Review of the Delivery Model of the Seniors Alert Scheme (SAS)

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Executive Summary

This Review reports on the effectiveness of the current Senior Alarm Scheme (SAS) in Ireland in the context of the roles of stakeholders such as community groups, equipment providers and installers, and monitoring centres. It also examines the opportunity for improved performance, greater cost-effectiveness and a wider role for the scheme than may be possible through realising the potential of new technologies.

There are four parts to the Review:

a)   An analysis of the effectiveness of the SAS;
b)   A discussion of new technologies that can support people, or enable people to support themselves, in their own homes;
c)   A consideration of options for developing and/or improving the SAS; and
d)   Some specific recommendations and suggestions for the SAS.

The effectiveness of the SAS was studied through a combination of desk-research to collect data on statistics and relevant literature, and semi-structured interviews with a range of stakeholders. The latter included supply sector organisations currently involved in the SAS and others that had been involved but had not been successful in the most recent funding round.

The interviews found a broad consensus that the current SAS was more efficient than previously but that the requirement for more robust reporting and the use of an online portal had discouraged some (generally) smaller community groups from participating. The SAS was, nevertheless, highly valued and its importance to the well-being of often isolated older people was a constant theme. The interviews also found some concerns regarding the operation of regional lot arrangements (integral to the tender arrangements for the equipment supply to the SAS) that had the effect in some areas of restricting access to some equipment providers. There was general agreement on the need for the SAS or a successor scheme to harness the opportunities offered by some of the new technological innovations and which could facilitate the support of a wider range of people with different levels of support need.

Supply sector organisations were, unsurprisingly, the most aware of the new technologies that were, or were becoming available. Other stakeholders recognised the SAS as a route to just a small and specific range of technologies; but were aware that wider opportunities were emerging. Some saw these in a broader strategic context where health considerations could be seen alongside those of security and the need to be able to get help in an emergency. A few were aware that there were strategic initiatives and policy frameworks in Ireland that were beginning to look at how these separate needs might be coming together.

The new technologies that were considered in the interviews (and for which there were varying levels of awareness) included those that related to improvements in (analogue) dispersed alarm units in order to add functionality. These improvements were pointed to as including prompts and reminders; as well as the opportunity to replace 'installed' devices with low-cost mobile phones. The latter are noted in this Review as including models that have been designed specifically with usability for older people in mind, and which have integrated alarm buttons. These, the Review points out, could be useful both for people who have given up their landline telephones, and for people who are at risk of accident or illness when away from their homes. The potential for introducing wireless peripheral devices, such as sensors that could automatically specific alerts for different emergency conditions, is also explored.

In broader terms, what is described as the 2nd wave of Technology Enabled Community Care (TECC) heralds, the Review points out, a potential opportunity in the medium or longer terms for the SAS platform to become available to a much a wider range of potential user groups. They could position the SAS for further development that should appropriately take place within a more 'whole of Government' approach involving not just the Department of Housing, Planning, Community and Local Government (DHPCLG) but also other departments. This, it is considered, could help ensure that the potential of the technologies would be harnessed for people's broader well-being – taking account of their need for security, community engagement and health.

The service approaches that link with such opportunities are discussed in the Review. One crucial aspect examined is the value chain of service provision. Examination of this value chain highlights functions and responsibilities in relation to which community groups have, arguably, been inadequately supported (in at least financial terms). Alternative arrangements for awarding contracts for different lots are put forward and arguments presented for supporting new provision through different relationships with equipment providers and with monitoring centres.

Finally the Review makes a number of recommendations. These are listed below and further information is provided in the main text. The recommendations are supplemented by suggestions including those that relate to improving assessment and referral processes, giving end-users more choices. Importantly, the latter point to the way in which community groups can retain a key role as the SAS is developed. They include opportunities for older people and possibly a wider range of people in need, to benefit from free equipment or to make a partial payment for other approved devices. Crucially, some nominal pricing schedules are proposed which could enable the number of users of basic services to be increased within existing budgets. Enhanced services were also proposed, subject to assessment processes being put in place that would link to potential benefits (outcomes) in terms of people's health, security and wider wellbeing.

Recommendation 1:
The current budget for SAS should continue to be utilised to fund only the basic system (social alarm and pendant trigger).

Recommendation 2:
Further funding should be sourced from other government bodies (at national and/or local levels) to facilitate the move from social alarms to telecare.

Recommendation 3:
An integrated framework reflecting a more 'whole of Government' approach (that recognises the benefits to health and well-being arising through community support, health and social care agencies) should be put in place to guide further development of the SAS.

Recommendation 4:
The service framework by which geographical 'lots' might be maintained should only relate to community organisations and arrangements for installation and maintenance.

Recommendation 5:
That Pobal and its partner agencies examine the suggestions made with a view to their adoption or amendment, as appropriate, to guide SAS development.

1. Effectiveness of Current Seniors Alert Service (SAS)

1.1. Introduction

On 29th July 2016 the Telehealth Quality Group EEIG (hereafter the TQG) were awarded by Pobal the contract to undertake a 'Review of Operation and Delivery Model of the Seniors Alert Scheme (SAS)' that operates throughout Ireland.[1] Following administrative preliminaries to enable the TQG to work in Ireland, the work started at the beginning of September and was completed in December.

The Review was required to address three elements of the SAS (paraphrased), viz. the

i) effectiveness of the commissioning and management framework for the procurement of suppliers;
ii) relationship of the scheme with monitoring services; and the
iii) identification of new technologies (and considerations relating to their interoperability and applicable standards).

In undertaking the Review an approach was adopted that involved some desk-based research (part of which was supported by information about the SAS and its take-up - as provided by Pobal); an initial meeting and follow-up consultation and contact with the officers of Pobal; a meeting with officers of the Department of Housing, Planning, Community and Local Government (DHPCLG); and a series of face to face, email and telephone consultations with (seven) technology and service suppliers, representatives of (twelve) community groups and of (four) national charitable / community development organisations. Associated information received by Pobal during the period of the Review was, where relevant, made available.

1.2. Effectiveness of the Senior Alert Scheme (SAS)

The SAS and the predecessor 'Scheme of Community Support for Older People (SCSOP)' are recognised as having made a positive contribution to the security and well-being of many thousands of vulnerable older people throughout Ireland. It must be noted, however, that the SCSOP was originally established following the suggestion of a 'task force established to investigate security issues affecting older people'. This followed concerns regarding such security – especially in rural and remote areas; and meant that the scheme that emerged involved both community groups and the Gardaí. The scheme (now the SAS) has, of course, evolved and it is important to point to the different social, demographic and technological contexts that now must be considered as it again moves forward.

Demographic Context

The demographic context is one that relates to the growth in number of older people for whom there are often challenges that relate to maintaining independence and well-being. For many there are issues of social isolation and loneliness that can be associated with survival (e.g. of loss of partner) and low incomes. And to these can be added the challenges that arise due to limited physical mobility and the greater prevalence of sensory and, increasingly, cognitive impairments.

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[1] Ireland means the Republic of Ireland in this report. The term all-Ireland is used where there is the specific intent to embrace Northern Ireland.

Social context

The challenges of older age should not be necessarily seen in a negative way. And though some older people are challenged (see above) most are recognised as making very positive and valued contributions to family life and to the economic and social lives of their communities. Many older people are, in fact, involved in the community organisations that were at the heart of the SCSOP and continue to work with Pobal within the SAS.

Technological Context

There has been rapid development in the range of technologies that increasingly affect the lives of older people. The range available through the SCSOP and SAS has, however, remained limited. There are, therefore, new opportunities to be explored.

The technologies which we are concerned within this Review come within the umbrella term 'assistive technologies'. Many of these help to support people's independence and can give access (regardless of age) to information, sources of support (including for health) and social networks. All can impact on both independence and well-being.

These developments mean that, as well as there being new opportunities, there is arguably an imperative that attaches to this Review regarding their realisation. What becomes clear from this is that the service framework provided by the SAS has the potential to extend from its somewhat narrow 'alarm and security' focus to embrace broader aspects of health and well-being. This points to the need for a more 'whole of Government' approach (that involves the DHPCLG and other departments) and fits with agendas that are concerned with both 'asset-based' approaches to older age (associated with the empowerment and engagement of older people) and to the government strategic intent to encourage the harnessing of a range of new technologies whereby older people are better able to be supported *and* support themselves to maintain better health. The asset-based approach is explicit in the 'National Positive Ageing Strategy' (Department of Health, Patient Safety First and Healthy Ireland, 2013). The potential to harness technologies in new ways to support better health is explicit in the work of the Health Information and Quality Authority (2015).

Our Review, therefore, takes a forward view as well as considering 'current' issues that are more directly concerned with the 'day to day' operation of the SAS. Indeed, it would be inappropriate to focus simply on the latter if the SAS (or its successor) is to provide a foundation for service provision as needs change and as the opportunities offered by new technologies further expands.

The 2010 Review and Ensuing Changes

The most recent prior review was of the SCSOP. This was undertaken in 2010 (Department of Community, Rural and Gaeltacht Affairs, 2010). It concluded that because of the 'unprecedented demand and escalating costs [and] concerns … that the scheme was no longer achieving its stated objectives of addressing the genuine needs of vulnerable older people or fostering genuine community support for older people on a nationwide basis.' This conclusion was a stimulus for some rethinking of the SCSOP; the adoption of changes in the administrative frameworks; and for the assigning responsibility of the newly titled SAS to Pobal in September 2015. A new service model was 'rolled out' with the SAS (re)affirmed as aiming *to encourage community support for vulnerable older people in our communities through the provision of personal monitored alarms to enable older persons, of limited means, to continue to live securely in their homes with*

confidence, independence and peace of mind (Pobal, 2015). The funding for the SAS enabled the purchase of equipment to the value of over €106,000 in 2015. In the 10 months from November 2015 to August 2016 some 6,000 alarm installations were made. Both the SCSOP and the SAS can be seen, therefore, as contributing to what Cullen et al (2015) point to as an estimated 80,000 older people (15% of the older population in Ireland) as having social alarms (termed in his report as 'basic telecare services').

1.3. Consultation with Community Groups

A full list of 'Registered SAS Organisations' (community groups) was provided by Pobal on the basis of which consultations as part of this Review could be made. This comprised (at 31st August) 506 in total. Each was numbered and a sample of 32 was drawn from the list using random number tables. This sample was viewed as sufficient to enable 10 community organisations (representing a 'range' in terms of size and geographical location) to be contacted and interviewed by telephone. A face to face meeting was held with representatives of a one further community group; and an email representation from another meant that information was drawn from 12 such groups in total.

The key outcomes are noted as follows. These are in a context where we truly found a wonderfully varied range of groups from the smallest in remote or rural areas to larger groups in urban Dublin and Cork. Most of the community groups were happy with the service provided with Pobal - with most having had experience of the SCSOP and SAS 'before Pobal'. Having said this most were aware of a reduction in their number as a consequence of a minority of community groups not transferring from the old (SCSOP) scheme. Specific information on this reduction was not sought but is understood, in the main, to have been due to discomfiture with having to operate on-line and the necessity (notably for smaller groups that operated somewhat 'informally') for registration as a legal entity. Support continues to be given, however, to a small number of groups who do not operate online. For those groups that made the transfer, however, the new procedures were, on the whole, viewed positively.

> *'There's less paperwork; not having to get quotes. It's working a bit better!'*
>
> *'It's very swift getting alarms approved. There's no fault on them, actually.'*
>
> *'It's a very good scheme. We'd like to reach out to more people. It's working well at the moment.'*
>
> *'It took quite a while to put into place. Nothing seemed straightforward. It was confusing.'*
>
> *'[They're] Very efficient. Things happen quickly. It's more organised since they took over. And there's no problem if you have a query.'*

The 'varied range' of community groups related not just to the geographical context but also to the number of (normally) voluntary 'activists' supporting the SAS and the number of alarms provided to older people (from just one to near a hundred over the last 12 months). Given the relatively small sample, however, the outcomes noted must be recognised as indicative rather than conclusive. But given the associated 'feedback' received from other stakeholders (see below) and Pobal's own experience, the outcomes help to provide a sound basis on which future developments of the SAS can be considered.

- o Concerns about (particularly) socially isolated older people remain strong.
- o A shared concern (e.g. with the Gardaí) for older people appears especially evident in rural areas.
- o Some community groups (often 'covering' large geographical areas) in rural and remote areas are, in themselves, isolated in the sense of reliance on very few activists (in some cases a single person with good local links).
- o Public health nurses are seen as an important referrer of older people to the SAS.

- There is growing recognition of health being the most important element of need ... but with personal security being seen as supporting people's health and their ability to remain independent.
- Some (larger) groups, often in more urban areas (albeit serving a wider rural hinterland), are involved in other community activities. The SAS was seen as complementary to these.
- There is, among all groups, an almost total lack of awareness of telecare aside from the basic 'alarm' device and pendant (as promoted within the SCSOP and SAS). Several wanted to learn more about the alternative 'peripheral' devices.

    'I'm still learning. I need more information.'

- There was concern, where specific needs of younger people had been encountered, about eligibility criteria that restricted provision of alarm devices to people aged 60 and above.
- There was concern about the limitations of the €7.50 allowance for community groups for their initial visit and subsequent annual contact with users (especially evident in rural and remote areas).
- A small minority was concerned about the (lack of) choice of monitoring services but, in general, praise was given to supply sector organisations in relation to their prompt and efficient services.
- Some had encountered technical problems (not working or false alerts) with CO detectors and fire alarms (but not for social alarms).
- Whilst some are aware of people giving up their landlines this is was not seen as a problem, but where encountered the GSM version of alarms appeared to some groups as far more costly.

