International Landscape Review on the Shift from Analogue to Digital in Telecare

Final Report, December 2016

NHS 24, Scottish Centre for Telehealth and Telecare

Revision	Description	Author	Checked	Reviewed	Authorised	Date
1.0	Initial Issue	RP/AP	AP	AP	RP	16/11/2016
2.0	Minor updates following initial client review	RP/AP	AP	AP	RP	09/12/2016

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1. Executive Summary

The Scottish Government's Technology Enabled Care (TEC) Programme includes a requirement to: "*Explore the scope and benefits of switching current provision of telecare from analogue to Digital Telecare*". FarrPoint was responsible for completing the study into Digital Telecare and, as part of this work, provided two deliverables detailing the potential benefits of Digital Telecare and a suggested implementation approach.

FarrPoint has been appointed by the Scottish Government to complete a "Landscape Review" of Digital Telecare internationally. The purpose of the study is to identify and obtain information from other organisations internationally that have already completed the shift to digital. This experience will be used to inform and shape Scotland's approach to implementing Digital Telecare.

FarrPoint's research found that **there are very limited examples of Digital Telecare deployments internationally.** There are, however**, a number of useful conclusions and recommendations that can be drawn** from the findings of this study, these include**:**

- **The definition of "Digital Telecare" developed and presented in FarrPoint's previous Digital Telecare feasibility reports and now being used in Scotland is in line with the definition being used internationally.** However, internationally the initial focus of Digital Telecare projects is on shifting the Telecare communications channel to digital, driven by the work telecommunications providers are embarking upon to decommission analogue telephone networks.

- Internationally, Digital Telecare projects are being planned in order to ensure that the service is rolled out in advance of analogue telephone services being decommissioned. There are also examples of where this has not been completed and **issues are subsequently being experienced** in delivering analogue telecare services over digital networks. **Both these observations reinforce the need for Scotland to progress with its Digital Telecare projects without delay.**

- The lack of available international Digital Telecare best practice **reinforces the recommendations made in FarrPoint's previous Digital Telecare**

feasibility reports that Scotland needs to complete a phased implementation of Digital Telecare to ensure that the optimum technical and operational approaches are identified and implemented.

- **There are other countries planning Digital Telecare deployments.** These countries are either at a similar stage of planning as Scotland, or at an even earlier stage, and so again there is very limited best-practice currently available. **Scotland should maintain its existing collaborations with other countries** and regions planning/completing Digital Telecare deployments to share best practice and lessons learned. In addition **Scotland should extend existing collaborations to include the other countries and regions** identified in this report as planning/completing Digital Telecare deployments.

- Given rapid developments in the decommissioning of analogue telephony services internationally it is likely that other countries will need to start deploying Digital Telecare. **Scotland should continue to monitor developments in Digital Telecare internationally** to ensure that new Digital Telecare projects are identified and further collaborations encouraged.

2.   Introduction

The Scottish Government's Technology Enabled Care (TEC) Programme includes a requirement to: "*Explore the scope and benefits of switching current provision of telecare from analogue to Digital Telecare*". FarrPoint was responsible for completing the study into Digital Telecare and, as part of this work, provided two deliverables detailing the potential benefits of Digital Telecare and a suggested implementation approach.

To further inform Scotland's approach to implementing Digital Telecare the Scottish Government wished to ensure that it learned from the experience of other organisations internationally that had already completed the shift to digital. FarrPoint was appointed to complete a "Landscape Review" to identify and obtain information from countries with relevant experience.

This report details the findings of the Landscape Review.

3.   Findings

3.1   Methodology

FarrPoint completed this Landscape Review using data from a number of sources:

- Existing FarrPoint knowledge;

- Internet-based research;

- Contacts obtained from service providers and equipment manufacturers;

- Suggested geographies from NHS 24/SCTT.

Potential projects of interest were identified and contacted to initially establish their relevance. Where projects were deemed relevant they were contacted again, either via email or phone, to obtain further information on their experience.

