The London Ambulance Service NHS Trust

Digital Strategy

A digital, data and technology strategy to enable a world class Ambulance Service for a world class city.

Update February 2019

CIO's foreword

London is one of the world's leading digital cities. Londoners are tech savvy, using contactless payments millions of times a day to travel, eat and shop. Penetration of smart phones is amongst the highest in the world, mobile data coverage is ubiquitous and London's tech sector is one of the most advanced.

In 2018 the Mayor launched his vision to make London the smartest city in the world and the new NHS long term plan rightly identifies technology as a key enabler of improving the quality of care we provide as well as the efficiency in doing so.

At the heart of everyday life in London is the NHS and The London Ambulance Service is one of its most visible components. The London Ambulance Service is one of the largest and busiest ambulance services in the world, serving a growing population of 8.6m people in one of the most socially and culturally diverse cities on earth. Londoners rightly expect the best possible healthcare and we are at the frontline of urgent and emergency care provision all day, every day.

The public expects healthcare professionals have access to their health records, to capture what we do digitally and to share that information with their GP and other relevant healthcare providers. They expect us to be harnessing the best innovations that push forward the quality of care. They expect the best care, appropriate for their individual needs, as quickly as possible, no matter how they contact us. And they expect our services to be resilient and secure in the face of increased threat of cyber-attack.

We deliver care in a complex range of settings that provide unique challenges to digital transformation – from the vibrancy and energy of Notting Hill Carnival to the depths of London Underground with everything else in between, spread out across the 620 square miles of London. We receive nearly 2 million 999 calls each year – that is 15% of all 999 calls in England - as well as nearly 1 million calls to the two NHS111 services we operate in East London.

Our vision is to be a world-class ambulance service for a world-class city. As the only NHS provider Trust that operates across London, we are uniquely positioned to play a leading role in the digital transformation of urgent and emergency care across the capital. Yet the state of our digital services and basic IT, like much of the NHS, is far behind where it needs to be.

This strategy sets out how we will use digital services to:

- get the basics right to run a world class organisation
- improve the quality of care we provide
- address the patient's needs at the earliest possible point of contact
- treat more patients on the phone and online, avoiding unnecessary ambulance dispatch
- treat more patients on-scene, avoiding unnecessary conveyance to A&E
- improve the utilisation and performance of our assets.

This strategy is rightly ambitious. The pace of change and investment in technology across healthcare is accelerating at a tremendous rate. We will proudly harness that change and play our role to deliver improvements in urgent and emergency care across London.

Ross Fullerton, Chief Information Officer

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1 Executive Summary

1.1 Digital transformation of a world class ambulance service

The LAS Five Year Strategy details how we will improve the way we provide care to the people who live, work and travel in London, with a vision of being a world-class ambulance service for a world-class city. The strategy identifies that to achieve this we need to be at the forefront of using technology and digital innovation. We not only want to use available technology, but want to lead the way in developing, piloting and utilising new technology.

Digital transformation and technological improvements are integral to each of the Trust's three strategic themes:

1. **Comprehensive urgent and emergency care coordination, access, triage and treatment, with multichannel access for patients**

   Our 999 and 111 contact centre staff will meet the needs of more patients at point of first contact. We will achieve this by providing our clinicians with access to patient records, expand the ability to book patients into appropriate care settings and send prescriptions directly to a local pharmacy. We will use our unique geographic footprint and system-wide data to optimise access to urgent and emergency care

2. **A world class urgent and emergency response with enhanced treatment at scene and for critically ill patients a faster conveyance to hospital**

   Our ambulance crews will convey fewer patients to emergency departments and provide better quality care at home. We will achieve this by providing our clinicians with access to patient records, video triage support and digitising our patient care records

3. **Collaborating with NHS, emergency services and London system partners to provide more consistent, efficient and equitable services to Londoners**

   We will improve the efficiency, coordination and management of London's urgent and emergency care provision. We will achieve this by connecting the unique pan-London data that we manage with data from across the healthcare system to inform strategic planning decisions as well as day-to-day decisions for specific patients

Whilst our focus is on transformation based upon the Trust's strategic themes, we also need to get the basics right. We need to be efficient, effective and agile in our corporate environment to deliver the transformation needed across the organisation. This need stimulates the inclusion of a fourth complimentary theme.

4. **Sustainable and Effective Corporate Functions**

   We will improve our core technical infrastructure, modernising our corporate systems, developing our exploitation of data, and innovating to improve our information flows and working practices and transform the internal running of our organisation.

1.2 The LAS's digital challenge

When compared to other Ambulance and NHS Trusts, digital maturity across the LAS is low and legacy technical complexity is high.

We rely on manual or paper-based processes to manage a variety of processes from patient records to staff training and development. We don't routinely have access to patient data that is available in other NHS care settings and we don't use data to efficiently plan the maintenance of our fleet. The systems we do have in place are rarely connected in a way that delivers reliable intelligence to inform better decision making.

Whilst there is a continuous programme to maintain and update systems, this has been done in the main with a traditional in-house refresh or renewal approach. As a result the Trust continues to directly manage a number of outdated legacy systems designed to suit the needs of the past. The combined web of systems is overly complex and does not provide the modern capabilities you would expect “out of the box” from modern systems.

From the Carter report it is evident that compared to other Ambulance Trusts this approach has led us to maintain systems that are inflexible and are costly to manage, secure and refresh. This is very apparent in the EOC environment and with standard “office” services provided to staff.

This strategy proposes significant step-changes in the way solutions are delivered. In particular there is a key decision to be made by the Trust on whether LAS should continue to invest in enhancing the existing core CommandPoint CAD system (only used by the LAS in the UK) or make an alternative investment to procure and implement a more standard and modern CAD, already in use elsewhere in the UK. In the corporate arena there are also decisions to be made such as whether we continue to manage our own Microsoft Office and e-mail environments or move to services managed and secured by others such as the NHS Digital managed NHS Mail service; as 80% of other Trusts do.

Strategically we need to move our focus away from directly developing and managing tailored technology systems in preference to using standard solutions already in use elsewhere. This will enable us to concentrate on ensuring our core digital services, intelligence and interoperability delivers continued stability and digitally enabled transformation for the benefit of our patients, people and the public.

The Trust will need to make some bold decisions to better balance modernisation, value and agility against traditional desires of ownership, tailoring and control.

1.3 Achieving our ambition

Achieving our ambition requires substantial changes to how the trust operates clinically, operationally and corporately. We have identified seven pillars to underpin our digital strategy.

1. **Digitise the patient journey**

   Implementing electronic patient records, transforming our operations centres, and enabling electronic referrals and handovers

2. **Connect clinicians and clinical data**

   Ensuring our people are fully connected, wherever they are, with access to the clinical applications and patient information that they need

3. **Interoperate across London**

   Connecting with other care providers across London and nationally, integrating our systems to provide access to patient records, service availability, automated bookings and referrals, and linking our data with that of partners across London to provide a complete picture of the patient journey and outcomes. We are uniquely positioned to play a leading role in the integration of London’s health and care records.

4. **Leverage external technology services**

   Accelerating delivery by aligning with national and regional initiatives, standards and services which can help us, and partnering with suppliers to deliver changes and commodity technical services.

5. **Sustain and modernise our core services and infrastructure**

   Continuing to operate, secure, and modernise our infrastructure to support resilient ambulance and 111 operations, including implementation of recommendations from recent reviews such as the Carter review.

6. **Build an advanced data and analytics capability**

   Transforming to a data-driven organisation by better managing, linking, and exploiting the valuable data which we hold or have access to as a pan-London organisation

7. **Transform the employee experience**

   Increased remote working and use of modern and innovative tools, modernising our internal business systems to support more efficient ways of working and the wellbeing of our staff.

1.4 How we will deliver

We will establish a set of programmes to deliver the outcomes in this strategy and continue delivery of the Connecting Clinicians[1] programme.

Our high level deliverables are:

By 2020:

- All ambulance crews can access detailed patient records
- 999 & 111 contact centre clinicians can access detailed patient records
- Electronic patient care records captured for patient attendances
- Automated transfer of care to appropriate providers
- Establish analytics platform
- Corporate systems moved to cloud-based services such as Office 365 and NHSMail
- New control room systems implemented to replace Airwave ICCS
- Deploy national mobilisation application in vehicles
- Achieve Cyber Essentials Plus

By 2022:

- Implement a replacement computer aided dispatch (CAD) system
- Achieve ISO27001 for Information Security Management
- Implement Emergency Service Network in full
- Fully integrate analytics platform with all data sources
- Introduce voice automation in call handling and major incidents
- Implement video capability for 111 and 999 patient

To achieve these deliverables requires a step change in capability and leadership across the Trust. The transformation described in this document is far-reaching and requires comprehensive business change: it will require process re-engineering, patient engagement, staff and system co-production, commercial acumen and clinical leadership.

[1] Connecting Clinicians delivers electronic patient care records (ePCR) and our role in London's Health & Care Records programme

1.4.1 Governance & Control

Oversight and scrutiny of delivery will be by the Logistics & Infrastructure board committee. A programme board structure will be established with cross-trust representation that reports into the trust-wide Portfolio Management Board

1.4.2 Skills & Leadership

Our people are essential to everything we do and it is critical that we support our workforce with skills and technologies to help them do their job. We will invest in training for all staff to develop skills that can fully exploit new digital technologies and tools.

The trust has recently appointed a Chief Clinical Information Officer (CCIO). This is a pivotal role in the transformation which is accountable for the ensuring our digital deliver meets the needs of the clinical strategy and workforce.

We will actively participate in national development programmes such as the NHS Digital Academy which has been set up to develop a new generation of excellent digital leaders who can drive the information and technology transformation of the NHS. We will work with partners in the NHS to develop our capacity and capability across Clinical IT systems, Business intelligence & analytics, Business change and project delivery, finance and commercials.

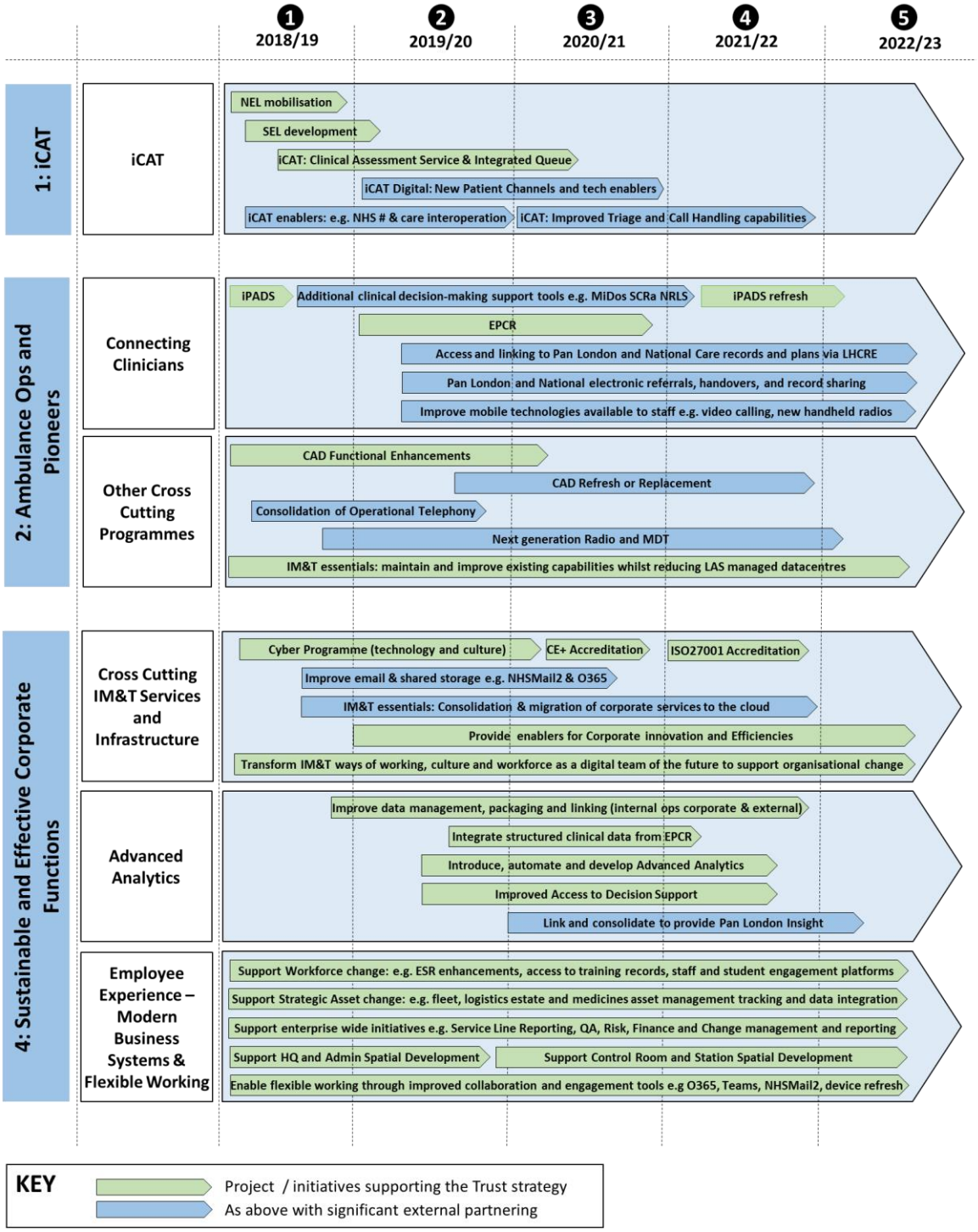
1.4.3 Exploiting Emerging Technology Trends

Emerging technologies offer exciting opportunities to dramatically improve patient outcomes and ways of working. The scope of emerging technology trends is broad, however there are three main areas of emerging technology trends that, if exploited as part of the delivery programmes, will be key enablers to our Digital Strategy in the longer term.

Artificial Intelligence and Analytics	New and improved devices	Intelligent Infrastructure
• Using advanced algorithms, and analysing big data and social media to provide enhanced intelligence and improved operational planning and execution. • Examples: Automated analysis of video and images, Predictive analytics, Natural Language Processing.	• New tools and devices allowing for new ways of working while creating new channels for receiving information and commmunicating with patients. • Examples: Unmanned drones and vehicles & wearable technology	• New ways to receive information about incidents to improve service levels and reduce costs. • Examples: Roadside sensors, Vehicle Infrastructure Integration, Connected homes & buildings.

1.4.4 Plan and funding

A summary roadmap for change is shown below. It will continue to be developed through our ongoing processes for business planning. In line with this process, the next 3 years are relatively firm with the roadmap also providing an indicative view out to 5 years.



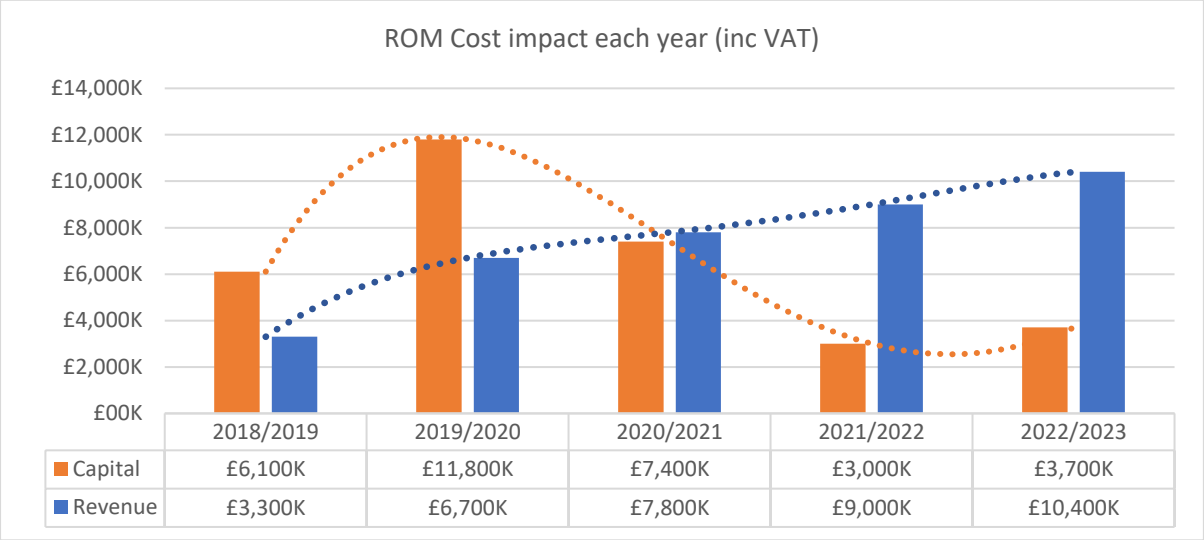
It is worth noting that there is, by intention based on Strategic Theme 3, a high degree of partnership and external dependency in many of the activities. This will again increase the complexity and management attention required to ensure delivery.

The Trust does not currently have the internal delivery capacity to enable this level of change in the timescale set. Increasingly the Trust will need to make better use of managed services, building on our use of arrangements such as the Crown Commercial Service frameworks, to deliver desired digital outcomes.

A very significant input of executive leadership and management attention across the Trust will be vital throughout the period to drive this level of activity and change.