1.4. Consultation with Key Stakeholders (Technology Suppliers)

16 organisations were approached including both those which tendered and/or were invited to join the initial framework concerned with the 'Provision of Telecare Equipment in connection with the Seniors Alert Scheme'. This tender process led to the implementation of 'multi-operator framework agreements (now suspended) whereby different suppliers were assigned to provide equipment (and liaise with community groups) in 10 different regions. Seven of the technology suppliers responded and all were interviewed (face to face). The interviews were guided by a topic list.

The suppliers demonstrated a very high level of awareness of the SAS and, as would be expected, were very positive about the merits of the technologies (and related services) they supplied. There were, in most cases, close working relationships with particular equipment manufacturers and (where they did not provide their own) with particular monitoring and response services.

The key issue of concern for most was one that related to the continuity of the SAS. This was, in part, a reflection of fears about changes to the scheme that might disadvantage or lead to a loss of income for them. Furthermore there was, for some, a clear sense of grievance that the tender exercise for the provision of telecare equipment had resulted in their being disadvantaged through the approach taken (essentially concerning the way that division was made into 'lots').

Our appraisal of the problem that arose with the tender process is not considered as central to this Review. It is appropriate to note, however, that we see the good intent of Pobal as unquestionable and the equipment specifications developed by them for the tender exercise as sound. The division into 'lots' is understood as having been a reflection of the wish to help ensure that the SAS kept a localised and community focused perspective - thus supporting the furtherance of the scheme in collaboration with community groups.

The main problem that arose related to the way in which the supply routes (including the arrangements for monitoring and response services) are becoming increasingly distant from local communities. The system of 'lots' led to some tenderers, therefore, positioning themselves within 'alliances' that would, if successful, enable them to extend their reach and, in effect, establish at least local monopolies. A complicating factor related, and continues to relate, to the issues of (or lack of) interoperability between the wares of some manufacturers … this leading to discontent in some areas where relationships had been built with sometimes different suppliers and potentially leading to supplier 'lock-in'. The linked 'cascading' approach, whereby a second supplier could be brought into the frame if the primary provider could not supply, did not come into play. Second 'ranking' for a tenderer, therefore, did not realise *any* benefit to them. What might, otherwise, have helped to improve choice for community groups (and, potentially, older people themselves) did not, therefore, materialise.

This was, therefore, the context for the interviews. But, generally speaking, their commercial agendas being set aside, there was a positive view given by suppliers of what Pobal were attempting to do and an understanding of the way that the 'market' for telecare was changing. With this in mind, it most appeared to welcome involvement in what was posited to them as a positive and forward thinking Review process.

That changing market was recognised by the suppliers as concerned with or characterised by

- o Moves to develop more integrated services … responding to the fact that new technologies can enable needs relating to independent living, security and health to be all met.
- o The rapid development of technologies, perhaps most notably manifested in smart mobile devices … some noting that more older people were using mobile devices instead of social alarms.
- o The 'restriction' of the SAS to supply of social alarm and pendant only – without, therefore, recognition of the wide range of peripherals that could provide benefits to users.
- o Difficulties arising from the lack of interoperability … especially true for mobile units where the protocols used for communication were not consistent.
- o Growing recognition of the (in some cases) actual and potential role of public health nurses as (along with community groups) providing local links and routes to referral.
- o The inevitability that SAS should move from any narrow focus regarding security to one that embraces health.
- o The growth of the private 'direct to customer' sector market for telecare.
- o The need for appropriate quality standards to underpin services (both impacting on the equipment supplied and the efficacy of monitoring and response services).
- o The alleged poor marketing practices of some companies to steer users to particular monitoring and response services.

One interviewee, as well as affirming a number of the concerns noted above, was forthright in suggesting that the SAS would beneficially be re-founded by supporting the purchase of *services* rather than equipment. With the latter came (in a follow up written response) their strong call for quality standards to be in place relating to the overall service (including installation, maintenance and 'a more formal assessment/referral process based on assessed need and informed consent') with this 'backed up' through an appropriate accreditation or certification. With such accreditation or certification a benchmark standard for such services would be in place. The position regarding standards is noted below (see 1.7).

Overall, however, the seven suppliers were generally unfazed by (and were supportive of) the possibility that the Review might give pointers to Pobal regarding a new procurement framework that could

- o move away from a framework based on geographically-based 'lots' unless current supply restrictions could be removed;
- o be emphatic on the matter of interoperability; and
- o demand quality standards to be attained and demonstrated by suppliers of technologies (and monitoring services where appropriate).

1.5. Consultation with Key Stakeholders (National and Regional Charities and Community Development Organisations)

11 organisations were approached including those acknowledged as having contributed to or collaborated in the 2010 Review (Department of Community, Rural and Gaeltacht Affairs, 2010). Four responses were received with three providing written views and one responding to a telephone interview in relation to four 'key questions'. All four respondents were 'strategic' in their thinking about the SAS. All had had experience of the scheme (and the predecessor SCSOP) over an extended period and had seen, therefore, its evolution. All were involved in work directly concerned with older people and/or community development.

Whilst it is not possible to be conclusive about the representativeness of the views expressed we can note the fact that all valued the SAS and would like to see the 'local' emphasis retained in one way or another. The scheme should, it was affirmed, both support local groups and endeavour to empower older people who could benefit from the technologies concerned. The essence of the responses is provided below:

1) Respondent 1 has a very strong community orientation - seeing challenges that arose because of the need, but time-consuming nature of, keeping in touch with older people. They suggested that simple telephone calls (coordinated through community groups) could be used to enable further 'outreach'. They did not provide any insights around the operation of the SAS and its potential development excepting to note particular problems for equipment supply and links via GSM networks in some rural areas.

2) Respondent 2 echoed the need for further support to community groups - arguing the need for 'a more proactive approach in supporting new and pre-existing registered groups to register with the scheme to ensure that systems are in place to respond to the changing demographics'. They saw this as important, in part, because of the challenges of isolation and loneliness. In relation to the outcome of the 2015 tendering exercise they opined that approaches that involved 'single companies' allocated to specific areas limited 'users being able to access different technology through the scheme'.

3) Respondent 3 affirmed that the potential of telecare was not being realised. Crucially, they noted that a lot of people 'in need' were not being reached. This linked with what they saw as a low level of awareness with many thinking that the technologies and services were *only* available with grant assistance via the SAS. They lamented that, despite some initiatives in Ireland using telecare in the broader health context, that the SAS had not sufficiently 'moved on'. To take things forward they suggested the merits of using local (statutory and voluntary) organisations to raise awareness and 'tapping into' local as well as national funding streams to facilitate service development.

4) Respondent 4 was clearly very well aware of the growing range of technologies and their potential for much more than simple 'alerts'. They emphatically called for a 'new telecare model [that] would operate in a proactive fashion; for example phoning all older people linked with the service on a

daily basis'. Additionally they noted the potential role for 'new smart applications' that could link with family and friends. There would, the respondent asserted, be a 'need to ensure that all telecare systems and telecare providers meet a quality standard for the provision of such services'.

The varied responses received (and the non-response of others who were approached) are suggestive of a general lack of knowledge about telecare and the wider range of technologies that could make an increasingly important difference to the lives of many older people. Such matters, this Review suggests, *should* be more in focus for such organisations in view of their frequent links with community groups and their common interest in the health, security and well-being of older people.

1.6. Evidence for a Wider Approach

Several studies and strategic overviews have either provided (some) evidence for the merits of telecare (and, more broadly, telehealth) or have pointed to its strategic importance as service developments take place. Each relates in one way or another to a 'repositioning' of services so that they are closer to and reflect the needs and choices of users. They, in turn, call directly or implicitly for some blurring of the boundary between health and social care.

A study of 'the benefits of telecare' undertaken by the Health Services Executive (Graham, Lawson and Bolton, 2011) 'in partnership with the Department of the Environment, Heritage and Local Government' linked with the more strategic agenda. This included reference to the National Positive Ageing Strategy (Department of Health, Patient Safety First and Healthy Ireland, 2013) and pointed to policy issues for health and home care services. Telecare, it was recognised in the study, embraced much more than an alarm but could include a range of linked devices (depending on individual need) ranging from 'property' (e.g. smoke and CO detectors) to 'personal' (e.g. fall and bed occupancy sensor) devices.

In order to appraise the 'benefits' of telecare, the study, following assessments made by HSE staff, provided 108 older people (from throughout Ireland) with telecare devices (social alarm plus pendant; most with bogus caller buttons (95%) and smoke detectors (69%); others with falls detectors (52%) temperature and CO sensors). All were linked to the monitoring and response service provided by Emergency Response (based near Wexford). Follow up Interviews with 21 users and 13 carers found that the telecare technologies and services were seen as important and gave substantial reassurance to their users. A key finding, suggesting the efficacy of the assessment process, was that 'those assessed as likely to need care within 6 months generated 2.4 times more activations than the average'. The report affirmed that 'at the very least, telecare seems to be working for … more dependent groups'.

A specific Health Services Executive telecare initiative involving 133 older people in North Leitrim / West Cavan found clear benefits to service users (Work Research Centre, 2016). These benefits, albeit based on a small survey sample (19 older people and five key workers) related to the reassurance given (a 'sense of security'), and the 'quick response in the event of a fall' and/or 'assistance in the case of a medical emergency'. The key workers affirmed that 'telecare was an important service in the context of care provision.' The report's discussion noted some operational challenges regarding eligibility, assessments, nominated contacts and installations. Significant, however, is their recognition of both security issues for older people living alone (echoing a key tenet of the SAS) *and* the potential (more in the arena of health) for telecare to underpin 'outreach work' from Our Lady's Hospital in Manorhamilton.

Straddling health and social care perspectives is the appraisal by Cullen et al (2015) that, after indicating different service approaches in Northern Ireland, Scotland and Spain, pointed to the need for the adoption in

Ireland of a broader 'perspective on telecare' that would harness many of the benefits indicated later in this Review. Particularly important suggestions made by Cullen are that 'HSE could consider giving telecare a more strategic role across a spectrum of settings for older persons' and that there should be a 'review of the restriction of [SAS] funding to people aged 65 or older'. This Review endorses such findings (see Section 4).

From the perspective of health, albeit more clinically oriented, the Health Information and Quality Authority (2015) pointed to 'telehealth interventions and home visit programmes' as supporting 'reductions' in mortality and the rate of readmissions to hospital (for discharged patients). Separately they also asserted, albeit for older people in care homes, that telecommunications and information technology devices … [can] support them to communicate and maintain contact with family, friends and others' (Health Information and Quality Authority, 2016).

Ireland's 'National Positive Ageing Strategy', meanwhile, is assertive about the role of telecare and its role in supporting older people (Department of Health et al, 2013). The key extract from that report is provided below.

'There is an increasing recognition that new technologies can offer new ways of supporting people with a disability or chronic illness, facilitating them to continue living independently at home and can play an important role in prevention and self-care. Telecare and telehealth services are becoming increasingly recognised as an effective way to prevent or manage some health conditions effectively'

Department of Health, Patient Safety First and Healthy Ireland (2013) 'The National Positive Ageing Strategy'

From the security perspective, notable (and very significant for this Review) is the affirmation, within one of the goals of the National Positive Ageing Strategy, that the An Garda Síochána 'Older People Strategy' should continue to be implemented and 'empower people as they age to live free from fear in their own homes … feel safe and confident in their own communities.' This was linked to ongoing concerns about elder abuse.

Each of the above studies and overviews clearly point to the fact that telecare and telehealth are relevant to the work of different Government departments. This gives further justification for this Review in calling for a more 'whole of Government' approach.

1.7. Quality Standards and Codes of Practice

Standards and codes for social alarms and telecare began to emerge some 20 years ago. They were very focused on the technologies rather than related monitoring services. But nevertheless the standards and codes in question were important in putting down markers regarding the operation of the 'systems' and setting out some of the basic requirements for installations, testing and the manner in which alarms could be activated and responded to. Most users were older people without significant support needs but for whom the alarms were seen as enabling help to be obtained in the event of an emergency. The history of such alarms (including their development in Ireland in the context of the SCSOP) and their use was documented by one of the writers of this Review (Fisk, 2003). The range of standards is noted in Table 9.

As the shift took place from social alarms to telecare, however, the role of such technologies in relation to health and social welfare (rather than 'emergency') came more to the fore. The technologies were playing an increasing part in supporting (mainly older) people with health challenges or impairments, this meaning that standards and codes had to take more account of the nature of services rather than just the operation of technologies. The standards developed still, however, were largely based on rather formulaic approaches

relating to a 'model' form of service provision that was, in large part, determined by the technologies available and was actively promoted by the main manufacturers and suppliers.

The standards were top-down in approach and aimed, it is argued, at 'delivering' services in ways that fitted the established ethos of many statutory and voluntary services. Acknowledgement of the need to rethink services (or technologies) in ways that could empower service users and enable them to harness technologies in ways that met with their choices or desires was, therefore, absent. This lack of imagination explains the close resemblance between standards and codes adopted and sustained for more than a decade in both European countries and in Australasia. Therefore, agendas concerned with (a) the further integration of social care and health (recognised as important in Ireland and a clear part of the European Union perspective); and (b) changes to the nature of services; were not allowed for. Most of these standards and codes remain in place but, when applied, may have the effect of tying providers to old service models.

Currently, therefore, there are (worldwide) just two standards or codes that meet both the wider requirements around services, offer flexibility to service providers and recognise that people (of any age) will want to interact with those services in new ways – often using the technologies of their choice (including mobile devices). Because the two standards are not 'prescriptive' they offer a framework which Pobal and the DHPCLG could consider for adoption to underpin telecare service configurations in Ireland as they evolve. The two standards in question both date from the 2014. These are the European (now International) Code of Practice for Telehealth Services of the Telehealth Quality Group (2016); and the Telehealth Services Code of Accreditation Canada (2014). Both were developed independently of each other, but took a similar path.