A list of the organisations that provided information to this study is contained in Annex A. Note that not all the organisations contacted chose to respond to FarrPoint's request for information.

It should also be noted that although Sweden has completed an extensive rollout of Digital Telecare it was not examined as part of this study having been examined as part of the previous Digital Telecare study completed by FarrPoint.

3.2   Summary of Findings

The research completed by this study has identified the following broad themes:

- **There are very limited examples of Digital Telecare deployments internationally.** This means that, other than the experience in Sweden already examined in the previous FarrPoint telecare reports, there is little other best-practice available to inform the Scottish telecare implementation planning.

- **There are other countries planning Digital Telecare deployments.** These countries are either at a similar stage of planning as Scotland, or even earlier stage, and so again there is limited best practice available from these projects.

- **There are several examples internationally of countries experiencing difficulties delivering analogue telecare services following the decommissioning of analogue networks by their national**

telecommunication provider(s). Whilst these examples do not provide any useful best practice, they do further reinforce the recommendations for Scotland to implement Digital Telecare prior to the rollout of digital telephony services and the decommissioning of the analogue Telephony network in the UK.

- **There are multiple examples internationally of Digital technology and connectivity being used to deliver Telehealth applications.** There is some best practice that may be available from these projects, however, Telehealth was excluded from the scope of this study and so has not been examined in any detail.

Each of these themes is examined further in the remainder of this Section.

3.3   Limited International Digital Telecare Deployments

The only large-scale natively digital telecare deployment identified during the study is in Sweden. This deployment has already been examined in detail in previous FarrPoint reports.

Although the scope of this study did not allow for an exhaustive analysis of the situation internationally, discussions with representatives from selected countries, suppliers, and other industry contacts reinforces the view that there is very limited experience internationally of using Digital Telecare at scale. Indeed, Telecare itself seems a relatively unusual service offering internationally. Several contacts described themselves as having Digital Telecare services, however, further investigation showed that these projects actually fell into the TEC programme's definition of Telehealth, rather than Telecare.

There are examples of some digital telecare services being deployed in other countries at a smaller scale, namely:

- **Australia:** Digital telecare services are being rolled out because of the deployment of Australia's national broadband network (the NBN), which is replacing the analogue telephone network.

- **New Zealand**: The Telecare Services Association of New Zealand has guidelines for Telecare providers that allow for the usage of digital connections

to user's homes[1].

- **France:** One equipment manufacturer[2] informed FarrPoint that there is significant demand for Digital Telecare equipment in France (although we have been unable to validate this with the telecare service providers). This is as a result of the planned switchover of analogue telephone service in France between 2018 and 2022 (Ofcom is currently anticipating similar timescale for the shift of telephony services in the UK). The Digital Telecare equipment connects via the 3G mobile network. The digital equipment in the home still connects to sensors/monitors using analogue radio connections as this is the reserved radio spectrum for these devices.

- **Private Sector Providers:** Although private sector providers were outside the scope of this study we did find examples of UK private sector telecare suppliers using digital connections (primarily via the 3G mobile network) to deliver telecare services. The examples we found were all relatively small scale, with <50 users.

The Netherlands and Germany may also be deploying digital telecare, although we were unable to obtain detail on these projects.

From the Digital Telecare examples identified, a number of themes can be seen:

- The definition of "Digital Telecare" being used internationally is similar to that being used in Scotland;

- The decommissioning of analogue phone networks seems to be the main driver for the move to Digital Telecare (rather than service improvement);

- (Linked to the above) The focus is on deploying digital connectivity to replace the analogue phone lines. There are no examples of digital technology being used in the communication between the in-home controller and monitors/sensors in the home (which remain on analogue radio connections). This means that any solutions deployed would not fully meet the Scottish definition of Digital Telecare as this stipulates an end-to-end Digital solution;

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[1] See Section 3.3.3 of
http://tsanz.org.nz/pdf/1475782470_PERS%20FINAL%20TSANZ%20Part%201%206%20Oct%20201 6%20V1.1.pdf
[2] http://www.solem.fr/

