Proactive & Preventative Services

Definitions and Guidance

TEC Quality

Quality · Safety · Innovation

Acknowledgements

TSA would like to thank colleagues across the Technology Enabled Care sector for their contributions to the content creation, feedback and review and the production of these guidance documents.

Special thanks must go to the significant contributions from members of Special Interest Group (SIG) 011, which has brought collective experience and knowledge from across Commissioning, Service Provision and Solution Supply to ensure a broad range of views and expertise have contributed to these documents and future guidance:

Contents

Executive Summary

This guidance document produced by the TEC Services Association (TSA), with contributions from special interest group members, has been produced to support services and commissioners to offer proactive and preventative services using a variety of Technology Enabled Care (TEC) and associated wrap-around services. The guidance sets out the why we should be changing to this model of delivery and the how to commission these types of service. It also provides guidance on how the performance of these services can be measured and evaluated, and the journey that services need to go on to be proactive and preventative, and where health, care and housing services can begin to utilise proactive, preventative and predictive insights to make a real difference to delivering personalised outcomes.

COVID-19 increased pressures across Health and Social Care systems. However, this brought with it significant opportunities for proactive and preventative TEC to be deployed as part of a Personalised Care Model. It accelerated the use of TEC and allowed increased outcomes for service users, commissioners, workforces, and communities.

This information and guidance document is intended to start the conversation and to assist services and commissioners across health, care and housing as they pose the following questions:

- How do you know a proactive and preventative service is for you?
- Are you looking for a better care experience for your service users?
- Would you like to see more personalised care outcomes being achieved?
- Are you looking for a care model that supports effective capacity management and realises cost avoidance?

Taking a more proactive and preventative approach, supported by data and insights, and targeting interventions to meet individual needs, can enable people to live more independently in their own homes and communities for longer and position TEC services at the heart of the community-based health and care system.

The next steps will be to build on the points in this document with evidence from practical application, lessons learnt from services and commissioners and to provide further advice and guidance through the creation of a suggested specification for the procuring of proactive and preventative services.

Setting the Scene

Technology Enabled Care

There are multiple categories that sit under the banner of Technology Enabled Care Services (TECS), examples being telehealth, telecare, telemedicine and telecoaching and indeed further sub-categories could be included. Telecare has been the dominant feature in services offered predominantly by local authorities, housing associations and private service providers.

Telecare is effective in protecting people from risks in and around the home environment, acting as a crucial safety critical service, albeit in a reactive capacity in the vast majority of cases; in its current form, telecare service provision is far less focused on supporting people outside of the home and current examples of intervention ahead of crisis are limited.
Simple changes, such as adding a GPS or mobile enabled solution will offer some protection when outside of their property. Solutions can be activated through detections of specific circumstances or can be triggered by the user themselves.

Telehealth, telemedicine, and telecoaching focus more on the health and well-being of the person and can involve a clinical element to enable the service to safely determine actions resulting from the indicators received. These services use sensors and equipment to monitor and report on the health of people in their own homes.
They have not experienced high levels of usage across the UK, unlike telecare.
Increased levels of digital inclusion, smartphone use, and wearables is furthering the health insights available and providing higher levels of information/data on those using these devices.

However, with the increase in innovation, greater breadth of digital solutions, increasing consumer demand and greater appetite from commissioners and services to see technology as an enabler across the health, care and housing system, there is a strong drive to enhance the support that the wider spectrum of TEC services can provide – combining:

1. the intelligence that devices, sensors and analytics provide
2. the interventions that robust TEC service provision can deliver from both targeted prevention as well as effective crisis response
3. the technical capabilities of digital solutions to move from in home support to mobile interaction through to virtual calling through video solutions for example – to offer a more tailored service

Positioned correctly, proactive and preventative TEC services allow the right sizing of care packages to support independence, reducing dependency within a proactive framework for adjusting the level of care especially during periods of declining health.

This approach supports better care planning and case management by indicating what level of support is needed for an individual and how that will be delivered again aligning with strategic priorities including cost avoidance and accurate capacity management.

Proactive & Preventative Services

What are proactive and preventative services?

With increasing pressures on staff and reduction in budgets across both Health and Social care it is time to adopt new care models for service delivery that can not only avoid or defer interventions within secondary care, but also support primary and social care to intervene ahead of crisis point and target meaningful ongoing support such as connecting people with their community and improving their health and wellbeing.

To date the typical service offer has been a combination of physical care and reactive services such as telecare providing a lifeline to emergency services/response teams. This has allowed people to stay safe within their own dwelling and provide peace of mind. But this provision is only triggered by an initial event or crisis for the person, which can have a hugely negative impact on their health and wellbeing.
Examples of these trigger events are falls or other physical injury, fires or flooding in the home. This can be increasingly difficult for an older or vulnerable person to recover from quickly leading to further decline.

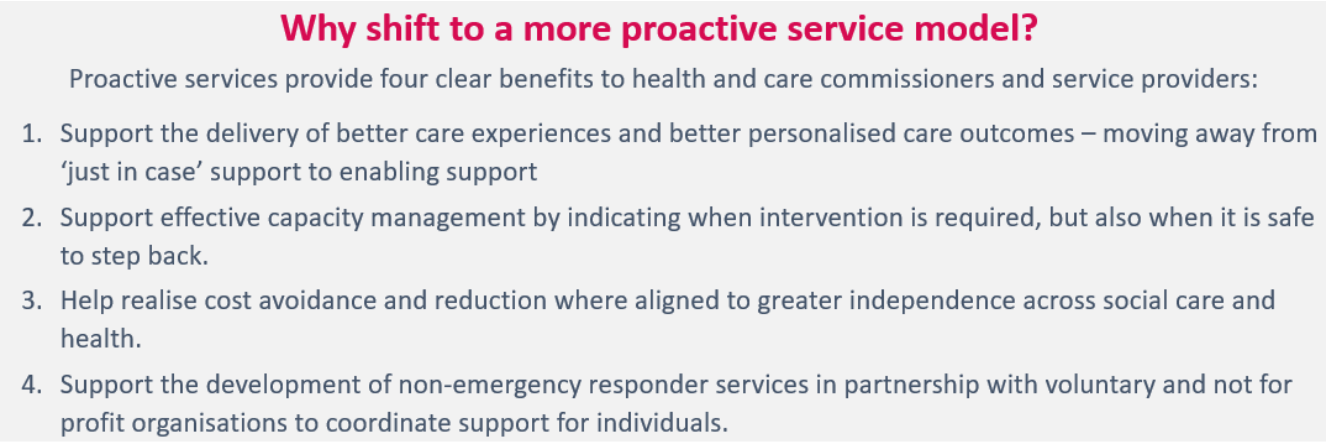

Figure 1 – Why Move to a more Proactive Service Model?

At present, services are delivering a hybrid scenario where a blend of physical, proactive and reactive care are all being provided. This allows the organisation to take steps to avoid a possible incident for the person. The TSA (TEC Services Association) have undertaken work in the sector with ADASS - https://www.tsa-voice.org.uk/adass-tsa-comm/ and within a special interest group (with representation from across commissioners, service providers and solution suppliers) and others to highlight the need to take this to the next level of delivery and to describe what this new vision of care may look like.

The future model will combine all the elements of proactivity to support activities of daily living and a more personalised approach to outcomes, as well as using a wider range of enabling technology solutions, such as activity and movement sensors connected to appliances in the home, smart speakers and video devices to aid communication, GPS and mobile devices with wellbeing apps to support safe access to the community, alongside a connected care platform capable of analysing data from devices to deliver effective insights to be actioned.
These new innovations have been proven to avoid several adverse incidents and improve wellbeing outcomes for individuals, but as part of a Connected Care solution and the delivery of data analytics and over time a move to more predictive insights, there can be far greater impact at individual, service and system levels.