A broad appraisal of the different codes (having explored those applicable from Spain to Australia) is offered by Fisk (2016). This argued that 'old' top-down standards offered 'comfort zones' for those who planned, commissioned or provided services. But because of changes in approaches and the fact that the technologies now disrespect traditional service boundaries the older standards are pointed to as of questionable' merit.

The most relevant counterpoint (recognised in Ireland) to the International Code is the code of the TSA Code of Practice. Two services in all-Ireland (per the TSA website at 13th November 2016) are understood to be accredited to this code. Because of its limitations, however, one of those services is poised to seek certification to the International Code. A copy of the 2017 version of the International Code of Practice for Telehealth Services (released in December 2016) can be accessed online at www.telehealth.global .

2. Developments in Technology Assisted Support

2.1 Dispersed Analogue Social Alarms and Systems

There are many different social alarms on the market today in Ireland. All are capable of operating within generic social alarm systems of the type drawn in Figure 1. This shows both the alarm trigger device and the social alarm (which are the elements provided under the SAS) and the other components that constitute a 'full' system. This includes both a monitoring centre, which is available 24/7 to receive alarm calls, to speak with the user, and to provide a telephone response or a mobilisation of emergency responders or family members. The alarm equipment is the facilitator for a personal emergency 'service' that reduces anxiety amongst vulnerable people and their families.
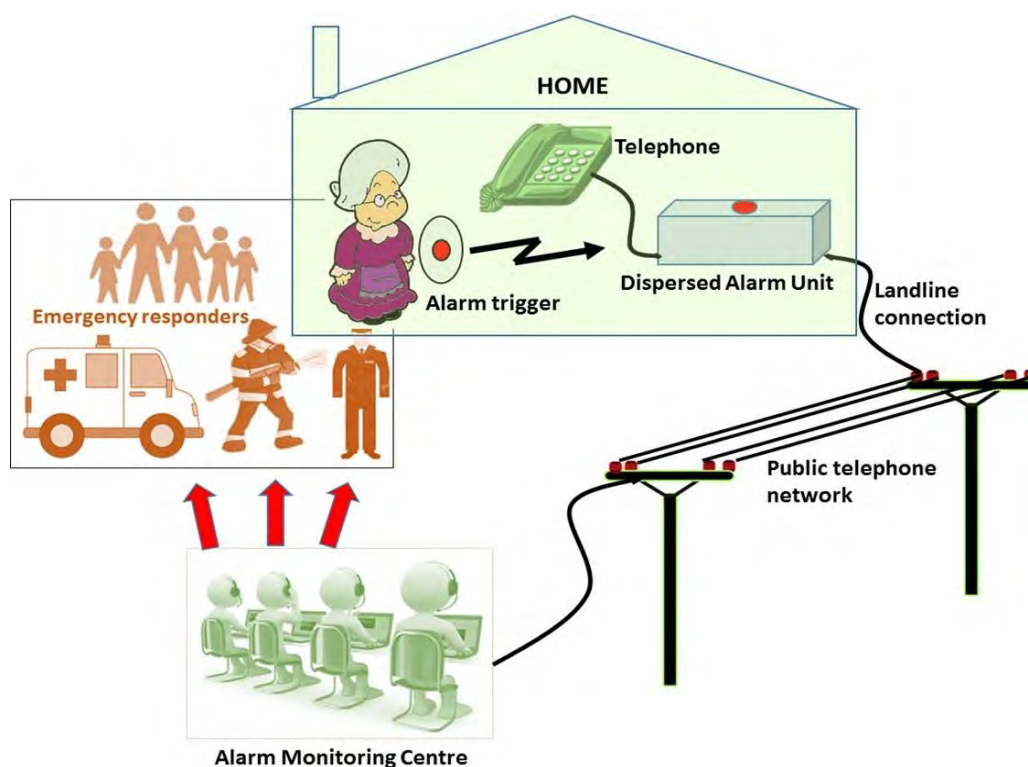
Figure 1: A Generic Social Alarm System to Protect Vulnerable People

Most social alarm hardware in use in Ireland today originates in different parts of Europe. This is because the licence-free narrow-band transmission frequencies allowed in the European Union (under EN50134 Parts 2, 3 and 5 which specifically relates to social alarm systems) are different to those employed elsewhere in the world. The allowed devices operate at the ESAF (European Social Alarm Frequency). This means they operate within very narrow bands around the European Social Alarm Frequencies of 869MHz or 169MHz. The frequencies are used to ensure that other radio equipment manufacturers do not use the same frequency, therefore increasing system reliability for the benefit of users.

The former frequency (869MHz) is used by most companies while only one or two (including Legrand, who now own a leading UK manufacturer, Tynetec) use the latter. In principle, there is little to choose between the 2 frequencies in terms of performance, though lower frequencies tend to suffer less attenuation when transmitting through thick walls (especially in older buildings). The components (and antennas) are smaller

at higher frequencies. Added to this in order to enhance performance, most, if not all suppliers use a 'Class 1' receiver which efficiently rejects out-of-band frequencies thus ensuring that interference from high power adjacent sources is rejected.

The requirements of EN50134 are multiple and described in more detail below. They provide the context for all current social alarm systems. There will, however, be issues in the future as technology progresses and new wireless transmission arrangements such as Zigbee and Bluetooth are used more widely. Zigbee is a protocol used extensively in smart home control systems and has a range of up to 50 metres, while Bluetooth is used between smartphones and computers, and links with their peripherals such as speakers, headsets and medical sensors. It has a range of about 10 metres. Both Zigbee and Bluetooth have become commonplace in telecare (and related telehealth) services.

2.2 Technical Standards

Technical standards are mandatory in the EU and are different in scope to the quality standards and principles discussed in section 1.7. The principle European standard relating to social alarm systems is EN 50134, the relevant parts of which are:

EN 50134-1 2002 – System Requirements
• Specifies the minimum requirements for a social alarm system.

EN 50134-2 2000 – Trigger Devices
• Specifies the requirements for manually and automatically activated wireless trigger devices transmitting a triggering signal, and the requirements and tests for trigger devices forming part of a social alarm system.

EN 50134-3 2012 – Dispersed or Local Social Alarm and Controller
• Applies to social alarm base units and controllers that receive an alarm triggering signal from manually or automatically activated trigger devices and convert this into an alarm signal for transmission to the monitoring centre (or to an individual alarm recipient). It covers a range of functional requirements such as: the Power supply, 2 way speech, alarm processing, testing and fault reporting, documentation and controls.

EN 50134-5 2004 – Interconnections and Communication
• Specifies the minimum requirements for the interconnections and communications within a social alarm system including the radio frequency employed, the system availability, the quality of audio, transmission times, the reporting of faults and system availability.

EN 50134-7 2003 – Application Guidelines
• Provides recommendations to service providers (and their sub-contractors) for effective and efficient management policy and procedures for installing, testing, operating and maintaining a social alarm system, including technical facilities and organising assistance. It also requires risks management, enhanced record keeping and documented procedures and training of staff employed to visit the homes of service users, and certain levels of staffing to ensure an adequate response.

Compliance with the relevant parts of EN50134 is mandatory both for the equipment *and* elements of service such as installation, maintenance and monitoring. There are some other standards that are relevant to social alarms, but most are UK-centric, reflecting the greater maturity of services in the UK. They have not yet been harmonised as European standards and therefore remain outside the scope of current requirements for the SAS. They are included below for completeness:

BS 8521:2009 - Specification for Dual-Tone Multi-Frequency (DTMF) Signalling Protocol for Social Alarm Systems
• Specifies requirements for the transfer of information and controls within a social alarm system, by means of dual-tone multi-frequency (DTMF) tone signals via the public switched telephone network.

BS 5979:2007 - Remote Centres Receiving Signals from Fire and Security Systems. Code of Practice
• Makes recommendations for the planning, construction and facilities of manned and unmanned remote centres, and for the operation of alarm receiving centres

BS EN 50518- parts 1, 2 & 3 - Monitoring and Alarm Receiving Centre: Location and Construction Requirements
• Sets out location and construction, technical requirements, procedures and requirements for operation.

The relevance of standards may be closely aligned to the quality of social alarm scheme operations. However, as noted in Section 1, they have changed little during the past decade during which technology has progressed considerably. The focus for services, meanwhile, has moved towards outcomes rather than performance indicators. This means that this Review must be sensitive to the purpose of the SAS (and to the vulnerabilities of those who receive support) and at the same time recognise the potential impact of new technologies. Following from the above, a specification for a social alarm consisting of a radio trigger and social alarm base unit, can be based on EN50134 Parts 2, 3 and 5 together with interoperability requirements to operate with a monitoring centre as described in EN50134 Part 7.

Each manufacturer may, of course, offer a number of other features as appropriate. Some options are shown in Tables 1 and 2. In addition, all social alarm units should provide an automatic alert to a monitoring centre when mains power has been removed and/or back-up power is close to exhaustion. They might also provide a spoken message to alert the user.

Table 1: Additional Features of Trigger Unit for Basic Social Alarm Applications

Feature	Examples
Wearing options	Wrist-strap, neck-cord or lanyard, brooch, belt clip, jewellery
Colour	Main body of device, button
Battery life	Number of years before replacement
Battery replacement	Replacement of battery or of entire trigger unit
Water-proofing	Shower, immersion depth in cold water, immersion depth in warm water
Out-of-range indicator	Sound, vibration or flashing lights
Auxiliary buttons	Non-emergency communication; cancel alarm
Identification mark	Bar code, QR code, NFC tag
Shape options	Circular, oval, square, oblong
Size options	Standard, miniature, large

2.3   Telecare Hubs and Sensors

A basic social alarm system involves only manually operated trigger devices. It may be evident that an active arrangement of this type may fail to raise an alert under certain circumstances including:

- The alarm trigger not being worn or carried at all times.
- The service user choosing not to press the alarm button for fear of causing a fuss, denial, or not understanding the seriousness of a situation.
- An environmental issue such as the emission of a dangerous gas, a flood or a fire which the individual is unaware of (perhaps because they are asleep).
- A medical emergency which has caused the service user to be unable to activate their alarm.
- A security situation in which the individual is not inclined to activate their alarm for fear of their safety or well-being.

Table 2: Additional Features and Applications Basic Social Alarms

Feature	Application
Speakerphone	Support people who have difficulty holding and using a telephone
Call Answering with Pendant	Avoid the need to pick up a handset to answer a call
Number of Radio Trigger Devices	Extend the number of active trigger devices and passive sensor devices that can be supported by the system
Real-time Clock	Enable alarm conditions and reactions to be included that are dependent on the time of day, or day of week
Hard Wired Inputs	Allow the use of wired switches including large pressure activated switches used by people with intellectual or physical disabilities
Hard Wired Outputs	Operate specific electrical light switches or actuators based on logic, time or remote commands
Hearing Loop Amplifier	Help people with hearing loss to hear conversations or the television, radio or music system
Telephone Keypad	Enable social alarm to operate without a telephone handset
GSM Module	Enable mobile communications in place of fixed line
Internet Protocol Address	Allow the unit to be used in an Internet of Things arrangement
Recorded Messages	Provide programmed reminders
Automatic Welfare Check	Provide a daily or weekly means of ensuring that the user is ok
Silent Call Dialling	Allow an alarm to be raised and a telephone line opened without the knowledge of a potential intruder or bogus caller
External Speaker	Allow user to hear monitoring centre staff while in a different room
External Microphone	Allow user to be heard by monitoring centre staff while in a different room
Battery-only Operation	Allow a unit to be used in a property that has no safe or available mains power source
Virtual Sensor Logic	Create smart sensors based on logic and combinations of inputs
Remote Set-up and Programming	Enable a change of monitoring centre (or individual responders) without staff having to visit a property
Multiple Alarm Recipients	Allow several individual responders to share responsibility
Pre-programmed Speech Messages	Provide reassurance to users that a call is being connected, or if there is a loss of mains power of telephone connection
Language Choices	Issue pre-programmed messages in a choice of language

These issues can, in principle, be addressed by including a range of appropriate smart (decision-making) sensors in a package of support. Each sensor has a transmitter that can send a coded alarm signal when its sensing threshold has been exceeded. Thus, through expert assessment of unmet needs and risks to independence and well-being, a range of smart sensors can be prescribed to address personal wellbeing in

relation to e.g. home safety, home security and issues relating to falls; using an appropriate selection of sensors of the type shown in Figure 2.
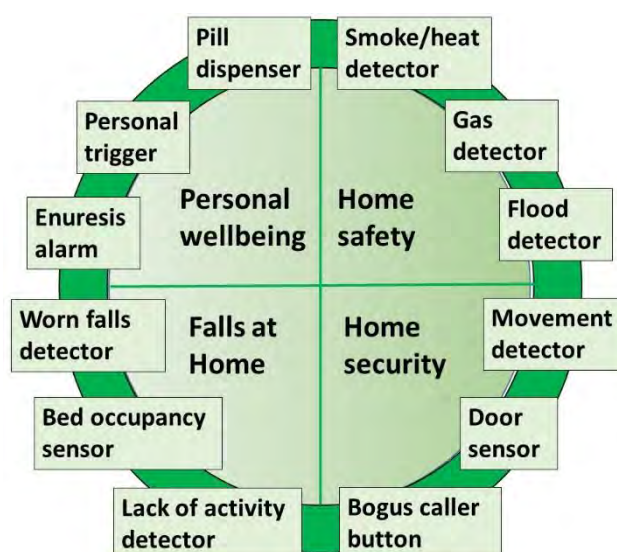
Figure 2: Smart Sensor Opportunities for Use in an Extended Telecare Alarm System

There are many applications for these sensors, some of which address concerns that are relevant to the SAS. Others can offer support primarily for landlords, family members and the Health Service Executive whether through their health function or through promoting wellbeing through social care. Table 3 describes the primary benefits of telecare services (sometimes described as Technology Enable Community Care or TECC) to four different stakeholder groups. Comparatively few of these benefits can be achieved using a basic social alarm system as currently provided through the SAS. But most of the benefits would be available, to some degree if the scope of the SAS was extended through the use of smart sensors (with, of course, appropriate response protocols).