We believe the roadmap to be ambitious – requiring an investment in the order of approximately £40-70m (including capital and revenue costs) over the next 5 years. We will need to access external funding from sources such as Health System Led Investment (HSLI) funds.

The Rough Order of Magnitude (ROM) model is shown in Appendix F. This is a ROM rather than a fully qualified cost estimate. The following table shows the estimated ROM impact per year, shown as split between the constituent Capital and Revenue.



	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023
Capital	£6,100K	£11,800K	£7,400K	£3,000K	£3,700K
Revenue	£3,300K	£6,700K	£7,800K	£9,000K	£10,400K

Note: This does not include the impact of cash releasing benefits

At this stage the analysis does not include the impact of Trust efficiencies (whether directly or indirectly) attributable to the Strategy, however, this will be compiled through the business planning processes to contribute to the transformation cost.

The detail of the phasing, costs and funding across years will be refined through Trust business planning activity and the development of individual business cases across the 5 years of the strategy.

1.4.5 Alignment with NHS Long Term Plan and Tech Vision (2)

The new NHS long term plan, published in January 2019, outlines how across all parts of the NHS technology will be upgraded and that “over the next ten years investments in technology will result in an NHS where digital access to services is widespread. Where patients and carers can better manage their health and conditions. Where clinicians can access and interact with patient records and care plans wherever they are, with ready access to decision support and AI, and without the administrative hassle of today.”

Aligned with the new long term plan, The Secretary of State for Health & Social Care, the Rt Hon Matt Hancock MP, launched his Tech Vision for the NHS in October 2018. The tech vision sets out real challenges to overcome:

- legacy technology and commercial arrangements
- complex organisational and delivery structures
- a risk-averse culture
- limited resources to invest

[2] https://www.gov.uk/government/publications/the-future-of-healthcare-our-vision-for-digital-data-and-technology-in-health-and-care/the-future-of-healthcare-our-vision-for-digital-data-and-technology-in-health-and-care

- a critical need to build and maintain public trust

At the heart of this vision are 4 guiding principles we should maintain to make this work:

- user need
- privacy and security
- interoperability and openness
- inclusion

We will adopt the vision wherever possible and use it to guide our delivery plans.

Appendix G, National Alignment, shows in more detail how this Strategy aligns with the NHS Long term plan, the Tech Vision for the NHS and the National Ambulance Digital Strategy.

1.5 Conclusion

Our vision to be a world-class ambulance service for a world-class city is underpinned by a Trust strategy which sets out a case for significant business transformation. As the only NHS provider Trust that operates across London, we are uniquely positioned to play a leading role in the wider digital transformation of urgent and emergency care across the capital.

Modern and transformational digital, data and technology capabilities will be intrinsic to our future and to improvements in patient care to Londoners; yet the state of our digital services and basic IT, like much of the NHS, is far behind where it needs to be to realise this ambition.

Overall the planned digital roadmap is rightly ambitious, and requires significant investment and executive leadership. Whilst these challenges could be eased by extending the timeline, this would be at the expense of a slower pace of delivery.

The potential benefits to our patients, public, partners and our people make this a worthwhile plan to pursue vigorously.

The remainder of this document describes the digital vison, and how we will achieve it in more detail.

2 Digital Transformation of a World-Class Ambulance Service

A world-class ambulance service needs to be at the forefront of using all technology and digital innovations to provide the best possible service to London. Delivery of our Trust Strategy requires us to be innovative and to embrace digital transformation across the organisation.

This section sets out our vision for the future, outlining how digital, data and technology will support the Trust's strategic themes between now and 2023.

2.1 Our Vision – Technology and Data Supporting Digital Transformation

This Digital, Data and Technology Strategy plays a critical role in the delivery of our services, and a central role in supporting the achievement of strategic change in the way LAS delivers care.

> *"Technology is a critical component of the NHS modernisation required to meet rising demand and expectations and improve outcomes"*
>
> Rt Hon Matt Hancock MP, Secretary of State for Health and Social Care

Our vision is:

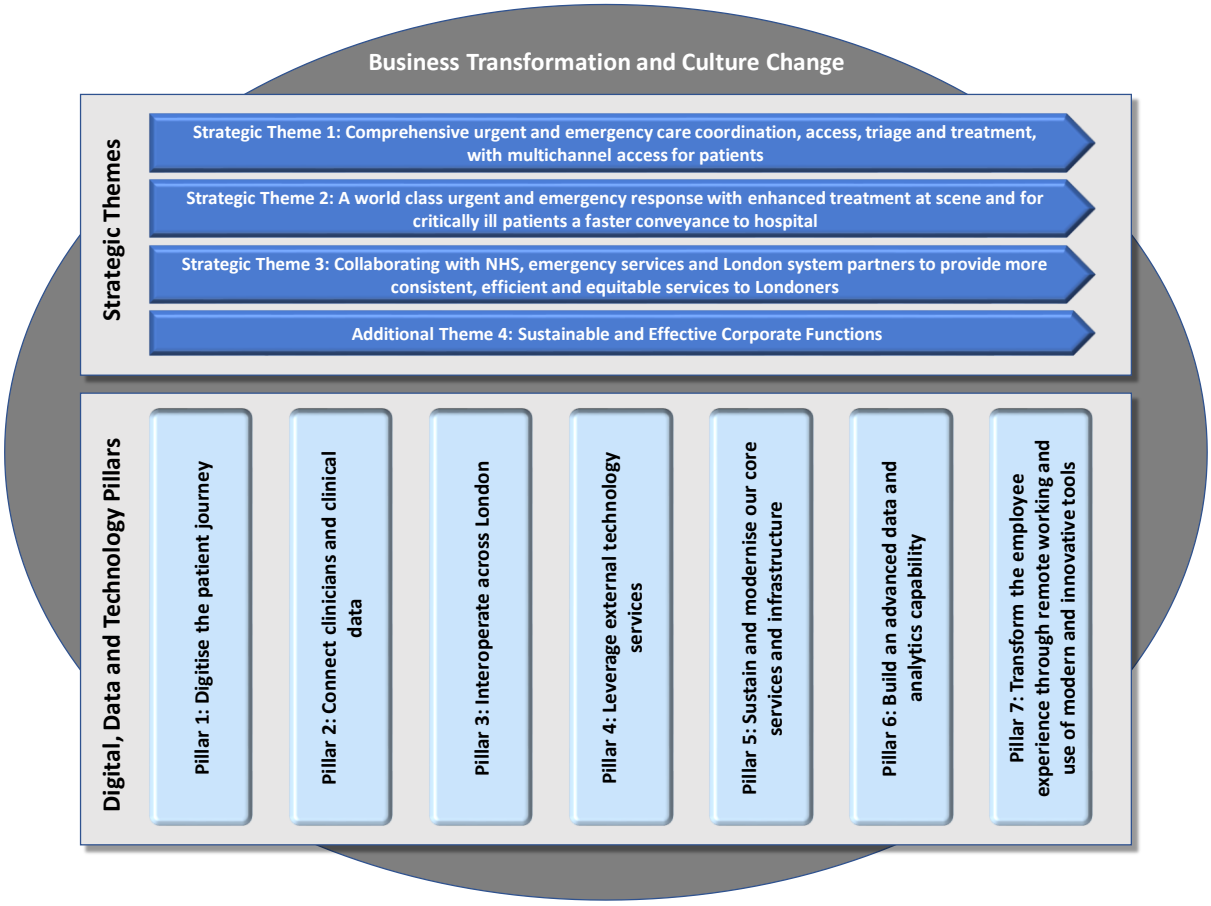
To drive digital transformation
through modern and innovative use of technology and data
for the benefit of patients, the public, our people, and our partners

- ***Digital*** in this context refers to the use of technology to drive transformative change - directly affecting Patients and the Public, Our People, and Our Partners.
- ***Technology*** underpins digital transformation by providing the tools, infrastructure and applications to support our work.
- ***Data*** is a valuable asset which we need to make sure we are managing, analysing and sharing to support decision making by our strategic and operational teams.

This transformation requires us to move away from fragmented digital, data and technology approaches to collectively enable and stimulate improvements in patient care. We will move to a combined mind-set, providing innovative yet robust technology solutions to manage new and diverse information collected and held by ourselves and our partners, engaging and empowering our people, patients, partners and the public in increasingly digital forms.

We will digitally empower our people to effectively deliver care for our patients; we want patients to be digitally connected to all health services, and we aim to be digitally working with partner organisations.

2.2 Our Approach - Pillars supporting Business Transformation



The diagram illustrates how our vision can be achieved, based upon enabling our three strategic transformation themes and supported by the additional theme of sustainable and effective corporate functions. Each of the themes is enabled by Digital, Data and Technology – and we have identified seven key areas of activity which provide the supporting pillars from a digital, data and technology perspective. A wider agenda of business transformation and culture change underpins the whole picture.

In terms of the seven pillars, these have already been introduced in the previous section so here we elaborate more specifically the support each one will provide. The following chapters then explain in more detail how the relevant pillars support each strategic theme.

Pillar 1: Digitise the patient journey
We will:

- Implement electronic patient records, migrating from paper to a digital clinical records system
- Introduce new channels such as video-calling to enhance our interaction with patients to improve clinical outcomes
- Integrate workflows across 999 and 111 to deliver appropriate, seamless patient care regardless of the number called.
- Invest in resilience and interoperability of our Computer Aided Dispatch (CAD) capability
- Capture the NHS Number whenever possible and use it to help identify patients and access data
- Identify frequent callers to better manage their care

- Enable electronic prescribing by appropriate clinical staff across our services
- Introduce additional clinical decision-making support tools
- Enable electronic referrals and handovers, supported by access to the directory of services which is a live resource providing information on appropriate care pathways.
- Explore the potential of voice automation and evaluate its suitability in call handling

Pillar 2: Connect Clinicians and Clinical Data
We will:

- Upgrade the mobile technologies available to our staff including implementation of the Ambulance Radio Programme which replaces the national Airwave system.
- We will adopt the national in-vehicle mapping and dispatch tools funded by the Department of Health to replace our locally developed Mobile Data Terminals.
- Expand upon the deployment of iPads to front-line clinicians to enable mobile access to core clinical applications
- Provide access to external patient records so that our clinicians can be better informed about a patient's history
- Enable electronic referrals and handovers, supported by access to the directory of services which is a live resource providing information on appropriate care pathways.
- Use video-calling to allow clinicians to provide peer support and advice to each other (e.g. real-time access to specialist consultants, mental health nurses, pharmacists or GPs for advice regarding a case).

Pillar 3: Interoperate across London
We will:

- Connect with other Health and Social Care providers across London (for example via the LHCRE), enabling interoperability between our systems to provide access to patient records, information about service availability, and automated handovers, appointment bookings and referrals.
- Link our data with that of partners across London to provide a complete picture of the patient journey and outcomes, thus gaining insight into the wider health and social care system and optimising and transforming the way we work

Pillar 4: Leverage external technology services
We will:

- Play a leading role in pan-London healthcare data interoperability such as the One London programme funded by NHS England's Local Health and Care Records Exemplar (LHCRE) programme.
- Accelerate delivery by aligning with national and regional initiatives which can help us. There are many opportunities to leverage external skills and opportunities, and by doing so we can achieve more, at greater pace and lower cost, than we could by working alone
- Identify technologies and solutions which are needed but can already be provided by others or are commodities. This includes the use of cloud wherever relevant. These opportunities will be embraced through partnerships and commercial arrangements, thus reducing costs and freeing up our time for the transformational innovation needed.

Pillar 5: Sustain and modernise our core services and infrastructure
We will:

- Consolidate, secure, and modernise our infrastructure to support resilient ambulance and 111 operations - The intention is to make sure required services are maintained

and functional, with appropriate resilience, consolidating software and services, and updating our data centres only where necessary. The primary approach is to move services to the Cloud where practical. Where end-of-life systems cannot move to the Cloud immediately, the services they provide will be assessed to either be moved to third party data centres, be run as hosted services or be replaced as best fits their provision.

- Implement recommendations from recent reviews such as Carter and the Operations Centre Review
- Implement NHS accredited email such as NHSMail2 or Microsoft Office 365
- Refresh our 999 and 111 telephony infrastructure
- Upgrade our mobile communications and devices, to ensure that we put modern connectivity in the hands of crew staff
- Continue to address cyber vulnerabilities by investing in modern infrastructure, protective controls, threat intelligence and data loss prevention capabilities and education across the organisation
- Transform our ways of working within the IM&T directorate. To achieve this step-change we will need to change our culture, and develop our workforce and the capabilities of our digital team of the future to support organisational change

Pillar 6: Build an advanced data and analytics capability
We will:

- Become patient data oriented with the patient at the centre of all our decisions
- Implement a self-service analytics platform that provides an integrated single source of truth for all data and intelligence decisions
- Transform to a proactive, evidence-based organisation, recognising data as a valuable corporate asset which we need to manage and exploit
- Improve the management of our data - assuring its quality, linking it across patient, operational, corporate and external systems, and packaging it in ready-to-use formats. Holding data in an unstructured or disparate way may act as a barrier to modernising ways of working and mobility whereas having good quality and structured data available will be a critical enabler when it comes to designing and implementing our strategic objectives around iCAT, pioneer services and partnership working
- Develop asset management capability for predictive maintenance across estates and fleet
- Better exploit our data - developing our tools and infrastructure for Business Intelligence, applying advanced analytics such as forecasting and machine learning, and producing accessible information to support decision making. This will improve the quality of decisions made in the Trust – all the way from the individual patient to the boardroom
- Transform our ways of working within the Performance directorate. To achieve this step-change we will need to change our culture, and develop our workforce and the capabilities of our digital team of the future to support organisational change

Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools
We will:

- Modernise our internal business systems to support more efficient ways of working and the wellbeing of our staff. New robust systems will ensure that we can run our organisation more efficiently, properly train our people, and be able to manage a more complex fleet and multi-skilled workforce.

- Enable flexible working for our people. The majority of our staff are mobile and we have other pressures such as costly estate which means we should be more flexible in where and how our people can work.
- Be bolder and more innovative in our use of technology - to the benefit of Patients and the Public, Our People, and Our Partners. We need to take advantage of the opportunities which technology innovation can bring - putting in place processes to support innovation, whilst balancing the potential benefits against the risks inherent in providing a safe and efficient service.

These activities described under these pillars are important, but alone they are not enough. To deliver benefit it is vital that they are embedded within a wider organisational business transformation and culture change:

Business Transformation and Culture Change
We will:

- Recognise that the transformation described in this document is far-reaching and about far more than just technical solutions.
- Deliver appropriate training develop skills to fully utilise new digital technologies and tools. Our people are essential to everything we do and it is critical that we support our workforce with skills and technologies to help them do their job.
- Give proper attention to the planning of implementation and business change, involving staff who will be using new technology in the planning for its introduction.
- Make better use of managed services, building on our use of Crown Commercial Service frameworks, to help deliver desired digital changes services and outcomes
- Consider how technology can help improve job satisfaction. For example, by eliminating tedious tasks, or by providing feedback on outcomes
- Work at pace to implement these important changes and improve what we do
- Enable a wider business and culture change from “Board to Floor” thus ensuring that the benefits of digital transformation are unlocked.

2.3 Benefits – what it means to Patients, Public, Our People and Our Partners

The benefits to our patients and public, our people, and our partners are summarised below:

Patients and Public
• Can use a range of ways of contacting and communicating with us, and experience a single point of access; whether in person on scene, on the phone or on-line • Achieve better outcomes, due to a wider range of treatment and referral options, and improved learning and information flows across the system • Receive a more personalised service, based on more complete and personalised knowledge of their circumstances and condition • Are confident that we are using technology innovatively and appropriately for the benefit of Londoners, whether as individual patients or members of the public during a crisis.

Our People
• Are connected wherever they are – whether on-site, on-scene, or at-home • Are connected to data – including patient records and service information • Are empowered by modern and resilient technology – which is easy to use and "just works" • Are empowered by advanced decision support – which provides guidance based on previous experience and best-practice • Are empowered by training and career development – giving confidence in using digital tools and developing specialist skills • Are supported by modern ways of working and managing their personal needs in a modern digital world • Are empowered by an innovative and agile culture – to make improvements which improve patient outcomes and increase job satisfaction • Work together – using voice and video technology to communicate with colleagues and get help and advice wherever they are.

Our Partners
• Provide access to patient records and history • Enable us to provide an integrated "one-stop" approach to referrals and appointment booking • Work together to design efficient and high-quality patient pathways which may be complex but can be enabled by advanced in technology and communications • Share data with us, so that we can "join up" across the wider system to better understand our patients, clinical outcomes, patterns of demand and pressure in other parts of the patient's chain of care • Work with us to determine standards and technology that we can leverage to accelerate systems implementation • Work with us to identify opportunities for collaborative implementation and use of technology and data to avoid duplication of effort and complexity.