This will result in care to be delivered in the right way at the right time for an individual. Organisations will be able to offer a truly person-centred approach for a user and achieve better outcomes and better experience in a cost-effective way.

Moving towards this new care vision dovetails with the strategic objectives of many local authorities to think and work differently with the joint funding of services. It facilitates the building of an integrated service in partnership with Integrated Commissioning Systems (ICS) to deliver benefits across both Health and Care instead of in siloes.

Critical to the success of this new method is establishing a national perspective on proactive and preventative TEC, coupled with a view towards creation of accompanying standards and measures for continuous improvement.
Ensuring TEC services are commissioned to deliver in a proactive and preventative way will help wider adoption of enabling technology and position Technology Enabled Care more at the heart of care and support to maximise the impact for Health and Social Care services in the UK.

Figure 2 – The Shift to Proactive and Preventative Services

Nationally, there is a continual need to do more with less across both Health and Social Care. Utilising TEC in a way that can predict adverse incidents before they happen and spot trends of behaviours that are the early warning for a decline must become the new norm.

The benefits for a whole system by far outweigh the challenges of procurement and implementation. This preventative pathway provides an ability to continuously manage capacity better with record low numbers in workforce. It facilitates better care experiences for individuals as it can be tailored to their specific needs resulting in better outcomes for all.

The time to move to this model of care is now, technology use has been expedited since the pandemic and older and vulnerable groups have had to become more TEC literate as have the staff delivering the care services.

Benefits for commissioners and service users

Proactive and preventative services must be user focused as demonstrated within the TSA Personalised Care Model. Using TEC across the various stages of need, outcomes are achieved for the individual and these can be tracked as part of an integrated approach to benefits realisation.

These demonstrable outcomes are calculated in terms of personal health and well-being, care provision, and progression of need. They will also record and track the associated costs in delivering care and the future costs likely to be incurred, as well as impacts on the community and frontline services; in this way, the model becomes self-sustaining.

This approach to benefits realisation enables commissioners to forecast the impacts of the service over an extended period and project financial outcomes as part of budgeting processes and forecast models. As commissioning is increasingly carried out by Integrated Care Systems (ICS) this joined-up benefits realisation becomes more important as savings and efficiencies can be achieved, measured, and reported on in a coordinated way.

It also evidences the effectiveness of both the service and associated technologies that are being used by individuals, highlighting the achievement of personalised outcomes and the progress that has been attained for services users. Thus, allowing the renewal of services and securing of funding to become an easier conversation for commissioners.

Definitions

Defining Proactive & Preventative Technology Enabled Care

Defining Proactive & Preventative TEC is important for establishing service models that are consistent across organisations in both Health and Social Care. It provides a common language and framework for all stakeholders to work to and deliver upon. As commissioners, understanding proactive and preventative TEC and what this means for services on the ground is fundamental to ultimately achieving its goals and objectives, value for money and social impact.

The opportunity is to commission and deliver a blended model of the safety critical, more reactive telecare service approach with the insights driven, more proactive and preventative TEC approach to ensure a robust, more personalised service offer is in place to support people across homes and communities, across a range of care settings and for the widest range of health and care needs.

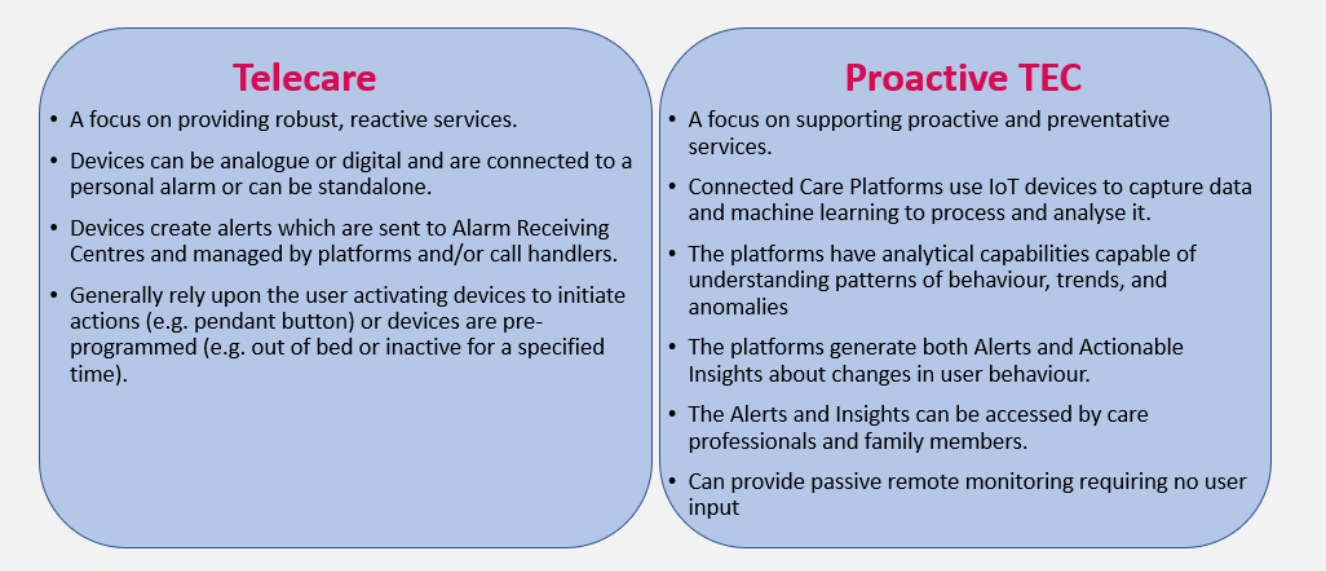

Figure 3 – The Shift to Proactive and Preventative Services

Proactive & Preventative TEC

A service matures to a proactive and preventative model when it begins to use data analysis and proactive outreach to the user instead of relying solely on user generated or circumstantial occurrences.

The service model increases in its complexity in comparison to reactive telecare as it is designed to support early intervention to avoid or reduce occurrence of exacerbations that would usually be responded to as and when they arise. A proactive and preventative model is geared to avoid or delay the exacerbation occurring in the first instance and to then deliver an earlier intervention via a holistic service offer to achieve improved, and more substantial outcomes for users and stakeholders.

Proactive and Preventative TEC services are embedded within the overall infrastructure that supports the user as part of a population, interlinking with other services provided by Health, Social Care,

Housing, carers, and numerous other third parties providing support. The service sits at the heart of a personalised care model that enables a wide range of services to function with a greater level of intelligence and interoperability as TEC solutions are more inherent to the users' overall support and care arrangements.

Figure 4 - Proactive Services further defined

The aim is to avoid occurrence of anticipated scenarios or exacerbations that would have detrimental effects for the user and stakeholders through improved intelligence around the user themselves. This can be achieved through various means including data analysis and proactive outreach to the user.

Employing more dynamic ways to gather intelligence around the user needs to be central to the service and this is realised through technological and service model specific channels. Personalising the model for the individual is critical as each user will have different circumstances, conditions, communication needs, support networks, disabilities, capacity, etc., and these need to be considered when gaining this improved intelligence.