Table 3: Benefits of Technology Enabled Community Care to Different Stakeholders

Individuals and their families	Emergency services	Housing landlords	Health & Well-being (HSE)
Increased choice and peace of mind about safety & security risks	Reduced number of ambulance call outs	Reduced voids in social housing schemes	Reduced hospital and care home admissions
Support for self-care and prevention, and reduction in anxiety	Early detection of fires and kitchen incidents	Increased demand for shared/specialist housing	Improved medication / therapy compliance
Improved quality of life and self-confidence	Reduction in doorstep crime and burglaries	Fewer incidents of fire and accidental damage to property	Fewer A&E presentations and readmissions
Increased independence and ability to work	Reduction in falls incidents requiring pick ups	New roles for wardens and support staff	Improved access to specialists & 2nd opinions
Improved access to services closer to home	Reduction in anti-social behaviour	Improved security of properties	Shorter hospital stays and rapid discharge
Reduction in loneliness and social isolation	Reduced numbers of older people going out and becoming lost at night	Early warnings of increased risks	Reduced demand for primary and community care services

The role of this generation of telecare is fundamentally one of risk management i.e. a reduction in the chances of an individual's independence and well-being being undermined. Figure 3 below explains that risk can reduced, or managed, either by reducing the likelihood of an adverse event occurring and/or by reducing the degree of harm that may occur as a result of such an event.

The **risk** associated with a potential accident/dangerous incident

=

The **likelihood** of the event occurring (never, sometimes, often)

X

The **degree of harm** that occurs as a consequence (none, minor injury, serious injury, death)

Figure 3: The Risk Management Equation Applied to Potential Accidents and Incidents

Table 4 shows how risk management techniques to reduce likelihood and impact can be applied in different circumstances. The latter two examples both refer to incidents that are likely to occur in the home – a fall and an accidental fire. It also shows how safety techniques may be applied to prevent such occurrences and how the outcomes may be improved in various ways - including the use of linked (smart) sensors that can quickly and reliably detect adverse incidents. In the case of falls, this could involve informing carers, family members or the ambulance service immediately so that a 'long lie' is avoided. Such long lies are known to lead to unsatisfactory outcomes (including higher mortality) and can induce a fear of living independently. Similarly, a fire may be detected by a smoke detector or by a high temperature sensing device which, if an alert is transmitted rapidly to the fire service, could greatly decrease the chances of harm to the person and to the level of damage to the building.

Table 4: Applications of Risk Management Techniques in the Community

Risk management	Risk of being killed in a motor vehicle accident	Risk of suffering a fall in the home	Risk of experiencing a serious house fire
Reduce the likelihood of having an accident or adverse incident – example actions	Good training, not driving when tired or under the influence of alcohol, reduce distractions, don't go out at night or in poor weather	Don't drink alcohol, keep active, don't get up quickly from a chair/bed, use ramps and grab-rails, improve lighting, have reminder devices for use of walking aids, slippers and lights, remember medication	e.g. don't smoke, don't use candles, don't overload electricity circuits, don't use a chip pan, don't put paper or cloths on the hob, don't put food for long in the oven or microwave oven, switch off appliances after use
Reduce the level of harm possible as a consequence of accident or incident – example actions	e.g. limit speed, wear seat-belts, have air bags fitted, drive a car with added protection such as roll bars, have vehicle tracker and impact alert system	e.g. wear hip protectors and gloves, use fall mats, use linked fall detectors and bed occupancy alerts	e.g. sprinkler system, fire bucket, fire extinguisher, smoke or heat detectors linked to call centre

This approach can be used to answer many of the 'What if?' questions that can be posed when considering the risks associated with independent living. There is good evidence that following appropriate assessment, a 'prescription' of smart sensors linked into a TECC system can result in meaningful outcomes such as making people feel safer and more connected in their own homes, enabling vulnerable people to return home from hospital sooner and more safely, and reducing the demand for long term care (whether in a care home or in the individual's own home). As well as leading to well-being gains, the avoidance of cost to statutory services can be considerable.

2.4   Mobile Alarms and Other Digital Systems

The SAS, and similar personal emergency response schemes (PERs) elsewhere in the world, were developed to enable vulnerable people who often lived alone to be supported. The fundamental requirement was that the home was served by a working telephone landline. But during the 21st century, the attraction of landlines and their geographically-based codes and numbers has diminished amongst many groups. This is especially the case for younger people - whose lifestyle and employment is such that they spend little time at home, and who may move home frequently. For them, a landline can be restrictive compared with their mobile phones which they can take with them everywhere, and which may be kept on charge at the bedside during the night.

However, older people have also seen the flexibility (subject to there being a satisfactory signal) provided by mobile phones and have started to use them in increasing numbers. One attraction has been added to by the introduction of Pay-As-You-Go contracts so that users are often able to manage their costs without having to pay a line rental fee. Consequently, increasing numbers of older people are abandoning their fixed lines and using only mobile phones. From the point of view of social alarm and telecare services the impact of this trend, includes:

- increased difficulty in engaging older people in digital connection and online strategies;
- the potential need for greater focus on areas of the country that are not well served by any of the mobile operators; and the
- need for options including roaming SIMS in such areas in order for the SAS to operate successfully.

Linked with the above, and in the absence of government subsidies and schemes that will fund the installation and/or ongoing telephone costs for vulnerable people, this removes an incentive for older people with limited financial means to be referred to the SAS. At the same time, the number of 'not spots' (that have no mobile coverage) in Ireland is slowly falling. Hence, most areas have coverage through at least one of the mobile operators, especially in areas in and around big towns and cities as shown in Figure 4. A local survey and a roaming SIM approach can overcome most of these issues, and needs to be considered in cases where there are concerns over mobile coverage.

This 'patchy' albeit improving situation has been recognised by the social alarm equipment designers and manufacturers. Their solutions have ranged from a dedicated mobile telecare hub (such as provided by Doro) through to GPRS modules that have been 'bolted on' to existing social alarms. In each case, the 'mobile enabled' social alarms have the same capability as the respective fixed line version. Unfortunately, as the markets for the mobile versions are (currently) small compared with those for the fixed line versions, the prices can be considerably higher. For basic social alarm units this can, in some cases, effectively double the cost.
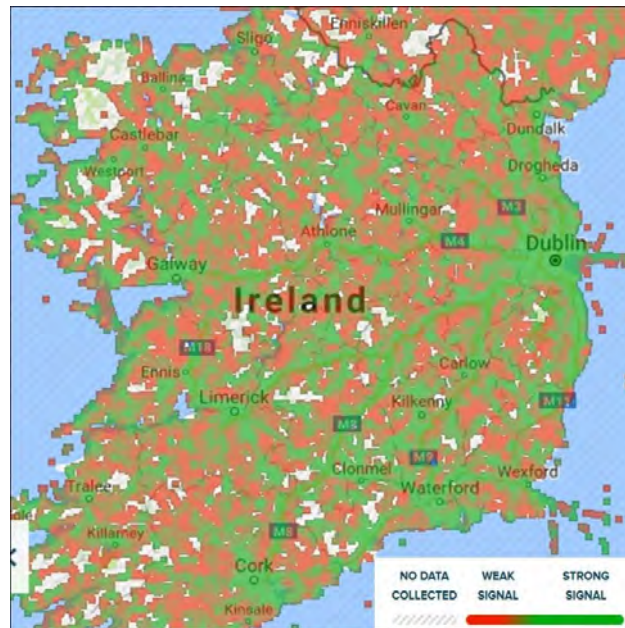
Figure 4: Mobile Phone Coverage across the Ireland

In practice, mobile-based social alarm functionality can be achieved without an investment in dedicated telephone technology. Many manufacturers, in fact, now produce mobile phones aimed at older people. Most have a large red SOS button which is effectively a fast-dial arrangement that could be programmed to a 24 hour monitoring centre or to the mobile number of a friend or family member. A range of such devices is shown in Figure 5. The first four of these (left to right) are available for less than €40 each and can be used with an individual's Pay-As-You-Go SIM card. The fifth device (the OwnFone) is a personalised credit card-sized mobile telephone that can be worn around the neck or carried in the pocket or in a hand-bag. It is custom-made and pre-programmed with 2 to 22 named contacts that could include a monitoring centre. The OwnFone is sold for about €60 in the UK and in Australia (but there is a 'kick-starter' campaign which aims to extend its use to Ireland and other countries in Europe and North America). However, it does not allow the user to operate a Pay-As-You-Go contract. As things are, a separate user contract must be in place.

Model	EasySMX vkworld	Lifeline 925	Denver GSP 110	Binatone AN001	Ownfone
Image					
Features	Large buttons Red SOS button Hands-free mode Radio Camera Flashlight	Large buttons SOS touchdial 10 hours talktime 10 day standby battery	Large buttons SOS button Bluetooth Calculator Calendar Speed dials Alarms Flashlight	Talking large buttons Hands-free speech SOS button Torch Phonebook	Credit card size Simple operation Named personal contacts Choice of colour

Figure 5: Popular Low Cost Mobile Telephones that May be Suitable for Seniors

It should also be noted that GPS tracker devices are now routinely available which can provide information on the user's location. This involves the use of mobile phone messaging systems to receive requests and to return coordinate information (from which location can be derived using a bespoke system of standard Google maps). Such devices are available as mobile telephones or as relatively small devices that are suitable for carrying in a pocket or in a handbag, as well as in more conventional modes such as a brooch or around the neck on a lanyard. Others are embedded in a wrist-watch while others are integrated into a belt or in shoes. Figure 6 shows a range of such devices which are generally used to help locate people who have an intellectual or cognitive disability (including dementia). They are also increasingly supplied with automatic fall (or impact) detection, and with an emergency button similar to that used in alarm pendants. Most of these can, furthermore, provide automatic alerts if the user goes outside a geographically pre-defined safe zone. Alerts are then generated and relayed to a monitoring centre or to family members using SMS or email.

Figure 6: A Range of Mobile Devices with Different Form Factors and Wearing Options but including GPS Location Capability and Alarm Functionality

It is difficult to predict whether the future trend will be for an increase in demand for a mobile social alarm within the SAS. This offers, of course, the potential to give people support when they are away from their homes and might, at the same time, help to deliver health gains as older people exercise more through walking and visiting and participate in more social activities. But conversely there could be a return to using fixed telephone lines in order to access faster broadband services which are becoming an essential part of modern living. The latter may provide a route into more highly linked systems (through e.g. the Internet of Things, a concept which is much discussed but currently not fully developed). This points to the potential for future systems to include the option of more devices that have their own internet protocol (IP) address, enabling a greater level of information to be collected and analysed using 'Big Data' concepts. Some manufacturers offer IP-enabled social alarms. However, they are more expensive than conventional (analogue) units, and arguably offer little (at the moment) additional functionality that would be of benefit to older people supported by the SAS.

2.5 Monitoring Centres and Platforms

The SAS, in common with others who are concerned with telecare or social alarm service provision across the world, recognise that is not simply about the use of technology. The concern is about a complete system, enabled by technology, that can give vulnerable people and their families increased confidence and peace of mind. Indeed, mention has been made above to the need for a more 'whole of Government' approach.

Figure 1 shows that the monitoring centre lies at the heart of social alarm systems, playing a key role in linking vulnerable people, often at a time of crisis, to appropriate responders whether family members,

volunteers, or emergency services. Fundamental to the safe operation of such systems is a need to identify the origins of incoming calls, even when the caller is unable to communicate. This line identification technique, which is simple in all-digital communication systems, is less straightforward in the older analogue systems on which most social alarms are based. EN50134 has been noted as governing the performance of such systems and, when further devices including smart sensors are employed, it ensures that device identification can take place. Linked to the identification of the devices would normally be a response protocol (e.g. for any health or security problem), incorporating escalation procedures that can help ensure optimum outcomes even when circumstances are not ideal.

In this context it must be noted that the protocols that are used to interpret the signals carried by tone or frequency modulation down the telephone lines have, in the past, been bespoke to particular companies. This presented an interoperability issue that has restricted market competition. It also enabled the suppliers of monitoring centres to treat equipment provided by its own manufacturing or distribution partners in a special way, perhaps with particular enhancements for remote programming or reprogramming.

However, in the digital world, it is considered that all monitoring centre platforms should be equal. This is achievable subject to each equipment provider adopting a bespoke software routine for handling their incoming calls that is available *freely* to all monitoring centres. This would mean interoperability (and ready management of mobile devices (including those that add GSM modules to their analogue dispersed alarm units) within services. When this is made a condition of supply, this results in an opening up of the market - allowing more 'generic' monitoring centres to offer functionality that is similar to that offered by those dedicated to telecare. It would mean that monitoring centres that offer security services could, from a technical perspective, offer the same services as those that focus on healthcare. Thus, provided that the platform provider has addressed the reception and processing needs of each and every relevant digital device, interoperability issues disappear and a level playing field is created.

