



The voice of technology
enabled care



CONNECTING PEOPLE,
IMPROVING LIVES

**A DIGITAL FUTURE
FOR TECHNOLOGY
ENABLED CARE?**



OCTOBER 2017

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WELCOME

Technology enabled care, particularly telecare and telehealth, plays an increasingly important role in health and care. Yet it is threatened by disruption as UK telecommunications shift from analogue to digital. It is essential that we, the TEC community, work with service providers, communications companies and regulators to build a roadmap that minimises disruption whilst harnessing the transformational opportunities offered by digital.

THE BIG PICTURE

FOREWORD

There is an urgent need for government, regulators, telecoms and the TEC sector to agree and mobilise a plan to manage the transition and realise the full potential of digital connectivity.



Rt Hon Professor Paul Burstow
TSA President

Technology has revolutionised our lives and transformed our economy. As well as the funding and workforce pressures facing traditional health and care services, there are other forces at work that will disrupt business as usual in the care sector. The convergence of mobile communications, cloud computing, machine learning, data analytics, the internet of things and 3D printing are remaking our economy and empowering consumers. So far, care and support, even health care, has remained largely untouched by this revolution.

That is about to change.

The technology enabled care sector in the UK is built on tried and trusted technology, traditional telephone line connectivity delivering voice and data. Over the next few years, possibly as soon as 2023, analogue telephony services will be switched off as the UK's telecommunications infrastructure is upgraded to digital connectivity.

The implications of this analogue to digital shift are what this report is all about. The paramount concern of the TSA is that the reliability and safety of telecare and social alarm services is not compromised: that lives are not put at risk.

There is an urgent need for government, regulators, telecoms and the TEC sector to agree and mobilise a plan to manage the transition and realise the full potential of digital connectivity.

Today's TEC is largely delivered by standalone specialist devices chosen and installed by care providers and connected to dedicated monitoring systems. Over 1.7 million people benefit from these services and the peace of mind they offer. We expect further developments, with the 'internet of things' forecast to have 20-30 billion devices connected by 2020.

Many of these consumer selected devices and apps, for example, voice interaction systems, smart washing machines, fridges and meters, could be adapted and incorporated within 'bundles' of technology enabled care. Indeed, they already are.

The telecommunications industry has started the shift to digital networks, time is short for the TEC sector to prepare itself. The TSA – the voice of the TEC sector – is in the forefront of understanding this complex change management challenge.

Earlier this year we convened a seminar bringing together over 50 of the key players from government, Ofcom, NHS Digital, local government and the TEC sector to share our preliminary research and start a dialogue. This report marks a further step. It is a call to action and a challenge.

A call to action to the TEC sector to get ready for the shift and recognise the opportunity it represents to devise new service and product offerings. This must be in tune with the aspirations of a public who value and expect intuitive, easy to understand services and products in every other part of their lives. Simply replicating the analogue service in the digital world will miss that opportunity.

It is a challenge to government, Ofcom, care regulators and telecommunications to work with the TEC sector to ensure the transition is handled well, that vulnerable people are not put at risk and the potential of a digital future for health and care is realised.

This report is not about a nice to have, it is about a MUST DO.

CONNECTING PEOPLE, IMPROVING LIVES:

A Digital Future for Technology Enabled Care (TEC)?

1.7 million Vulnerable people rely on telecare in the UK

Most telecare connects via **telephone lines** to one of the UK's **240+** monitoring centres

If telecare providers don't **upgrade** from analogue to digital **BY 2025** then many people could lose the technology that keeps them safe

Common devices include **pendant alarms** and **fall detectors**

Technology Enabled Care (TEC) helps people live independently at home, avoiding **homecare, care homes** and **hospital**

BUT by **2025** all UK analogue telephone services in the UK will be **SWITCHED OFF** and

REPLACED BY DIGITAL CONNECTIONS

Any loss of TEC would put pressure on health and social care
Yet action is slow and uncertain

WHAT ARE THE POSSIBILITIES?

Moving from analogue to digital TEC could be about more than a simple replacement. Is this an opportunity for a fundamental redesign of TEC?

Emerging digital technology is already impacting health and care:

Big data analytics have cut A&E waiting times by **30 min** in some hospitals

Research shows that **artificial intelligence** is as good as human experts at recognising skin cancers

100s of UK councils use GPS tracking systems to monitor people with dementia

USERS & CHOOSERS ARE MORE TECH SAVVY

The average UK home has **8.3** web connected devices. By 2020 this will rise to **29**

20-30 billion devices will be connected to the 'internet of things' globally by 2020

10.7% of UK patients ordered repeat prescriptions online in the last 6 months

Consumer power means the TEC sector risks falling behind. It must move with the times.

3 million wrist-worn health and fitness wearable devices were sold in the UK in 2015

WHAT ARE THE CHALLENGES?

Planning and awareness: Transition roadmap and education needed

Connectivity and interoperability: Problems triggered by complex digital ecosystem

Standards and regulation: Concerns about reliability and data accuracy

Information security: Cyber protection and data storage risks

Funding gap: Upgrades could cost £150m+

WHAT NEXT?

What should be done by TEC providers, manufacturers, regulators and government?

#digitaljourney



EXECUTIVE SUMMARY

Every hour of every day, telecare services directly support the independence and safety of 1.7 million vulnerable people in the UK. Those individuals who may have otherwise required a number of home care services or a place in a care home, can, with the help of the right technology enabled care (TEC), aim to maintain and regain their independence.



Over the next few years and possibly as soon as 2023, analogue telephone services in the UK will be switched off and replaced by digital systems using internet protocol (IP) technology. It is evident that the telecommunications industry has started its shift to 'IP networks' and will not wait for care services to fully prepare themselves.

Many services that employ analogue connectivity, including the vast majority of current telecare services, will need to be upgraded or decommissioned. Yet action is uncertain and too slow, and a large-scale upgrade programme has not yet begun. If the UK fails to act in a swift and coordinated way, a great number of vulnerable people could lose the technology they rely on, and it is likely that other health and care services would be significantly impacted as a result.

THE NEED FOR A DIGITAL SWITCH PLAN

EMBRACING CHANGE

Moving from analogue to digital TEC should be about more than just replacing existing technology on a like-for-like basis. Whilst simple replacement is an option, a more fundamental redesign of the TEC offer has the potential to transform health and care services across the UK to the benefit of those people who rely on them.

Beyond enabling individuals to remain safe and secure, technology emerging now can offer so much more:

- ▶ Richer datasets can enable integrated care services, and the design of predictive services, with the aim of preventing problems before they escalate.¹
- ▶ Technology can potentially reable daily activities that many of us take for granted, helping individuals reintegrate into communities and remain productive members of society.
- ▶ In an age where isolation and loneliness are as damaging to health as smoking 15 cigarettes a day,² digital technology can add years to life and life to years.

THE CHALLENGES

Immediate, concerted action is needed to avert a major disruption to telecare. Understanding the scale of the impact and defining a vision for future TEC services are vital first steps in creating a roadmap for digital transition. The roadmap needs to enable a rich mixture of technologies and services from multiple suppliers, all within an evolving telecommunications infrastructure, where service providers need greater transparency from infrastructure providers and the regulator.