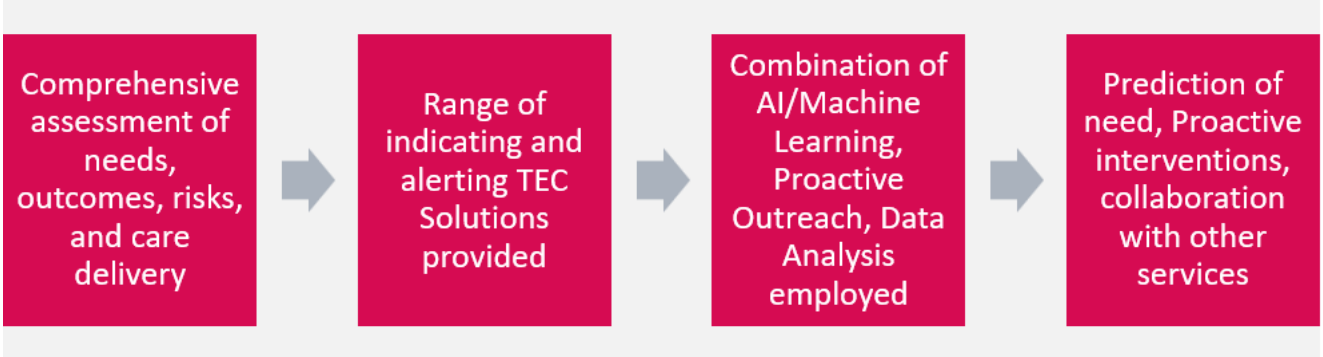

Figure 5 – Developing Maturity Level within Proactive & Preventative TEC Services

Technological channels can include a range of digital solutions that provide data, and these can then be analysed via information systems and prediction software, but this will often include personal intervention within the process of analysis to determine the resulting outputs of the intelligence data provided.

Assistive Technologies

Assistive Technologies form part of improved intelligence gathering on users to adopt a proactive and preventative approach, but the service model itself depends on a personalised approach to outreach with the user to maximise intelligence levels. Human interaction is fundamental to quality care, and this must be embedded within TEC to maximise the outcomes for the user and stakeholders. Proactive outreach to individuals can be employed to not only to support intelligence gathering, but also to support well-being and mental health outcomes.

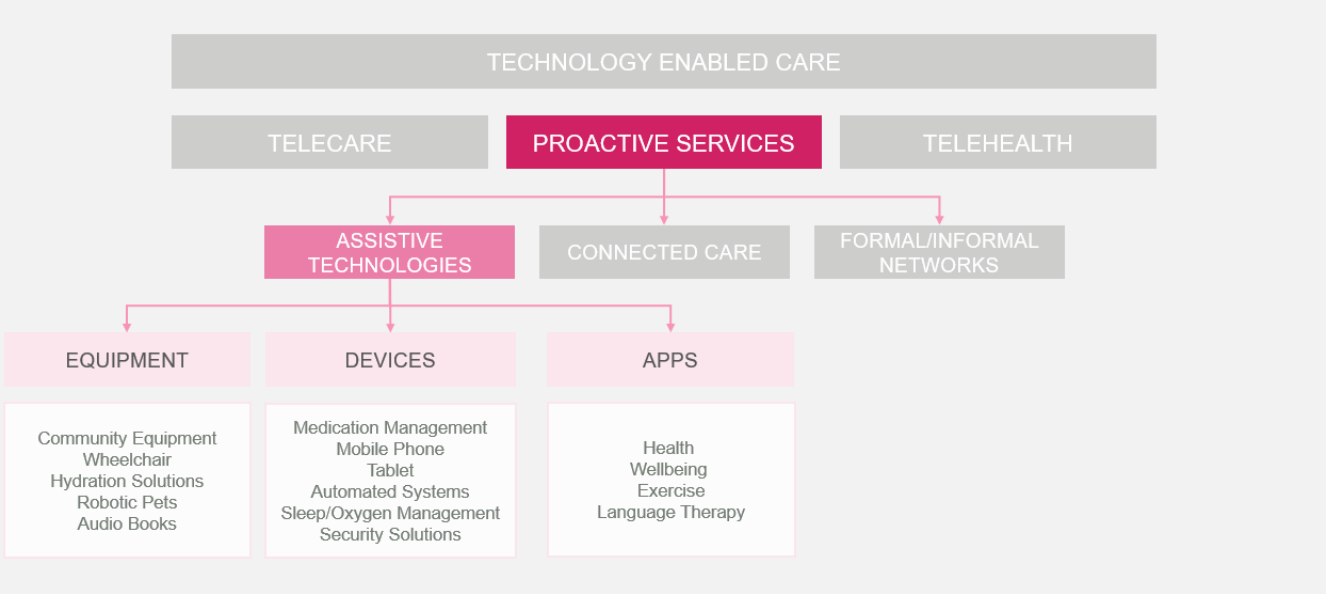

Figure 6 – What qualifies as Assistive Technologies (not an exhaustive list)

TEC services may go through a transitionary journey as they mature their approach to being proactive and preventative, and this may be illustrated in the way in which they employ outreach to users, for example:

a) A reactive telecare service may begin to make scheduled wellbeing calls as part of an individual's care package, perhaps calling people each morning to check on their health and well-being at that time.
b) This can mature to the use of predictive interactions, data driven decision making around who to contact – a tailored approach to every user based on data.
c) Further evolution may include the use of human and automated calling allows the client to choose, conversational A.I. and outbound activity utilising all media -e.g.: video conferencing.

Connected Care Platforms and Software

Connected care technology is focused on supporting proactive and preventative services. Connected Care platforms use Internet of Things devices and sensors to capture data and machine learning to process and analyse it, turning the data into useful information that can be used to support making better informed care decisions.

As the range of such platforms and solutions continues to grow, and indeed the spectrum of use cases for such IoT systems and data insights continues to expand, there will be greater need for commissioners and services to identify their requirements, review the range of solutions on the market and challenge solution suppliers to ensure they can not only provide the technical support, but also play a role in understanding what data to analyse, which trigger points would result in an

intervention being required and to ensure the solution remains outcomes-led and not technology-led.

The platforms build an understanding of the service user's life based upon:

- The environment in which they live
- Their daily routine and patterns of behaviour
- Their physiological wellbeing
- Their safety and security

Connected Care platforms have analytical capabilities capable of understanding these patterns of behaviour and creating data that show trends and changes over time.
Platforms can start to build data within 48 hours and within 28 days most will have created a very clear sense of the service user's normal daily routines; platforms can use both passive devices and sensors that require no interaction from users and incorporate wearable devices which require the user to keep them on and offer the potential to press a button to raise an alert.
Typically, the data created comes in three formats:

- Alerts – which suggest the service user either needs immediate help, such as they have had a fall, or the service or local contacts should carry out further investigation to determine if there is a presenting issue to deal with.
- Actionable Insights - non-urgent notifications of changes in a service user's individual daily routes or patterns of behaviour that should be investigated further.
- Reports –that can show in greater detail what is happening to each service user over time.

While the examples below are not exhaustive lists, it should be noted that sensors and systems are not in place to watch activity, they sense movement and activity and built a pattern of habit and activity over time; there is not a standard period of time for every person as everyone has different routines, the Connected Care systems learn the behaviour of an individual and then measure against that identified norm.

Examples of types of Alerts

1. Falls alert: if the service user falls in any room where a passive falls sensor is installed or where a user is wearing a device which can trigger an alert; in particular the TEC sector is seeing strong activity relating to fall detection and use of passive sensors that can pick up gradual falls, for example a slow slide off a chair where the person is unable to get back up – combining this detection with notification through to a 24/7 service can have significant impact on reduction of long lies for non-injury falls.
2. First morning activity not detected: An alert raised if the service user is not up and about in the morning at their normal time (includes agreed tolerance for each service user).
3. No movement in a room: An alert raised if it appears that the service user has gone into a room, is not moving, and has not come back out after a set period of time. This would be best used for for the hallway, kitchen and bathroom.

4. Too long in a room: An alert raised if it appears that the service user has gone into a room and not come back out after a set period of time. This would be best used for for the hallway, kitchen and bathroom.
5. Door left open: raised if the service user is at home and has left the front or back door open for a long period of time.