But, as noted earlier, for the most basic of alarm services, interoperability issues have been largely addressed. This means that the quality of the monitoring and response service is, in large part, determined by the following:

- Empathy of call handlers with the customers;
- Training received by and expertise of call handlers to deal with the needs of vulnerable people;
- Response protocols including escalation procedures;
- Reporting arrangement and processes for record keeping;
- Value added functions such as welfare check calls and birthday greetings;
- Interactions governing emergency situations; and the
- Regular testing of equipment.

There is no definitive good practice guide for monitoring of social alarms, but the issue of standards and codes of practice is discussed in Section 1.7.

2.6   Relative Costs of Social Alarms and Services

The processes involved in the SAS are shown in Figure 7. Each process has cost implications and is performed by a different group of people. The current roles of different players and the funding provided through Pobal are summarised in Table 5. It is apparent that the community groups can be responsible for more than half of these processes
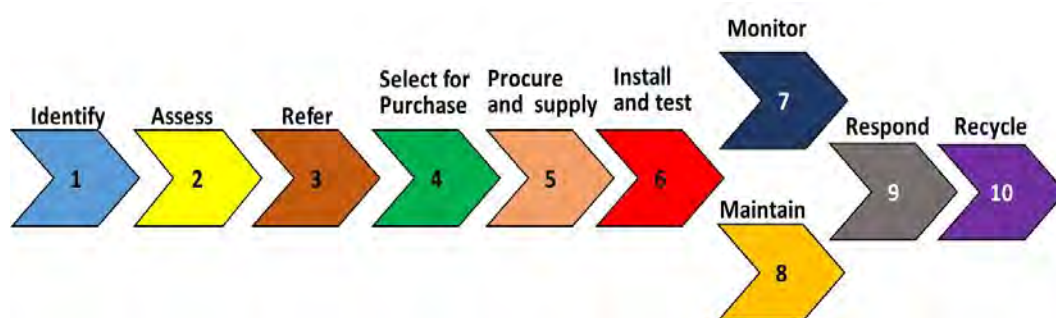
Figure 7: Generic Processes Required for Seniors Alarm Scheme

As things stand, it may be evident that the SAS offers good value for money but, as technology develops (and as the number of older people increases and their needs become increasingly complex) it becomes essential for opportunities to be considered for improving processes and service efficiencies.

In Table 5, we attempt to separate funding opportunities that are already included in the present SAS in order to identify gaps, and to suggest some alternative funding sources that might be included in any future scheme.

Table 5: Funding Arrangements Concerning the SAS

Process	Description	Type of Organisation	Pobal Funding	Other Possible Funding Sources
Identify Recipients	Receive suggestions from community especially from retired Garda and nurses	Community groups	Yes	Charities Sponsorship
Assess Eligibility	Collect profiling information including age, housing status, communications	Community groups	Yes	HSE
Refer	Use Pobal portal to confirm bid and obtain reference number	Community groups	Yes	None
Select for Purchase	Determine most appropriate social alarm for individual	Community groups	Yes	Equipment supplier or monitoring centre
Procure and Supply	Place order and receive/check equipment;	Installers; equipment suppliers	Yes	Sponsorship from monitoring centre. Profit from social alarm sale.
Arrange Monitoring	Confirm a monitoring contract with 24 hour centre	Unclear	Unclear	Unclear
Install and Test	Connect social alarm to mains and telephone socket; place test call to monitoring centre; train scheme user	Installers; organisation	Yes	Sponsorship from equipment suppliers
Monitor	Quickly receive and identify all emergency calls from users	Monitoring centre	No	Individuals pay weekly, monthly or annual fee
Maintain	Visit property to check on equipment or repair faults; call service users to encourage routine checks	Community groups; Installers	No	Sponsorship from monitoring centre or equipment provider
Respond	In the event of an incident, coordinate emergency or community personnel	Monitoring centre; community groups	No	Individuals pay monthly or annually
Recycle	Cleanse, check operation and offer redundant equipment to new users.	Community groups	No	Nominal sum per unit reissued (Pobal)

The identification of the process elements and related information below is not intended to imply any criticism of current provider organisations. Our intent is to set out and facilitate analysis of the total value chain, so that opportunities for improvements and/or efficiencies can be highlighted. In particular, the 'Pobal Funding' column refers to how this may be assigned according to process to which it relates. It may be evident that several of these processes are currently unfunded, or potentially receive a small portion of the current funding. This highlights how other funding streams may be needed to provide appropriate payment (or at least re-imbursement of costs) to the organisations that perform these processes, including the a new process of device selection which can be necessary when the number of approved interoperable devices is increased.

The above table includes an element, 'Arrange Monitoring', that lies outside the process diagram in Figure 7. This is because it should be entirely a matter of choice for the end-user, and not restricted in any way - providing that individuals have access to relevant information and pricing as they, rather than Pobal, will be required to meet the ongoing charges for potentially many years. Thus, the end users may be influenced by many organisations, including the monitoring centres themselves, who might want to offer special terms (such as a year's free monitoring). But there might also be a funded role for the community organisations to provide independent advocacy. It is also assumed that the community groups will play an ongoing role in linking with the installers for subsequent repairs and maintenance.

Finally, the issue of response involves a coordination role that can be organised by a 24/7 monitoring centre or, at least during the working day, through an extended community group operating perhaps as a social enterprise on a wider scale. The latter would represent a new model of provision that is enabled by advances in cloud computing and through dispersed monitoring platforms. But it could offer a sound mechanism for enabling physical response to circumstances that arise but would not require the intervention of emergency service.

2.7 Future Technology Opportunities and Developments

As populations age and more older people live in relative social isolation, there has been a worldwide surge in interest in using technology firstly to support care in the community (i.e. closer to home) and, secondly, to offer practical help to people to manage their own health and well-being. As noted in Section 1, the equipment that can be harnessed for these purposes is generally known as assistive technologies. Four different groups of assistive technology are described in Table 6 with examples of both low-tech and high–tech applications - whether electromechanical or electronic in nature.

Table 6: Four Pillars of Assistive Technology with Examples

AT Group	Description	Low-tech examples	Higher tech examples
Home Adaptations	Modifications to property to make daily activities simpler and/or safer	Grab rails; ramps; improved lighting	Stair lifts; level access shower rooms
Portable Aids to Daily Living	Devices that can be carried with the person for use anywhere	Walking stick; spectacles	Pavement scooter; medication box
Electronic AT	Smart devices to overcome sensory or functional deficits	Hearing aid; TV remote control	Motorised wheelchair; environmental controller
Connected Technologies	Devices that can help people to stay in touch	Telephone	Skype; wearable sensors, remote monitoring; apps

There is significant evidence to demonstrate the effectiveness of home adaptations, portable aids, and smart control devices in offering benefits to older people who are living with mobility and other issues related to

chronic disease or disability. But new technological developments in these fields are relatively slow when compared with the rate of innovation concerning the introduction of new devices and systems around telecare and telehealth. The latter are enabled by major telecommunications advances which have seen a rapid increase in the speed of Internet access, both through fixed lines and through mobile telephony. Meanwhile, sensor technologies have matured and become smaller, less intrusive and less power hungry. Those sensor technologies also have on-board processing power that enables them to make decisions *within* the device.

In combination, these factors have enabled the use of sensors and systems for the remote support of vulnerable people in their own homes to multiply. They can be described through the 7 wave model shown in Figure 8, in which the first wave is the analogue telephone arrangement (for social alarms) that lies at the heart of the SAS.
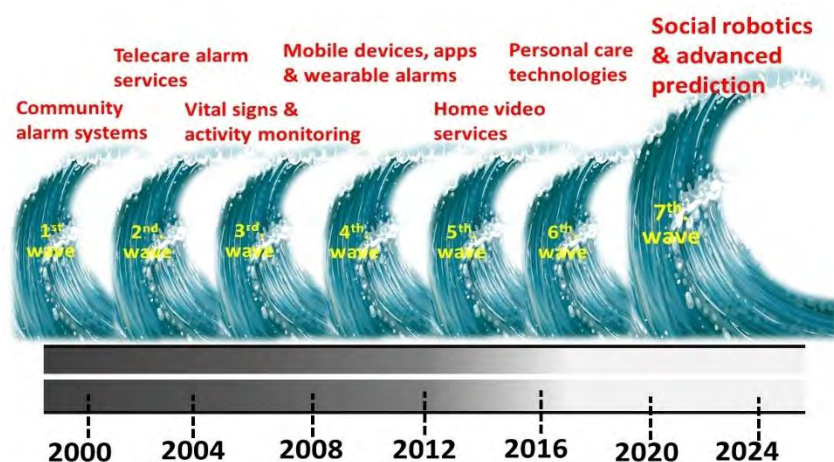
Figure 8: The Seven Waves of Technology Enabled Community Care (TECC)

The second wave of this technology is generally known as telecare, and has matured over the past decade, usually employing the same social alarms that are used in SAS but with a move from active devices (alarm triggers that need to be pressed) towards greater use of passive devices (smart sensors that can automatically signal an alert). There are various applications that can be enabled using a mix of such sensors that depend on individual circumstances and, in particular, the identified risks. By personalising the sensor selection, and by providing appropriate response protocols, the technology is suitable for supporting one or more of the applications shown in Figure 2.

In principle, all the identified risks could be managed in this way but, in practice, this would require so many sensors that the overall cost of provision and maintenance would be prohibitively high. There are also issues about user acceptance to be considered. Nonetheless, smart sensor combinations could be used to improve the overall service, and opportunities for this are discussed in the next section.

It should be noted that the 7th wave shown in Figure 8 is larger than all the others. This is in line with folklore amongst surfers that suggests that the seventh wave is the one that is worth waiting for. We suggest that it will have to be large to carry all the 'silver surfers' who will be keen to participate in TECC within a decade!

3. Suggestions for Improving the SAS

3.1 Supporting the communities

The involvement of community groups to identify and provide limited support for vulnerable older people within their communities is a feature of the SAS which is fundamental to its success. It not only provides potential scheme users with the reassurance that there are local resources focused on their support needs; but it is also a low-cost method of helping to bring together communities that, through the extended mobility of families, might otherwise fragment. But it appears evident that the community groups in some instances may need to be strengthened in order that they continue to be a key element within the SAS.

It was reported that some of these groups, in particular smaller ones that may be or used to be run by retired individuals who may not be proficient users of computer systems, have struggled with the use of an online portal for making referrals and the automated processes employed for approvals. Some, it is understood, have found the more formal registration procedures, including taxation arrangements, a complexity that they hadn't anticipated, especially if the extent of their experience was perhaps only in identifying half a dozen suitable applicants in previous years. These issues add to what are recognised as some concerns about privacy (especially with regard to financial matters) that had previously inhibited some needy older people from allowing their community groups to propose them for support through the SAS.

With the above matters in mind it is suggested that the community groups could usefully be strengthened, both through increased financial incentives and a centralised agency, to provide advice and information to them over the telephone or through an online system. A number of other approaches include:

- Consolidation of local groups into regional entities. These could be on a county or wider regional level. The number of groups per area would be likely therefore to range from 10 to 50. This could be encouraged by requiring each local group to achieve a particular level of membership either individually or through confederation with other groups in the region.
- Building relationships with regional installation and support organisations with experience of social alarms and telecare. Such organisations would support the community groups through training and improved information sharing.
- Building relationships with monitoring centres. Informal relationships already exist, but these need to be made more transparent because the potential value of a contract between an individual and a monitoring centre over a period of 10 years could be as high as €500. Monitoring centres should be seen as offering real choice in their preferred equipment choices.
- Facilitating the wider role of family and community responders – but with community groups and the Gardaí becoming a back-up to such responders.
- Developing expertise whereby referrers or assessors could provide more flexible and personalised profiling of individuals. This could include use of an app (for a tablet device) to enable referrals to be made and relevant information to be entered (more quickly and with fewer errors).
- Automated feedback to community groups on an individual level for use made by them of any social alarm or telecare service - with the use of electronic 'returns' enabling reports to be supplied by monitoring centres that facilitate comparisons with other service users.
- Providing support for recycling and reuse of equipment. This could ensure both compliance with environmental waste regulations and the more efficient use of assets.

3.2 From Social Alarms to Telecare Systems – Sensor Choices

A shift in focus from active social alarms to 'passive' telecare (i.e. with some degree of constant monitoring leading to calls being made or information being sent automatically) allows more flexible risk management to be introduced without a significant change in system infrastructure. As an example, Figure 9 shows how a telecare system can be applied to help someone at risk of falling. It involves a sequence of actions that culminate in an appropriate response being offered to the person who has had an accident.

The success of a telecare service using a wider range of sensors depends on an appropriate assessment of risks and those sensors providing an early warning - with a monitoring centre receiving and interpreting the calls, reassuring the person with conversation, and initiating an agreed response protocol. Protocols need, of course, to be personalised, reflecting individual choice, local circumstances and the availability (or not) of family members and friends. Relating to this, emergency services may be considered appropriate for responding to some 'events' - though many people may choose not to be taken to hospital after a fall, for example, fearing that this would lead to an admission and ultimately compromising their independence.
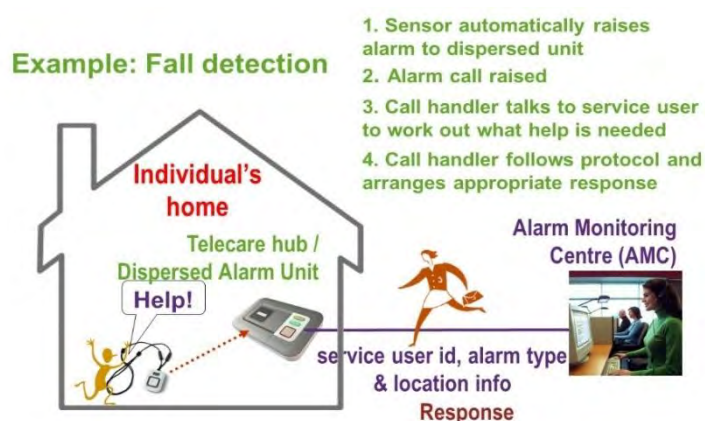
Figure 9: A Telecare System Employed to Provide Rapid and Automatic Detection and Response to a Fall

Four different areas of interest for telecare systems were identified in Figure 2. An extended list of sensors that are appropriate are considered and compared in terms of benefits and issues in Table 7. Unit costs for peripherals of this type are all in the order of €100 which is considerably higher than unconnected devices with similar specifications. This is a result of the currently limited market for such devices in Ireland, though the relatively high price of linked peripherals has been a feature of the telecare market worldwide since they were introduced over a decade ago. With sufficient scale, prices might be expected to halve.