Diversity in technology and service models will need to be encouraged and managed, to exploit the opportunities presented by the growth of consumer-chosen technologies.³ Collaboration and engagement across organisations and sectors will be critical to success in this context.

Safety and security in cyberspace will be paramount, and we, the TEC industry, need to manage this challenge as we seek to embrace innovation and positive disruption in a digital world.

The potential economic impact of a digital transition is significant. Intelligent deployment of technology enabled care could contribute to efficiencies in care delivery whilst improving the health, wellbeing and independence of vulnerable people.⁴

Telecoms migration to digital networks has already started. The TEC community also needs to act now in responding to these changes.

We need to minimise the disruption to TEC services and hence any negative impact on NHS and social care services. Investment will be required in the short term to deliver guidance, education and transitional steps to digital technology enabled services, and we need a clear understanding of the costs and benefits as we pursue a more sustainable and productive future.



EXECUTIVE SUMMARY

THE ACTIONS REQUIRED

1

An agreed roadmap for digital migration of TEC is required

The digital shift is inevitable. We, the TEC community, need a plan of action to minimise the disruption of current services and pursue digital inclusion for vulnerable citizens. A roadmap must be developed that can be agreed and worked to by all the key stakeholders, and is vital in ensuring that vulnerable users and carers are transitioned to new services ahead of any telecommunications deadlines.

2

Best practice and regulation will require amendment to enable exploitation of the technology

We, the technology enabled care community must ensure that emergent technologies and services can be trusted by users, carers and providers. We need to amend TEC regulations and standards to be both flexible and robust enough to ensure the reliability and safety of future care applications. In the short term, effective guidelines are needed, whilst TSA, the national body for TEC, works with standards development bodies to pursue the necessary updates to system and service standards.

3

We need to embrace new commercial models that are driven by changing consumer expectations and emerging technologies

It is evident that consumers will have an increasing say in the specifications and user experience for new technologies and services. We need to consider how new choosers, recommenders and payers will impact the TEC marketplace, and how co-pay models can be made to work effectively.

4

An injection of resource and financial support will be needed for the initial transition from analogue TEC to digital

The TEC community needs to pursue funding options and create a ring-fenced procurement environment to manage the changeover. Capacity and capability will need to be supported to enable the work required to manage the change.

5

Strong national leadership is required

The digital transition of TEC services will require focused contributions from multiple sectors. For these different parties to work effectively together, clear national leadership is required, starting with central government.

6

Collaboration and alignment are vital, driven by clear and accurate communication

The shift to digital for TEC will impact many stakeholders, from people who use services and their carers to providers and commissioners. We, the TEC sector, need a clear and coordinated communication plan to ensure that threats are minimised and opportunities are exploited to the full.



INTRODUCTION

The UK has a long history of technology enabled care, ranging from social alarms and telecare to digital and mobile apps for self-management of health.



Care, and more importantly, lives, have been revolutionised by technology.

The telecare segment alone delivers services that directly support the independence and safety of over 1.7 million vulnerable people, through remotely connected systems and monitoring devices. These services help to manage the needs of users and their families, allowing them more control, ensuring their safety and security, reducing anxiety and improving their quality of life.

Individuals who may have otherwise required extended care services or a place in a care home can, with the help of the right technology enabled care, aim to maintain and regain their independence. They can stay living in their home, caring for themselves, with a support network to monitor them safely and react early if things seem to be going the wrong way.

Care, and more importantly, lives, have been revolutionised by technology. And yet we, the TEC sector, now find ourselves at risk of losing some of the great benefits that have been achieved if TEC fails to evolve at the same pace as telecommunications. Moreover, we are now at an inflection point where there are opportunities to further revolutionise care, borne out of a fundamental change to the underlying infrastructure upon which these services have been built.

During the early months of 2017, and culminating in a Think Tank review on 24th May, TSA has been gathering views on the challenges and opportunities presented by a digital migration from key stakeholders in the technology enabled care sector and beyond. The Think Tank was attended by over 50 invited contributors, ranging from service and technology providers to regulators, voluntary organisations, government bodies and the NHS. Key themes and areas for investigation were identified,^{5 6} and have formed the basis for further engagement⁷ and for this White Paper.



THE THREAT

Ofcom is aiming to set out arrangements for the UK's digital transition by the end of 2017⁸

Many technology enabled care services, particularly the installed base of telecare systems in the UK, rely on traditional telephone line connectivity for the exchange of voice and data between users and care services. However, telecommunications providers are planning upgrades of networks to digital connectivity (referred to as 'ALL IP'), and as a result analogue telephony services in the UK will be switched off.

Some forecasts predict this switch-off to be as early as 2023, and it is evident that the changes are already underway in some regions, with consequential impact on TEC service reliability.

Many services that employ analogue connectivity will therefore need to be upgraded in some way during the upcoming change. Telecommunications upgrade schedules are not yet in the public domain, with the effect that no agreed action plans are in place for large-scale TEC service migration.

A coordinated response to the expected changes is therefore essential if we, the TEC industry, are to avoid extensive disruption to the services that many vulnerable individuals rely upon. Such disruption would have a major impact on other health and care services.

Ofcom is aiming to set out arrangements for the UK's digital transition by the end of 2017.⁸ They are likely to outline the full extent of telecommunications' digital migration, including timings, geographic or service provider variations and implications for services that rely on legacy systems.

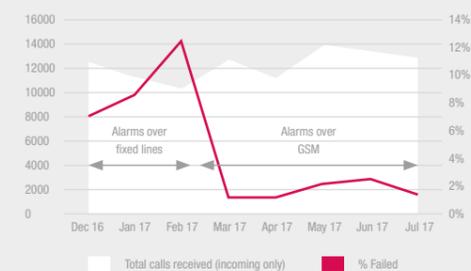
It is evident that digital migration is already underway and we need to mobilise a wide range of stakeholders now to ensure that we not only avoid a crisis but maximise the great opportunities that change could deliver.

CASE STORY

FALKIRK: THE IMPACT OF TELECOMS NETWORKS MIGRATING TO 'IP'

Falkirk Council currently has 4,500 telecare service users. Historic failure rates for incoming alarm calls have been at manageable levels, but rose markedly during the period Dec'16 to Feb'17. Diligent analysis of voice recordings and call data has shown that, in a single month, over 1,200 failures of first time alarm calls were experienced due to failed recognition of alarm signalling over phone-line connections. This presented an unacceptable monthly failure rate of over 12%. It was established that this escalation of failures coincided with changes made by a major telecommunications service provider in upgrading their infrastructure to packet-switched (IP) networks.

Falkirk: Alarm Call failures during telecoms upgrade



Falkirk alarm service took the decision to procure alarm devices that connect via mobile communications networks, thereby avoiding the immediate phoneline communication problems. All users impacted by the telecoms change are now offered alternative products, and alarm failure rates have reverted to their previous, manageable levels. Other benefits have resulted, including automated monitoring of alarm systems, faster deployment and installation (for urgent referrals) and reduced cost of installation.