Examples of Actionable Insights

1. Increased activity at night: raised if increased activity is detected during the night which is more than the service user's usual behaviour.
2. Increased/Decreased bathroom visits: raised if the service user visits the bathroom more or less frequently than across the previous 7 days.
3. House too hot or too cold: raised if the service user continually lets their house get too hot or too cold.
4. Microwave not used frequently: raised if the service user does not use the microwave as frequently as normal.
5. Fridge door not opened frequently: raised if the service user does not open the fridge door as frequently as normal.
6. Kettle not used frequently: raised if the service user does not boil the kettle as frequently as normal.
7. Kettle being re-boiled: raised if the service user has been re-boiling the kettle repeatedly in a short period of time. Could be a sign of forgetfulness.
8. First morning activity view (enhanced): reassures the care provider and family that the service user is up and about in the morning and has had a hot drink.

Examples of data found in reports

1. Time in bedroom insight: reported in hours and minutes
2. Time in bathroom insight: reported in hours and minutes
3. Number of bathroom visits insight
4. Increase in night-time movement insight

Configuring the platform for each service user

Typically, each of the following can be configured at installation for individual service users. As the user is placed on the system these can be pre-set and amended based on individual habits to ensure the parameters set are relevant:

1. Routing for Alerts & Actionable Insights (who receives them, at what point is the trigger to share the insights or which systems is the data sent to)
2. Escalation for Alerts (where do alerts go if the first point of contact does not act, and how long to wait before escalating)
3. Standard parameters
    1. Time up in the morning – can be set for a specific rise time, or be based on a service user's average rise time

2. Time to bed - can be set for a specific bedtime, or be based on a service user's average bedtime
3. Time before alerting for 'No Movement' and 'Too Long' scenarios

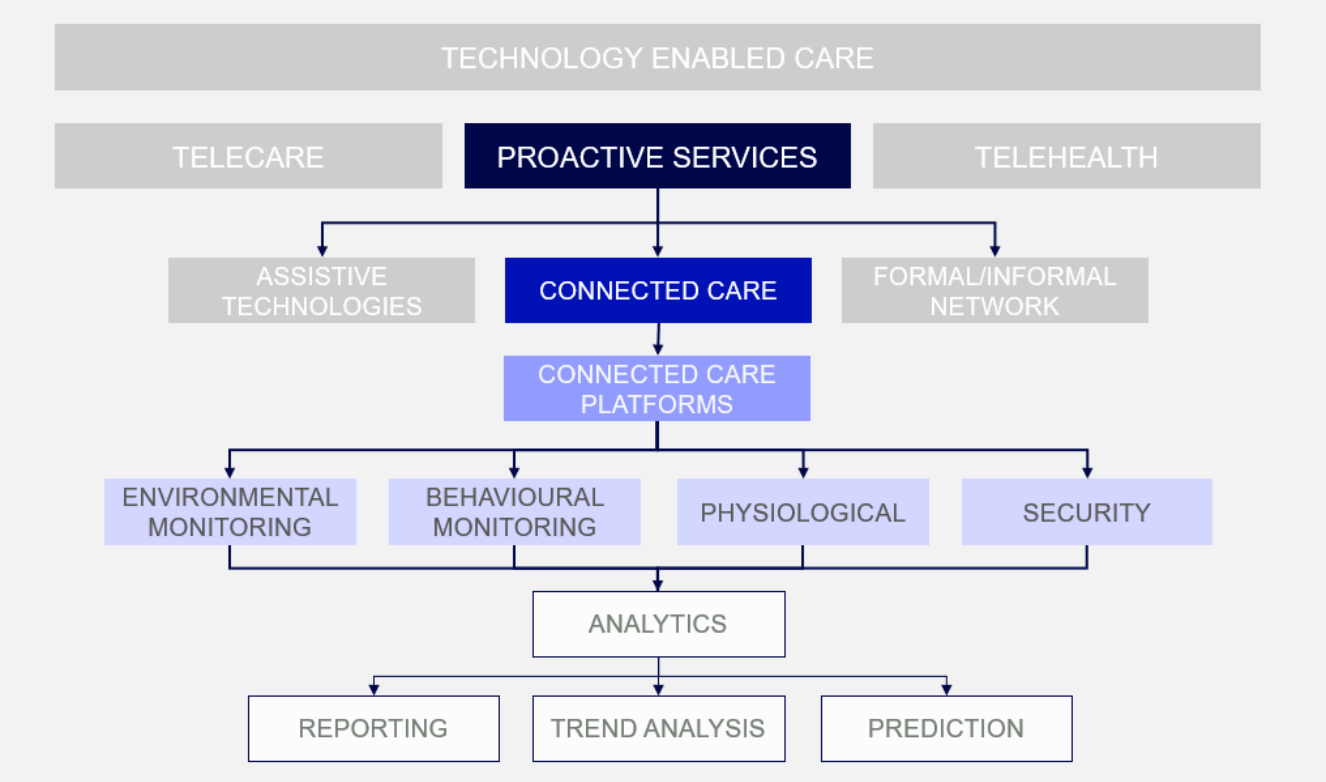

Figure 7 - Defining Connected Care

Who will use connected care?

Connected care can be provided by local authorities/private care providers and health partners via formal/informal networks as below. They can determine the right level of care for an individual using the wealth of data the actions and insights provide them. The platform highlights both subtle changes through to more obvious incidents or actions and then an informed decision can be made.

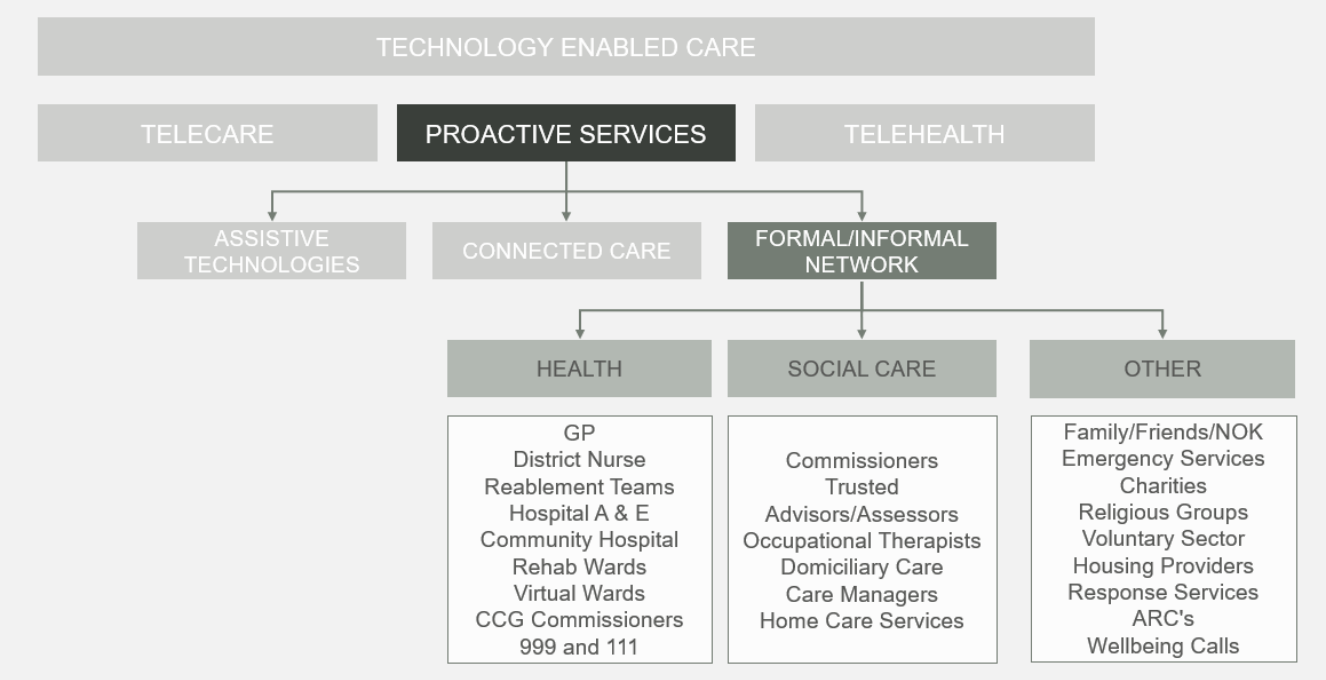

Figure 8 – The position of Formal and Informal Networks to take action driven by insights

How is connected care being used?