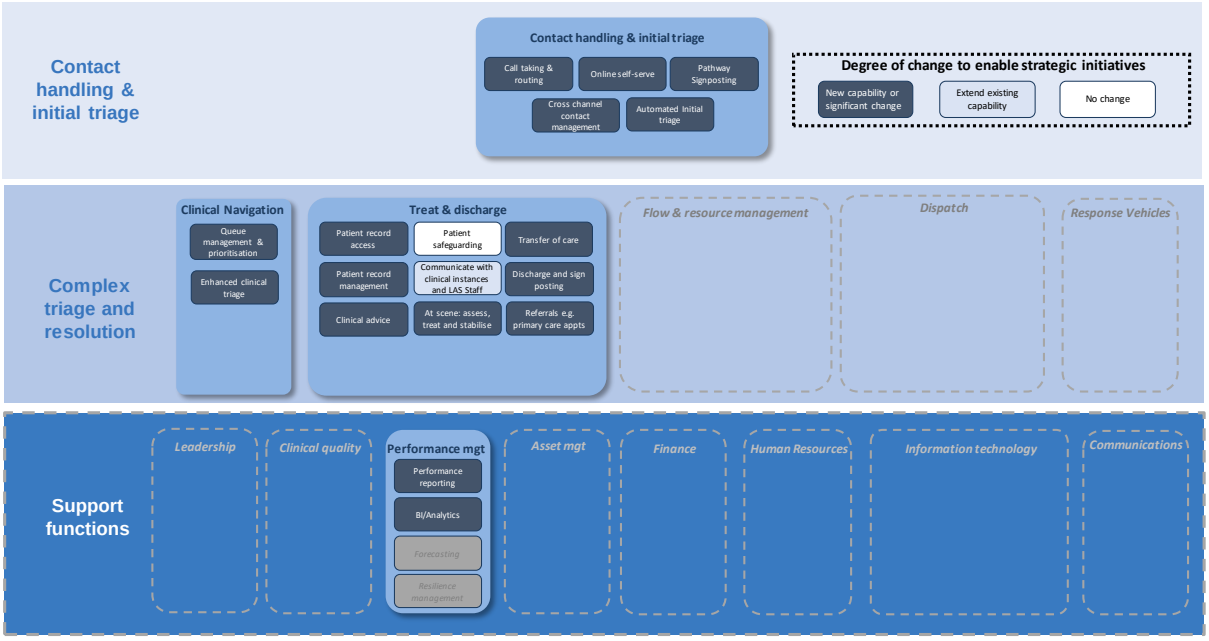
These benefits are further brought to life using a set of "day in the life" case studies in Appendix A – What will it mean for me?

3 Strategic Theme 1: integrated Clinical Assessment and Triage (iCAT)

Comprehensive urgent and emergency care coordination, access, triage and treatment, with multichannel access for patients

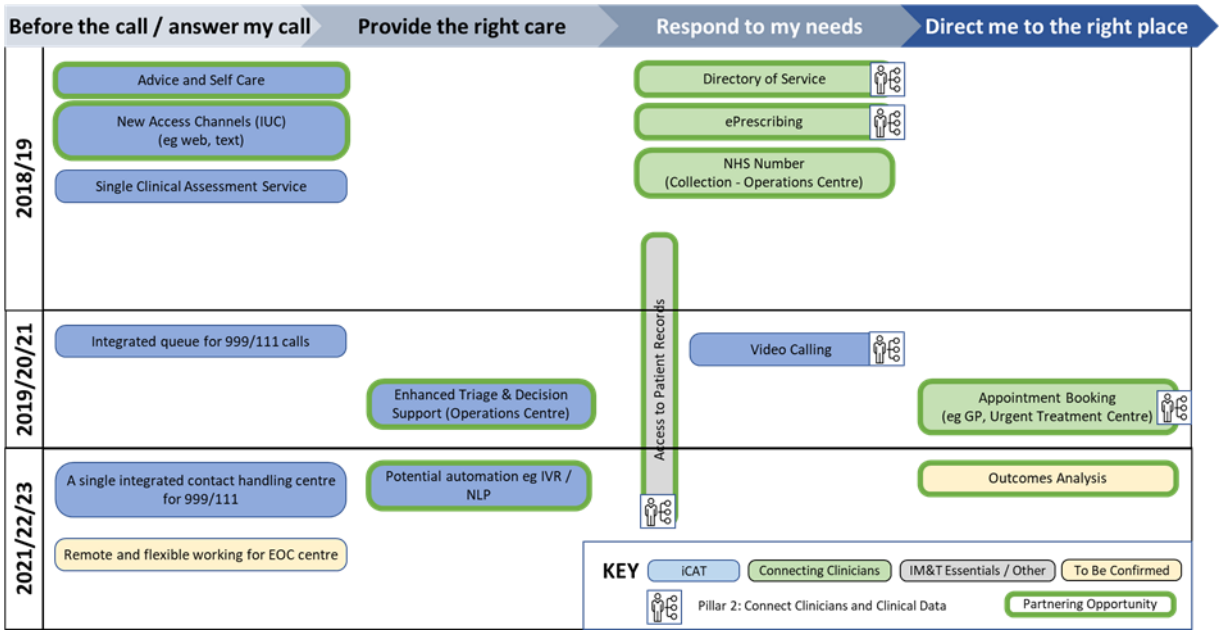
At the heart of our strategy is the idea that we want to manage and coordinate the flow of patients through urgent and emergency services, making it as easy as possible for people to access the help that they need. Our response is to develop an integrated clinical assessment and triage service: iCAT London, which will sit behind both NHS 111 and 999, providing integrated urgent and emergency care.

To set this Strategic Theme in context, it is useful to refer to our Business Capabilities Map. (See *Appendix B - Business Capabilities Map* for more about this and for a copy of the entire map). This theme corresponds to the development of our capabilities in “Contact Handling and Initial Triage”, as well as in those aspects of “Complex Triage and Resolution” which can be performed via the Clinical Assessment Service. “Performance Management” also plays an important role in closing the feedback loop. Relevant areas of the Business Capabilities Map are highlighted below:



3.1 Pillars 1 & 2: Digitise the patient journey & Connect clinicians and clinical data

This theme is strongly supported by both of the first two pillars. The diagram below is based on “Pillar 1: Digitise the Patient Journey” - and shows the steps of a typical patient journey with the enabling digital, data, and technology features. However some of these steps in this digitised patient journey also enable on “Pillar 2: Connect Clinicians and Clinical Data”, and these items are highlighted in the diagram. Relevant implementation projects and timeframes are also indicated.



Pillar 1: Digitise the Patient Journey
We will: • Use new channels such as video-calling to enhance our interaction with patients • Monitor opportunities for other emerging channels such as telehealth, apps, email, social media etc. based technology developments and National policy guidance • Transform our operations centres, putting in place advanced and integrated infrastructure for call-taking with a single queue across 999 and 111, and providing enhanced triage and clinical systems to enable integrated Clinical Assessment and Triage. Thus supporting the Trust in flexing services to better manage patient’s needs • Capture the NHS Number whenever possible and use it to help identify patients • Introduce additional clinical decision-making support tools • Deliver electronic prescribing, by appropriate clinical staff • Deliver electronic referrals and handovers, supported by access to the directory of services which is a live resource providing information on appropriate care pathways

Pillar 2: Connect Clinicians and Clinical Data
We will: • Provide access to external patient records so that our clinicians can be better informed about a patient's history • Deliver electronic referrals and handovers, supported by access to the directory of services which is a live resource providing information on appropriate care pathways

In more detail, key points along the process are:

3.2 Contact Initiated

As an alternative to phoning, patients may wish to contact us via other channels such as the web or messaging as well as, in future, potential via automated alerts from telehealth devices. In some cases patients may even be able to find the advice they need (or make an appointment) online - and so not need to make direct contact at all. This is an example of where we can leverage external capabilities – integrating with the National development of "111 Online" rather than having to invest in our own local implementation.

Internal work on telephony and queuing will then enable both 111 and 999 contacts to be handled via a single queue, as well as routed as necessary to the Clinical Assessment Service for specialist advice.

Developments in our technology infrastructure will also give us increased flexibility regarding where the call handler is located; whether in one of our Operations Centre or, potentially, at home.

3.3 Triage

The Trust currently uses three triage systems – NHS Pathways and Manchester Triage System (MTS) in 111 and the 999 clinical hub and Medical Priority Dispatch System (MPDS) in 999 call handling. Each system has its strengths however none can address all of the requirements of the service nor the opportunity to deliver a more tailored and sophisticated response.

Having information available on a patient as soon as they contact us including minimum patient dataset and past history of interactions with the NHS will enable a more personalised service and a more appropriate triage.

Powered with more information on an individual patient, and a vast evidence base of previous patient contacts and outcomes, new triaging tools and modules will assist in rapidly routing calls towards the most appropriate response. Whilst we will need to implement these tools ourselves, national initiatives such as the Clinical Triage Programme can assist with direction and standards.

In terms of innovation, we also intend to evaluate options for automating - where appropriate - some aspects of calls. For example, using technologies such as Interactive Voice Response (IVR), Natural Language Processing (NLP), and machine learning, to improve quality assurance auditing of calls or provide faster automated responses to callers where appropriate.

3.4 Advice / Treatment

The Clinical Assessment Service gives us new options for Advice / Treatment which do not necessarily require dispatch of an ambulance (Hear & Treat).

Putting in place the infrastructure for video calling will enhance the ability to diagnose remotely, as well as providing a richer interaction and “human face” for the patient.

Our clinicians in the Clinical Assessment Service will need to be fully connected with access to patient records – taking advantage of work to integrate with National and Regional systems to access these. They will also need to make use of external Directory of Service information and tools, to help navigate the wide range of potential treatment pathways.

In some cases our clinicians may also be able to treat the patient remotely – making use of integration with ePrescribing to remotely provide necessary medication.

3.5 Dispatch

To sustain the delivery of care to patients we must maintain our current key operational capabilities so that we can dispatch appropriate resources and manage the overall lifecycle of our patient contacts.

Currently we rely on a wide variety of interconnected technical systems surrounding our core CAD system (CommandPoint), such as separate mapping and triage systems, to provide the overall capabilities needed. This is a legacy model originally designed some twelve years ago at which point this approach was feature rich and moved the Trust away from an in house developed CAD system.

The majority of our dispatch systems and services including our CAD, 999/111 telephony infrastructure, mobile data communications and devices and radio systems, are due for refresh and enhancement during the timeframe of this strategy.

Whilst there is a continuous programme to maintain, update and upgrade these services, this has been done in the main using a traditional in-house refresh or renewal approach. This has resulted in the Trust relying on and managing a number of outdated legacy systems designed to suit the needs of the past. The combined web of systems is overly complex and does not provide the modern functional and disaster recovery capabilities you would expect “out of the box” from modern CAD and mobile data systems. The Trust invests heavily in, largely bespoke, developments and changes to the core CAD and MDT systems, where as other Ambulance Trusts benefit from more agile, standardised and shared developments. From the Carter report it is evident that compared to other Ambulance Trusts this approach has led us to maintain a capability that is inflexible and costly to manage, secure and refresh.

With the drive for our staff to routinely have seamless access to patient data that is available in other NHS care settings and digitally interoperate with other care partners, there is an emerging ongoing need to integrate the CAD environment with a number of new services and partners in more dynamic way.

Consequently the CAD capability roadmap in particular will involve more than just a technical refresh. The solution will need to cater for developing requirements for our “future CAD”, delivering functional and interoperability enhancements to provide this. Early work considering the implementation of recommendations from recent reviews such as Carter and the Operations Centre Review leads us to take a fresh view on the future of the Control Services environment. It is clear that other Ambulance Trusts enjoy similar, and increasingly better capabilities at a lower overall cost. Their systems incorporate many enhancements the LAS is looking to develop and other advanced functionality, as core elements.

Examples are:

1. CAD2CAD national	Transfer of incidents between Trusts
2. NHS number lookup	To identify patients and enable and end-to end patient record
3. SCR	To view and pull-in SCR information automatically based on the patient's NHS number
4. 999 – 111	Transfer of calls and patient details from the 999 environment to 111 call centres
5. Integration to the new national ICCS	To enable us to connect our CAD to ESN and maintain consistency of fleet and clinician status/locations with CAD.
6. Integration to the new national mobilisation application	To enable us to connect our CAD to the new national mobilisation application provided by the DHSC Ambulance Radio Programme to all ambulance services.
7. Seamless business continuity capabilities	To meet cyber patching, software upgrade and operational requirements (without going to paper)
8. Flag "at risk" or "care plan" based on patient details	Making use of the patient identity rather than geographic location to identify risks and existing care plans
9. Advanced mobile location	To make use of new technology developed to locate caller's smart phones and hence patients with greater accuracy
10. Pathways	Integrated Pathways triage protocols at point of contact
11. Multi-disciplinary 111 and 999 call-takers	To provide greater operational flexibility

Arguably the level of investment in providing the above enhancements to our current CAD solutions would be better invested in implementing a replacement CAD service which is already capable of providing these facilities as part of its core "out of the box" delivery. The Trust will need to consider the choice of approach carefully, not only to consider the overall cost and benefits implications, but also the pace and priority of the work along with the interdependencies with and the Trust's ability to deliver this change amongst other priority enhancements such as EPCR.

The mobile data elements of the dispatch capability will be replaced by the new national mobile data capability (known as the National Mobilisation Application)

3.6 Discharge / Next Steps

In many cases it may be that the Clinical Assessment Service identifies that the patient does need further help, but that this is not urgent enough to warrant an ambulance response. In these situations the clinician will need to use integration with National and Regional appointment booking systems – for example to make the patient an appointment with their GP, or at an Urgent Treatment Centre.

Finally, we need to monitor the effectiveness of our service, to make sure that new treatment approaches are having positive patient outcomes - providing feedback to our clinicians and the giving us the opportunity to adjust and improve where necessary. This is an example of how we can develop our exploitation of data. We will collate information about each call, link it to outcomes from the wider system, and apply analytics and machine learning to gain insight which can reduce variation and drive service improvement.

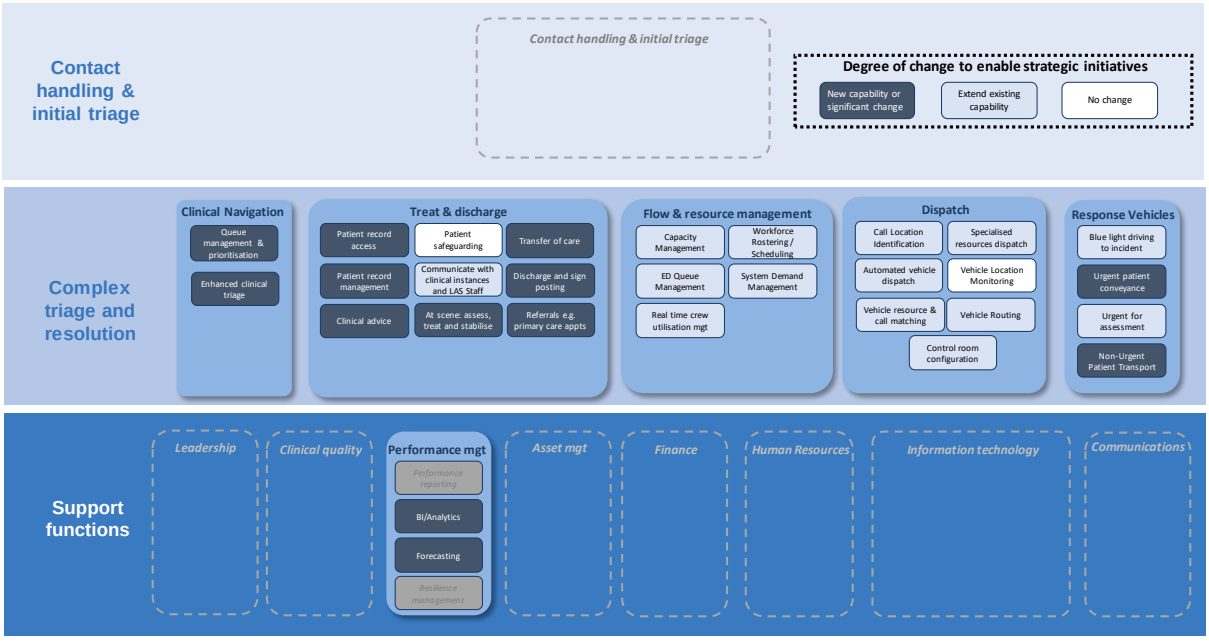
4 Strategic Theme 2: Ambulance Operations and Pioneer Services

A world class urgent and emergency response with enhanced treatment at scene and for critically ill patients a faster conveyance to hospital

Meeting the challenges of improving London's urgent and emergency care requires an ambulance service which places a clear emphasis on assessment and enhanced treatment at scene and in community settings, with transport to alternative care settings where required to access established pathways of care. Transport to hospital should be used for those patients who require the assessment and treatment skills and equipment available only within an emergency department.