Whilst Falkirk's innovative actions have addressed the immediate issue, the concern is that all UK telecommunications networks will follow a similar path and a sustainable and scalable approach is needed. The service has understandably prioritised support for the most vulnerable service users to date and anticipates that consumers will start to drive demand for a range of new assisted living technologies, where guidelines and standards will need to move on and support the adoption of alternative solutions.

"We have identified that alarm communications from traditional analogue devices are impacted by telecommunications networks upgrades, but it is important that our vulnerable users have access to this emerging digital world, and we need the TEC industry to move forward and adopt these technologies in a reliable way."

Pauline Waddell
Falkirk Telecare Service Director



CASE STORY

DORSET: MITIGATING THE RISKS OF NEXT GENERATION DIGITAL NETWORKS

From June 2016 to June 2017, the number of failed calls increased from 3% to

7.5%

Nearly 1 in 4 (23.6%) people in Dorset are aged over 65. When you look at this in the context of the continued strain on the NHS and local health and care facilities, there is a real need to support people to live independent lives in older age. Appello supports over 5,500 people in the region, providing monitored services to assist in an emergency.

The propensity of those reliant on telecare in Dorset to call on this support highlights the potential national scale of the risks associated with failed calls due to the digital shift.

In 2015 Appello started to see the impact of communications providers upgrading their networks to deliver voice services using "All-IP" technologies that work exclusively using the internet. This is due to the incompatibility of analogue devices, which currently make up the majority of telecare equipment in operation.

With over 200,000 connections across the UK, and in excess of 5 million inbound calls received annually, the data that Appello can review is telling. The service has experienced a startling incline in failure rates over the last 24 months. From June 2016 to June 2017, the number of failed calls increased from 3% to 7.5%.

A failure can occur because the call didn't reach the monitoring centre or because it was received but with impaired sound quality. The risks for housing providers and their customers is deeply worrying.

As these risks became more apparent, it became clear that analogue systems were not appropriate for future digital networks.

Network upgrades have already started and, in the longer term, the telecoms infrastructure will be 'All-IP' for all services. Appello has taken the approach that new data-centric devices and systems should be designed with the native capabilities of these new networks in mind, without reliance on the continuation of the old Public Switched Telephone Network (PSTN).

As a result, Smart Living Solutions was established - a suite of services that are digital from start to finish. In doing so, key benefits have been delivered, from vastly reduced call waiting times to the ability for multiple residents in housing developments to make simultaneous emergency calls, using equipment that is fit for a digital age.

Any new, digitally enabled care service should not be treated simply as requiring a minimal solution to a technical infrastructure problem.

THE OPPORTUNITY

As a society, we have shifted to digital or internet enabled services in most aspects of our lives. New functionality has been driven by a fresh means of accessing information and by intelligent combinations of data that create new service opportunities. The technology enabled care sector is not immune to these changes and should seek to benefit from positive disruption.

Whilst dealing with the urgent need to replace and upgrade technology, the TEC sector has an unmissable opportunity to consider what more could be achieved. Any new, digitally enabled care service should not be treated simply as requiring a minimal solution to a technical infrastructure problem, but as a powerful tool that could transform and integrate care services, giving vulnerable people a better way to manage and improve their lives within a connected community.^{9,10}

Traditional telecare has prioritised the safety of service users by giving peace of mind to their families and offering individuals greater control over their lives and health. Yet emergent technology – such as wearables for digital health management, smart voice interaction systems, big data analytics and artificial intelligence - can offer so much more.

Many of us take for granted simple activities such as doing our own shopping, speaking to far-away family members over video link and participating in games and pastimes online. In an age where isolation and loneliness are key contributors to our ill-health, being able to connect and share interests and information in new ways can contribute to a sense of purpose and belonging that can help to 'add life to years'.

THE ECONOMIC IMPACT

A shift to digitally enabled care creates new market opportunities and business models. Key to this is the willingness of consumers to contribute to emergent technology and the opportunities for data-driven, proactive health and care services that this creates.

The shift also introduces more complex supply chains and requirements for system and service interoperability, presenting challenges for competitive procurement that need resolution.

A large number of installed analogue telecare devices will need to be upgraded or replaced, whilst avoiding disruption to existing TEC services and minimising the pressure this could put on health and care services.

In a world of digital telecommunications infrastructure, TEC will undoubtedly be subject to regional variation in connectivity and it is likely that infrastructure investment will be required to deliver equity of access and reliability of service across all users.

CASE STORY

HAMPSHIRE: IDEAS BEYOND A LIKE-FOR-LIKE ALTERNATIVE TO ANALOGUE

With 9,000 vulnerable people using conventional analogue care technology solutions, Hampshire County Council (Hants) faces a bigger challenge than many as it considers the implications of the coming shift to digital infrastructure. However, working closely with its provider, PA Consulting's Argenti Telehealthcare Partnership, the Council is determined to make the most of the change. This means looking beyond the usual technology and thinking about how innovation in other sectors can be leveraged to deliver outcomes for people in need of care and support.

Hants and Argenti are working with Amazon to develop new 'skills' (Amazon's term for apps) that can be delivered by Alexa through the Echo, the Dot or future iterations of the voice-activated online assistant.

Fifty vulnerable people across the county will receive an Alexa service as part of a pilot funded by the Local Government Association. The funding will cover the devices, the development of new skills and the support needed to ensure people are comfortable interacting with technology in this new way. Crucially, the impact for individuals and the Council will be rigorously evaluated and reported.

The first skill will focus on reminders: for example to take medication, to hydrate, to lock the front door. A second skill will link with the time recording system of domiciliary care providers, so Alexa can quickly and accurately answer the question 'where's my carer'? These skills will of course be in addition to the out-of-the-box capabilities that Alexa brings, from playing news, local weather and music, to reading e-books and providing stimulation through games and quizzes.

50 vulnerable people across the county will receive an Alexa service.

The principle underpinning the shift to a digital programme in Hants is to "start with why". By focusing on the risks that service users face and the outcomes they hope to achieve (like greater independence, or avoidance of a spell in hospital), the Council aims to avoid drifting into a simple 'like for like' swap of analogue telecare kit for digital. The focus on 'why' broadens the options immeasurably: Hants is not simply looking for new technology that can do what today's telecare does (albeit digitally), but wants to find new ways to address different problems and deliver previously unachievable outcomes. For some service users, the answer will be Alexa. For others, it could be their digital TV or mobile phone. In each case, if technology in care is to deliver on its longstanding promise, the evidence of outcomes achieved and other costs reduced or avoided must be robust.

A DIGITAL FUTURE

FOR TECHNOLOGY ENABLED CARE



DIVERSITY IN TECHNOLOGY AND SERVICE WILL NEED TO BE ENCOURAGED AND MANAGED

In the UK, telecare or social alarm services are often commissioned and provided through statutory bodies such as local authorities, health providers and housing associations. Current TEC devices are, in most cases, stand-alone and specialist, chosen and installed by care providers and connected to dedicated monitoring systems. Contrast this with the adjacent world of the internet of things, where forecasts are for 20-30 billion devices

by 2020¹¹ that will connect in a multitude of new ways to support our lives, health and care.

This digital future will increasingly rely on a variety of communication service providers as well as a range of devices that will connect digitally in the home or on the move, and onwards to a rich ecosystem of application software, data analytics and hence proactive care services.