Connected care will have nuances depending on the environment it is used in; to illustrate this below are examples of how the application of Connected care as part of service provision can benefit different care needs and settings, provided by members of the TSA Special Interest Group (SIG011):

Supported Living, supporting people with Learning Disabilities (Cascade3d)

The use of sensors and smart device technology is an excellent way to enhance the level of care within a supported living environment. Connected care technology can balance on-site care provision against a resident's level of independence by adding 'just enough' care where it is most needed.

Connected Care is a combination of sensors, devices and smart analytics that can understand movement and behaviour patterns and a way to distribute that information to the right care givers and responders in the right way. For example, motion sensors can provide a resident's location and movement data, combined with door sensors to show if a resident is safe at home. This combined information paints a full and meaningful picture of how much care is needed at any given time throughout the day and night.

It is at night that sensors can be especially useful when normal activity levels will be expected to decrease with a resident normally safe in bed asleep. Night care teams can quickly be alerted if this is not the case using sophisticated messaging without the need to set off traditional alarms waking up the whole house.

The other significant benefit of connected care for supported living is with the early identification of changes in behaviour, sometimes behind closed flat or bedroom doors. Residents who are unwell, unable or unwilling to seek help can be identified from changes in regular behaviour, for example the

number of visits to the bathroom increasing overnight or increased use of the fridge during night hours. Care can then be provided at the earliest opportunity and will hopefully be simple and effective and reduce the need for dramatic interventions or hospitalisation.

Overall Connected Care has many uses in any home but is likely to be most effective where any vulnerable residents live which is often in supported living schemes. No matter how vulnerable a resident is, the balance between effective care and independence will be high on every agenda.

Here we can see the use of data and insights to allow you to provide the right level of care at the right time to prevent adverse events for individuals. Crucially, it also highlights the fact that there it can be delivered without intrusive technology and monitoring.

Providing insight within a reablement intervention (Howz)

At the point of discharge the main source of information is from the alien hospital setting and subjective reports, with home teams then continuing to rely on face-to-face visits and subjective reports from residents and families to build a picture of how someone is progressing at home.

The key point around reablement is that the individual returns to a level of independence over the course of the intervention and so tracking over time and gathering objective evidence is key to describing the outcomes for the resident and helping understand ongoing needs.

The use of environmental sensors that can describe normal routine and detect changes will not only support the assessment process but provide objective measures of Activities of Daily Living (ADLs) such as meal preparation, hygiene and toileting, and sleep - all key outcomes for a successful discharge.

In this setting Connected Care can support the withdrawal of services and allow the resident to try for themselves whilst still being monitored by the team. This will not only remove some of the guess work but will also potentially reduce visits.

Howz reinforce above the idea that technology can support the right sizing of care by safely withdrawing care that is not needed and allow and individual to be more independent in their own environment. It highlights the ability to personalise care for the individuals needs rather than delivering a standard offering.

Personalised Care Model

TSA's Personalised Care Model below illustrates how TEC can enable services to deliver multiple outcomes across all stages of need that people experience during their lives. A proactive and preventative service is likely to focus more on the Early Help and Targeted Support stages of need where intervention via TEC solutions are more likely to make a significant impact.
From the model, the correlation between enabling, preventing, and enhancing solutions and delaying someone's progression of care needs can be seen with recognisable opportunities for informed decision making to better manage their care; spotting frequent bathroom trips, for example, can highlight a potential UTI before a presentation in an acute setting is needed or changes in gait and movement may flag a greater risk of a fall and support and preventative action can be provided before that event becomes a reality.
This approach facilitates the capture of the unknown and reveal changes in activity and behaviour patterns of those living alone or unwilling to disclose. This knowledge can support a personalised delivery of care to achieve individual outcomes.

Over time services will identify further use cases that can be supported by data insights and the wrap-around services and community assets that can be mobilised to support people in their own homes and communities, and increasingly avoid, reduce or defer entry into more formal health and care services.

It must be noted that a mature service model and a robust service specification from commissioners will ensure the key enablers in the diagram are in place – having excellent technology solutions to support and well-defined services to take action are only a few of the required elements.

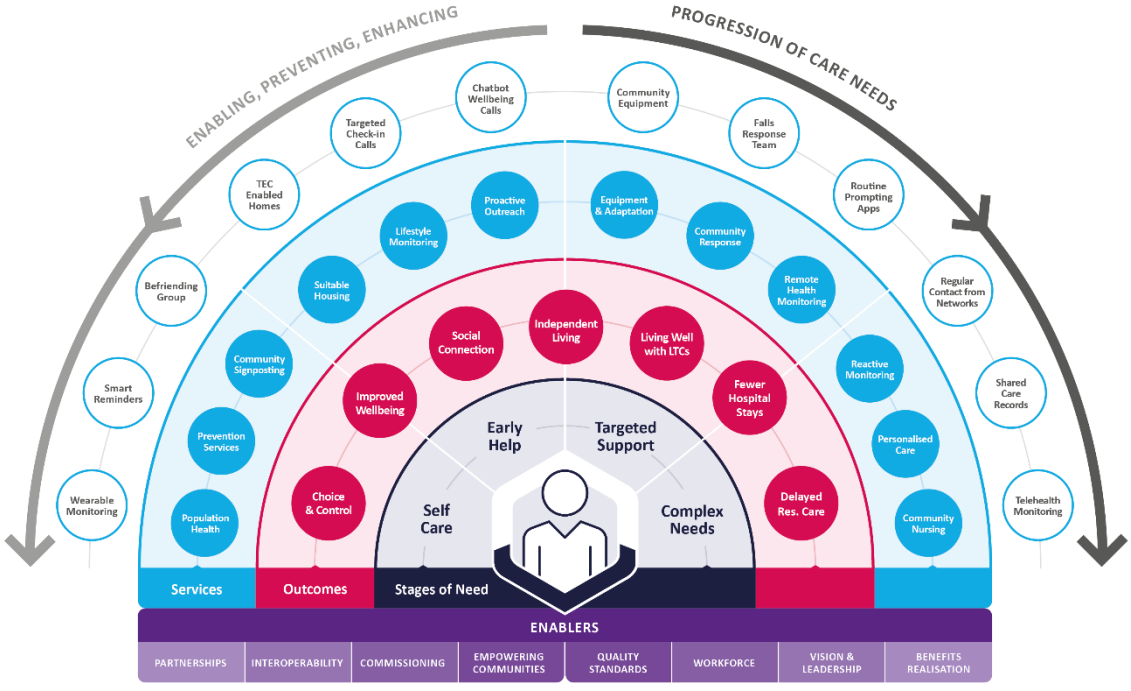

Figure 9 - TSA's Personalised Care Model illustrates the need for proactive and preventative TEC