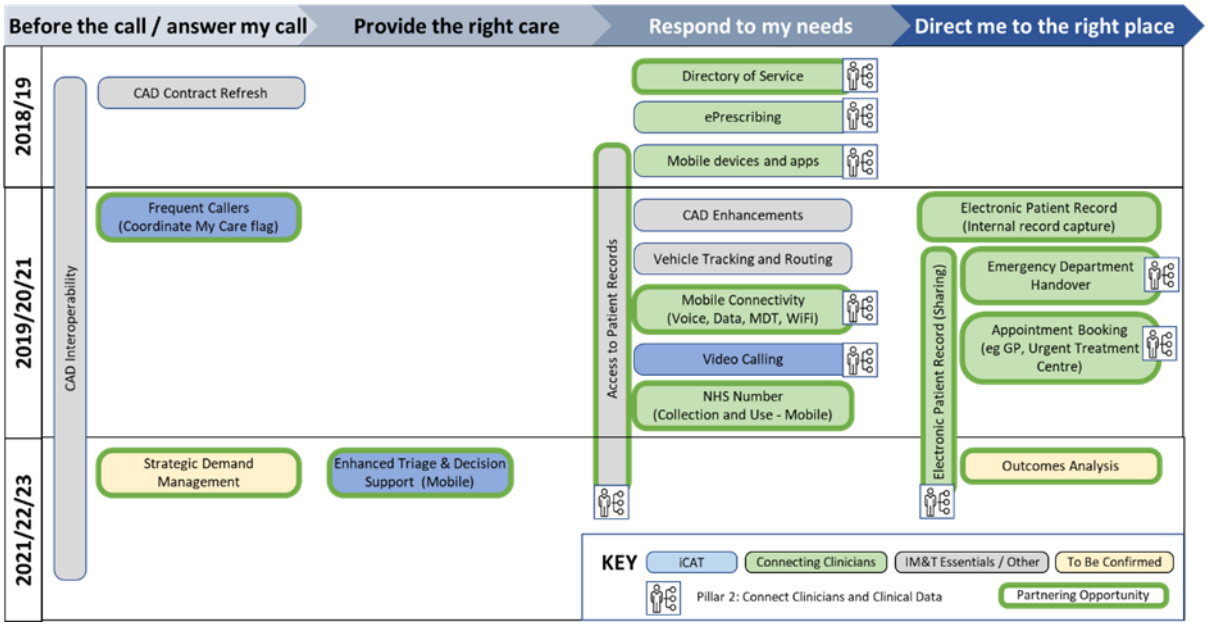
We will continue to support delivery of high quality care to all patients, especially those most critically ill and injured. Providing enhanced treatment at scene will enable us to use our staff and vehicles in the most effective way, preventing escalation and helping to manage demand on the wider health system.

This theme corresponds primarily to the development of our capabilities in "Complex Triage and Resolution; continuing to improve what we already do, but also providing a wider range of new care options for our patients. "Performance Management" again plays a role, especially in terms of service planning. Relevant areas of the Business Capabilities Map are highlighted below:



4.1 Pillars 1 & 2: Digitise the patient journey & Connect clinicians and clinical data

This theme is also strongly supported by both of the first two pillars. The diagram below again illustrates this - based on the steps of a digitised patient journey with the items relating to connecting clinicians and clinical data highlighted, plus an indication of relevant implementation projects and timeframes.



Pillar 1: Digitise the Patient Journey
We will: • Implement electronic patient records, migrating from paper to a digital clinical records system • Identify frequent callers to better manage their care • Modernise our CAD, enhancing functionality and interoperability • Introduce additional clinical decision-making support tools

Pillar 2: Connect Clinicians and Clinical Data
We will: • Upgrade the mobile technologies available to our staff including implementation of the Ambulance Radio Programme • Provide access to external patient records so that our clinicians can be better informed about a patient's history • Enable electronic referrals and handovers, supported by access to the directory of services which is a live resource providing information on appropriate care pathways. • Introduce additional clinical decision-making support tools • Use video-calling to allow clinicians to provide peer support and advice to each other (e.g. real-time access to specialist consultants, mental health nurses, pharmacists or GPs for advice regarding a case)

In more detail, key points along the process are:

4.2 Contact Initiated

Multiple channels for communication and better streaming of calls, as described in Strategic Theme 1: iCAT, means that those patients who need to get through quickly for an emergency response will have more options to quickly connect with the right level of response.

The introduction of EPCR also has implications for later themes, and specifically for “Pillar 6: Build an advanced data and analytics capability”. It means we can collate information about each call, enriching the raw statistics with personal information and clinical details around the individual. For example, recording why we do or don’t convey the patient would provide the input data to analyse whether alternative care pathways are in place and functioning. This data can then be joined with other sources in London, such as weather, traffic and demographics, to get a much richer understanding of drivers of demand. Analytics and machine learning can be applied to gain insight into patterns of demand and to build predictive models or where and when to best focus our resources.

4.3 Triage

Better streaming and triaging of patients, as described in Strategic Theme 1: iCAT, means that those patients who do need an Emergency physical response will be more likely to be seen to within the seven and eighteen-minute targets.

With the introduction of EPCR, the data collected from calls and incidents will be based around the patient and can therefore be more easily joined up with wider health system data to create a view of the whole patient pathway. This can be used to monitor and improve the triage process with a focus on the triaging decisions taken and the final outcome for the patient.

A point to note here is to re-emphasise the importance of enhanced triage tools. With the wide range of response options and Pioneer Services available, it will be important to provide decision support to help guide rapid and consistent selection of the most appropriate response for each patient’s needs.

4.4 Advice / Treatment

A fast response is vital for critically ill patients. New Mobile Data Terminals and navigation capability in our ambulances will assist with dispatching and routing vehicles as quickly as possible. There are also enhancements planned to the CAD system to improving features, interoperability resilience and helping to optimise job cycle times.

In addition to these improvements to existing ambulance operations, new pioneer services will be available to support the CAS and provide the expert help required for patients by offering differentiated services.

Many of the other aspects of providing advice and treatment are similar to those covered under Strategic Theme 1: iCAT. However, the emphasis now is on connecting our clinicians on-scene in a See & Treat scenario. It should therefore come as no surprise that the digital, data and technology capabilities required here are similar to those enjoyed by colleagues in the Operations Centre – including access to a Directory of Service, viewing of Patient Records and, potentially, prescribing.

Video calling is another common feature, although in this context it is likely to be more about allowing a clinician on-scene to get advice and support from specialists back in the Operations Centre or indeed elsewhere in the NHS. This could include the use of body-cameras to allow hands-free operation.

The emphasis of this theme is therefore on making these capabilities available to ambulance crews and Pioneer Services in mobile, on-scene, See & Treat scenarios. To this end projects such as implementation of the Ambulance Radio Project will provide the voice, data and Wi-Fi connectivity needed, whilst the provision of iPads will provide mobile staff with the ability to access these applications.

4.5 Discharge / Next Steps

A key activity here is the implementation of an Electronic Patient Record (EPCR) to record details of the patient interaction. Capturing this information in a structured electronic form has a transformative potential – both in terms of informing analysis of our own operations, and in allowing sharing with other healthcare professionals. National standards for this data are being developed as part of the Ambulance Dataset project, and we will need to align with these. Reducing the number of times that a patient's information is re-taken as part of a clinical handover will greatly improve patient experience whilst reducing this risk of information being missed.

Also enabled by the EPCR is the ability to provide electronic data transfers for Emergency Department Handover. This will streamline the administrative aspects of this process, helping to reduce job cycle times and allow our crews to be more quickly back on the road responding to patients.

The ability to refer and book appointments for clinicians on-scene in a See and Treat scenario should be the same as for their colleagues in the Operations Centre. The new strategy makes this capability vital if unnecessary conveyance to hospital is to be avoided.

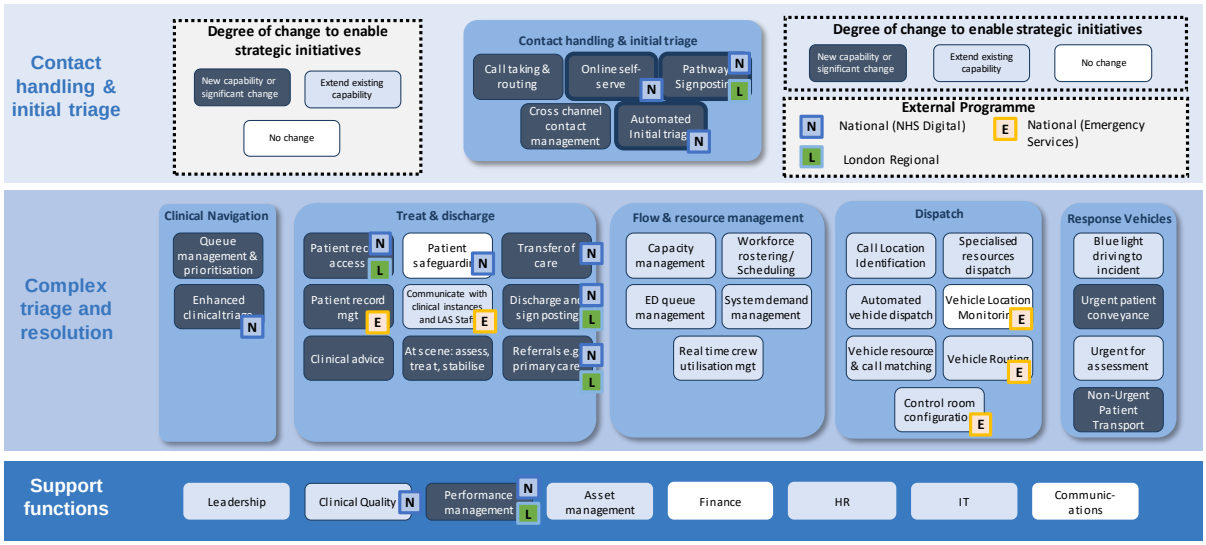
Finally we need to monitor the effectiveness of our service - to make sure that new Pioneer Service and treatment approaches are having positive patient outcomes. This again links to "Pillar 6: Build an advanced data and analytics capability" in terms of relying on information being captured and monitored as part of a structured evaluation programme as well as an ongoing feedback loop.

5 Strategic Theme 3: Partners

Collaborating with NHS, emergency services and London system partners to provide more consistent, efficient and equitable services to Londoners

We will develop collaboration, partnership and innovation across the full range of public services in London and will support all opportunities to improve patient outcomes and experiences and improve public value.

Increased interaction with partners represents a significant change in how we will deliver our digital, data and technology capabilities. This cuts across all aspects of the Business Capabilities Map - with opportunities in many areas as illustrated below:



These partnership opportunities may be broadly divided into those which involve interoperating across London to support the patient journey, and those which relate to how we source our technology solutions.

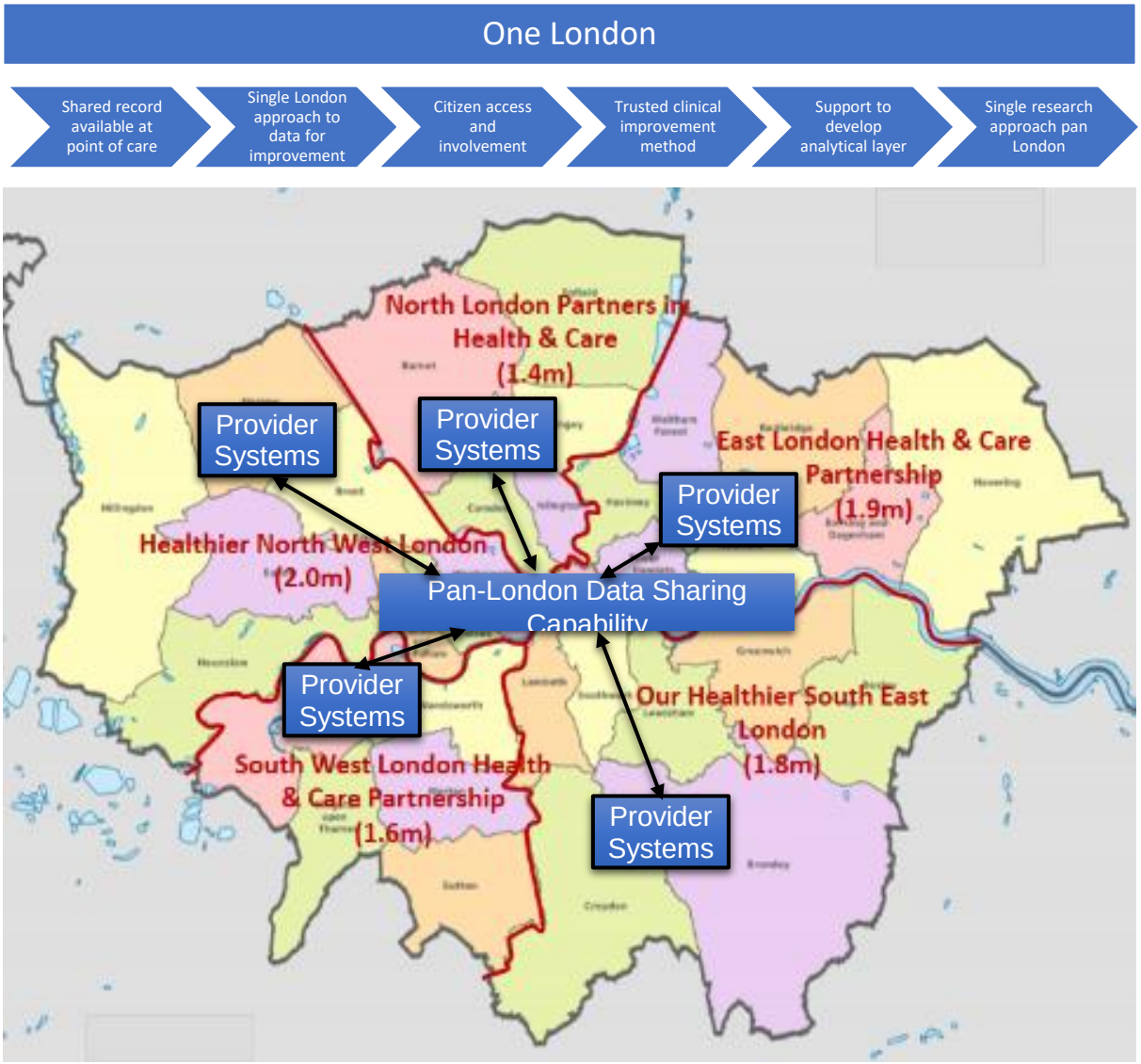
Note that this theme is somewhat different to the others - in that it is not a programme of work in itself, but rather it defines <u>how</u> we will go about implementing the activities described under each of the other themes

5.1 Pillar 3: Interoperate across London

5.1.1 Direct Patient Care

Pillar 3: Interoperate across London
We will: • Connect with other Health and Social Care providers across London (for example via the LHCRE), enabling interoperability between our systems to provide access to patient records, information about service availability, and automated handovers, appointment bookings and referrals.

Whilst an incident is in progress we need to partner with other health and social care services to provide the best possible response and patient outcomes. We are working closely with the London One London Local Health and Care Records Exemplar (LHCRE) programme, and anticipate this playing a key role in providing this integration.



The London LHCRE is tasked initially with developing a normalised, longitudinal, shared care record for each patient registered in London - and longer-term it will interoperate with LHCREs elsewhere to provide yet wider access to patient records. The approach will be based on open standards and the LHCRE will act as a broker for interoperability between health and social care organisations in London.

We are closely involved in the development and piloting of this important initiative, and will play our part by contributing data from our own Electronic Patient Record into LHCRE. The LHCRE will provide us with a single-point-of-contact, based on open APIs, with which to integrate our systems with. It will therefore be able to assist us in particular with:

- ***Access to Records*** – enabling interoperability between systems to provide access to patient records held by partners, so that our clinicians can be informed of the wider patient history and preferences
- ***ePCR Sharing and Referrals*** – sharing our own electronic records with others, such as the patient's GP

Note that enabling interoperability across London again underscores the importance of capturing the NHS Number as a definitive patient identifier across systems.

5.1.2 Pan London Insight

Pillar 3: Interoperate across London
We will: • Link our data with that of partners across London to provide a complete picture of the patient journey and outcomes, thus gaining insight into the wider health and social care system and optimising and transforming the way we work

The London Ambulance Service is the only pan-London Trust and therefore has a unique view of the health of the London population. As we become a primary integrator of access to urgent and emergency care we will need to go beyond working only with our own data and begin working with partners to gain insight across the wider Pan London healthcare system. This will involve linking data at three levels:

- Internal LAS datasets (e.g. ePCR, CAD, case mix);
- Wider London healthcare datasets (e.g. patients' health record and plans, outcomes from Emergency Departments); and
- Other non-healthcare datasets (e.g. population demographics weather, traffic flow).

Our goal is to monitor the full patient pathway. With automated access to more external data sources through new shared technology platforms (for example 111 activity data, GP records, patient pathway, and hospital admission data), we will be able to model demand, and to understand the impact of care throughout the urgent and emergency care system and provide further evidence for interventions that would improve the effectiveness or efficiency of care.

We again anticipate the London LHCRE playing a key role here to develop Pan-London analytic and population health capabilities. We will provide the LHCRE with data, and it then collates and links this with data from other providers across London - providing the results of analysis as an output. We expect this to be able to assist us with:

- ***Demand Management -*** Deep data insights around demography, weather, transport and infrastructure required to enable us to better predict demand. It is important to understand the geographic variation in the demand profile across London, and how the provision of services differs in each STP, this helps to understand the impact on patient outcome in different areas. This can be done to some extent within our existing capabilities but requires additional data to provide richer insight.
- ***Outcomes Analysis -*** Linking of emergency, urgent and hospital admission data will allow us to model and interpret full pathways to understand the flow of our patients and impact of response and pathway on patient outcomes for both emergency and non-emergency patients.
- We see the LHCRE as a key partner in understanding the full patient pathway through health and social care.