An extended world of digitally enabled care raises questions about security, variable geographic access, quality of connectivity, interoperability, end-to-end connectivity and the ownership and visibility of data. A robust quality framework will therefore be needed to ensure the reliability and safety of any new digitally enabled care offering. Furthermore, the standards and guidance for future technology enabled care services must also provide for a flexible environment, where technology and services are brought together from a variety of sources and can enable integrated access to health and care data and services.

SAFETY AND SECURITY IN CYBERSPACE WILL BE CRUCIAL

The vast majority of current TEC systems benefit from the natural barriers to cyber threats that are afforded by analogue connectivity.

As we, the TEC sector, shift to digital, information security challenges will emerge, in relation to citizen identity, cyber protection, data control, data storage and consent models. This is a concern where user data is incorporated into electronic health and care records. In this environment, ways of uniquely identifying users will be critical to help join up personal support services and ensure security.

The potential for combining health, housing and care networks, information from the home environment, private pay and statutory equipment, medical and non-medical grade devices will bring

interoperability and information governance challenges. New digital TEC systems need to be reliable and system and service performance accountability needs to be clearly defined. Care service providers carry these responsibilities currently and they will need to ensure their competencies extend to the accuracy and security of data and the resolution of service breakdowns. These challenges all need to be addressed in a more complex and highly connected digital care ecosystem. It is crucial that we respond to these challenges whilst creating an open yet accountable culture that does not hinder progress towards integrated care delivery.

TO ENSURE NO SERVICE USER IS LEFT BEHIND, WORK MUST START IMMEDIATELY

It can be argued that vulnerable citizens are amongst those who can benefit most from access to digitally enabled services, and that the TEC community therefore needs to embrace the shift to more capable infrastructure.

It is also evident that the telecommunications industry has started its shift to 'IP networks' and will not wait for care services to fully prepare themselves. In this environment, care providers have identified that the digital shift is not entirely under their control, given their limited awareness of plans for telecoms upgrades. This raises concerns that if care services across the UK are not active partners in the transition they risk being unprepared, leading to significant disruption of existing technology enabled care services (such as telecare) that have been designed around older infrastructure.

Clarity on the timelines that telecommunications providers and Ofcom are working to is critical, to enable planning for the inevitable changes to be put in place.

Wider awareness raising is also vital, promoting digital leadership, collaboration and the shared learning that will be critical to the redesign of services and effective implementation of change. We, the TEC industry, should also move very quickly to develop procurement specifications which assure reliability and performance of equipment operating over 'IP networks'.

The likelihood of local variations in digital connectivity raises a risk that some populations or individuals will be excluded from new digitally enabled care offerings, particularly where broadband or mobile access is restricted, leading to unacceptable inequalities. This variability in access will need to be managed and minimised, requiring wider collaboration and investment in the necessary infrastructure.

HUMAN VOICE, CHOICE AND TOUCH IS STILL VITAL



PEOPLE WILL HELP TO DESIGN WHAT THEY WANT TO USE

Clinicians and carers, as users of the devices themselves and trusted advisors and advocates for service users, will be critical to the development of new products and services. To gain their support, equipment and services must be reliable, quick and easy to prescribe, with clear and tangible benefits. As those who know the services in most detail, the input of clinicians and carers is vital. Yet many will need to develop their digital skills to engage fully.

It is also crucial to consider how millions of potential users and stakeholders (carers and families) will be involved in future technology enabled support. Experience across care services provision, as well as consumer marketing, has shown that it is crucial to involve the end user in co-designing products and services if the best outcomes are to be achieved.

Technology must be useful and usable, and will be selected by consumers on this basis. As evident in so many other areas of life, intuitive design and simple interfaces are vital in engaging users. Yet more than just easy, digital devices should be fun to use; they are bought because people enjoy having them at home as much as because they are necessary. 'Gamification' may, for example, be as relevant to technology enabled care as it is to other industries, as shown by computer games that interact with devices measuring blood-sugar levels in diabetic children.¹³

Harnessing the power of fun, curiosity and consumer desire will drive better services and better use of those services.

THE HUMAN TOUCH MUST NOT BE LOST

Some future service options are expected to involve artificial intelligence (AI). A number of UK local authorities are already using AI in the form of 'chatbots' or online assistants to respond to questions from the public about council services. Equally, the concept of health and care datasets being combined in new ways to build an integrated and yet personalised picture for each citizen is increasingly relevant to a stretched care economy.

These intelligent approaches may lead to earlier and better-informed responses, but they need to be balanced with a human response from health and care practitioners, monitoring centres and individual support networks. Whilst technology can help to transform care and lives, we can also expect that human interaction will increasingly step away from the mundane to target those relational elements of care where a personal touch has the greatest impact, so that the sense of being cared for is maintained or even enhanced. Opportunities for companionship are vital and must be supplemented by community interaction and remote connectivity if capacity from care professionals

continues to diminish as a result of demographic challenges.

Interaction with monitoring centres, primary care practitioners, specialist health services (for example, for diabetes and mental health) will need to be customised around each person's unique digital footprint and lifestyle, as well as their personal needs and preferred way of interacting with services.

We, the technology enabled care community, can also anticipate work force challenges, where a refocus on personal needs, data-driven services and new means of interaction between service users and carers will combine in requiring a rethink of skillsets and care planning.¹²

CONSUMER POWER MEANS THE TECHNOLOGY ENABLED CARE SECTOR RISKS FALLING BEHIND

For technology enabled care to remain relevant and helpful, it must also move with the times.

Technology is moving quickly and new opportunities are springing up regularly. Improved apps, voice-operable services, 'always-on' systems and connected wearables are changing the way we interact with devices and live our lives.

Many of the internet connected consumer products (for example, Amazon Echo, Google Home, Apple Watch) could be adapted for incorporation within technology enabled care services to provide new and appealing forms of interaction with remote care or health support.

For example, voice interaction systems can encourage people to take exercise, suggesting appropriate activities depending on the weather and the options available locally. 'Always on' devices mean an individual who has fallen or is struggling to move could quickly and easily communicate with the help they require. A wide range of flexible service options could be made available for users and carers, from medication and discharge support to palliative care.

Users and carers are more likely to engage via a device they have purchased and configured to suit their needs, rather than one that has been prescribed to them.

Consumer expectations have evolved, and increasingly we are using new technologies to interact with entertainment, retail, travel, financial services and many more. For technology enabled care to remain relevant and helpful, it must also move with the times.

We can expect technology and associated services to continue to develop at pace over the coming decade. Technology that we do not even know about today will undoubtedly be in common use by the end of the next ten-year period. Manufacturers have an important role to play in communicating roadmaps for innovative technologies, platforms and hence services that meet user needs and deliver truly beneficial outcomes in health and care.



THE POTENTIAL ECONOMIC IMPACT IS SIGNIFICANT

POSITIVE DISRUPTION TO CARE SERVICES SHOULD BE EMBRACED

A CLEAR AND COMPELLING ROADMAP IS ESSENTIAL



DATA DRIVEN CARE ALLOWS US TO PREDICT RISK AND BE PROACTIVE

The TEC industry needs a roadmap for the digital transition that can be delivered with acceptable risk

Digital devices create potential for much greater exploitation of data-driven health and care services. Integrated platforms can be used or developed that take fuller advantage of the information made available and which bring TEC into core health and care delivery. Future modalities of digital devices should improve predictive modelling, provide advanced warning and intervention planning, thereby making services more proactive.