'Peripheral' devices usually have 2 batteries that need to be replaced occasionally. Most will send an alert to indicate low battery charge some weeks before they stop working. However, a lack of interoperability between manufacturers of some social alarms and the sensors of other suppliers means that, as noted earlier, the choice of system (or service) can be limited. In particular, manufacturers who have a focus on security or environmental safety may not have a range of sensors appropriate for monitoring that relates to personal well-being or falls within the home. It follows that the conversion of a basic social alarm system which allows for fewer than 6 external inputs, into a telecare system is not always straightforward. An appropriate assessment of needs and risks may, for instance, find a need for multiple sensors. Issues relating to the assessment are discussed in the next section. The development of an appropriate selection tool (to

match needs or issues identified during the assessment process with the most appropriate technology and other support) may be a prerequisite to moving into the 2nd wave of TECC as described in Figure 8.

Table 7: Examples of Linked Alarm Devices that Are Popular in Telecare Systems

Category	Device type	Examples of use	Benefits	Potential Issues
Home safety	Smoke detector	Early detection of house fire	Ensures a response	Properties may have standalone alarms
	High temp alarm	Early detection of kitchen incident such as hobs left on for extended periods of time	Reliable alarm system with few false alerts	Critical location above cooker for best performance
	Low temp alarm	Hypothermia alert	Warns of poorly heated homes	Risks depend on time of day and movement level
	CO alarm	Detection of faulty non-electric heating appliances	Early warning prevents fatal poisoning	Response involves disconnecting appliance
	Explosive gas detector	Detection of gas leaks and unlit hobs on old stoves	Avoid explosions; allows people with poor memory to continue to cook	Relatively rare situation with modern gas appliances
	Flood detector	Detection of overflowing baths, sinks and toilets	Avoids damage to floors, and electrical circuitry	Devices may be moved or removed
Home security	Passive IR Movement detector	Detection of intruders	Activity in property when resident is away or asleep in bed	System needs to be armed and disarmed to avoid false alerts
	Door opening sensor	Detection of intruders; measurement of social isolation	Warns of security risks and loss of heat	Property may have several exit door
	Bogus caller button	Means of silently calling for help at the door	Gives people confidence that they overcome doorstep criminals	People can forget about it and fail to activate the alarm
	Pressure mat	Detection of intruders	Simple means of detecting presence of someone	High incidence of false alarms
Falls at home	Worn fall detector	Rapid detection of some types of fall events	Gives people confidence to mobilise	Device must be worn; many false alarms
	Bed/chair occupancy alarm	Detection of failure to return after getting up at night	Most reliable means of detecting a fall during the night	Bed times and getting up times need to be programmed
	Lack of activity alarm	No movement in a room such as a kitchen or bathroom during defined times	One of the simplest ways of detecting a problem	Alarm may be raised several hours after an incident occurred
	Bathroom alert	Combination of sensors to identify a problem in the bathroom	Offers an alarm without the user having to wear a device or press a button	Location of movement detectors is critical to avoid false alarms
Personal wellbeing	Pull cord	Simple fixed means of raising alert	Provides a visible means of reassurance	Often situated in the wrong locations
	Medication dispenser	A reminder device for collecting pills at the correct time	Improves adherence for people needing many different medications	Carousel must be loaded by a relative or friend every week
	Enuresis alarm	To provide a carer with a warning of a toileting issue	Avoids the need for carer to feel for dampness	Carer must be able to provide rapid response
	Nocturnal seizure alarm	To detect convulsive seizures while in bed	Manages the risk to life of people with epilepsy	Sensitivity needs to be adjusted carefully to avoid false alarms
	Property exit sensor	To raise an alert when someone with a cognitive issue leaves home at night	Avoids need to lock door of dementia sufferer who may wander at night	Some people leave the house for a few minutes before returning safely.

3.3   Making Assessment (Profiling) more Appropriate

The process of identifying and selecting people for the SAS is important in ensuring that the scheme supports older people who are most in need of the technology that can link them to a monitoring centre. The role of the community groups is vital both because they have the local knowledge, and are positioned to receive intelligence from nurses, the church and other relevant sources. And because community groups are well-located they are often best able to visit the people concerned and ensure that systems and services are operating as intended.

The current criteria for SAS eligibility are quite loose. This approach avoids the need to collect complex, and potentially intrusive information on lifestyle and financial means. It may, furthermore, be reassuring for some people who are particularly concerned about their privacy. To introduce criteria that require a higher level of openness about personal circumstances could, as noted earlier, undermine some people's willingness, regardless of their level of need, to be referred.

The challenge is, therefore, to collect sufficient information to allow a reasonable profile of an individual to be developed without involving a process that is onerous and time-consuming (and, potentially alienating to the potential beneficiary). As the level of need increases, however, so the significance of the profiling process increases, as does the potential for harnessing the benefits of telecare technologies. Ideally the process should be at least sufficient to differentiate between different groups of vulnerable people according to the type and extent of their needs. Such groups (though, of course, not mutually exclusive) relate to needs as follows

- Social isolation – living alone, unable to get out, few visitors;
- Security – anxious about threats, bogus callers and burglars;
- Safety – at risk of accidents due to declining mobility, dexterity, memory, sight or hearing;
- Well-being – declining health and/or the management of illness or long-term conditions; and
- Frailty – risk of falls, poor nutrition and inability to provide self-care

While some people will be vulnerable under each of the 5 categories above, one category will dominate for the majority. This needs to be identified so that the appropriate support intervention can be offered. The current SAS clearly provides for people in all of these groups and carries the potential to continue to do so in a cost-effective manner. However, regardless of the future shape of the scheme, it will be necessary to gather sufficient (personal) data on individuals to determine its effectiveness when set against other options.

There is, therefore, a need for a universal profiling tool that is quick to complete, involves the potential beneficiary and which enables collection and prioritisation using the information gathered, including that which relates to unmet needs. Such a tool needs to be person-centred and focused more on what people can do (reflecting an 'asset-based' approach) and on what older people want to do with their lives, rather than on disabilities and things that they can't do or have difficulty in doing. It would need to be simple and also to be flexible enough for self-assessment as well as assessment by others.

The main advantage of introducing such a tool (that, perhaps, takes self-assessment as its starting point) is that it would take away any stigma associated with 'selection'. The responsibility of the community groups would then be to promote its use amongst the population that it serves. If data was collected electronically (perhaps on a tablet device) it could be recorded in a format that is ready for onward transmission to Pobal which would enable eligibility for the SAS (and any new schemes) to be determined automatically together with any recommendations made by the relevant community groups.

The basic information that might be required through a self-assessment tool is shown in Table 8, based on 5 key sections - personal information, the home, preferences, ambitions and issues. In addition, individuals could be encouraged to identify with some ambitions including whether they want to continue to live at home independently. Such a 'My Life' representation should be sufficiently short that it might be completed in 10 minutes. This profile would usefully be available to the individual in a format that allows them to carry it with them and, if necessary, present it to hospital staff in the event of an admission. Alternatively, people could be given a wrist-band to wear which has either an identification number (and a telephone number for a monitoring centre) or a bar-code (or QR code) that could be scanned by a smartphone running an app, or which could contain an Near Field Communication RF identification chip as used in some payment bands.

Table 8: My Life Basic Self-Assessment Tool for Older People

| Personal information	Family and friends	The Home	Likes and Dislikes	Issues
Name	Children and grandchildren	Type of property	Food	Health
Address	Location of family members	Ownership	Drink	Mobility
Marital status	Community support	Lives alone or with others	TV programmes	Hearing loss
Pets	Fellowship or organisations	Location of home (with respect to other houses)	Local or national radio channels	Vision
Telephone line	Emergency contacts	Bathing facilities	Music	Worries
Mobile phone	Number of visitors per week	Cooking facilities	Sports	Memory
Date of birth	Frequency of going out	Laundry facilities	Books	Depression or anxiety
Previous occupation	Who helps with shopping, collecting medication etc.	Heating	Activities	Money concerns

Basic information elements of information that can be collected using a form based on Table 8 might directly indicate suitability for the current SAS and also for alternative telecare schemes.

3.4 End to End Services

The successful operation of the current SAS and related telecare services are dependent on the integration of three types of organisation:

- Community groups;
- Installation and maintenance organisations; and
- Monitoring centres.

The procurement of equipment can, in principle, be excluded from the list because it can be purchased independently - provided that it is properly identified and is appropriate for the purpose intended. Figure 7 and Table 5 clarify the funding and support arrangements and serve to emphasise the significance of the process and how responsibilities are shared. In such cases, it is often the interfaces between processes that lead to weaknesses in communication and may compromise the objective of achieving the optimum service for vulnerable people. Such weaknesses could, therefore, be largely removed if end-to-end services are provided (as shown in Figure 10). It should be noted in this context that community groups, installation and maintenance should all be local or regional; while the monitoring centres could be local, regional, national or international.
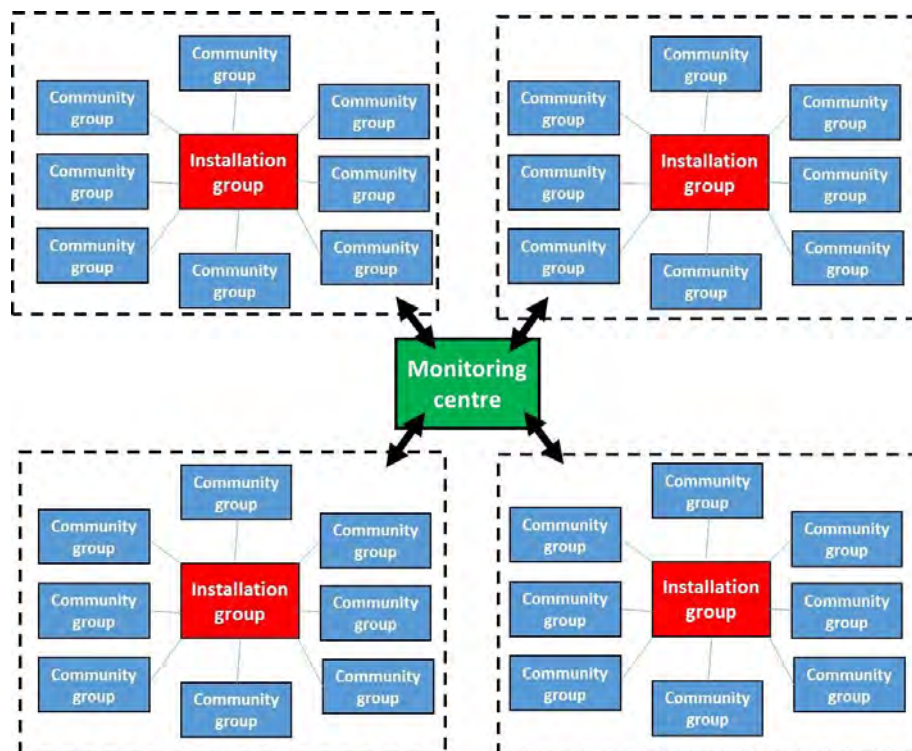
Figure 10: A Generic Model of Service Provision for the SAS

The argument that monitoring centres should be local or regional is powerful in terms of call handlers knowing the geographies of and being able to establish relationships with the population that they serve. However, there is a stronger argument in favour of larger centres being necessary because of requirements associated with quality service standards and their financial viability. The ability of larger centres to spread the load amongst higher numbers of call handlers also improves response times and avoids potential delays in calls being answered. In this context it can be noted that there is the potential for the emergence of more flexible and innovative monitoring centre arrangements that use cloud computing. Such arrangements could allow distributed handling of calls with multiple linked local access centres that might be operated, for example, by the community groups either on their own or in partnership with charities or local not-for-profit organisations.

The number of community groups (and people in each locality) that can be supported by each installation and maintenance group would be dependent on their overall capacity both to install new equipment and to support existing service users. This would depend on the extent to which such groups might have responsibility for responding to new installation requests and/or to repair or replace faulty equipment. In the former case, the priority might be to offer a flexible service where installations occur on days and at times that are suitable for the service users and, in particular, their family members who they might wish to have present.

In order to maintain a more integrated approach, this model requires a defined relationship between the community groups, the installation services and the monitoring centres. In principle, this could be achieved in many ways but the approach which appears to 'fit' with the current situation in Ireland is for installation groups to be owned or managed by the monitoring centres, or vice versa. This also allows for maintenance and support through the annual or monthly charge that also includes monitoring.

The fact, however, that community groups are independent of other organisations means, of course, that they would retain (indeed, develop) an important role in supporting service users to select equipment (which would, it is envisaged, be provided free of charge) *and* a monitoring and support service (which they pay for). It follows that the community groups would need to offer service users clear choices in a way that would ensure that they were not constrained by a relationship with a single monitoring centre or equipment supplier. Naturally, such an approach would not preclude people from directly accessing (and paying for) social alarm or telecare services outside of the SAS. The implications for different organisations for operating within such a framework are discussed below.