There will also be opportunities to join our data with other types of partners across London, for example:

- ***Academic Institutions*** - We have established partnerships with academic institutions. This gives us access to cutting-edge research with a broader application than could be achieved alone in-house providing extra scope and capacity for innovative projects, and enhancing our appreciation of best practice analytics in other fields and industries. These benefits are applicable more widely than the London Ambulance Service, and often the appeal for universities to work with us is the quantity and richness of our data, as well as the ability to gain pan-London insight.

- ***Vehicle Routing -*** Gaining a real-time understanding of traffic flows in London to make better dispatch choices; additionally to help planning by understanding where demand might arise based on historic travel patterns and commuter routes.
- ***Workforce Analysis -*** Tracking of the NHS workforce across London. For example, looking at trends in paramedics within the education system, those likely coming into local recruitment populations, the existing paramedic cohort, and those retiring. Such staff grouping information would allow us to model the full workforce pathway, and horizon scan for imbalances in supply and demand of specific skills across emergency and urgent care services across London

5.2 Pillar 4: Leverage external technology services

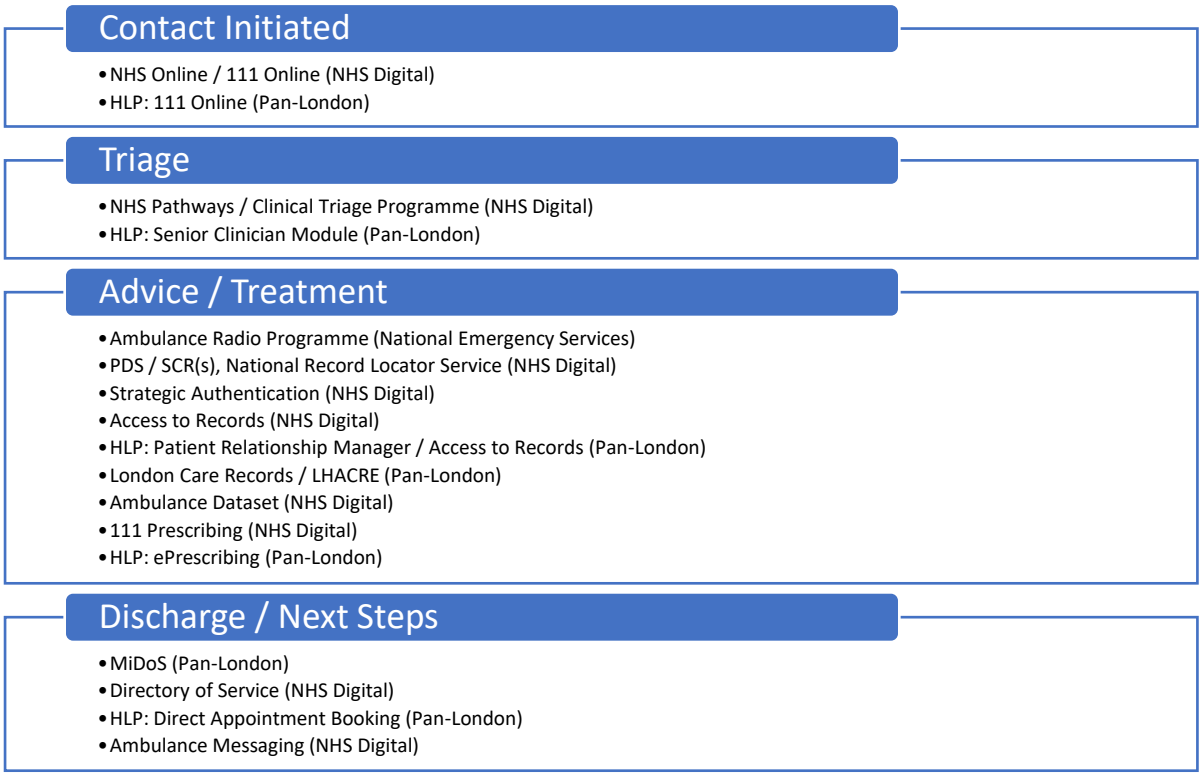
5.2.1 National and Regional Enablers

Pillar 4: Leverage external technology services
We will: • Accelerate delivery by aligning with National and Regional initiatives which can help us. There are opportunities to leverage external skills and opportunities, and we can achieve more, at greater pace and lower cost, than we could by working alone

External enabling initiatives are in progress at several levels which can help us to achieve this transformation:

- ***National: NHS Digital*** - A wide range of programmes with an emphasis on interoperability and standards
- ***National: Emergency Services*** - The workstreams of the Ambulance Radio Programme: Voice, Data, ICCS, Vehicle Solutions
- ***Regional: Pan-London*** - Numerous pan-London initiatives, including Healthy London Partnership (HLP) workstreams, and more recently the LHCRE.

The following table lists external opportunities which have been identified as relevant to LAS, categorising them based on the steps of a patient journey:



To take advantage of these opportunities we will engage in a partnership-based style of working, and to do this it is important that these external projects be "paired" with internal delivery projects within LAS. The internal project team can then work with the external partner – steering the direction of the opportunity and incorporating the external outputs for the benefit of LAS. *Appendix D – External Opportunities* provides more information about each of these external opportunities - and pairs each one with the internal project(s) within LAS which are best-placed to incorporate its outputs.

5.2.2 External Technology Services

Pillar 4: Leverage external technology services
We will: • Identify technologies and solutions which are needed but can already be provided by others or are commodities. This includes the use of cloud wherever relevant. These opportunities will be embraced through partnerships and commercial arrangements, thus reducing costs and freeing up our time for the transformational innovation needed.

Our IT costs per capita have been assessed as the highest in the country for an ambulance trust and so we need to look for efficiencies to provide better value for money to the public. At the same time our internal teams are stretched, and the ongoing demands of daily operations are preventing us from focusing our attention on the transformational activities which we want to progress.

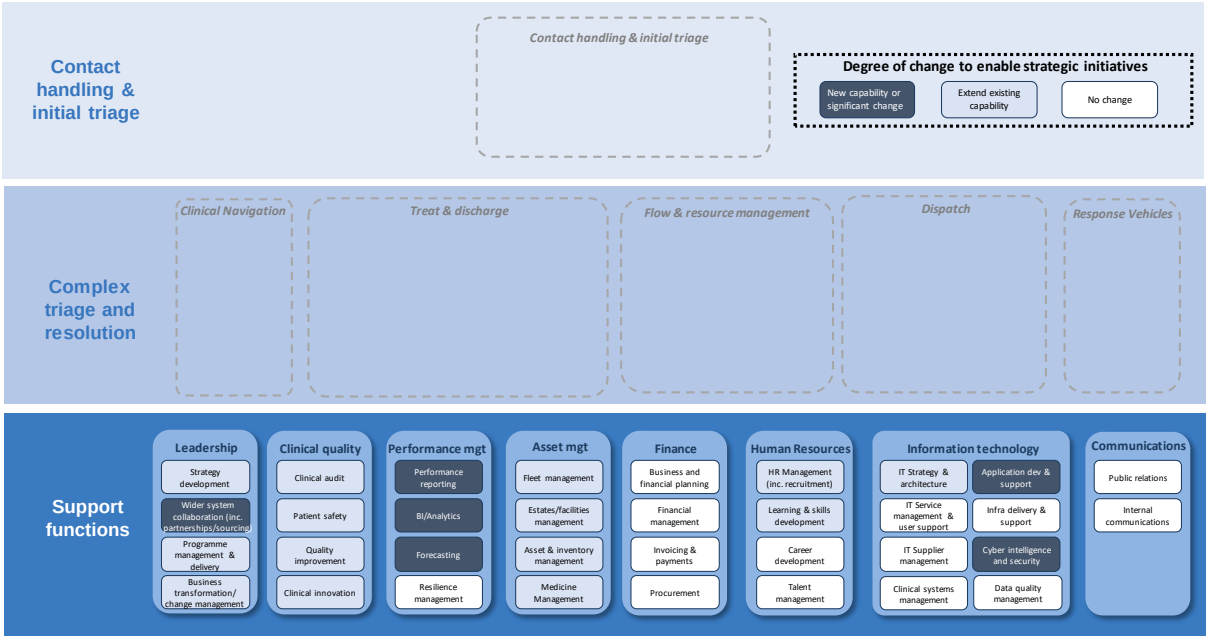
For both these reasons we need to review our approach to sourcing technology services. For areas where we are not innovating or providing a differentiated service for LAS then we need to consider developing strategic partnerships with suppliers. For example: considering areas such as cloud where we may be able to outsource commodity activities. This will also require us to further formalise our management of suppliers and SLAs.

6 Additional Theme 4: Sustainable and Effective Corporate Functions

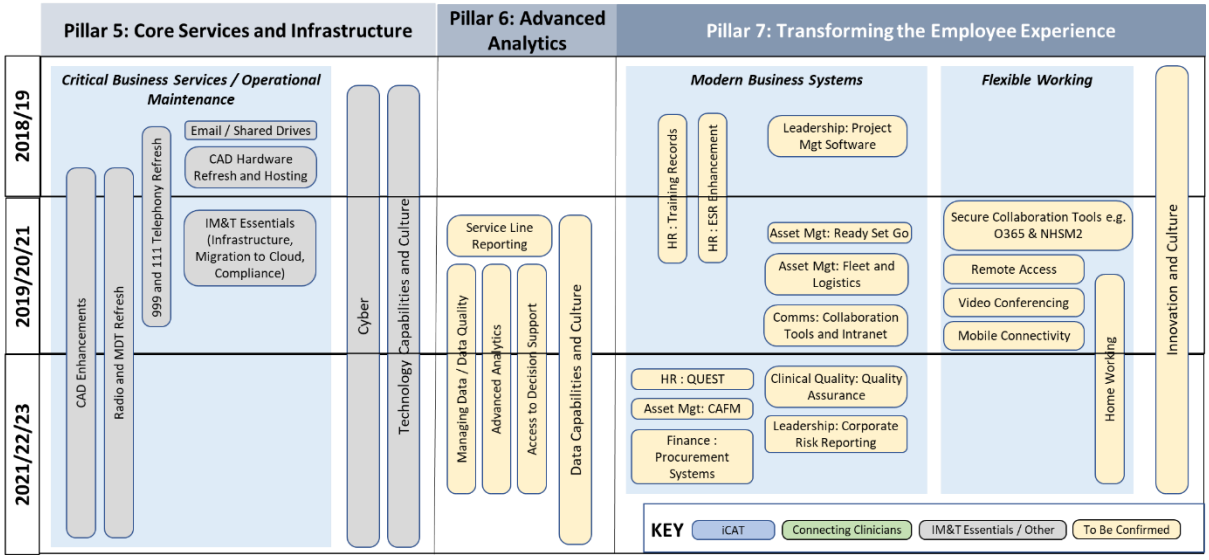
Sustaining and consolidating our core technical infrastructure, developing our exploitation of data, modernising our corporate systems, and innovating to transform our working practices

Whilst our focus is on transformation based upon the three strategic themes, we also need to attend to the technology and information flows which support the internal running of our organisation. There is a continuous need to maintain, update and upgrade our information and technical architecture to support operational and corporate capabilities and our staff. This section looks at what this means – both for critical ambulance operations, and to support our internal organisational transformation.

In terms of the Business Capabilities Map, in this section our focus is on the Support Functions which play a key role in enabling our operations:



The next diagram again illustrates how this internal transformation is enabled, highlighting key activities within each of the three remaining pillars.



6.1 Pillar 5: Sustain and modernise our core services and infrastructure

At the core of delivering our services continues to be the support which the information technology business capability provides for Ambulance and 111 operations - specifically secure and resilient Operations Centres, the communications infrastructure, and mobile technology in the hands of crew staff.

6.1.1 Critical Business Services and Operational Maintenance

Pillar 5: Sustain and modernise our core services and infrastructure
We will: • Continue to consolidate, secure, and modernise our infrastructure to support resilient ambulance and 111 operations - The intention is to make sure required services are maintained and functional, with appropriate resilience, consolidating software and services, and updating our data centres only where necessary. The primary approach is to move services to the Cloud where practical. Where end-of-life systems cannot move to the Cloud immediately, the services they provide will be assessed to either be moved to third party data centres, be run as hosted services or be replaced as best fits their provision. • Implement recommendations from recent reviews such as Carter and the Operations Centre Review • Upgrade and increase resilience of email and shared drives • Refresh our 999 and 111 telephony infrastructure • Upgrade our mobile communications and devices, to ensure that we put modern connectivity in the hands of crew staff • Refresh, enhance, and develop the interoperability of our CAD • Implement requirements mandatory for GDPR and Compliance

Our CAD, 999/111 telephony infrastructure, and mobile communications and devices are critical services, and all are due for enhancement, refresh or replacement during the timeframe of this strategy. The CAD will involve more than just a technical refresh – also developing requirements for our “future CAD” and delivering functional and interoperability enhancements to provide this. This will also need to take into consideration the implementation of recommendations from recent reviews such as Carter and the Operations Centre Review.

Alongside CAD, access to emails, office productivity tools and shared drives are viewed as key critical services. There are tactical projects underway to improve stability in all of these areas. Elements of the mail and shared drives systems are being renewed to counter immediate reliability issues, with a medium term view of moving such services to the cloud. Whilst they are tactical, these projects form a large part of the current technical work required, underpinning continuity and delivery of solutions to close strategic gaps. The Trust will move from this tactical approach to a more strategic cloud based approach for these services to provide secure email and office productivity tools (e.g. NHSMail2, Office 365) to enable the Trust and its staff to leverage patient benefits form improved collaboration and interoperation internally and with our health-care partners.

There is also a continuous need to apply appropriate IT Governance and service management rigour to manage systems in place to ensure that critical data, systems and services continue to support the Trust’s objectives. For example, every technical service should have a service owner to manage and drive change. This will include effective

management of change and delivery, scheduled testing and maintenance, proactive service and performance management, and organisational resilience in terms of staffing.

Other essential IM&T activities include:

- ***Infrastructure enhancements –*** The intention is to make sure required services are maintained and functional, with appropriate resilience, consolidating software and services across departments, and update our data centres only where necessary. The primary approach is to move services to the Cloud where practical. Where end-of-life systems cannot move to the Cloud immediately, the services they provide will be assessed to either be moved to third party data centres, be run as hosted services or be replaced as best fits their provision.
- ***GDPR –*** implementing the implications of GDPR for our organisation
- ***Compliance –*** compliance with legal requirements

6.1.2 Cyber

Pillar 5: Sustain and modernise our core services and infrastructure
We will: • Implement the recommendations of the 2017 Cyber Review

The 2017 cyber review recommended three key focus areas covering:

- Architectural design –ensuring the IT architecture is protected through use of zoning and firewalls and that systems are regularly patched and kept up to date
- Day to day management of the IT systems –ensuring that security good practice is in place through good test and release processes and there is clarity on which is the primary and secondary datacentres
- Security governance –ensuring there are clear lines of governance and accountability and that all teams follow agreed policy reporting regularly on the security status of the systems under their management

There are tactical projects in place to improve the performance in these areas, however the threat from cyber is continually evolving and it is not practical on-going for the Trust to react to and manage all of the changing cyber threats alone. The Trust must look to evolve the protection it has using more modern techniques, partnerships and services. As an example, this will include a move to the monitoring and analysis of what is happening within our networks and datacentres by expert cyber threat intelligence and analytic capabilities outside the Trust to identify any concerning patterns of technical or human behaviours, correlated dynamically with up to the minute knowledge of evolving cyber threats.

The move of our data, cyber and operational services to the cloud is often perceived as a security and data management challenge, however it is a clear opportunity to provide more sustainable services. By discarding legacy internal solutions, which are difficult to maintain securely, and move to more common services designed, which are maintained and invested in centrally we can provide improved security and data protection by design. An example of this is the opportunity to take up modern data loss prevention capabilities natively delivered by commodity cloud storage and email services.

In terms of assurance, the Trust holds Cyber Essentials accreditation and along with all other Trusts will be looking to attain Cyber Essentials Plus. This represents a significant shift in the level and scope of technical controls needed both internally and at our border. The Trust also has ambitions to obtain ISO27001 accreditation for some or part of the Trust's business areas. This will again require a shift in approach, particularly in relation to effective

data protection controls being applied to information management processes across these business areas.