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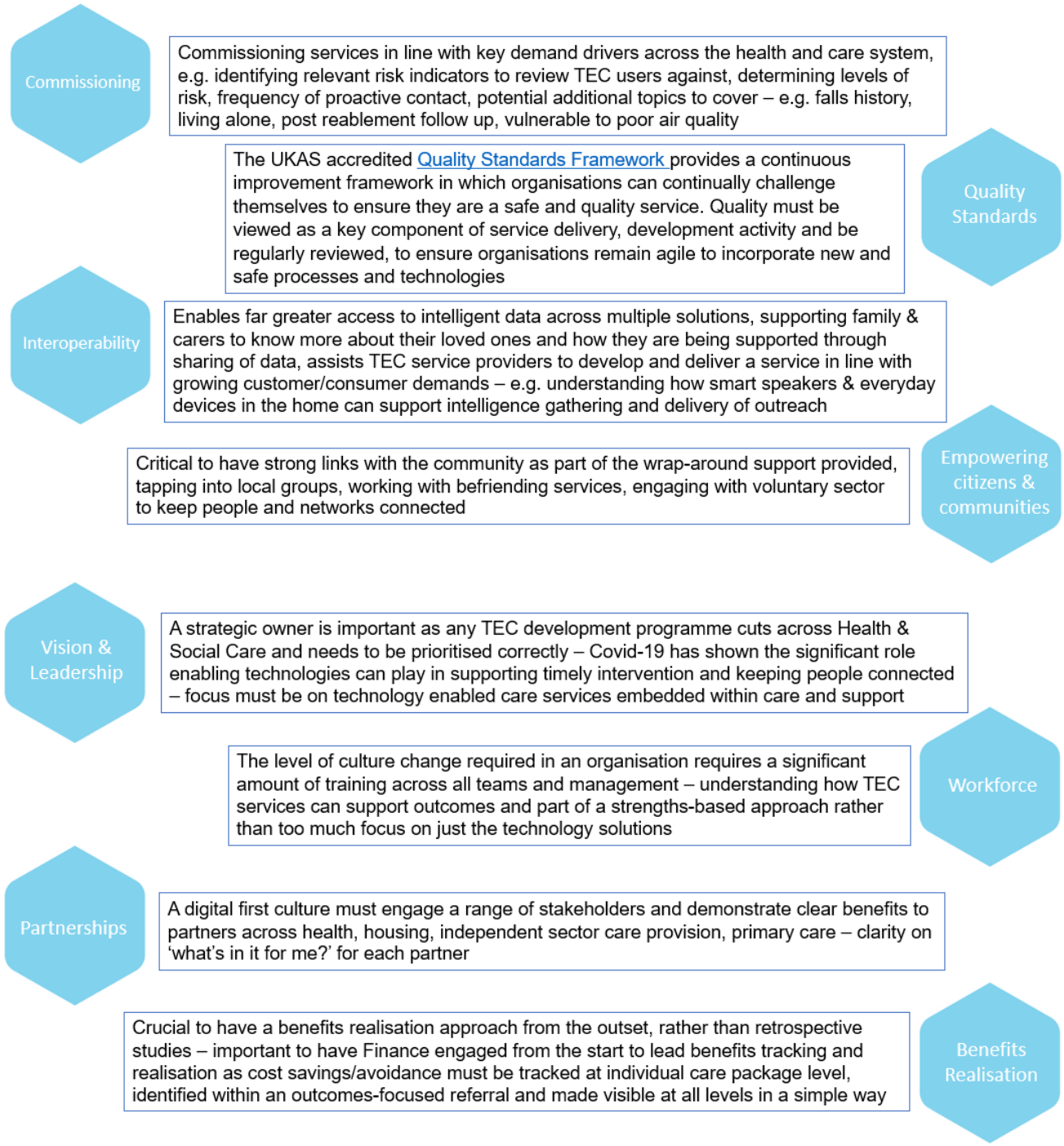

Figures 10 & 11 – Key Enablers to support the development and delivery of the Personalised Care Mode

By becoming part of the wider personalised care model, TEC can enhance the connections made across it, linking key service elements to each other, and improving the outcomes that they can achieve. A proactive and preventative TEC service that has matured to a level that encompasses all the stages of need and is able to accrue very rich data and predict needs will be the most valuable as it will achieve more significant outcomes and at scale.

By progressing to this level of maturity it will become more efficient as machine learning and AI is more informed and is fed by more data. As it gains in intelligence, it will deliver further outcomes as its learning is applied repetitiously.

From a commissioning and service perspective, it is important to focus attention on the problem statement or required outcome and how the system and data can support services to take more proactive intervention – the starting point must not be a question of 'what data can we have?' but one of 'what are we trying to evidence and how can the insights empower staff and families to take proactive action'; similarly, when identifying suitable Connected Care platforms and organisations to engage with, it is strongly recommended that suppliers are asked to demonstrate how they can work with services, how they can take problem statements and produce meaningful insights rather than how many ways are there of displaying information or how much data can be provided – the power is in the analytics and how the insights are presented in a simple, easy manner to allow action to be taken.

The enabling role of proactive TEC intervention

Positioning proactive support within key pathways

Across the broad spectrum of care and health needs, as outlined in the Personalised Care Model, there are initial pathways that lend themselves more naturally to the proactive and preventative approach with TEC as they present ideal opportunities for greater outcomes to be achieved for individuals. Over time, as evidence and use cases grow, it is anticipated that more proactive intervention will be seen across a wider range of cohorts, in particular within Learning Disability and Mental Health services.

Reablement

- TEC solutions can be employed to evidence strengths, achievements, and outcomes effectively through data capture, observations, patterns of behaviour, etc.
- The deployment of TEC can assist in continually assessing the correct size and composition of care package, improving self-reliance promoting independence and offering constant value for money.
- Less reliance on physical interventions during reablement period and greater accessibility of reablement facilities such as 'step-down' properties.
- It can support quicker discharge from hospital with appropriate wrap around services (effective mobile response) and avoid delays in activating domiciliary care

Assessment

- TEC can evidence personal strengths, achievements and future outcomes – supporting a more person-led, strengths-based support model
- Assessment allows for continual right sizing the package of care and improving independence in the same way as reablement
- When positioning enabling technology at the heart of support, it is important to not dismiss solutions already in place in someone's life

Long term Locality care

- TEC allows you to utilise insights from digital TEC to review changes in care needs
- Promotes early intervention and proactive calls to allow people to live safely in their own home
- Can delay placement in residential care for individuals
- Technology solutions can be used to maintain connections with the community, encourage and promote social inclusion, but are not used in place of human contact

Learning Disabilities and Autism

- TEC provides opportunities for proactive care services to enable independence, support education and learning
- It is critically important that robust governance in the use of insights protect individuals based on the recognition that TEC is an important enabler
- Proactive support can empower people to do more for themselves, where it is safe to do so – an outcomes-led approach must be taken rather than a technology-led, one size fits all method

Helping to meet the challenges for commissioners – the role for Connected Care

Risk stratification

- supporting where people have no family or carer network as there is no one to pick up the clues from the dashboard and first intervention alerts
- supporting people with formal care support (private or funded package of care) and flagging where the care provision could be adapted to +/- changing needs
- identifying people with comorbidities and/or complex care needs, mental health support

System transformation to integrate real-time data into the review and assessment criteria – support change management

- information available depends on sensors deployed – behavioural, medication management, vital signs, isolation
- calling, contacting, and seeing people based on a prescribed or dynamic schedule to intervene before a crisis
- Connected Care aims to use insights and information to disseminate proactive/early intervention contact through a network of services, including informal family and friends, voluntary sector and formal health and care services and related practitioners

Building understanding of Proactive Services

Understanding Proactive and Preventative TEC services is essential in maximising the outcomes that can be achieved through their successful operation. The importance of building this comprehension at all levels is immeasurable.
This shift in approach will require significant culture change and should not be underestimated as it will allow teams to be supportive of service commissioning by providing a shared goal for the organisation and benefits for all.