3.5 Service Provider Requirements

The functions required of the service provider would, in brief, be to:

- Accept instructions from a registered community group for equipment to be installed;
- Procure and test equipment and its operation;
- Programme telephone devices according to end-user requirements;
- Install equipment and demonstrate its use to end user;
- Provide end-user with documentation pack detailing their responsibilities and their actions in the event of a technical problem;
- Respond to identified technical issues including change of batteries;
- Remove equipment when no longer needed;
- Cleanse and retest recovered equipment; and
- Make recycled equipment available to the community group.

Responsibility for cleansing and retesting could be passed to the community groups, but only if they were provided with appropriate training and equipment, and received appropriate compensation for their efforts.

Immensely helpful is the fact that the reliability of modern social alarms is such that little if any maintenance may be required within a 5 year period other than repairs to damage caused by environmental factors (such as lightning strikes) and by accidental damage (such as hot drinks being spilled on the equipment). Consequently, the primary function of the service provider is the installation and testing of the social alarm, and the explanation of its use to the end users.

Many vulnerable older people may be wary of such technologies and will prefer to have their family members present during the installation. To support this requirement, installers would need to be available in the evenings and at weekends. If the safety and well-being of the end-users is dependent on the SAS, an equipment failure, once reported or detected automatically by the monitoring centre, would require a response within 24 hours.

Whilst the above requirements may appear onerous, they are entirely consistent with 21st century working practices for telecare and replicate the kind of technical support arrangements that are required by the security industry, IT and telecoms providers, and many organisations that support domestic appliances. Such requirements, furthermore, are embedded within some of the standards noted in Section 1.7. Maintenance and supply companies, in any case, often employ staff on an on-call basis. This is consistent with current practice in many telecare services that employ a generic workforce that alternates between different roles including assessing the needs of potential users, installing equipment, responding to problems, and handling calls.

There is, of course, the risk that the performance of service providers would vary but a requirement might usefully be put in place by which they sign up to a minimum service delivery standard, and both measure and publish their ability to achieve it on a regular basis. This could easily be checked by the monitoring centre through a telephone call to new users and periodically with others.

3.6 Monitoring Service Options

Basic alarm monitoring using today's analogue technologies involves line identification and marrying that identity with that of a customer - so that their details, including contacts, home address, and access information are readily available to the call handler in the event of an emergency button being activated. However, as noted earlier, this process has not changed in 30 years despite rapid changes in telecommunications, data handling and in the capability of monitoring centres! But the process is simple, robust, and clearly sufficient to deal with responding to the more common types of issue that arise from time to time in the community, especially where older and vulnerable people are involved. There may, therefore, be little initial demand for the kind of Internet-enabled services that will follow quickly when the analogue Public Switched Telephone Network (PSTN) that supports plain old telephones (POTs) is turned off. This process has begun in some Scandinavian countries and is being considered elsewhere but it is unlikely to occur for a decade in Ireland. Thus, the social alarms described in this report will continue to work for the benefit of the SAS or any successor scheme.

However, there are a number of different options that need to be considered for fielding emergency calls generated by the alarm equipment. These include:

1. Use of a dedicated social alarm centre which prioritises SAS calls over all others;
2. Use of a generic alarm monitoring centre which includes calls from a range of different sources including security alarms;
3. Use of a multi-function telephone monitoring centre which works on behalf of several different (corporate) organisations as well as individuals;
4. Use of a community group's office telephone (office hours only);
5. An arrangement for calls to be forwarded to the telephones (usually mobiles) of on-call responders; and
6. An arrangement for calls to be forwarded to landlines or mobile phones of individuals nominated by service users.

It may be apparent that the options close to the top of the list represent more robust (and hence more expensive) options. These options are provided by organisations that usually have significant experience in providing dependable services for thousands of users. Those options towards the bottom of the list offer lower-cost (and potentially no-cost) options but in a context where there are clear gaps in provision. This is particularly the case, for obvious reasons (including absence), where the option is dependent on an individual being available to answer the call. The issue of choice is, however, important. But when a system or service is funded or part-funded through a government scheme it follows that there should, in normal circumstances (exceptions might relate to people with a limited life expectancy), be conditions attached. These might include a minimum level for a contracted of monitoring service (suggested as 2 years) where equipment is funded via the SAS.

In giving attention to the options close to the top of the above list it is necessary to consider some additional benefits of requiring the use of a 24/7 monitoring centre (with the capacity for fielding more than one call

simultaneously). These include the potential added value services that are not currently standard in Ireland. These might include:

- Birthday greeting calls;
- Daily welfare check call (e.g. for a period following hospital admission or discharge);
- Annual activity reports; and
- Automated changes in trends alert (to notify user, next of kin and, potentially, the referring community group)

Other proactive calling options might also be relevant but would reasonably be expected to be separately funded.

3.7   Equipment Supply Options

In a market where there might be expected to be 10 or more suppliers of equipment that is fundamentally similar, i.e. that would meet a specification based on most of the items shown in Tables 1 and 2 (and satisfying relevant European standards), procurement can become a time-consuming process. Yet, the need for cost-effective supply remains apparent, as does the importance of having choices at various stages of the supply chain. In the case of equipment, the choice may be down to one or more of:

- Pobal - as the owner or purchasing authority;
- The end-user – as the recipient and user of the equipment;
- The community group – as potentially the organisation that supports and represents the end-users
- The installation organisation – as the ones who must physically collect the equipment, test and program it, and then provide installation and maintenance; and
- The monitoring centre – to which all equipment should be connected via a communication network.

Of all these stakeholders, the monitoring centre should exert *least* influence on the choice of equipment as it should be capable of accepting and interpreting data (and open two-way speech channels to) all equipment that meets a basic specification. Indeed, there is an argument for ensuring that national suppliers and distributors of alarm equipment in Ireland should operate independently and should not, therefore, manage, own or control either monitoring centres or installation organisations. This would avoid the supply being restricted in any way and any potential 'lock-in'. In practice, however, this may be difficult to achieve in view of the nature of the current market place where the supply chain has prevented equal access to products because of the relationship between equipment suppliers and particular monitoring centres. For example, Emergency Response is part of the Tunstall Group which manufactures and supplies a range of alarm equipment. Other monitoring services use the equipment of other manufacturers. Such links may be appropriate for the more general consumer market, but are arguably unnecessary and inappropriate for public contracts where the challenge is to achieve best value for money.

Similar arguments are also relevant for the role of the installation organisations, especially if a structure such as the one shown in Figure 10 is adopted. Their staff would need to be appropriately trained by the manufacturers or distributors, and their willingness or experience in this could be important factors in determining their ability to fulfil a SAS initiative in a particular geographical area.

The choice of equipment should therefore rest with the community groups and, most notably, with the end-users. They should have as much choice as possible and should be shown examples of equipment wherever appropriate, especially if some options require a top-up payment by the user which is not being met through

the SAS. This approach might require all suppliers to submit samples of their equipment to Pobal (or to a test-house working on their behalf) for accreditation to the specification required for the SAS, though this may be avoided through appropriate alternative demonstrations of compliance. They would certainly need to promptly submit prices for supply of the defined equipment directly to installation organisations complete with a 5 year warranty (that would provide immediate replacement and factory repair for units that fail).

This type of arrangement could, it is considered, both drive down prices and improve after-sales service. Pobal may wish, in this context, to select a set number of supplier organisations or may wish to use a more aggressive approach (subject to them satisfying a robust specification) where they agree to pay only a set price (for a basic social alarm and pendant trigger) such as €150. It is likely that some suppliers could meet this requirement but others may require a top-up that would be paid by the end-user. Thus, consumer choice would be integral to an amended scheme but within which there would be the ability for basic social alarms to be supplied (as currently is the case) free-of-charge by Pobal.

3.8   Higher Level Services

The seven waves of Technology Enabled Community Care (TECC) applications shown in Figure 8 describe applications that will take a number of years to mature, and perhaps even longer to be deployed at scale by service providers in Ireland. Figure 11 describes a range of risks to independence that have been collected under various headings. They have been colour-coded to indicate which TECC wave is required in order for users to benefit in term of risk management and improved well-being. It may be observed that the 1st wave (as used in the SAS) reduces anxiety, the fear of crime, and addresses the risk of fire. A basic mobile phone arrangement (see Figure 5) would achieve similar results.

Figure 11: Risks to Independence that can be Managed Using 6 Waves of TECC applications

However, the 2nd wave of TECC applications, most of which use the same alarm infrastructure as the SAS but with the use of peripheral linked sensors, helps manage at least another 22 of the 52 identified risks! Some of the mobile devices shown in Figure 6 could also address some of these risks. It follows that the benefits achieved by a relatively straightforward progression from the 1st to the 2nd wave of TECC are considerable and to be strongly encouraged.

To enable such a progression, the following issues would need to be addressed:

1. Social Alarms: The specification required may need to be higher than that employed for 1st wave systems. In particular, more local intelligence and user interfaces may be required in order to allow for messaging and response options, and for dealing with an extended inventory of sensors.

2. Installation and Testing: The location of sensors is critical to some applications, so installers need enhanced training to ensure optimum system performance.

3. Monitoring Centres: Software is required to correctly decode an extended range of alarm meanings, some including location information. Response and escalation protocols need to be developed and in place on an individual basis to ensure that the approach to an emergency is appropriate. All centres should be open about their capabilities in this regard and should, therefore, publish prominently on their websites what capability that they have with respect to interpreting all common alarm codes used in telecare and social alarm systems within Europe. If they are unable to correctly identify both the origin and the location of, say, a bed sensor alarm, they should make it clear that they do not offer full compliance with industry standards in this regard.

4. Repairs and Routine Maintenance: Self-check and routine testing regimes are required for all devices, and regular checks and battery replacement programmes introduced.

Not all monitoring centres capable of managing social alarm systems (including the SAS) will have the necessary operational requirements to become centres for 2nd wave TECC applications. Pobal may need some technical expertise and support in developing specifications that would identify the capabilities (and shortcomings) of such centres.

3.9 Links to Other Agendas

There is evidence that the SAS can strengthen communities whilst making vulnerable people feel more secure, safer, and confident that they can continue to live independently. The technology employed in the SAS, furthermore, has been noted as supporting other strategic agendas for Ireland. That support is reflected in the following:

- Primary Care: Nurses and GPs need to visit patients (in their homes) less frequently to check their well-being.
- Hospitals and Care Homes: There is less likelihood of people being admitted and greater ability for timely discharges;
- Disability: People with intellectual, physical and sensory disabilities can be better supported within their communities;
- Home Safety: Risks associated with environmental issues, as well as some social and medical ones, can be more effectively managed;
- Social Landlords: Properties can be protected from accidental damage due to flood, fire and gas explosion;
- Dementia: The enhanced level of risk associated with poor short term memory can be better managed (including for those who may 'wander'); and
- Family: Family and other carers have a greater ability to carry on working and engage in other activities knowing that their loved ones are better protected.

These benefits are summarised in the telecare benefits clock (in Figure 12). These, in all cases, have significant (beneficial) financial implications for users and to the providers (or funders) of statutory services.

Notable is the fact that for statutory services the main beneficiary is the Health Service Executive as many of the clock points refer to elements which are fundamental to their budgets. However, in practice, many of the benefits are linked. This implies that the use of telecare to benefit one group (or agency) is likely to have a knock-on affect on others. Hence an investment in an enhanced service using 2nd wave TECC to support one of the agendas will have multiple benefits, and carries the promise of an excellent return on investment. The challenge, in pursuing such a way forward, is to ensure effective targeting so that the needs of users are matched with appropriate levels of service.
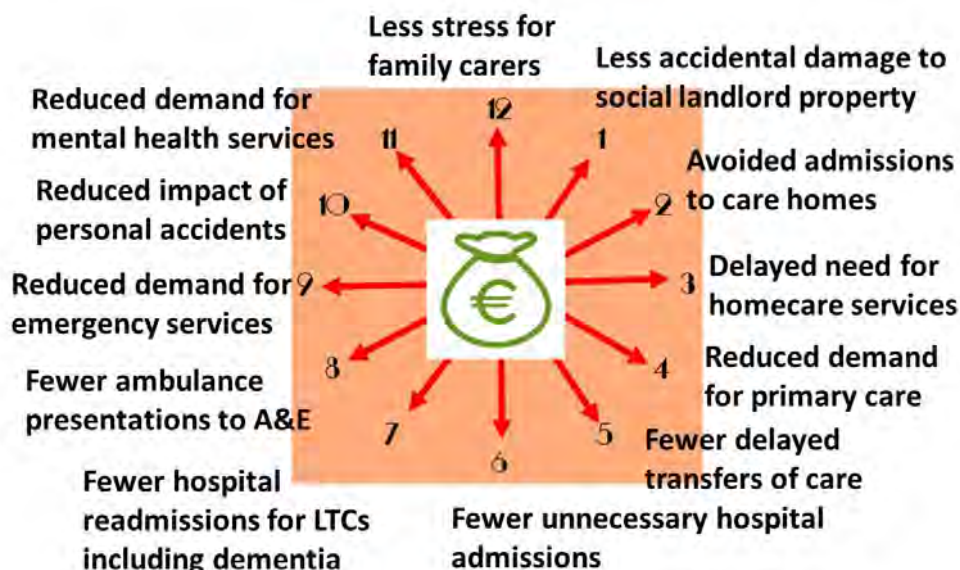
Figure 12: The Telecare Benefits Realisation Clock

3.10   Quality Assurance

Telecare and social alarm *equipment* is covered by a range of technical standards that ensure that they are fit for purpose. Unfortunately, it is not always appreciated that the quality of service provision may depend more on people than on technology, and on outcome measures and the opinions of service users rather than on a set of technical measures (that may be put forward as 'key performance indicators'). Table 9 shows a range of TECC service standards (embraced under the label of telehealth) that have been introduced over the past 20 years. The majority are specific to alarm services whilst others are more generic, dealing with 'home telehealth' and issues relating to use of medical data.