6.1.3 Technology Capabilities and Culture Transformation

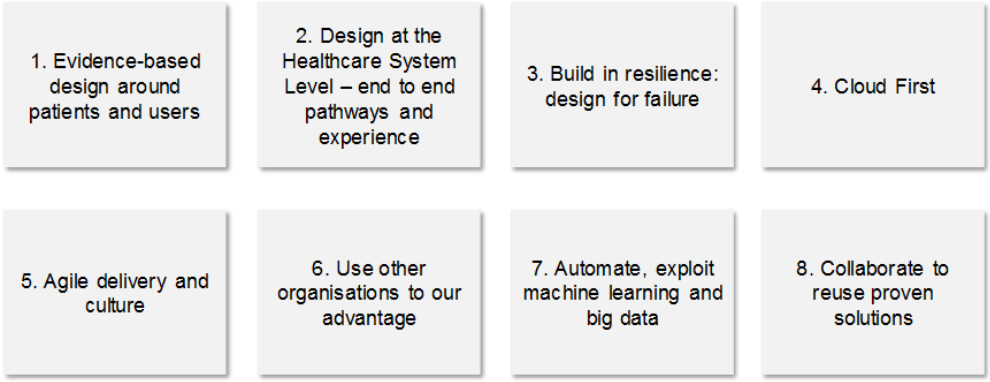
Pillar 5: Sustain and modernise our core services and infrastructure
We will: • Transform our ways of working within the IM&T directorate. To achieve this step-change we will need to change our culture, and develop our workforce and the capabilities of our digital team of the future to support organisational change

To achieve this step-change we must consider the changes required in culture to achieve our digital transformation, and develop our workforce and capabilities. This includes:

- Developing the right workforce;
- Developing the right capabilities;
- Developing the right solutions;
- Partnering with stakeholders;
- Aligning on common principles and architectures.

We also need to consider how to ensure our systems are secure by design (see also *6.1.2 Cyber*) as well as our approach to partnering and to buy vs build (see also *5.2.2 External Technology Services*)

The following design principles will be used to shape our digital, data and technology operations and culture. These are summarised below and described further in *Appendix C – Digital and Data Operations and Culture.*



6.2 Pillar 6: Build an advanced data and analytics capability

The business capability for “Performance Management” and the analysis of data will become increasingly central in allowing us to continually improve our operational performance and provide clinical decision support - as well as allowing us to collaborate in the identification of opportunities across the wider healthcare system.

6.2.1 Managing Data and Data Quality

Pillar 6: Build an advanced data and analytics capability
We will: • Transform to a proactive, evidence-based organisation, recognising data as a valuable corporate asset which we need to manage and exploit • Improve the management of our data - assuring its quality, linking it across patient, operational, corporate and external systems, and packaging it in ready-to-use formats. Holding data in an unstructured or disparate way may act as a barrier to modernising ways of working and mobility whereas having good quality and structured data available will be a critical enabler when it comes to designing and implementing our strategic objectives around iCAT, pioneer services and partnership working • Ensure we take advantage of the significant new data opportunities which will become available once structured clinical data is added from the Electronic Patient Record

Data is a vital organisational asset, and we need to recognise it as such and manage it throughout its lifecycle. The data we hold and access to support staff helping patients must be structured in a way that supports our patients' digital interaction, our staff's use of the data and data interoperation with other care partners.

Whether we are referring to internal data, data about patients in the wider system, or other external data, we need to be clear what data we have or access and understand its meaning regardless of structure or origin. Data needs to be managed in a composition and location that supports easy, shared access, processing and analysis. Building on the work of our existing Data Quality Team and Data Quality Strategy, we will also use data assurance mechanisms to ensure the data quality is maintained. We need to combine and package data so it can be reused and shared, and provide rules and access capabilities governed through managed and enabling information policies and mechanisms. For example, implementing the analytics capability we describe below depends on having joined up data and common patient records.

In order to achieve this we will need to more proactively manage data throughout its lifecycle:

- Identify data needs of the organisation and understand its meaning;
- Store and protecting data to support easy, shared access and processing;
- Provision and package data so it can be reused and shared;
- Process, move and combine to provide a unified consistent data view
- Continually improve the quality of data including accuracy, timeliness, relevance and acceptance of definitions; and
- Govern with clear and supportive mechanisms for effective data usage.

The matrix below outlines a data and analytics best practice maturity model. We can map our current capabilities against the different grades, outline the level of maturity we require, and create a plan to achieve that goal. It is recommended that a full assessment be done as part of strategy implementation, however an initial view is that in most cases we would currently be at the "Developed" level, with an ambition to progress to "Advanced" and in some cases "Optimised" within the lifetime of this strategy.

	Basic	Developed	Advanced	Optimised
Analytics	Reactive reporting Spreadsheet dashboards distributed via email. Analysts aligned to business functions.	Descriptive analytics Pockets of analytics tools enabling self-service slicing and dicing of data.	Predictive Analytics Automated self-service analytics maintained by a central analytics team	Prescriptive Analytics Productionised analysis of structured, unstructured and real time data.
Insight	Insight limited to describing what happened	Insight used to inform decision makers why something happened	Analytical insight used to forecast what will happen	Actionable insights inform what should we do?
Culture and Operational execution	The importance of analytical insight is understood but the culture is resistant to take advantage of the insight	Limited business decisions using analytical insight to improve operational efficiency	Decision makers are well informed with proactive insight from analytics, and capable of acting to maximize resulting business value	Business processes continuously adapt and improve using analytical insight in-line with strategic business goals
Architecture	Some coordination or integration between systems in an ad hoc fashion. Some duplicate data across systems	Enterprise tools implemented to manage data. Analytics are defined and have been applied in certain areas	All core data managed through central tool with partially integrated systems	All core data managed through central tool with fully automated integration and provisioning across systems.
Governance	Some or no awareness of data issues and need for data governance	Wider awareness of need for data governance and data quality with corporate initiatives	A governance model that delegates responsibility for data quality embedded within everyone's role	Fully integrated governance and culture of fully managed information and data quality

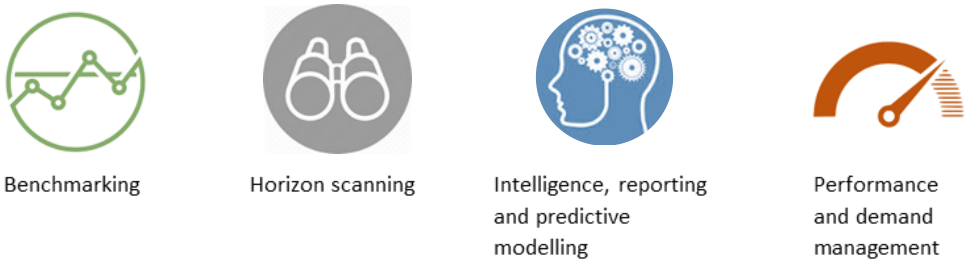
As well as continuing to develop and evolve our Business Intelligence (BI) capability we need to recognise that there is likely to be step change in the volume of data being handled across the organisation as well as the ongoing demand for analysis and insight of that data. We will therefore need to ensure that the capacity of our BI team reflects the demand from the wider organisation. We will also need to ensure that as much of our regular reporting and analysis is automated where possible to further increase the capacity of the team.

6.2.2 Advanced Analytics and Access to Decision Support

Pillar 6: Build an advanced data and analytics capability
We will: • Better exploit our data - developing our tools and infrastructure for Business Intelligence, applying advanced analytics such as forecasting and machine learning, and producing accessible information to support decision making. This will improve the quality of decisions made in the Trust – all the way from the individual patient to the boardroom

We have been evolving our business intelligence and analytical modelling skills for a number of years, and are well practiced in gaining insights through sophisticated modelling approaches and crafting and communicating a story from qualitative and quantitative information. A variety of daily decisions are already enabled by the wide availability of our data and due to the work we do with other non-technical teams to facilitate the interpretation of the wealth of this data.

Our core capabilities in analytics are shown below:



By continuing to develop this analytics capability we can:

- Gain insights from data and identifying trends;
- Manage care delivery in near real time;
- Develop evidence-based recommendations to drive improvements in the effectiveness or efficiency of care; and
- Shape the design of future services.

This capability will provide feedback within the organisation to both improve operational performance and provide clinical decision support. It will also be potentially relevant externally – for example, providing feedback to commissioners to ensure alternative pathways are in place and functioning.

Looking to the future, there is much that can be learned from industry leaders in the analytics arena, from financial to retail sectors. Some examples of service and service-user improvements achieved from analytical insight which are applicable in a healthcare setting are shown as follows:

Demand management	Disney is a pioneer of customer satisfaction and demand management, monitoring demand in real time and dynamically deploying resources where they are needed to manage the customer experience. Disney also use this insight strategically to forecast for the future and to determine capacity. The transferable learnings here apply not only to our mission of being a high quality service provider, but in understanding the pathway and full system experience of our patients, incorporating real-time information (e.g. weather) and social contexts (e.g. tourism, demographics and economy).
Performance management	Many household-name supermarkets and retailors have experience in performance management and understanding the equity of their service provision. They make use of innovative analytical techniques to monitor data and recommend improvements in specific areas. It is important to us that new models of care are equitable and managed effectively to provide the best care to patients across London. Intelligence and insight will be produced by our in-house business intelligence and data science teams.
Service-user satisfaction	Businesses such as British Airways and John Lewis are renowned for their customer satisfaction scores and service quality. Analytics are a pivotal part of informing business strategies in these companies. As an emergency care provider, we support and serve the population of London in their greatest moment of need. We can use insight from the evaluation of patient and staff satisfaction to recommend ways to improve. This branch of analytics is essential for helping us to understand which efforts lead to positive service experiences.
Personalised service	In the finance sector many companies generate marketing based on intelligence from customer data and target specific individuals with products and services they believe will be most useful/relevant. Applied to healthcare, this means using ensuring that we: understand our patients' needs by using business intelligence and analytics to make accurate predictions; and respond to patients in the most appropriate way, referring them to the right care pathways. It can also mean creating more effective media campaigns to inform the public, and evaluating the impact they have made.
Centralised intelligence	The Ministry of Justice has a Data Lab that generates evidence for change. The Department of Health provides guidelines for employing analytics and making use of insight and expertise. And NHS Digital has established a centre of excellence in big data and data science. We aim to enhance our own in-house capabilities, from what is already a sound base, to increase the value that we add from analytics and statistical modelling to support our staff, our commissioners, and other providers of emergency care across London to care for patients.

Having analysed the data, we must then empower our people with self-service and environmental intelligence via automated, interactive dashboards – as well as, where appropriate, making these tools available to our partners for viewing and exploring data. This will allow us to ensure a standard approach to organisational analysis through the use of templates and formal processes, provide value adding insight from consolidated data sources and operational systems, and enable the delivery of dynamic self-serve information. Typical tools and their benefits include:

Reporting:

- A key benefit of interactive reporting is enabling consumers to become detectives through dynamic views and filtering.

- Providing users with the ability to drill down into the details allows them to leverage their domain knowledge to drive the line of questioning.
- This reduces friction allowing insights to be uncovered in a more efficient and effective manner.

Analytics:

- Once an issue or opportunity has been discovered, interactive analytics provides visibility on actions available and their predicted impact.
- Simulations and predictive models can have their assumptions updated as new information comes available, and testing can be run to determine impacts on key performance indicators under different scenarios.
- This combines the creativity of experienced users with the computational heavy-lifting of artificial intelligence.

6.2.3 Data Capabilities and Culture Transformation

Pillar 6: Build an advanced data and analytics capability
We will: • Transform our ways of working within the Performance directorate. To achieve this step-change we will need to change our culture, and develop our workforce and the capabilities of our digital team of the future to support organisational change

We already have a well-established and trusted analytics team, who ensure an efficient flow of data insight, and support decision makers with reliable evidence-based intelligence. Our business intelligence analysts and data scientists are able to understand the impact of interventions on the system, use statistical and mathematical modelling to make predictions, determine relationships between system elements or services, and model “what-if” type scenarios. The strength of such a team is that the models built can be designed to be generic and reusable – bringing efficiencies and cost savings, compared to ad-hoc pieces of analysis being carried out.

To achieve this step-change we must consider changes to our operating model and culture - to achieve our digital transformation, and develop our workforce and capabilities. *Appendix C – Digital and Data Operations and Culture* provides examples of best practices for developing the capabilities and operating model of the data and analytics team. These would need to be further considered and customised for LAS as part of the strategy implementation work. This change will need to be part of the wider culture change and transformation within our organisation as a whole, gaining buy-in at all levels – for example in terms of the type of work, prioritisation of resource, and frequency and scale of requests made of the teams.

6.3 Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools

Under our new strategy, the scope of support provided by digital, data and technology to the organisation is set to significantly expand. Initiatives in other areas, such as HR, Rostering, Training, Estates, and Asset Management, will require substantial elements of new technology systems with consolidated, structured and linked data to enable enterprise wide informational views of performance, issues and decisions. We need to embrace modern ways of working – allowing our people to work remotely where appropriate and taking advantage of technology innovations to help us perform our roles.

6.3.1 Modernised Business Systems

Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools
We will: • Modernise our internal business systems to support more efficient ways of working and the wellbeing of our staff. New robust systems will ensure that we can run our organisation more efficiently, properly train our people, and be able to manage a more complex fleet and multi-skilled workforce.

In many cases our internal business systems have been neglected and are no longer fit for purpose to support a modern organisation. Today many processes are manual, whole rooms are dedicated to the storage of paper records, and our people struggle to find the information they need to do their jobs. These outdated internal systems do not provide us with the agility needed to support organisational transformation and change.

Furthermore, once these basics are addressed then new systems can help to remove drudgery from our daily tasks, modernise our ways of working, and give new insights into operational performance and efficiency

The following areas are anticipated to require substantial elements of new IM&T systems, information management and analytical support – including implementation of new systems and/or formal management of suppliers and SLAs:

Human Resources

- ESR - Continued delivery of ESR transformation programme and developments
- Access and storage of training records
- Staff engagement platform

Strategic Assets

- Asset Management (Fleet & logistics)
- Computer Aided Facility Management (CAFM) software
- Ready set go (medicines management)
- Integration of data to achieve better utilisation of assets, using black box technology in ambulances to review road traffic accidents as part of the driver safety systems, fuel monitoring
- Consumable tracking and distribution in a similar fashion to medicines
- electronic fault tracking of vehicles
- asset management systems for predictive maintenance regimes for buildings and vehicles
- improved utilisation of support services workforce and assets through demand modelling

Finance

- Procurement Systems
- Service Line Reporting

Clinical Quality

- Quality Assurance

Leadership

- Corporate Risk reporting
- Enterprise Programme and Project Management software

Communications

- Collaboration tools and intranet

6.3.2 Flexible Working

Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools
We will: • Enable flexible working for our people. The majority of our staff are mobile and we have other pressures such as costly estate which means we should be more flexible in where and how our people can work.

The majority of our staff are mobile and those not mobile are currently dispersed across some 80+ locations across London. There are also other contributory pressures, such as a costly estate, 24-hour working, high London travel costs, and increasing demand which combined with this means we should be more flexible in where and how all our people can work. This will also help us to be an employer of choice to our staff who live the rest of their lives largely in a digital world.

This drives us to look at solutions such as mobile and cloud for technology services and access to information. We will need to progress initiatives such as seamless yet secure remote access to both internal and cloud services, collaboration tools, video conferencing, mobile devices, home-working, staff intranet etc. – so that our people are equipped for a modern, flexible and supportive work environment.

6.3.3 Innovation and Culture

Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools
We will: • Be bolder and more innovative in our use of technology - to the benefit of Patients and the Public, Our People, and Our Partners. We need to take advantage of the opportunities which technology innovation can bring - putting in place processes to support innovation, whilst balancing the potential benefits against the risks inherent in providing a safe and efficient service

Over and above our day-to-day operational imperatives, our ambition is to be more innovative in exploring new technology, and faster at adopting that which is beneficial. Possible areas which appear promising at present include: devices (e.g. drones, wearables), intelligent infrastructure (e.g. vehicle sensors, connected buildings), and artificial intelligence and analytics. *Appendix E – Emerging Technology Trends* provides more information about these topics. We need to put in place processes to trial and adopt new technologies which can drive operational productivity and provide world class care for our world class city.

7 Delivering Our Strategy

Delivering our strategy will require us to implement significant programmes of change in the areas of Digital, Data and Technology. This section sets out what needs to be done and provides a roadmap for delivery.

7.1 Delivery Approach

Delivery of this ambition for digital, data and technology transformation at LAS will require a programme of work which:

- Is multi-year, phased, and prioritised
- Balances the need for strategic transformation with "getting the basics right" in terms of the ongoing demands of operational maintenance and the development of internal business systems
- Combines internal delivery projects with partnership working and external programmes of work from the wider system
- Embeds technical delivery within a wider transformation context of staff training and organisational change
- Can flex to incorporate new technologies, changing priorities and wider system transformation

The roadmap diagram in this section summarises the approach. It shows how over the next five years we will need to deliver our strategic transformation whilst at the same time progressing essential work on the basics. Working with partners is not a separate activity but rather an intrinsic part of everything we do – as are innovation and driving efficiency.

7.2 Delivery Programmes and Projects

7.2.1 Governance and Prioritisation

The Trust's business planning and delivery processes, under the stewardship of the Trust's Programme Management Board (PMB), will tie delivery programmes to the transformation agenda set in the Trust and Digital Strategies. With delegated responsibly from the Executive Committee for delivering the Trust's programmes, and in conjunction with the Logistics Infrastructure Committee, the detailed phasing of investments and benefit delivery will be shaped through the PMB's more refined management and assessment of competing priorities and urgencies.