The primary aim is to prevent problems before they arise, such as reducing falls and hospital admissions and supporting users and carers to remain independent. We, the TEC community, already see the emergence of underlying technologies, such as devices that monitor changes in gait,¹⁴ and so can predict a fall, and smart fridges¹⁵ that are in development which will be able to automatically reorder food and even warn of food products being unsafe or unsuitable.

The migration of TEC to digital connectivity as described over the last few pages will pose significant challenges, including:

- ▶ the reorientation of the market to include consumer-selected device and system components
- ▶ the emergence of new commercial models
- ▶ upgrading of standards and guidelines to ensure safe and reliable use of new technology configurations
- ▶ emergence of innovative TEC solutions
- ▶ the anticipated upgrades of underlying telecommunications infrastructure

This emphasises that we, the TEC industry, need a roadmap for the digital transition that can be delivered with acceptable risk, and where we may need to manage co-existence of analogue and digital connectivity for a period, by targeting users and regions with most urgent need of upgrade.

NEW ECONOMIC MODELS

In shifting to digital connectivity for technology enabled care, the TEC sector will encounter new economic challenges, including:

- ▶ **consumer selection and co-pay:** where consumer access to emergent technology creates new expectations for services and a willingness to pay.
- ▶ **prospects for proactive health and care services:** new, data-driven services will emphasise early detection and triggering of proactive services. They will change citizen expectations in terms of access and contribution to personal care information and will challenge commissioning practices.

- ▶ **more complex supply chains:** devices, apps, data and services will be deployed across multiple providers in a digital ecosystem and therefore proven interoperability will be vital.
- ▶ **a large installed base of analogue connectivity needs to be churned:** the UK installed population of analogue-connected telecare devices will require some form of upgrade, at a cost, as we shift to digital. It has been estimated that digitisation of telecare would require £150 - £300 million investment over a period of four years, if all analogue systems require replacement with digital devices and their associated communications fees¹⁶

As with many economic models, it is difficult to forecast the speeds at which these elements will evolve with great accuracy. Perhaps the only certainty is that the shift to 'IP' telecommunications infrastructure will definitely happen, with consequential disruption to analogue TEC services, prompting the need to avoid large-scale knock-ons to other health and care services.

TECHNOLOGY ENABLED CARE COULD HELP AMELIORATE THE HEALTH AND SOCIAL CARE FUNDING CRISIS

Future savings are dependent on a certain level of investment in the present

Health and social care budgets are constrained, with a £30bn funding gap anticipated for NHS England by 2010/21.¹⁷ In this environment, commissioners are seeking effective and alternative means for delivery of care.

One aim of technology enabled care services is to reduce the cost of care per individual, as the unit cost of remote support can be lower than that of traditional alternatives. Frailty, chronic health conditions, dementia and other long-term conditions are increasingly benefiting from services that are enabled at a distance, where elements of monitoring and support can be effectively and safely delivered through use of appropriate technology. The economic opportunities include the targeting of home care services towards personal care and away from routine checks and monitoring, and also the early identification of needs to avoid unnecessary deterioration or admissions to hospital.

Yet these new economic models face challenges. There is understandable scepticism about the true value of an 'avoided cost' in health and social care, yet it is precisely this type of efficiency saving that technology enabled care aims to deliver: the avoidance of the cost of more expensive care and treatment through effective, continuous monitoring, management and prevention.

We, the TEC sector, urgently need an informed debate about how savings are accounted for and demonstrated, to ensure the business case for more and better technology enabled care in the digital age is clear and the investment required is forthcoming.

This requires robust monitoring of benefits to be built in to any redesigned service from the outset. In addition, future savings are dependent on a certain level of investment in the present, which can be a burden on the already-pressured finances of local authorities.

EMERGENT TECHNOLOGIES PROVIDE NEW COMMERCIAL OPTIONS FOR TECHNOLOGY ENABLED CARE

Access to technology designed for and sold directly to consumers creates potential for a mixed commercial model for TEC, where state payments, personal budgets and private pay might be combined.

Here, the consumer demand is stimulated by the shift to a device and 'app' environment that users, family members and other key influencers are increasingly familiar with.

The utilisation of consumer-purchased technologies enables (if not necessitates) services to be re-designed and provided in innovative ways without requiring local authorities and other care organisations to invest in the development or purchase of hardware. This can be a real help to those organisations whose current financial situation might make a significant investment challenging, despite a desire to transform services.

The opportunities of a mixed economy will require commissioners and providers of care services to engage seriously with the private-pay market.¹⁸

Those suppliers who can offer safe, secure, reliable and sustainable services will be highly-valued. In this context, specifiers and suppliers of digital TEC will require new guidance and standards for systems and data design to ensure dependability in life-critical applications.

Technology developments are also having a positive impact on the infrastructure that is needed for TEC service delivery. The emergence of cloud and virtualisation technologies means that remote monitoring of care could be delivered more efficiently, by aggregating data from multiple service providers, moving away from dedicated hardware and buildings infrastructure and adopting service delivery models for information technology. For example, could the UK's 240 telecare monitoring centres amalgamate their IT and data management into a small number of regional 'hubs', whilst retaining capability for local service delivery?

INVESTMENT WILL BE REQUIRED IN INFRASTRUCTURE TO ENSURE SAFETY AND EQUITY

The regional variation in digital connectivity, such as that between urban and rural areas, poses significant challenges, where data download speeds can vary enormously.¹⁹

Infrastructure investment will likely be required to guarantee sufficient reliability of connection, and it seems unlikely that such investment will be made by care providers or indeed users.

The government, in collaboration with telecommunications providers, will need to provide the necessary infrastructure and services to ensure equity in service safety and quality.

In a more informed debate on how financial savings are accounted for, such an investment will be viewed as boosting the safety and quality of life of those who enjoy improved connectivity. It will also act as an effective financial investment, driving future efficiencies in the cost of health and social care and, as such, public finances.

CASE STORY

TELECOMMUNICATIONS IMPACT ON DIGITAL UK TV: THE SWITCHOVER HELP SCHEME

£603m

was ringfenced to pay for the Switchover Help Scheme.

From 2007-2012, a Digital UK initiative handled the switchover of TV from analogue to digital. Following the completion of the switchover, some of the airwaves previously used for television were auctioned for 4G high-speed mobile broadband.

The initiative included an extensive programme to raise awareness and provide useful information and advice as the roll-out progressed around the country.

