8. (Friend) Jim's care interest & information needs.

As a result of this exercise, and the analysis of several additional scenarios, a sequence of analysis emerged common to all stakeholders. This was captured as a generic sequence described below.

3. Stakeholders Interests Analysis Process

The sequence of analysis leading from care interest to telecare technology requirements for each stakeholder were found to follow a common path, which is presented in table 1 below.

Table 1. General analysis of care and information needs leading to information platform.

Carer Analysis		Technical Analysis	
Analysis Stage	Description	Analysis Stage	Description
Stakeholder	What is the name and role of the stakeholder?	Sensor	What sensor would be used to measure this state or behaviour?
Service User	Name and ID of the Service User	Data	What data will be generated by the sensor, and what processing will need to be done to extract phenomena of interest from the data?
Care Need	What care needs does the service user have that are relevant for this stakeholder?	Data Representation	How would the stakeholder prefer to be informed of the answer to their question, in terms of information representation, and the device used to convey the information?
Interest	What is the care interest of the stakeholder?: In what way do they care?	Connections	What relationship does this stakeholder have with other stakeholders?
Care Question	What specific question is this stakeholder needing to have answered?	Further Comments	
Measure	What aspect of the state or behaviour of the service user will be measured to answer the care question?		

This table shows that the telecare requirements analysis has two distinct phases; an understanding of the specific care role and information needs, and a selection of the candidate technologies to meet those care information needs. This is illustrated in tables 2, 3 and 4 below where the specific cases of Alice, Jim and the GP within Bert’s care scenario are presented.

Table 2. Analysis of care and information needs of daughter Alice leading to information platform.

Carer Analysis		Technical Analysis	
Analysis Stage	Description	Analysis Stage	Description
Stakeholder	Alice, Daughter	Sensor	GPS & Mobile phone location: Panic Alarm & Vital Signs monitoring: Peak Flow Meter
Service User	Bert	Data	Endpoint Log with Timestamp (not waypoints): Alert flag and Vital Signs levels: Peak Flow level
Care Need	Well-Being: Health	Data Representation	Trend representation on a picture frame: SMS messages on mobile phone: Trend representation on a picture frame
Interest	Is Bert OK Socially: Is he healthy: how is his	Connections	Discuss with Social Worker: Call Doctor:

Care Question	COPD? Does Bert get to the bookies as expected?: Is he having an acute episode?: how well are his lungs working?	Further Comments	Discuss with Bert
Measure	Location & Movement: Breathing Difficulty: Breathing Effectiveness		

Table 3. Analysis of care and information needs of friend Jim leading to information platform.

Carer Analysis		Technical Analysis	
Analysis Stage	Description	Analysis Stage	Description
Stakeholder	Jim, Friend	Sensor	GPS & Mobile phone location
Service User	Bert	Data	Endpoint Log with Timestamp (not waypoints)
Care Need	Well-Being: Health	Data Representation	SMS messages on mobile phone
Interest	Is Bert OK Socially?	Connections	Discuss with Bert
Care Question	Does Bert get to the bookies as expected?	Further Comments	
Measure	Location & Movement		

Table 4. Analysis of care and information needs of family doctor/General Practitioner leading to information platform.

Carer Analysis		Technical Analysis	
Analysis Stage	Description	Analysis Stage	Description
Stakeholder	Family Doctor	Sensor	GPS & Mobile phone location: Panic Alarm & Vital Signs monitoring: Peak Flow Meter
Service User	Bert	Data	Waypoint Log with Timestamp: Alert flag and Vital Signs levels: Peak Flow level
Care Need	Well-Being: Health	Data Representation	Trend representation within an application interface:
Interest	Is he healthy?: how is his COPD?	Connections	Discuss with Social Worker: Call Specialist Doctor: Discuss with Bert
Care Question	Is he having an acute episode?: how well are his lungs working?	Further Comments	
Measure	Location & Movement: Breathing Difficulty: Breathing Effectiveness		

4. Stakeholders Telecare Requirements Instrument

The outcome of the analysis above has been an insight into a generic process by which it is possible to isolate which specific telecare technology is appropriate for each

stakeholder in the context of a specific care study. As a result, the authors transformed the table into a form that could be used to capture the requirements of stakeholders in real care situations.