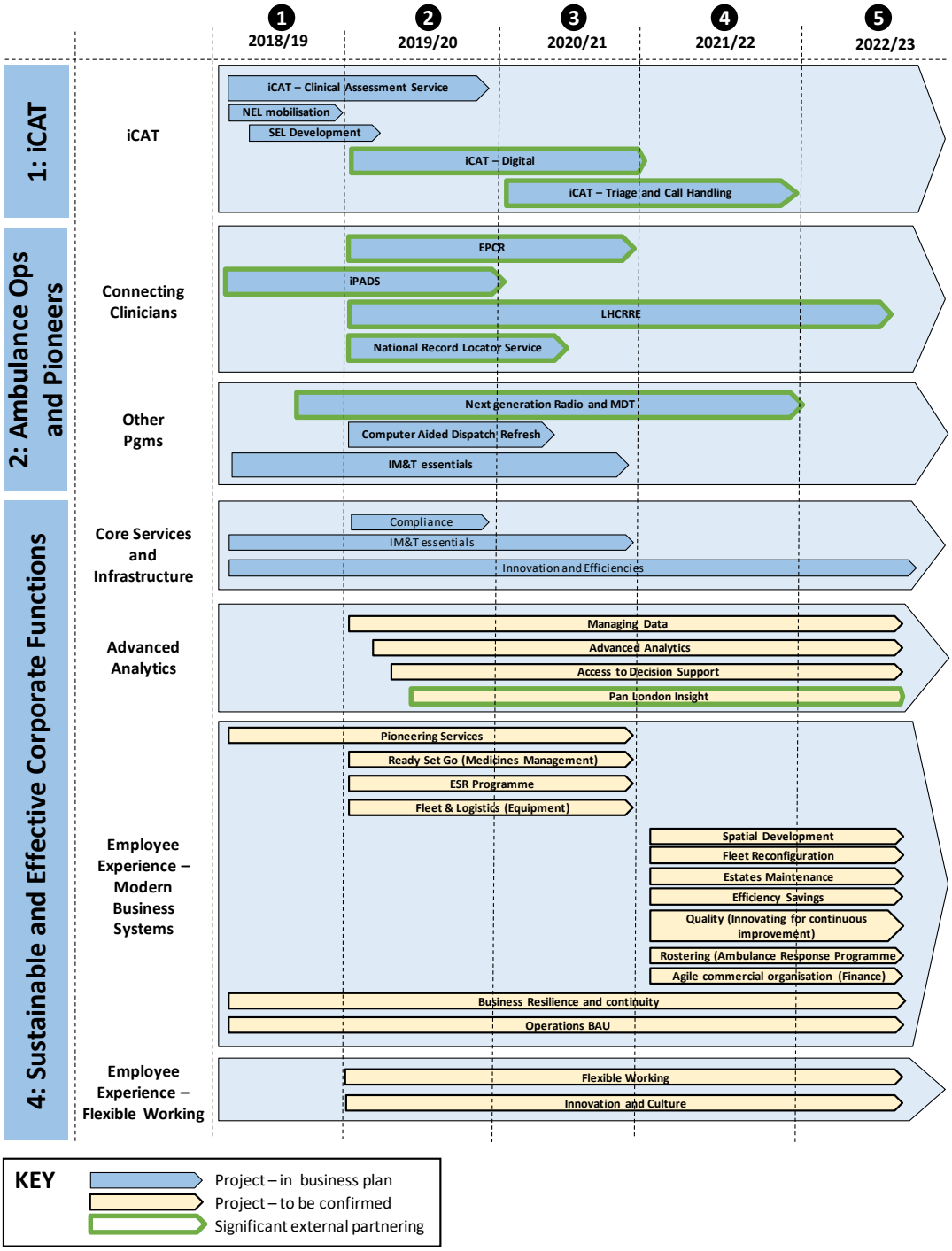
The level of change and investment required is a risk to the delivery of the Strategy. Whilst this risk will need to be balanced against other competing Trust Priorities, the digital transformation of the Trust is vital to the delivery of the Trust's Strategy. More agile delivery models, such as building on our use of Crown Commercial Service managed service and delivery arrangements, and leveraging delivery from partnership and national initiatives must be explored to help mitigate this risk along with proactive pursuit of external funding opportunities.

A significant input of broad executive leadership and management attention will be vital throughout the period to drive the Trust's digital transformation and the required levels of activity and change at the desired pace.

7.2.2 Roadmap

The diagram below develops the approach into a roadmap for change. The prioritisation and funding of internal delivery projects is managed via the LAS Business Planning process, and

in line with this process, the next 3 years are relatively firm with the roadmap also providing an indicative view out to 5 years. The following sections then summarise - for each of the themes - the programmes and projects needed to take forwards delivery of this strategy.



7.2.3 Strategic Theme 1: iCAT

The Clinical Assessment and Triage (iCAT) programme will integrate our services and transform LAS towards a more sustainable model of combined Urgent and Emergency care. This includes offering advanced and integrated infrastructure for call-taking, triage, clinical assessment, and onward referral. Thereby clinically personalising the service we provide to our patients based on their history, preferences, and on swift evidence-based decision making, increasing "Hear and Treat" and "See and Treat" capabilities, and reducing unnecessary completion. Where

referrals need to be made, these will be supported by access to the directory of services which is a live resource providing information on appropriate care pathways, suited to individual patient needs.

As at the latest business planning iteration the programme comprises the following workstreams:

iCAT	**iCAT - Clinical Assessment Service**	*Create a single Clinical Assessment Service for the Trust that is accessible by 999 and LAS operated IUC services.*
	NEL Mobilisation	*Mobilise the North East London Integrated Urgent Care (111) contract*
	SEL Development	*Transforming the South East London 111 service into an Integrated Urgent Care service*
	iCAT – Digital	*Develop and implement Digital and IT solutions supporting the target operating model for the iCAT 3, including integrated queue across 111 and 999 services. Patients will be able to access our services via a unified platform across telephone, the web, apps and common text and video messaging platforms*
	iCAT - Triaging and Call Handling	*Create a single contact handling centre bringing together 111 call centres and 999 EOC.*

7.2.4 Strategic Theme 2: Ambulance Operations and Pioneer Services

The Connecting Clinicians programme focuses on supporting our clinicians in the field. More than for any other healthcare provider in London, our work depends on effective mobile technology. Connecting our clinicians will brings huge benefits for our staff, for the London healthcare system and to patients. It will be a complex multiyear programme that will transform how the London Ambulance Service, providers, commissioners and other key stakeholders, manage and share clinical information:

- Investing in new technology infrastructure that will support our transformation as an organisation – both within our operations centres and within our vehicles
- Rolling out tablet computers to our front-line clinicians that will provide digital connectivity including location-aware directories of local pathways and access to e-learning.
- Upgrading the mobile technologies available to our staff. For example, roll out of the ESN / Airwaves / Ambulance Radio Programme, roll out of iPads to our front-line clinicians, provision of Garmin SatNav, and Mobile Data Terminal (MDT) upgrades.
- Migrating from paper to a digital clinical records system that integrates with the wider London healthcare system encompassing an electronic patient report form, access to the NHS spine, summary care records, Local Health and Care Records Exemplar, National Record Locator Service, special patient notes or ‘Coordinate My Care’ and seamless interoperability with the CAS.
- Introducing additional clinical decision-making support tools and better access to advice and support from the CAS will help our staff to provide better care at scene and prevent unnecessary completion to hospital.
- Engaging with technologies that provide tools for healthcare professionals. These include the capacity to access other professionals’ expertise, tools to prioritise and manage their clinical workload and tools to identify the patients at greatest risk.

- In addition, work is planned on the Ambulance Radio Programme, Computer Aided Dispatch, and IM&T Essentials which will improve our core ambulance operations, including our ability to dispatch, route, and communicate with response vehicles.

As at the latest business planning iteration the relevant programme workstreams are as follows:

Connecting Clinicians (Health Informatics)	**EPCR**	*Implement a new comprehensive electronic Patient Care Record (ePCR) that records digitally our patient interaction and shares that information with other relevant organisations such as a patient's GP and care providers that we convey patients to*
	IPADS	*Builds on the roll out of iPads to our front-line clinicians to provide ambulance crews with up-to-date information about patients and other capabilities which will inform better decision making and improve interoperation with care partners.*
	Local Health and Care Records Exemplar	*In London, we are collaborating with regional health and care partners to become a Local Integrated Care Record Exemplar. This means that London will be one of the first regions in the country to benefit from full interoperability*
	National record locator service	*The creation of a National Record Locator Service "acts as a national index to be able to find out what records exist for a patient across local and national care record solutions (such as SCR)."*
Ambulance Radio Programme	**ESN / Airwaves / Ambulance Radio Programme**	*Integrated Communication Control System (ICCS). Use of secure national mobile data network*
Computer Aided Dispatch	**CAD refresh**	*CAD enhancements and hardware refresh and/or a CAD replacement*
IM&T Essentials	**MDVS**	*National MDT replacement scheme*
	MDT / Sat Nav	*Garmin SatNav, MDT3 Roll out, etc.*
	Telephony (Avaya) – 999	*Avaya Telephony Upgrade*

7.2.5 Strategic Theme 3: Partners

This theme is somewhat different to the others - in that it is not a programme of work in itself, but rather it defines <u>how</u> we will go about implementing the workstreams described under each of the other themes. There are therefore no additional programme workstreams specific to this theme.

7.2.6 Additional Theme 4: Sustainable and Effective Corporate Functions

In terms of Pillar 5: Sustain and modernise our core services and infrastructure, as at the latest business planning iteration the relevant programme workstreams are:

Compliance	**GDPR / Compliance**	*GDR Compliance and Datix Cloud*
IM&T Essentials	**Asset Management**	*Security of Assets - mobile and fixed - Asset tags*
	Cyber / Risk	*New accredit* *Security disruptive team. This team will attempt to identify weaknesses within the security of the trust and any new technology.*
	Data Centre	*Datacentre hardware LAS and Migration of services (inc CAD) to third party ARK*
	End of Life Refresh	*Refresh technologies, laptop, desktop, servers*
	IM&T System Resilience	*Resilience enhancements*
	System and Network resilience	*WAN, LAN, Wi-Fi, Network Enhancements*
	Consolidate IT / software across depts.	*Understand and Consolidate*
	Enterprise Architecture	*To introduce an EA capability ensuring services are designed to support the Trust's objectives*
	Sourcing solutions	*Our approach will be to support and influence NHS Digital's national urgent and emergency programme and to take nationally-developed solutions where they deliver the cost effective functionality that we require at the time that we will need it.*
	Innovation and Efficiencies	*Improvement /Efficiency / Enablers*

In terms of Pillar 6: Build an advanced data and analytics capability, a new programme of work with the following workstreams is proposed. This is currently pending incorporation in the business planning process.

Data and Analytics	**Managing Data**	*Pending incorporation in business planning process*
	Advanced Analytics	*Pending incorporation in business planning process*
	Access to Decision Support	*Pending incorporation in business planning process*
	Pan London Insight	*Pending incorporation in business planning process*

Finally, in terms of Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools. The LAS Business Planning process has identified the programmes of business transformation activity listed below. Most, if not all, will require some aspect of technology support. This will be further confirmed as plans in each area continue to be elaborated.

To this we add support for innovation as defined in "IM&T Essentials", plus a proposed new programme to enable flexible working.

Support for Business Transformation **(Modernised Business Systems)**	**Pioneering Services**	*Business transformation programme*
	Spatial Development	*Business transformation programme*
	Fleet Reconfiguration	*Business transformation programme*
	Ready Set Go (Medicines Management)	*Business transformation programme*
	Estates Maintenance	*Business transformation programme*
	Fleet & Logistics (Equipment)	*Business transformation programme*
	Efficiency Savings	*Business transformation programme*
	Quality (Innovating for continuous improvement)	*Business transformation programme*
	Rostering (Ambulance Response Programme)	*Business transformation programme*
	ESR Programme	*Business transformation programme*
	Business Resilience and Continuity	*Business transformation programme*
	Agile commercial organisation (Finance)	*Business transformation programme*
	Clinical Education Development	*Business transformation programme*
	Operations BAU	*Business transformation programme*
	CQUINs	*Business transformation programme*
	Corporate BAU	*Business transformation programme*
IM&T Essentials	**Innovation and Efficiencies**	*Improvement /Efficiency / Enablers*
Flexible Working	**Flexible Working**	*Pending incorporation in business planning process*

7.2.7 Future Investment Directions

Whilst the majority of the strategy is delivered by programmes already incorporated into the LAS Business Planning process, there are several areas identified which need to be considered for future investment decisions. These include:

Pillar 6: Build an advanced data and analytics capability

- This is the most significant single area for future consideration. Whilst the strategic case for improving our management and exploitation of data has been made, there are currently no programmes in the portfolio to progress this. The activities involved in developing this capability are described under Pillar 6: Build an advanced data and

analytics capability, and this therefore needs to be considered further in the next round of business planning.

Pillar 7: Transform the employee experience through remote working and use of modern and innovative tools

Modernised Business Systems

- There are currently a number of planned and funded transformation programmes in the business plan which are likely to require technology support for enhancements to internal business system. See 6.3.1 Modernised Business Systems for further details. In the next round of business planning the extent of this support needs to be further clarified and the proportion of funding set aside for technology developments confirmed. In the event of a mismatch then additional investment may need to be considered.

Flexible Working

- Whilst the case for enabling more flexible working has been made (e.g. remote access, homeworking), a programme to implement it now needs to be evaluated.

Innovation and Culture

- A provision has been made for innovation, in terms of the "Innovation and Efficiencies" workstream of the IM&T Essentials programme. However given the strength of our ambition in this area this may want to be broadened, and given the inherent unpredictability of new technical developments then the provision may need to be reviewed periodically. This might also encompass taking advantage of new external opportunities (e.g. new initiatives from NHS Digital) as they arise.

In terms of releasing capital, it is worth noting that *Pillar 5: Sustain and modernise our core services and infrastructure* – and specifically the migration towards Cloud – is likely to shift technology spend towards a revenue-based model. This will therefore also be worth reviewing over the next 3-5 years.

7.3 Deliverability

Deliverability of the roadmap needs to be considered from both a financial and also a business change perspective.

In terms of finance we estimate that an investment of in the order of approximately £70M will be required over the next 5 years.

In terms of business change we believe the roadmap to be challenging. It proposes a significant transformation of our patient-facing services at the same time as major internal operational changes and system upgrades. At many points in the roadmap there are multiple major business and technology change programmes running concurrently. This will result in a high rate of change to be assimilated. Recruitment and on-boarding of new team members and/or use of external specialists is likely to be needed to support the activities.

The Trust does not have the internal capacity to deliver this level of change in the timescale set. Increasingly the Trust will need to make better use of managed services, building on our use of Crown Commercial Service frameworks, to deliver desired digital outcomes. A very significant input of executive leadership and management attention will be vital throughout the period to drive this level of activity and change.

It is also worth noting that there is, by intention based on Strategic Theme 3, a high degree of partnership and external dependency in many of the activities. This will again increase the complexity and management attention required to ensure delivery.

Overall therefore we believe the roadmap to be ambitious. Whilst these challenges could be eased by extending the timeline, this would be at the expense of a slower pace of delivery.

7.4 Ongoing Review

The overall roadmap for change therefore consists of actions within LAS and also collaboration with the wider system, and needs to include regular reviews.

LAS Planning
• Planning internal investment in key areas where external initiatives do not exist, or where LAS may need to drive the pace of change.
National Planning
• Maintaining a portfolio view of National programmes, and working to contribute and influence priority areas for LAS
London Planning
• Being fully involved in London-based initiatives such as LHACRE • Working strategically with partners such as Healthy London Partnership to drive implementation in areas beneficial to LAS

It is important to recognise that detailed planning horizons throughout the wider system are often quite short - this reflects the need to react to change, plus the realities of securing funding. New technology developments may also need us to react to change. This represents a risk to delivery, however an agile approach based on regular reviews, prioritisation, and change control can help LAS turn the situation to advantage.

It is therefore recommended to review and iterate the roadmap regularly on a 12-18 month basis

8 Appendix A – What will it mean for me?

This section outlines how the digital, data and technology strategy will impact different stakeholders within the system.

Robert – Ambulance Clinician
Robert is a 36-year-old paramedic who has been working for the LAS for 8 years. Robert attends a patient who requires emergency care.

Mobile Tablets

New Ambulance Technology

Mobile Devices

Mobile Tablets

Access to records – Robert will have access to patient records en route to the incident. He will be able to identify existing conditions, care plans, patient specific protocols and other pertinent information directly on his tablet.

Access to ePRF - Robert will be able to record patient details on his tablet. This will remove lengthy paper procedures with pre-populated forms, enable quicker handovers, improve patient information security, and allow easier referral to iCAT. Information will automatically upload to the wider system removing the duplication of effort when the patient arrives in hospital.

Access to NHS Services – Robert will also have real time awareness of other NHS services available, such as GP surgeries or urgent care appointments. He will be able to handover patients not requiring emergency care to other services much more efficiently. Patient information can be shared with other care agencies and contribute data back into urgent and emergency care records.

Remote access to internal tools – Robert will be able to access internal applications to keep him connected to the LAS system even when on shift. Email, learning materials, and other HR functions will all be readily available. There will also be a tool for Robert to understand his patient's outcome, creating a full reflective loop and will enhance clinical learning.