By its nature, a fully integrated proactive and preventative TEC service will benefit from integrating with adjacent services to achieve the outcomes they are designed to deliver. The relationships between services that are fostered and supported by TEC should deliver education and training for all staff as part of a comprehensive approach to workforce development.
An example of this would be to educate social workers, health and housing staff in the ways in which TEC can be implemented to help individuals remain in a place of their choice for longer whilst achieving their personalised outcomes.

Once the workforce is aware of the impact of the TEC, they can then adopt a TEC first approach to their own service and daily operations making proactive and preventative care commonplace. It also builds confidence in new technology and alternative ways of working.
By creating a supporting workforce that encourages TEC to be used, widely adopted, forming part of care/support provision is essential and leads to greater acceptance of their implementation.

This can be progressed to further levels of maturity within the proactive and preventative model as people become upskilled and, ultimately, it becomes second nature to use and apply TEC to achieve maximised outcomes for users, families, commissioners, stakeholders, and the wider community.

Advice for Commissioners

Commissioning of proactive and preventative TEC services requires a significantly different approach to that for more traditional telecare or assistive technology services. A focus on demonstrable outcomes is required whereby the impact of TEC is clearly established, accurately set out, and is the driving force behind the payment mechanism for the chosen provider(s).

Proactive and preventative TEC services predominantly focus on avoiding decline, exacerbation of pre-existing conditions, incidents & emergency situations, and worsening of overall health and well-being of the end user. Other outcomes such as carer and community impacts should also form a key part of the service specification, so that the wider benefits of an embedded approach to TEC are captured and proven.

Establishing effective mechanisms for data and outcomes capture is essential, providing a dynamic infrastructure that demonstrates the effectiveness of the deployment of TEC packages and the wider

service model is required. Providing these mechanisms can prove challenging as it often varies greatly from more traditional commissioning approaches that focus on unit cost and direct savings, although these should form part of the wider specification as impacts on current costs can also be achieved through the effective deployment of TEC.

Before creating and sharing a tender including Connected Care, Commissioners should consider the following:

- This new way of working is about so much more than the technology. It is also heavily dependent on the service that wraps around the technology.
- It is important to remember that it is a partnership you are entering with the supplier and there should be flexibility within the contract especially on their part as the supplier. There will be a need to work together to improve the solutions over time and to jointly achieve the best for the service users.
- The focus from the start should be on the outcomes that need to be achieved for individuals rather than the devices that can enable them. Commissioners are encouraged to discuss this approach with suppliers before creating a tender and discuss the specific goals you are looking accomplish for service users.
- The offering that solution suppliers present including devices and capabilities will continually change as new innovations come along but it is important to know if your future visions for the service are aligned to their roadmap. They may be working on something that will help achieve your outcomes, but it is important to ask the question of them upfront.
- It is important to build in requests to the specification and contract that allow you access to future capabilities at a low/no cost as this is not a standard offer with most suppliers. You will not want to be caught with additional charges for functionality you thought was included and have not budgeted for.
- Allow time to research the market, it is good to know what innovations are being released and when and this will provide you with a knowledge base to compare both equipment and solutions to find the best fit for your service users.
- Ask the solution suppliers if they can suggest some customers you can speak to as part of your due diligence in procurement. It is always best to hear it from those with experience of the supplier.

Approaches for commissioning Proactive Services

Commissioning a proactive and preventative TEC service can be part of a singular or multi-faceted procurement exercise and advising commissioners on their approach will depend upon procurement schedules and requirements.

For a comprehensive joined-up approach, it may be advantageous to commission relevant services as part of a more holistic procurement exercise that considers the impact of key stakeholder services that can contribute to the overall effectiveness of a proactive and preventative TEC service. However, it is recognised that this may not always be possible, and that services may need to be separately procured for various reasons.

As part of a Technology Enabled Care service

A TEC service will usually focus on addressing the key areas of care needs and risks, with products and solutions deployed to meet needs and mitigate identified risks.
A strength-based approach is often used to identify these, and a care plan is formulated, but these focus on the here and now, rather than looking at the longer-term picture for the end user and their support network.

Introducing a proactive and preventative approach involves switching the emphasis of assessment to promote a longer-term strategy for the user, capturing goals, aspirations, and opportunities to avoid deterioration that cause increases in care provision and associated costs.
Data must be readily available and form part of a more dynamic decision making and review process that supports service users throughout progression of need.

A wide variety of TEC solutions/devices must form part of the service approach and 'one size fits all' approaches must be avoided as these will undermine the personalisation of care and lead to outcomes not being achieved.
A good example of this is often seen with wrist worn fall detectors being prescribed whenever a risk of falls is identified with the user regardless of whether that is an appropriate TEC solution for them and their support network.

TEC solutions employed by the service should be supplier agnostic in that applicable solutions should be easily and swiftly integrated if they will achieve the best outcomes as part of benefits realisation. A service user with certain needs should not be excluded from the service because a specific device or solution is not made by a particular manufacturer or supplier.

Every effort should be made to adopt an open and inclusive approach whereby new devices and technologies are integrated into the service and made available to encourage their deployment by people operating within the proactive and preventative model.
Approaches that should be avoided during commissioning are the traditional telecare models that focus on a unit cost per device or equipment solution rather than the outcomes being achieved by them.
Understanding that TEC solutions/packages will differ greatly in their complexity and level of interventions helps to inform charging mechanisms that will need to be employed when services are commissioned.

Varying rates will need to be adopted for various alerting functions, proactive interventions, and enabling technologies. Charging models will need to be flexible as needs change and benefits are realised at both an individual level and across the ICS.
An example of this is demonstrated through the example of Epilepsy and prescription of assistive technology to support people living with this condition and their progressive levels of need –

technology may be prescribed as part of a patient's hospital discharge and reablement process and this may be funded or funded in part by NHS.

Successful implementation will require more than just selecting technology

- the platforms will not recommend care or clinical actions to be taken – they supply data, insight and trend analysis that shows changes are taking place.
- alerts created by platforms can still be monitored and managed by reactive telecare services, but the insights generated require new approaches.
- there must be a commitment to review and use the insights provided by Connected Care Platforms. This will require both process and behavioural change by practitioners and care professionals.
- the role of informal carers must also be considered and the part they play in reacting to insights provided.
- there needs to be clarity about where and when in the care pathway the insights are used.

Measures & Evaluation

Proactive & Preventative TEC provides numerous data points that build up a picture about the individual or cohort of people and these will be nuanced by the technology employed to support them out in the community.
Measures will include significant datasets relating to various elements of their independence, health, and well-being that drive outputs from the formal and informal networks of support around them. Understanding what measures are typically gathered by a proactive and preventative TEC service is essential for mapping integrations across these networks, both from an operational and technical perspective.

Connected Care relies on significant amounts of data being collected to inform (artificial) intelligence systems that deliver predictive insights for care. Data quality is essential and therefore standardisation and consistency of data collection is advantageous. Service models will be self-perpetuating as they are fed by increasing datasets and as a national picture is built up over time, these models will become increasingly dynamic in their understanding and predictive capabilities. When establishing a proactive and preventative TEC service, and indeed when piloting such an approach, commissioners should be mindful of what data is being collected, how it is collected, and the measures for achieving data quality and consistency.

The matrix in appendix B below illustrates a set of typical measures, intended as a starting point, that may be operated by a proactive and preventative TEC service using a connected care system approach; included are some suggested KPIs that would be present within a service of this type and indicate how risk stratification is embedded within such a service. As systems, assistive technologies and models of care progress, these measures will be expanded to include new data points and categories of data that would need to be assessed and mapped for performance and appropriate action.