4.1. Analysis Tool

The telecare requirements instrument that resulted from the analysis of the scenarios within the MATCH project is presented in figure 9 below. It mirrors the sequences resulting from the care role and information requirements analysis enacted for each stakeholder and focuses on the care interest of the stakeholder and the associated information needs.

Stakeholder Care Interest Form

Stakeholder (What is the name and role of the stakeholder?)	
Service User (Name and ID of the Service User)	
Care Need (What care needs does the service user have that are relevant for this stakeholder?)	
Interest (What is the care interest of the stakeholder?: In what way do they care?)	
Care Question (What specific question is this stakeholder needing to have answered?)	
Measure (What aspect of the state or behaviour of the service user will be measured to answer the care question?)	
Sensor (What sensor would be used to measure this state or behaviour?)	

Data (What data will be generated by the sensor, and what processing will need to be done to extract phenomena of interest from the data?)	
Data Representation (How would the stakeholder prefer to be informed of the answer to their question, in terms of information representation, and the device used to convey the information?)	
Connections (What relationship does this stakeholder have with other stakeholders?)	
Further Comments:	
Form Completed by:	
Date	

Figure 9. Telecare Requirements Instrument

4.2. Experience Using the Analysis Tool

During 2009 the authors had an opportunity to be involved in a telecare trial taking place in the community in Liverpool, UK, building on work undertaken by BT and Liverpool City Council (Buckland et al., 2006). As part of the conversation with the stakeholders, the Telecare Requirements Instrument was used within the broader requirements gathering exercise, focusing specifically on the role of the Community Matron (CM). This was a relatively new care role involving home visits prioritized according to care needs. Telecare was used to monitor the progress of patients with chronic conditions in conjunction with the normal practice of regular home visits.

The framework provide by the Telecare Requirements Instrument was found to be useful as a vehicle for exploring the range of telecare options available to the CMs. As

this was a new care role, The CMs had had little previous exposure to telecare and struggled to comprehend both the information it could yield and the way it could be integrated into their care role. The conversation allowed the technical members of the trial team to ensure that the information required by the community matrons was presented in a form that was relevant to them and enabled them to handle their tasks appropriately. Taking into account the working models that the community matrons had, the cohort of home based patients were organized into virtual wards depending on the clinical condition and degree of risk associated with the patient at the time. This is illustrated in Figure 10 below.