With (aside from a code developed in Canada) the notable exception, noted earlier, of the International Code of Practice for Telehealth Services (2016)[2], these standards fail to provide the light touch needed to define specific TECC applications such as those with which the SAS is concerned. However, without having in place some bench-mark for service quality, it presents the end users of a service (such as SAS) with an extremely difficult task in choosing the monitoring service which they can rely on. The lack of a standard, furthermore, risks the introduction of lower price, lower quality services. The same issues apply to other parts of a more general telecare service, including assessment, installation, maintenance and response. In this context there remains a need for specific quality standard that fits in with the Irish agenda and which, when attained, can bear testimony to service quality.

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[2] The 2017 version is available at www.telehealth.global

Table 9: TECC or Telehealth Standards from Across the World

1998	ASAP Code of Practice	Social Alarms	UK
1999	AS 4607	Personal Response Systems	Australia
2003/16	EN 50134	Social Alarm Systems	EU
2007/16	UNE 158401	Servicio Asistencia	Spain
2009	Code of Practice	PER *Services*	Australia
2011	VDE AR E 2757-2	Staying at Home	Germany
2011	Code of Practice	Telecare Services	New Zealand
2012	Guidelines	eHealth: Telehealth	Australia
2012	Quality Mark	Personal Alarm Services	Netherlands
2013/17	TSA Code of Practice	Telecare and Telehealth	UK
2013	NF X50-520	Téléassistance	France
2014	Standard	Telehealth	Canada
2014	Guidelines	Telehealth	US
2014	ISO TS 13131	Telehealth Services	US
2014/16	TQG Code of Practice	Telehealth Services	EU and International

The above points to the need for an operational protocol or good practice guide for the SAS, and equivalent ones, where appropriate, for wider telecare services (and for other applications from TECC waves 3, 4, 5 or 6). In each case, such protocols or guides could sit under the umbrella of and be fully compatible with the International Code of Practice for Telehealth Services. This Code, it is argued, provides the required framework for SAS and gives attention to a broader range of requirements as shown in Figure 13. The Code includes 56 clauses of which 48 are considered relevant to all types of service. It ensures an agile approach to service provision which will remain appropriate to new service propositions as they develop utilising the latest technologies.

Figure 13: The Nine Domains of the International Telehealth Service Code of Practice

4 Preliminary Recommendations and Suggestions

4.1 Recommendations

An increased investment in telecare and similar technologies could yield significant benefits to different stakeholders, including various government departments. The scope of the opportunities means, furthermore, that a more 'whole of Government' approach is justified within which the primary role of the DHPCLG might appropriately be questioned.

The context is one where it is clear that the SAS has served Ireland well and, through its use of basic equipment, offers very good value for money - albeit there is little evidence to demonstrate exactly how great the return on investment might be. There are, furthermore, robust arguments for developing the scheme to support other groups of vulnerable people (echoing the view of Cullen et al, 2015) using extended technology propositions. However, as the cost of such options would be considerably more than the basic scheme, the result could be a reduced number of users benefiting from the service.

At this juncture, therefore, we recommend using the current budget for SAS to fund only the basic system **[R1]**. This would enable the numbers benefiting from the scheme to be increased through greater efficiencies. However, we strongly believe that the SAS could provide the framework for extended services that should be funded using new budgets from other government departments **[R2]**. Both should take place in the context of integrated strategic frameworks (reflecting a more 'whole of Government' approach) that recognises the benefits to health and well-being arising through both community support and that provided by health and social care agencies **[R3]**.

Recommendation 1:
The current budget for SAS should continue to be utilised to fund only the basic system (social alarm and pendant trigger).

This budget is noted as likely to remain the same in the shorter term.

Recommendation 2:
Further funding should be sourced from other government bodies (at national and/or local levels) to facilitate the move from social alarms to telecare.

Fulfilment of this recommendation is recognised as needing to be presaged by discussions between Government departments.

Recommendation 3:
An integrated framework reflecting a more 'whole of Government' approach (that recognises the benefits to health and well-being arising through community support, health and social care agencies) should be put in place to guide further development of the SAS.

Below are listed a number of specific suggestions for improving the SAS and making it more efficient and cost-effective. These link with suggestions aimed at extending the propositions that relate to both technologies and services. Both are concerned with the needs of end-users and embrace, therefore, consideration of approaches that may use mobile devices instead of or as well as devices linked to landlines and involve where appropriate (peripheral) sensors to manage risks. In each case, it is proposed that the any restrictions placed on 'lots' by allowing equipment to be chosen from only one or two providers should be

removed **[R4]**. This may be, it is suggested, achieved by breaking the links between equipment manufacturer or suppliers and others in the supply chain as described in the previous sections. The geographic lot arrangement can, however, be retained (and potentially strengthened) by only allowing installations to be provided through a regionally located organisation, and allowing these organisations to operate in a maximum of three regions. Opportunities for different partnership arrangements should be restricted to ensure that regulations are not circumvented through the establishment of a number of organisations under an umbrella of a national organisation.

Recommendation 4:
The service framework by which geographical 'lots' might be maintained should only relate to community organisations and arrangements for installation and maintenance.

A number of suggestions are made below that supplement or expand on the recommendations above. These should be considered by Pobal and its partner agencies as offering pointers to the way forward for the SAS – and, more importantly, towards better and more integrated services that will benefit many thousands of older and vulnerable people **[R5]**. Some of the suggestions include some indicative prices. These are initial estimates and should be considered in the context of available budget and inputs from suppliers, bearing in mind the fact that prices are falling while reliability is improving all the time.

Recommendation 5:
That Pobal and its partner agencies examine the suggestions made with a view to their adoption or amendment, as appropriate, to guide SAS development.

4.2 Suggestions Supporting the Recommendations

4.2.1   Procurement of Basic SAS Equipment

1. A minimum standard to be introduced for analogue social alarms (and radio triggers) for use in the basic SAS, in relation to a requirement that it is used with mains power and with a fixed line telephone socket.

2. Organisations wishing to be involved with the SAS through supply of social alarms to be required to demonstrate their capability or perhaps submit units for type testing. Suppliers should be charged an appropriate fee to cover administration and testing costs (e.g. through the Telehealth Quality Group or a suitable independent organisation).[3]

3. Up to 6 different models to be approved subject to satisfying the required specification and to be available 'off the shelf' for a fixed charge held for 3 years.

4. Pobal to pay a set sum or subsidy for social alarms and radio triggers, perhaps €150 to include 5 years of free maintenance from the supplier. It is assumed that most of the models will be available at this price. However, to increase the range of available equipment, units charged at higher prices could be eligible for purchase, but the difference between their advertised price for the scheme, and the Pobal subsidy of €150, to be paid by the user.

5. All purchases of equipment for SAS to be made by Pobal.

6. A minimum standard for mobile phones for use in the SAS to be introduced based on the ability of a service user to use their own SIM card which would be selected to maximise the possibility of

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[3] Such as T-Cubed. See t-cubed.co.uk .

receiving a mobile signal in their homes. Organisations wishing to be involved with the SAS through supply of mobile phones suitable for use by older people to be required to submit units for testing and approval (see above). Suppliers to be charged an appropriate fee. Up to 6 different models to be approved subject to satisfying the required specification and to be available without significant delay in delivery and for a fixed charge held for 3 years. People wishing to use their own SIM cards would need to be clear about the limitations of service and on their own responsibilities, in order to avoid expectations that the system will work without the ongoing support and actions of the individual.

7. Pobal to pay a set sum or subsidy for 'senior' mobile phones, perhaps €50. However, to increase the range of available equipment, units charged at higher prices could be eligible for purchase, but the difference between their advertised price for the scheme, and the Pobal subsidy of €50 would be paid by the user. Limitation and responsibilities of service users would need to be made clear.

8. All approved equipment would be available to all service recipients without geographic control and without a restriction on other elements of the supply chain

4.2.2   Referrals

9. A new but simple profiling method to be introduced to ensure that information on vulnerable individuals is collected in a complete and standard format by the community groups.

10. Consideration to be given to providing community groups with a tablet computer, and appropriate training in their use. The devices to have wireless connectivity, enabling them to send data instantly to the Pobal portal from the homes of potential service users, enabling them to receive immediate responses and initiating the next steps in the process.

11. An app to be developed for the tablet device to specifically enable the community groups to profile users and to follow the referral process to its conclusion. The app should collect sufficient data on applicants to enable an automatic identification and determine suitability for basic, safety, security or well-being service options. It should also identify people with additional needs to help ensure that the basic SAS equipment is appropriate for their use.

12. People who are suitable for the SAS but who have sensory or dexterity issues to also be offered bespoke switching devices or peripherals for support, selected from an approved list of tested devices managed by Pobal

13. When a referral is approved, Pobal to issue the community group with a code enabling it to access information on equipment and installer services in their area.

14. The app to allow the community group to show photographs of *all* appropriate equipment to users explaining in each case which items are available free of charge and then those that are available on payment of a supplement, with appropriate warnings regarding inappropriate selling of additional peripheral products. This information could also be made available through a national brochure that would be available electronically. Printed brochures might also be relevant though there would be limitations on the lifetime of hard copies.

15. Any additional equipment (such as additional trigger devices) that are added to the SAS 'portfolio' to be from an approved list, and registered with Pobal irrespective of whether the devices are funded by Pobal (or some other government agency) or by private means.

4.2.3 Basic and Enhanced Telecare Service Targets

16. Pobal to consult with other government departments and agencies on using its procurement and service delivery model to support vulnerable people appropriately.

17. Any new services based on the SAS to be treated as addition to the current scheme; none of the current budget to be removed in order to fund alternative or more advanced schemes that would benefit other agendas.

18. The target number of SAS users to increase every year to reflect the needs of an ageing population. This may be achieved on the basis of reducing prices for equipment and without increases in budget beyond what may be required to increase payments to community groups and to provide them with tablet devices and training.

19. A minimum standard of analogue social alarms (and radio triggers) for use in an enhanced SAS to be introduced, based on a requirement that it is used with mains power and with a fixed line telephone socket, and able to be used with a minimum of 6 different peripheral devices.

20. Organisations wishing to be involved with the SAS through supply of enhanced social alarms and telecare to submit, with an appropriate fee, units for testing. Up to 6 different models should be approved and installers would need to be capable of installing all approved devices.

21. Pobal to pay a set sum or subsidy for telecare systems (i.e. social alarms and radio triggers enhanced by peripherals), perhaps €300 with 5 years of maintenance – the difference between advertised scheme price and €300 would be paid by the user.

22. All purchases of equipment for SAS to be made by Pobal but who then provided on loan to users subject to them gaining approval. At the end of the period of use, equipment to be returned/collected and cleansed prior to any reuse, provided that it remains fit for purpose.

23. A minimum standard of mobile alarms for use in an enhanced SAS to be introduced based on a requirement that it is used by people who are not housebound, and who have specific risks relating to falls, and/or becoming lost.

24. Organisations wishing to be involved with the SAS through supply of enhanced mobile device to submit units for testing and pay a fee. Up to 6 different models should be approved.

25. Pobal to pay a set sum or subsidy for supply of enhanced mobile device, perhaps €150 with 2 years of maintenance and, for equipment that provides alarms and tracking, a suitable amount of data – the difference between advertised scheme price and €150 would be paid by the end user.

4.2.4 Payment of Fees

26. Community groups to be paid €10 for each completed profiling form for eligible people (i.e. over 65 years of age, living alone and with no occupational pension)

27. Community groups to be paid an additional €25 for each accepted referral when they visit the individual's home within 4 weeks of installation to confirm that they are happy with their equipment

28. Installation groups to be paid a one-off payment of €60 for the installation and testing of a basic social alarm, and an annual payment of €20 for maintenance and technical support (including removal of unit and replacement when appropriate). 5 years of use is assumed.

29. Installation groups to be paid a one-off sum of €30 for the installation and testing of a mobile phone social alarm, and an annual payment of €20 for maintenance and technical support.

30. Outside the current SAS, and subject to an appropriate assessment, installation groups to be paid a one-off sum of €80 for the installation and testing of an advanced social alarm, and an annual payment of €20 for maintenance and technical support.

31. Outside the current SAS, and subject to an appropriate assessment, installation groups to be paid a one-off sum of €20 for the installation and testing of sensor peripherals, and an annual payment of €10 for maintenance and technical support.

4.2.5   Other Aspects of Service

32. Social alarms no longer required by the original user to be removed within 14 days of the community group being informed, with Pobal being informed of the change. It should be cleansed and tested before being reissued to a new approved service user following the awarding of a reference number.

33. The maintenance and technical support team to be paid €40 for the cleansing and testing of the social alarm and radio trigger device.

34. If a social alarm is not suitable for recycling, it would be returned to the manufacturer for repair or replacement if is within the 5 years of warranty, with a record of returns being shared with Pobal.

35. If a social alarm is not suitable for recycling and lies outside its 5 year period of warranty, it would be disposed of according to European regulations or returned to the manufacturer, and Pobal informed so that the device is removed from its database.

36. All equipment supplied outside the SAS scheme to be covered by separate charging and recharging arrangements agreed with other potential providers of financial support.

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