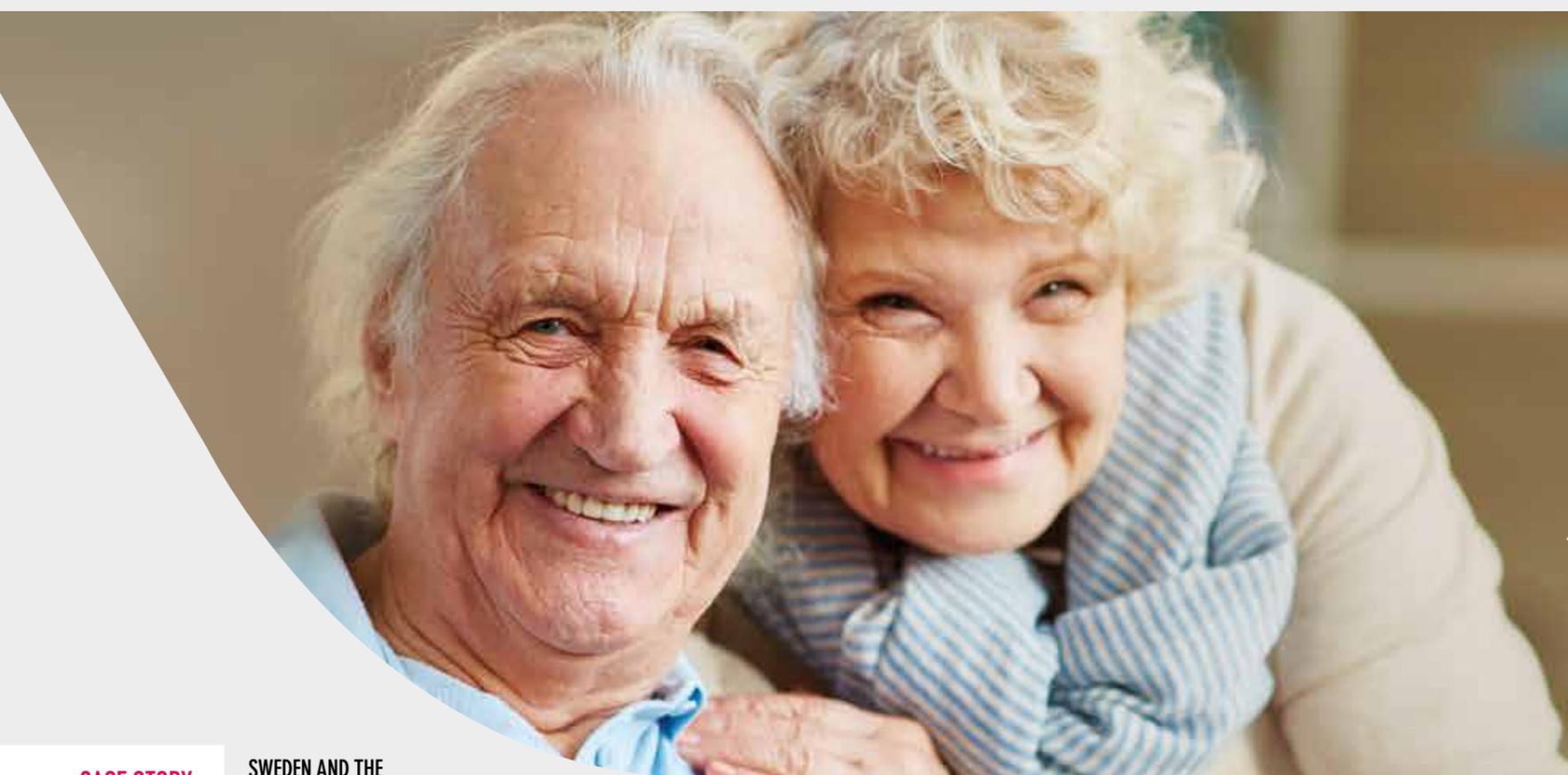
Also, during the scheme, £603 million was allocated by the government and ringfenced within the BBC Licence Fee to pay for a Switchover Help Scheme.

The help included easy-to-use equipment, installation, with an aerial upgrade if needed, and 12 months free aftercare. People were eligible if they were aged 75 or more, eligible for certain disability benefits, living in a care home long-term, or registered blind or partially sighted.

More than seven million households were offered help. Most were asked to contribute £40, with eligible people also on income-related benefits offered the help free.

The Help Scheme ultimately spent £260m and provided practical help to over 1.3 million older and disabled people.





COLLABORATION AND ENGAGEMENT WILL BE CRITICAL TO SUCCESS

NO SINGLE ORGANISATION CAN MANAGE THE CHANGE ALONE

CASE STORY SWEDEN AND THE DIGITAL TEC TRANSITION

The Swedish government targeted a total digital shift by the end of

2018

Analogue telephone networks are being decommissioned by network providers across Europe and municipalities and service providers now recognise the need to replace their analogue TEC infrastructure. Sweden is leading the way in this transition. As far back as 2007 there were widely reported occurrences of failed telecare calls, including an incident where a 76-year-old man died after his analogue social alarm failed to connect via the next generation network (NGN).

The Swedish Post and Telecom Authority (Ofcom equivalent) advised local authorities that hybrid analogue solutions should be avoided and that switching to end-to-end digital solutions was crucial to ensure a reliable service. As a result, the Swedish government targeted a total digital shift by the end of 2018. Transition planning included a comprehensive service specification and the tender process was managed centrally by the Swedish Association of Local Authorities and Regions (SKL). First deliveries of digital alarms commenced late in 2013.

To date 120,000+ analogue devices of an installed base of 220,000 have been replaced by digital carephones, 98% of which are using roaming SIM cards to deliver fast, easily deployed and always-on communication to alarm receiving centres (ARC) using a digital method (SCAIP protocol) for communicating alarm data. In most cases, the municipalities have opted for a subscription based model covering the device, SIM subscription and ARC response, with costs ranging from £15-£20 per user per month.

Digital devices ensure service user security as control signals or 'heartbeats' are sent every few minutes to an online server and any failure in the communication chain is reported instantly. Traditional analogue social alarms cannot do this.

SKL calculate that, based on the average Swedish municipality of 33,000 inhabitants, if only 1% of older residents are able to remain at home with a digital alarm and home care support, instead of moving to specialised accommodation, the annual savings would be circa £185,000.



"Continuous monitoring of SIM operation is a big advantage over analogue carephones... Not needing a land line and having more flexible installation options is good. To be able to get an "all in one" solution is a big time-saver."

Representative
Boras Stad Council in Sweden

The telecare sector is only just starting to understand the implications for the commissioning and provision of digitally connected care services. Organisations across the whole spectrum of care planning and provision are showing a level of concern and nervousness.

For the different groups in the sector to be able to work effectively together, true leadership is required from government.

A shift to digital provokes a complex range of issues such as: the infrastructure required; device selection; consumer choice; data security and so on.

This requires that a range of stakeholders, including government, care commissioners, care providers and technology suppliers must all play a role in reshaping the care landscape. All have a role to play in planning and managing the transition, and ensuring there is no break in care and support; yet none can do this in isolation. Focused and joined up engagement is critical to ensure that timelines, technologies and service change plans are aligned and no significant disruption is experienced by users and carers.

A successful digital home environment relies on secure, interoperable devices that work seamlessly together and create a whole that is greater than the sum of its parts.

This means that having robust system design, standards and procurement in place for TEC is essential, featuring reliable products and services from trusted suppliers.