Appendix A – Glossary of Terms

Artificial Intelligence (AI)	A machine capable of learning and making decisions for itself.
Telecare	Telecare is the continuous, automatic and remote monitoring of real time emergencies and lifestyle changes over time in order to manage the risks associated with independent living. Support is generally provided through an alarm unit and range of peripheral devices in the home (e.g., smoke detector, property exit sensor, CO detector, bed occupancy detector) connected through telephony to a 24/7 Alarm Receiving Centre (ARC), which will take appropriate action based on the identified need and connect to the appropriate method of response (family member, mobile responder service, ambulance intervention)
Telehealth	Telehealth systems support people with long term conditions (LTC's) such as Chronic Obstructive Pulmonary Disease (COPD), Chronic Heart Failure (CHF) and Type 2 Diabetes to self-manage, remain more independent, support early hospital discharge, and reduce the dependency on primary health and GP (general practitioners) services. Telehealth services usually consist of a smart hub that allows the patient to enter vital signs data or have the data collected by various devices (blood pressures readers, pulse oximeters, and blood glucose monitors) which automatically transmits the readings to the hub and/or onto a clinical or non-clinical monitoring service.
mHealth	Telehealth accessed via mobile phone technology and Apps. Younger service users and patients adopt these technologies to give greater flexibility to access these services. A further mHealth application is the use of GPS and GPRS to provide safe walking services to people with dementia, early-stage Alzheimer's and learning disabilities.
Assistive Technologies (Environmental Controls)	Enables people with severe disabilities to function as independently as possible by using devices that allow them to carry out day-to-day activities such as switching on lights, opening curtains, turning on the TV and using a computer though a range of switches and sensors operated with only limited movement.
Telemedicine	Enables specialists and consultants to support patients and other professionals remotely to diagnosis and recommend treatments. Telemedicine systems are employed mainly in an acute health environment
Application Programming Interface (API)	An interface that allows software programs or apps to communicate to each other regardless of how they were originally designed.
Proactive Services	Taking action by pre-empting situations (identified through formal and informal networks, assistive technology or connected care technology) and deploying the right solution in order that incidents are avoided, and independence is maintained or improved.

Appendix B – Proactive & Preventative Insights Matrix

Measure	Source	Alert Classification	Exacerbation/ Indicator	Associated KPI(s)	Likely output/action
Activity/Inactivity	Activity sensors	Low	Activity levels have declined slightly against the norm within a defined time period	90% of low-level alerts actioned within 24 hours	Care provider alerted Family alerted
Activity/Inactivity	Activity sensors	Medium	Activity levels have declined significantly against the norm within a defined time period or slightly over an extended period of time	90% of medium-level alerts actioned within 5 hours	Care provider alerted Family alerted Notification sent to GP/Nurse
Activity/Inactivity	Activity sensors	High	Activity levels have declined substantially against the norm or slightly/significantly over an extended period of time	90% of high-level alerts actioned within 1 hour	Care provider alerted Family alerted Notification sent to GP/Nurse for urgent escalation
Activity/Inactivity	Activity sensors	Low/Medium	Activity levels indicate unusual activity taking place such as more frequent trips to the bathroom	90% of low-level alerts actioned within 24 hours 90% of medium-level alerts actioned within 5 hours	Care provider alerted Family alerted Notification sent to GP/Nurse
Activity/Inactivity	Activity sensors	High	No movement detected within defined time period	90% of high-level alerts actioned within 1 hour	Care provider alerted Family alerted Notification sent to GP/Nurse

					for urgent escalation
Blood pressure	Telehealth/ Wearable	Low	Low/insignificant change in BP in-line with clinical assessment	Clinically determined response	Clinically determined response
Blood pressure	Telehealth/ Wearable	Medium	Medium/significant change in BP in-line with clinical assessment	Clinically determined response	Clinically determined response
Blood pressure	Telehealth/ Wearable	High	High/very significant change in BP in-line with clinical assessment	Clinically determined response	Clinically determined Response
Blood oxygen levels	Telehealth/ Wearable	Low	Low/insignificant change in O2 in-line with clinical assessment	Clinically determined response	Clinically determined response
Blood oxygen levels	Telehealth/ Wearable	Medium	Medium/significant change in O2 in-line with clinical assessment	Clinically determined response	Clinically determined response
Blood oxygen levels	Telehealth/ Wearable	High	High/very significant change in O2 in-line with clinical assessment	Clinically determined response	Clinically determined response
Glucose levels	Telehealth/ Wearable	Low	Low/insignificant change in Glucose in-line with clinical assessment	Clinically determined response	Clinically determined response
Glucose levels	Telehealth/ Wearable	Medium	Medium/significant change in Glucose in-line with clinical assessment	Clinically determined response	Clinically determined response
Glucose levels	Telehealth/ Wearable	High	High/very significant change in Glucose in-line with clinical assessment	Clinically determined response	Clinically determined Response
Falls risk identified	Service user voice interaction	Medium/High		90% of medium-level alerts actioned within 5 hours 90% of high-level alerts actioned within 1 hour	Falls prevention service notified

Medication compliance	Medication monitoring/ calls	Low		90% of low-level alerts actioned within 24 hours	Service user prompted to comply with medication plan
Medication compliance	Medication monitoring/ calls	Medium		90% of medium-level alerts actioned within 5 hours	Escalation to Health professional to support
Medication compliance	Medication monitoring/ calls	High		90% of high-level alerts actioned within 1 hour	Urgent escalation pathway to Health professional to intervene
Degradation of mobility levels	Thermal Sensing cameras or sensors	Low	Mobility levels have altered slightly indicating change in circumstances in-line with clinical appraisal	90% of low-level alerts actioned within 24 hours	
Degradation of mobility levels	Thermal Sensing Camera	Medium	Mobility levels have altered significantly indicating change in circumstances in-line with clinical appraisal	90% of medium-level alerts actioned within 5 hours	
Degradation of mobility levels	Thermal Sensing Camera	High	Mobility levels have altered substantially, indicating change in circumstances in-line with clinical appraisal	90% of high-level alerts actioned within 1 hour	
Loneliness/isolation identified	Service user voice interaction	Low	Service user has indicated feelings of loneliness via surveying or technology	90% of low-level alerts actioned within 24 hours	Care provider alerted Family alerted
Exercise level decreased	Wearable	Low	Exercise levels have deviated from existing fitness/well-being plan	90% of low-level alerts actioned within 24 hours	Proactive calls initiated
Inability to exercise identified	Service user voice interaction				
Access to bathing facilities restricted	Service user voice interaction	Low	Service user has indicated that struggling to or no	90% of low-level alerts actioned	

			longer able to access bathing facilities	within 24 hours	
Unusual electricity usage encountered	IoT (internet of things) Technology	Low	Electrical usage high/low from norm encountered	90% of low-level alerts actioned within 24 hours	Care provider alerted Family alerted Housing provider notified
Eating/drinking	Activity sensors Hydration monitoring Thermal sensing camera Service user voice interaction	Low	Eating/hydration levels have altered slightly indicating change in circumstances in-line with clinical appraisal		
Eating/drinking	Activity sensors Hydration monitoring Thermal sensing camera Service user voice interaction	Medium	Eating/hydration levels have altered significantly indicating change in circumstances in-line with clinical appraisal		
Eating/drinking	Activity sensors Hydration monitoring Thermal sensing camera Service user voice interaction	High	Eating/hydration levels have altered substantially, indicating change in circumstances in-line with clinical appraisal		

Proactive & Preventative TEC Guidance
and Definitions for Commissioners

TEC Quality

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