- Digital connectivity is generally provided using the mobile telephone network as the primary connection, or as a backup to broadband. This matches the approach for Scotland recommended in the previous FarrPoint Digital Telecare feasibility reports;

- The need for power continuity in the home is a concern. Battery backup to the in-home equipment must be put in place to ensure connectivity is maintained in the event of a mains power failure. Note that fixed broadband based connections can also suffer from power failure as street cabinets themselves have limited battery backup (1-2 hours);

- The lack of international technical standards means that SCAIP (the Swedish standard) or manufacturers' proprietary standards are being deployed;

- Suppliers blame the lack of demand from buyers for Digital solutions as the reason why there are not more devices available on the market.

3.4   Countries Planning Digital Telecare Deployments

There are several countries planning Digital Telecare deployments. These projects are at differing stages of their planning / deployment. The projects we have the most information on are:

- **Andalusia**:

    The region of Andalusia provides telecare services to 200,000 users (compared to approximately 160,000 in Scotland). Work is currently underway to plan a move to Digital Telecare and is being completed jointly between the regional government, and their telecare provider, Tunstall. Planning is currently focussed on digitally enabling the Alarm Receiving Centres (two ARCs, located in Seville and Malaga service all users, this compares to around 26 ARCs in Scotland). Work will then proceed to the migration of user connections and equipment to digital.

    A challenge identified by the Andalusians is the lack of Internet connectivity in users' homes meaning that a dedicated connection will be required to deliver Digital Telecare. A further challenge is the existing regulation in Spain which mandates that an analogue connection must be used for telecare emergency calls. A potential solution to this issue being examined in Andalusia is a dual connectivity telecare solution, with analogue dial-up being used for emergency

calls and a digital connection being used for advanced monitoring, integration with smart home devices, etc.

Separate to the Digital Telecare pilots, Andalusia is also planning to trial telehealth and video applications.

- **Basque Region:**

The Basque region in Spain is planning a trial of Digital Telecare to around 100 users in 2017 with an aim to have migrated 70% of their telecare users to digital by 2020.

The work is being completed jointly by the Basque region telecare provider, betiON and their equipment supplier, Tunstall. The design of the solution is still being developed, however, at this stage the solution is expected to be IP based, offering connectivity via both wired and mobile broadband. Analogue connectivity will also be provided. The solution will use the SCAIP and IPACS protocols.

In addition to the above examples we have anecdotal information that Digital Telecare pilots are being planned in Denmark, Norway, Germany and the Netherlands, but we have been unable to obtain further details.

3.5   Countries Experiencing Difficulties Delivering Analogue Telecare Services

The study found evidence of a number of countries experiencing difficulty delivering analogue telecare services as a result of the switch of telephony services to digital. These examples include:

- **Australia**:

Although Australia is rolling out some Digital Telecare services there are still a significant proportion of users with analogue solutions. Following the switch of users' telephone lines to digital (NBN), difficulties have been experienced with the reliability of telecare[3].

These issues relate to the use of analogue converters (also called Analogue Terminal Adaptors, or ATAs) to allow the analogue equipment to be connected

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[3] http://persa.com.au/what-to-do-when-the-national-broadband-network-nbn-is-connected-to-your-home/ and http://persa.com.au/persa-medical-alarm-nbn.pdf

to a digital network. The time-sensitive nature of the signalling tones used in analogue telecare (DTMF) causes problems due to the delays and distortion that can occur over Internet based (or other non-prioritised) IP networks at times of heavy traffic loads.

Difficulties have also been encountered with power. This is because the approach to delivering telecare means multiple devices require battery backup to maintain service continuity when mains power fails.

The use of 3G mobile solutions for connectivity is a solution to some of the above problems. However, coverage is an issue in many remote areas of Australia. Mobile phone connectivity is also an issue in Scotland with 79% of households having 3G coverage and 37% having 4G coverage[4].