Though commissioners and providers will be involved throughout the development of a digital health and care ecosystem, it should be acknowledged that levels of understanding and active involvement will vary. All commissioners and providers, particularly those organisations who are not at the forefront of the change, will need to consider organisational culture and behavioural issues. Health and care professionals are trained to offer support and may struggle when asked to 'help people to help themselves'. They may not be comfortable with what they see as an inadequate digital replacement of human contact. Change of any kind always poses a challenge.

Engaging staff through education and training, and raising awareness of user cases, evidence, costs and benefits will need to be an integrated part of a plan for digital shift.

National funding for health and care technologies has been made available, yet for the different groups in the sector to be able to work effectively together, true leadership is required from government. It is only government that will be able to corral the effort across the nation and ensure connectivity and equity. It will not be acceptable for regional differences in broadband availability and reliability to cause any gross inequality in the safety of care available to vulnerable people.

In supporting engagement and coordination, of particular importance will be the participation of industry groups, convened by TSA, Ofcom and others to ensure that information is shared and acted upon in a timely manner as the migration plans are announced.



CONCLUSIONS

1

The digital shift is inevitable; we, the TEC community, need a plan of action to minimise disruption.

The shift to packet-switched (IP) telecommunications is inevitable and already underway, through the efforts of telecommunications providers and the wider industry. It is crucial that technology enabled care services are made aware of the timing and impact and that they are prepared. Inaction could lead to dangerous failures of essential services, and will put the support given to vulnerable individuals at risk. Coordinated action must be taken immediately, by government, regulators, commissioners, providers of care and suppliers of telecommunications and technology, to ensure the threat does not become an avoidable crisis.

2

The great opportunities presented cannot be missed.

Emergent technology presents many opportunities for new, consumer orientated and data-driven services, opening up new worlds. We need to understand, validate and exploit these opportunities, which hold the promise of better quality of life, safety and enjoyment, keeping those who are at risk of being left behind connected to their communities in ways most of us take for granted. Not only safety and security, but isolation and loneliness can be targeted with the right technology linked to the right resources and community networks. In these days of increased isolation and community fragmentation it is an opportunity we cannot afford to miss.

3

Care services must keep up with consumer expectation and emerging technologies.

The changes in consumer behaviour and the proliferation of new home technologies also present opportunities for widening the economic model for technology enabled care to include personalised selection of technology and services, personal budgets and, potentially, co-pay models. These can significantly help the already stretched finances of public services, improving their sustainability and ensuring support reaches those most in need. Wider use of consumer technologies can reduce the initial investment required by public services, making the invest-to-save calculation easier to swallow in the short term whilst not jeopardising the longer-term benefits.

4

Best practice and regulation will require amendment to enable exploitation of the technology.

It is increasingly likely that these wide-ranging changes will cut across and call into question current approaches to standards and regulations for technology enabled care, both of services and the technologies. Amendments to the guidance and regulatory environment are needed to preserve the dependability of these life-critical services, yet enable exploitation of emergent technology.

5

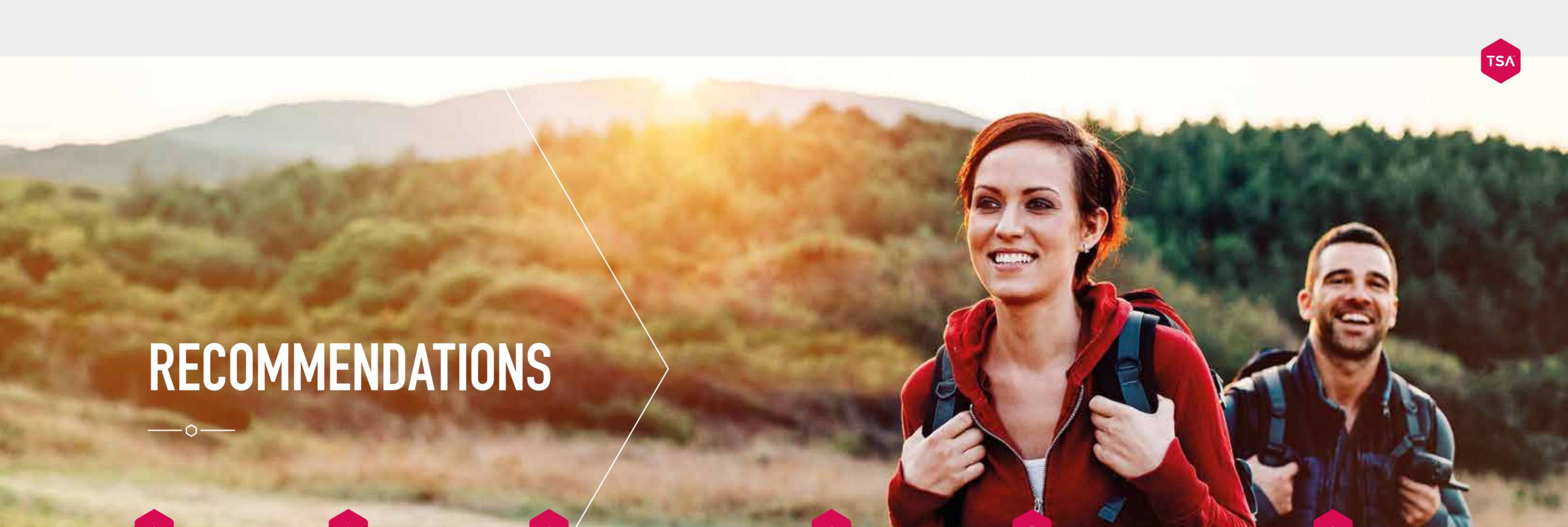
Collaboration and alignment are vital.

It is essential that the providers of technology enabled care devices and services are aligned with the migrations and timescales being pursued by the telecommunications industry. Interoperability of devices, systems and services will also be vital, in enabling an innovative and competitive landscape for digital TEC. These components also need to be amenable to continuous development, as is required by the fast-changing technological world we live in. More widely, commissioners, suppliers, clinicians and service users must be involved in the creation of an environment for the validation of new devices and models of care, to ensure they are fit for purpose, robust and sustainable.

6

Costs will be significant, but the investment is worth making.

The experience of other countries undergoing these analogue to digital changes indicates there will be a significant cost, which needs to be accommodated in the evolving commercial model for technology enabled care services. This cost will potentially need to be supported by central funding to ensure alignment in investment, timelines and changes to infrastructure and services. Such costs should be seen as a necessary and effective investment, which will support the effectiveness of future care services and aim to reduce the burden on traditional health and care services. Investment will also seek to ensure that vulnerable members of the community, who may currently struggle to participate in society, are not denied the benefits that technology can confer. We, the technology enabled care sector, need to establish a rapid process to quantify economic impact, and to agree how the risks and costs are shared by government, TEC industry, infrastructure providers and users.



RECOMMENDATIONS

1

A roadmap must be developed that all can agree to

The rapid changes in technology make the setting out of a roadmap essential, to ensure that vulnerable users and carers benefiting from current TEC are safely transitioned to new digitally enabled services well ahead of any analogue telecommunications switch off.

An understanding of the size of the problem is needed, along with a mapping of needs to new service opportunities, to help set out a roadmap for transition to digital. This will feature a mixture of technologies and services from multiple suppliers within a developing communications infrastructure.