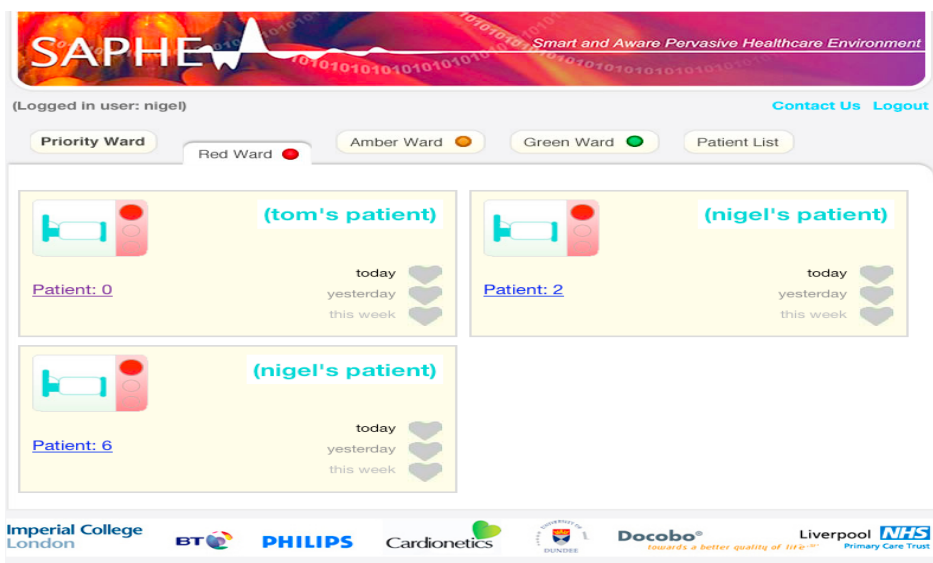


Figure 10. Community Matrons Telecare Interface Ward Screen

When a community matron selects a specific client on the interface, they are presented with data about that patient in a form that they have indicated is appropriate for them as a care professional. This is illustrated in figure 11 below.

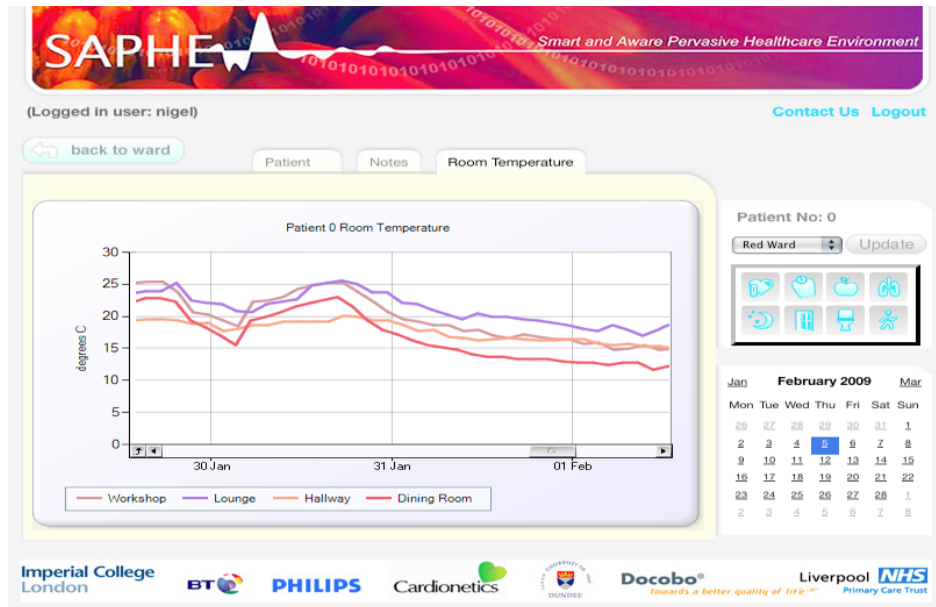


Figure 11. Community Matrons Telecare Information Screen

An important element of the feedback received from the stakeholders however was that when the conversation became too technical they did not understand what was being discussed and felt frustrated by the process. For them, the first page of the form was important and useful. The discussion of data processing was beyond the scope of their expertise, although they had strong opinions and useful input in defining the information rendering and the choice of delivery platform

5. Conclusions

This work attempts to bridge between the care needs of older home dwellers with chronic health conditions seeking to live independently in the community and the engineers seeking to develop and deploy telecare systems. Through the use of scenarios the different care perspectives of different stakeholders and the different information needs of different carers has been illustrated. From this, a generic tool has been proposed and used to conduct a conversation leading to the development of care interfaces for a telecare trial. By using such an instrument the nature of the telecare technology for specific care cases can be identified and appropriate systems can be developed and deployed. The authors propose that such an instrument can be combined with other technology deployment models such as proposed by Linskell and Bouamrane (Linskell and Bouamrane, 2012) to not only provide a managed deployment of technology but also confidence that the technology deployed meets the care interests and responsibilities of all stakeholders.

More generally, this work provides a platform for a wider exploration leading to systems that explicitly mediate a dialogue of care, where the focus moves from the more traditional topics such as medical and health conditions to the impact of those conditions of well-being and quality of life. In particular, work is urgently needed on

systems that support the conversation between clients/patients and informal carers, both at the algorithmic level where home behavior is correlated with well-being and at the user interface level where the meaning of the data is exposed to the stakeholders.

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