- **United States**:

  The Federal Communications Commission (the US' equivalent of Ofcom) is currently consulting on the conditions that will be placed on telecoms providers wishing to decommission the analogue telephone network[5]. Current US regulation allows telecoms providers "*to retire their copper networks in favor of fiber without prior Commission approval – as long as no service is discontinued, reduced, or impaired.*" The FCC consultation is seeking to define service reduction/impairment. Proposed considerations include:

  - "*Interoperability with devices and services, such as alarm services and medical monitoring*

  - *Access for people with disabilities, including compatibility with assistive technologies*".

- **Switzerland**:

  The Swiss national telecoms provider, Swisscom, is aiming to switch off its analogue network by 2017[6]. Subscribers are being provided with a digital device to provide telephony services in the home[7]. These devices include a

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[4] Ofcom figures: Connected Nations Report 2015.
https://www.ofcom.org.uk/__data/assets/pdf_file/0019/77212/mobile_voice_and_data_services.pdf
[5] https://apps.fcc.gov/edocs_public/attachmatch/DOC-334747A1.pdf
[6] http://www.rts.ch/info/suisse/5699907-swisscom-supprimera-la-telephonie-analogique-d-ici-2017.html (in French)
[7] https://www.swisscom.ch/en/residential/help/loesung/ip-telephony.html

port to connect legacy analogue devices, however, there are limitations on the equipment that can be connected using this method:

- o *" 'Telealarm' devices cannot be used.*

- o *Alarm systems (with an alarm via analogue telephone connections) have to be IP/VOIP compatible for continued use, or they have to be run via a separate, analogue telephone connection (CHF 25.35/month)."*

It should also be noted that Sweden also experienced significant difficulties delivering analogue telecare over a digital network (GSM) when attempted at scale. This was one of the reasons the country decided to deploy the current native digital solution.

3.6   Digital Technology and Connectivity in Telehealth

Examples of digital technology and connectivity being used to deliver Telehealth services are relatively widespread. A number of examples were found during the scope of this study (including, as mentioned above, in some examples that were initially identified as being telecare, not telehealth). We have detailed below the examples we encountered during this study, however, Telehealth was not within the scope of our work and so a detailed search of relevant projects was not completed. There are a significant number of Telehealth projects in progress that are not included here.

These Telehealth services are increasingly being deployed at scale, focussing on a relatively small number of health conditions. There may be useful lessons from Telehealth that can be applied to Digital Telecare, although the service is quite different in nature, not requiring the same levels of reliability and response times to events in the home. Indeed, some Telehealth services operate on a 'store and forward' basis, where information is stored and sent to a receiving centre, either at a pre-determined time, or as and when connectivity is available.

Examples of telehealth services identified during this study include:
- Japan[8]
- Italy
- Denmark
- Greece

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[8] http://jtta.umin.jp/pdf/telemedicine/telemedicine_in_japan_20131015-2_en.pdf

4. Summary and Next Steps

As detailed in this report, there is limited international experience available for the deployment and operation of Digital Telecare services. There are, however, a number of useful conclusions that can be drawn from the findings of this study.

The definition of "Digital Telecare" developed and presented in FarrPoint's previous Digital Telecare feasibility reports[9] is in line with the definition being used internationally. However, whereas the Scottish Digital Telecare definition is for an "end-to-end" service, internationally the initial focus of Digital Telecare projects is on shifting the communications channel to digital. This is overwhelmingly being driven by the work national telecommunications providers are embarking upon to decommission analogue telephone networks.

Internationally, there are a number of Digital Telecare projects being planned in order to ensure that the service is rolled out in advance of analogue telephone services being decommissioned. There are also examples of where this has not been completed and issues are subsequently being experienced in delivering analogue telecare services over a digital telecoms network. Both these observations reinforce the need for Scotland to progress with its Digital Telecare projects without delay given the likely timescales for the decommissioning of analogue telephone network in the UK being presented by Ofcom.