2

Regulation and guidance will need to evolve and enable change

Quality standards frameworks and guidance for TEC, as well as regulatory arrangements, will need to develop in line with future digital roll out and the emergence of consumer choices. This will likely include new guidance and standards for systems and data design to ensure dependability in life-critical applications. It is vital that these changes are made in a way that allows the effective exploitation of technology and continuous development.

3

New commercial models for TEC need development

Consumer bodies, health and care commissioners and providers should be encouraged to develop innovative solutions for construction of TEC services within a commercial framework that accommodates a mix of private pay, public purse and personal budgets.

4

Transitional funding must be made available

As with any major change initiative, the transition from old world to new is likely to stumble without the injection of resources to enable the transition.

In the context of digitisation of TEC, the investment that would be required if all analogue telecare systems require like-for-like replacement with digital communications has been estimated at £150 - £300 million over a four-year period.

Resource and capacity shortages across the health and care system can, to some extent, be compensated for by the adoption of productivity enhancing technology. Yet, during the transition itself, capacity and capability must be supported to enable management of the transitional work. With already stretched and pressured finances, funding will be required to ensure the right resource investment can be made.

5

National leadership is vital

The transition of care services must include bodies from different sectors: social care providers and commissioners, healthcare providers and commissioners, housing associations, employers, technology suppliers, telecoms companies, regulators, service users, care representatives and more. All transitional efforts will need careful planning and alignment, with a clear focus on beneficial outcomes and driven by a clear understanding of the consequences should the plans not be implemented as required. It is vital to corral the effort across the nation and ensure connectivity and access equity.

For the different parties in the sector to be able to work effectively together, clear and positive leadership is required on several key issues, including:

- ▶ leadership from Ofcom in providing clear messaging on the nature of the telecoms changes in shifting to IP, including the likely impact and the timescales that providers are working to.
- ▶ leadership from central government in establishing the appropriate funding models for both transitional and ongoing costs of digitally enabled TEC.
- ▶ TSA leadership in coordinating any necessary and timely amendments to guidance and standards for systems and services, as we transition from analogue to digital TEC.

6

Clear and coordinated communication is essential

TSA needs to coordinate a communications plan that helps TEC service and technology providers to navigate the challenges of the digital shift, and to communicate the way forward to service users.

It is evident that a digital shift in TEC impacts many stakeholders and clear messaging will be required to minimise disruption to existing services whilst promoting the opportunities presented by emergent, digitally enabled services.



IN RESPONSE TO THIS WHITE PAPER, TSA PLANS TO:

1

Work with Ofcom

to help communicate a clear plan for telecoms migration to IP, with identification of the impact on TEC service providers and users.

2

Lobby UK Government

for assistance in coordinating and funding a transition to digital TEC systems.

3

Engage with the Care Regulators

in each of the home nations²⁰ and standards development bodies to identify and plan any necessary changes to service and systems standards, to ensure that new digital TEC systems and services are reliable and accountable. It is anticipated that short-term guidance material may be required to bridge periods of standards development, and TSA will take a lead role.

4

Create a coherent plan

for engagement with TEC service providers and users to help navigate digital migration.

5

Work with TEC service and system providers

to capture new, digital service opportunities, and associated benefits to users, carers and commissioners.

NEXT STEPS FOR TSA

GLOSSARY

- ▶ **ANALOGUE TELEPHONE SERVICE**
Via an installed wall socket, an analogue telephone service connects a device to the telephone network and employs analogue methods of communication
- ▶ **APPLICATION SOFTWARE**
An application (or app for short) is a computer programme designed to perform a set of coordinated functions, tasks or activities for the benefit of the user
- ▶ **ARTIFICIAL INTELLIGENCE**
Computer systems able to perform tasks normally requiring human intelligence
- ▶ **ASSISTED LIVING TECHNOLOGIES**
A range of services that assist people to maintain independence and to promote quality of life at home
- ▶ **BIG DATA ANALYTICS**
The process of examining large and varied data sets to uncover hidden patterns, market trends and customer preferences
- ▶ **CITIZEN IDENTITY**
A data profile that is unique to an individual and created as more people conduct their lives online
- ▶ **CLOUD TECHNOLOGIES**
Technologies that store and access data and programmes over the internet rather than a computer's hard drive
- ▶ **CONSENT MODELS**
Different ways people can give consent for their personal data to be shared
- ▶ **CYBER PROTECTION**
Processes designed to protect networks, computers, programmes and data from attack, damage or unauthorised access
- ▶ **DATA CONTROL**
The automatic or manual control of the access, processing and use of data
- ▶ **DATA STORAGE**
Archiving data in a range of forms for use by a computer or device
- ▶ **ELECTRONIC HEALTH RECORDS (EHR)**
The systematised collection of patient and population electronically-stored health information
- ▶ **END-TO-END CONNECTIVITY**
The flow and joining up of information between people and their care providers, and across the entire healthcare spectrum, from hospitals and GPs to social care and home care
- ▶ **GAMIFICATION**
The application of typical elements of game playing (such as point scoring, competition with others and rules of play) to other areas of activity
- ▶ **INFORMATION SECURITY**
Action taken to protect against the unauthorised use of information, especially electronic data
- ▶ **INTELLIGENT DATA**
Taking a huge amount of data and reducing it to the right data by extracting useful knowledge
- ▶ **INTERNET PROTOCOL (IP) NETWORK**
A communication network that uses Internet Protocol (IP) to send and receive messages between one or more computers. Messages are exchanged as datagrams, also known as data packets
- ▶ **INTEROPERABILITY**
The ability of different IT systems and software applications to communicate, exchange data and use this information
- ▶ **MONITORING CENTRES**
Telecare systems are often connected to a monitoring centre which can provide support 24/7 if an alarm is triggered
- ▶ **NICC TECH STANDARDS GROUP**
A technical forum for the UK communications sector that develops interoperability standards for public communications networks and services
- ▶ **OFCOM**
The Office of Communications, UK's telecommunications regulator
- ▶ **PERSONAL BUDGETS**
An agreed amount of money allocated to an individual by statutory care bodies following an assessment of their care needs
- ▶ **PREDICTIVE MODELLING**
The application of mathematical models to predict an outcome such as the potential cost or risk associated with managing a specific patient population
- ▶ **PRIVATE PAY**
A term used to describe people who fund parts of their care themselves, rather than relying on state funding

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ABOUT TSA

TSA is the industry body for technology enabled care (TEC) services, representing over 350 organisations including health and social care commissioners, digital health businesses, telecare and telehealth providers, housing associations, emergency services, academics, charities and government bodies.

Led by Chief Executive Alyson Scurfield and supported by Rt Hon Paul Burstow, the former Minister of State for Care Services as President, TSA helps organisations that commission, provide and supply technologies such as telehealth, telecare, and telemedicine as well as digital health services including self-care apps, health IT, mHealth, eHealth, smart home technologies, artificial intelligence and internet of things.

This is achieved by driving up standards, influencing national policy, advising on the commissioning landscape, identifying tender opportunities, providing guidance around TEC procurement, sharing good practice, offering training and organising learning events.

TSA's vision is to put people in control of their own health, wellbeing and support, keeping them safe, well and independent; giving them and their families peace of mind. TEC is key to this.

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