The lack of international Digital Telecare best practice available reinforces the recommendations made in FarrPoint's previous Digital Telecare feasibility reports that Scotland needs to complete a phased implementation of Digital Telecare to ensure that the optimum technical and operational approaches are identified and implemented.

Sweden has previously been identified as having an implementation of Digital Telecare at scale, and there is highly relevant experience that can be learnt from this deployment. However, it should also be noted that there are key differences between the Swedish and Scottish situation: The currently Swedish model only offers "basic" telecare services, not some of the more "advanced" services being planned by Scotland (although the service is still being developed so this situation may change).

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[9] https://sctt.org.uk/programmes/community/technology-enabled-care-programme/telecare-provision-analogue-digital/

In addition, Sweden serves the majority (75%) of the country's telecare users from two large alarm receiving centres – the optimum approach to "clustering" Scotland's alarm receiving centres has yet to be determined.

There is useful information and best practice that can be obtained from the international Digital Telecare projects identified by this study, and the themes are detailed in this report. A number of countries are at a similar stage to Scotland in their planning for a Digital Telecare deployment with further countries likely to start planning relatively soon.

To ensure that Scotland's planning benefits from the emerging international experience it is recommended that Scotland:

- continues with its existing collaborations with other countries and regions planning/completing Digital Telecare deployments to share best practice and lessons learned;

- extends existing collaborations to include the other countries and regions identified in this report that are planning/completing Digital Telecare deployments;

- continues to monitor developments in Digital Telecare internationally. Given rapid developments in the decommissioning of analogue telephony services internationally it is likely that other countries will need to start deploying Digital Telecare;

- continues to stay involved in the development of Digital Telecare standards in order to stay up to date on technical developments, to emphasise the importance of the inclusion of group housing in the standard, and to identify other countries with an interest in deploying the technology;

- liaises with telecare equipment and services companies in order to understand their development roadmap and, again, to obtain information on other countries planning or completing Digital Telecare deployments.

Annex A – Summary of Organisations Contacted

We acknowledge and thank the organisations and contacts listed below who provided information to this study.

In addition to those listed, a further eight individuals/organisations were contacted, but did not respond within the timescales of the study.

Country Representatives:

- **Andalusia (Spain):** Ana Maria Carriazo and Jose Vargas, Junta de Andalucía.

- **Australia:** Philip Wait Chairperson, Personal Emergency Response Services Association (PERSA)

- **Basque Region (Spain):** Josu Xabier Llano Hernaiz, Director Gerente, Osatek, S.A. and Koldo Piñera Elorriaga, Organisational Innovation, bioef.

- **Denmark:** Christina E. Wanscher, EIP on AHA Coordinator, Region of Southern Denmark.

- **Greece:** George E. Dafoulas, E-health services consultant of e-trikala SA and Cities Net SA,Region of Central Greece.

- **Italy:** Simonetta Scalvini, Head of Telemedicine Dept. and Laura Comini, Direzione Scientifica, IRCCS Maugeri Foundation.

- **Japan:** Mr. H. Kurematsu of the international committee of the Japanese Telemedicine and Telecare Association.

- **New Zealand**: Telecare Services Association New Zealand.

- **Sweden**: Oskar Jonsson Senior Advisor, Digital Services, The Swedish Agency for Participation.

Equipment Manufacturers:

- **Doro (formerly Caretech):** Sarah O'Callaghan, Business Development Manager.

- **Groupe Solem (France):** Florian Fontana, Business Development Director.

- **Legrand (Jontek, Tynetek):** David McArthur, Business Development Manager & Stuart Carroll, National Sales Manager.

- **T2i Telecom (France):** Matthieu Etienne, General Director, Director of Marketing and Export.
- **Verklisan Ltd:** Paul Shead, Managing Director.

Others:

- Dave Foster, Telecare Consultant.
- Donna Henderson, Interim European Engagement Manager, NHS 24 / Scottish Centre for Telehealth and Telecare.
- Lesley Middlemiss, National Improvement Advisor, Technology Enabled Care, Primary Care Transformation, Population Health Directorate, Scottish Government.