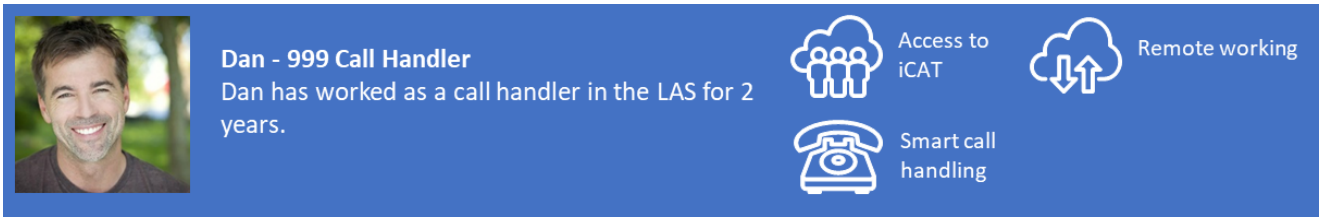
New Ambulance Technology

New and improved equipment - Robert will have access to improved hand-held radios and wireless data networks. This will allow him to effectively communicate with other healthcare professionals and treat or convey patients more efficiently. Smaller, lighter, and smarter equipment will also be available. Unmanned drones could be used to deliver blood, specialised equipment, and medicines to paramedics in congested areas.

Wearables – Robert can use wearable monitors or temporary patches on vulnerable patients. The technology will monitor vital signs of deteriorating health to alert healthcare professionals before an Ambulance is required. This will prevent hospital conveyance if patients can be treated before an emergency.

Mobile Devices

Robert will be able to use video cameras, with patient consent where necessary, to video the patient's conditions and communicate with iCAT to provide and enhanced patient assessment. Better decision support will be available to provide the most appropriate treatment for the patient.



Access to iCAT

Dan is now part of the professional clinical expertise to treat patients. He will be able to implement 'hear and treat' and "see and treat" approach to effectively care for patients, potentially mitigating the need for an ambulance.

Remote working

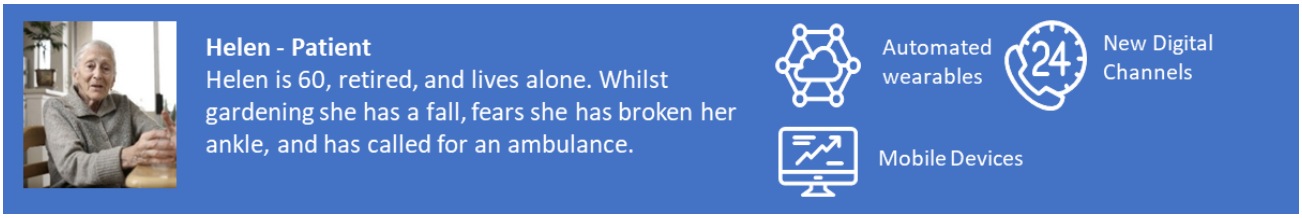
IM&T will enable Dan to access the calling system through a login on his home computer. This new way of working will enable staff to work more flexible hours and can work at short notice if there is a surge in demand.

Smart call handling

Dan will have access to smart call handling systems which will provide new ways to manage queues, triage, accurately dispatch, and provide clinical advice. Caller ID will be able to identify frequent callers and provide access to patient records. The additional patient information will accelerate the triage process.

Machine learning could be used for binary questions such as 'is the patient breathing?' before passing onto a call handler. This will reduce repetition for Dave and allow him to use his professional expertise to triage complex patients.

Dan will also have access to specialist services (e.g. falls, maternity) to support his triage decision. There will be feedback on patient outcomes to notify Dave on his performance for an enhanced learning experience.



Automated wearables

Helen could use new wearable technology to monitor her health. This will notify her GP if her health deteriorates and prevent admission to A&E through early treatment.

New digital channels

Helen can call for an ambulance through her smartphone or tablet to suit her needs. She has her smart phone in her pocket in the garden so she dials 999. Using the camera she can video her ankle and show the call handler her symptoms. This allows the clinical assessment team to visually assess her ankle, providing them with more information to accurately triage and dispatch the falls team.

Access to patient records

When the falls team arrive, they already know her medical history and current medication. This allows Helen to be treated much more efficiently. The paramedic will be able to digitally collect her details removing repetition within the system and as a result improve patient experience. Once Helen is treated, her notes from the visit are recorded and can be shared across healthcare services including her GP and social care. This integration of care will better support her recovery.

Laura - Trust Corporate Staff
Laura is part of the data and performance team and has been working for the LAS for 5 years.

Access to more collaborative and integrated data

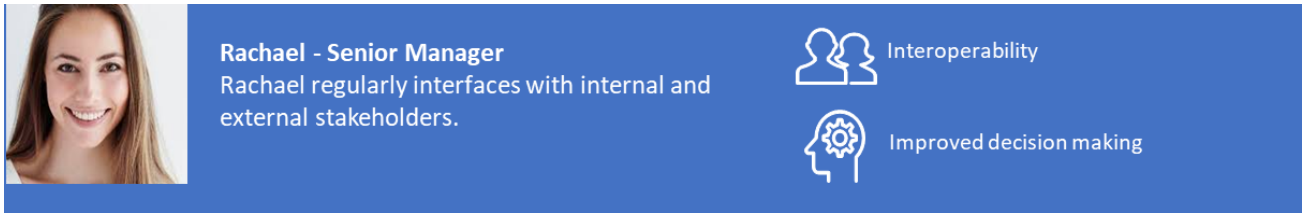
More efficient tools

Innovative analytics and more efficient tools - Laura has access to efficient data storage tools to accurately collect and record data; can follow best practice protocols for defining, extracting and analysing the resulting information; and has a robust and user-friendly interface to allow her to explore and manipulate the data in an effective and intuitive manner. All this means she can now provide deeper, more targeted insight for EOC and sector level operations, and can also support scheduling, fleet, workforce and various corporate teams. She is able to react in real-time to operational demands and request using pre-defined dashboard templates and visuals, saving him time and ensuring reproducibility of the request again in future.

With more efficient systems, Laura now has more capacity to be able to build cutting edge, bespoke dashboards and visualisations for internal and external stakeholders. Thanks to the implementation of a market-leading BI software package, Laura is able to provide assistive tools to staff across the organisation, helping them tackle a wide range of different problems from mental health to recruitment. This helps senior managers identify the impact of their operational and strategic decisions much more interactively, enables evidence-based decision making throughout the organisation, and also helps enhance the analytics capability and understanding of data across the Trust since staff are able to explore the information freely themselves.

Access to more Collaborative and Integrated Data - Laura can provide greater operational insight to drive and improve performance because he now has access to wider healthcare system data, including feeds from London Emergency Departments. This link means that Laura can generate information that influences decision making and helps improve patient care through models which help predictively identify the more appropriate patient pathway based on intel for that individual. This has a real positive impact not only on the LAS but on the wider healthcare service in London in terms of operational and cost efficiencies, but more importantly by getting the patient the right care first time.

Laura can build more intelligent, informed forecasts for the busiest periods in the calendar, including winter and Bank Holidays, thanks to collaborations with other industry partners across London. For example, access to shared weather forecasts enables Laura to prepare for extreme weather in a connected way, and can suggest periods of risk or identify hotspots of demand to be targeted with plenty of warning for actionable plans to be put in place operationally. Repetitive work can be automated, so Laura can spend more time on prescriptive analysis and driving change within the organisation. She will also be able to log in to her home device and access analytical tools. This will allow her to work more flexible hours.

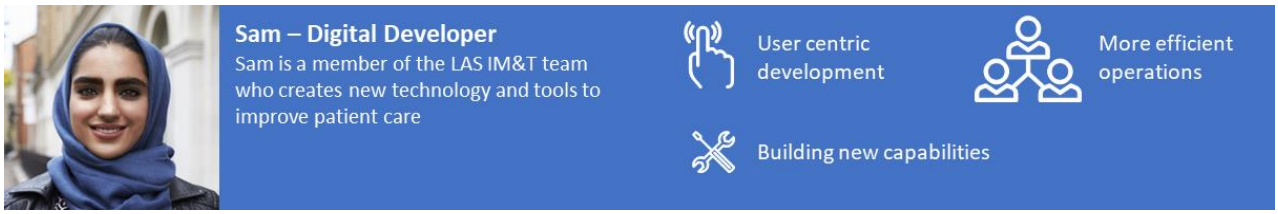


Interoperability

Rachael now has access to linked up data between the LAS, CCGs, and hospitals, allowing her to hold informed discussions with stakeholders about appropriate pathways, new services, equity in provisions and areas for improvement, allowing collective thinking of solutions and more intelligent decision-making benefitting patient outcome and improving Trust KPIs.

Improved Decision Making

Access to interactive platforms which portray key data and information in a clear, visual way at the click of a button, enables Rachel to communicate the relevant information at real-time, enhancing the quality and timeliness of decision making to impact positive change. This also helps share the more subtle elements of intelligence which are not always obvious through the raw data alone, and helps educate not only regarding the LAS operations, but also enhances analytics thinking and understanding within corporate departments. Improved access to data enables Rachel to help build a culture where decision making is evidence based.



User centric development

Sam can see the full impact of her work by co-producing new digital tools alongside the clinicians and operational teams. This creates a real sense of working satisfaction.

Building new capabilities

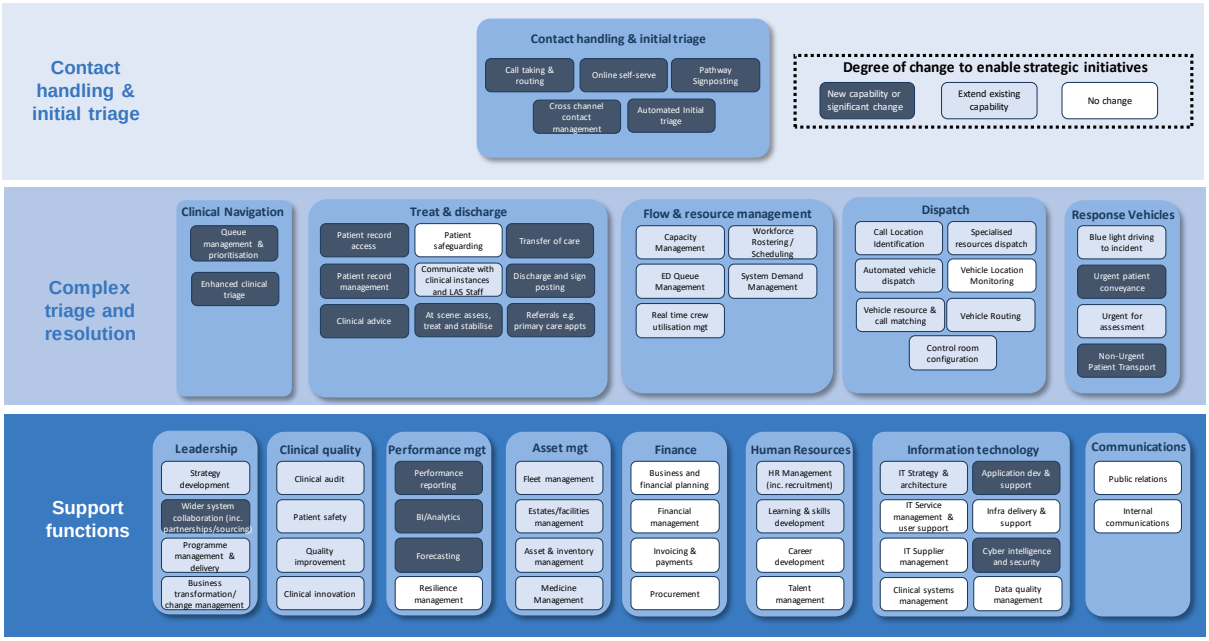
Sam is able to build her capability as she can work functionally across LAS beyond the borders of IM&T. She will be working in a professional healthcare informatics environment that is applying world class leading best practice and developing valuable skills for her and the Trust.

More efficient operations

Sam is able to work with the latest technologies including machine learning and testing the capability of drones. This freedom will encourage and drive forward the use of technology within the NHS. With new and improved IT systems such as the cloud, there will be less time spent on troubleshooting and solving technical issues, but on more time for innovative thinking.

9 Appendix B - Business Capabilities Map

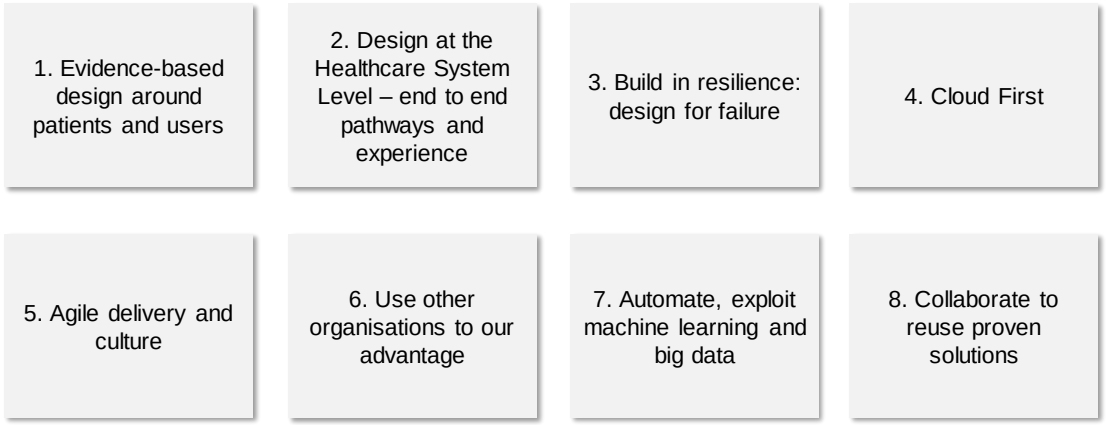
The challenges and opportunities faced by the trust around Digital, Data and Technology are further illustrated by the Business Capabilities map below. This highlights the strategic organisational change required. Extracts from this map are used throughout the document, specifically when we look in more detail at each strategic theme and further examine how digital, data and technology can enable the development of these new business capabilities.



10 Appendix C – Digital and Data Operations and Culture

10.1 Principles for Digital Operations and Culture

In order to meet the challenges of a modern, digital enabled organisation we will need to continue to transform the way that we work within IM&T and Data, Analytics – building the digital team of the future. The following design principles will be used to shape our strategy delivery:



1. Evidence-based design around patients and users

Design starts with identifying user needs. In order to identify needs we will conduct research, analyse data and talk to users. Services that are designed around users and their need are more likely to be used, and cost less to operate by reducing time and money spent on resolving problems.

2. Design at the Healthcare System Level – end to end pathways and experience

The ambition articulated by the Trust's Executive Leadership Team is to undertake a significant transformation of the London Ambulance Service over the coming years. In summary this is about becoming an urgent and emergency care provider integrated with the wider healthcare economy so that the overall system becomes more than the sum of its unlinked parts.

3. Build in resilience: design for failure

Delivery of the Trust's priorities relies on the continual effectiveness and resilience of supporting technology services. A major factor for any Ambulance Service is the need to provide stable systems. Interruptions can hugely impact on Trust performance and patient care. The utilisation of our service is significantly higher that other parts of the country (LAS crews are utilised for over 85% of their time, whilst in other parts of the country this is more likely to be 65%). This overall constant pressure with little headroom, and the need to provide service resilience to increasing demand and internal and external threats contributes significantly to the Trust's increasing reliance on IM&T services.

4. Cloud First

We want to focus our time doing value adding activity, rather than developing proven solutions that are available on the market. Cloud is a key underpinning of agile and automated delivery. It facilitates automated testing and software upgrades that can make services more resilient. It also manages large changes in demand more effectively, and can be more effective in the use of mobile devices and remote access. In 2013, the UK

government introduced a ‘Cloud First’ policy for all technology decisions. As the world of cloud technologies continues to accelerate, IM&T should absorb new developments and best practice.

5. Agile delivery and culture

The expectations on our service will keep growing at a fast pace. We need to be able to easily respond to changes in policy and IM&T needs to make sure that services keep meeting user needs, whilst delivering at a lower costs. Agile methods can help us to build services and platforms that:

- Meet the needs of our users
- Are adaptable to scope or policy changes
- Cost less
- Have lower defect rates
- Reduce the time to release new features or to deliver working software
- Keep improving, based on user feedback

6. Use other organisations to our advantage

We can accelerate benefits realisation by collaborating/partnering with other organisations. This will help focus our current capacity on value adding activities. By leveraging external suppliers to provide services where no internal advantage, or no committed investment we can get the benefits of efficiency and economies of scale.

7. Automate, exploit machine learning and big data

The services delivered by LAS range from those that are driven by routine and repetitive processes through to services that require human intervention. In both types of service, the quality and cost of what we deliver can be improved through automation. The same challenge is being taken up by NHS England who have clearly identified the need to use the skills, techniques and solutions around robotics and business process automation to drive productivity and efficiency gains throughout the system.

8. Collaborate to reuse proven solutions

The synergy effect stemming from shared platforms and capabilities with other Healthcare and Emergency Care providers is large. For example, information and data shared appropriately across organisational boundaries without loss of integrity, reduces the need to hold duplicate data and supports efficient service delivery.

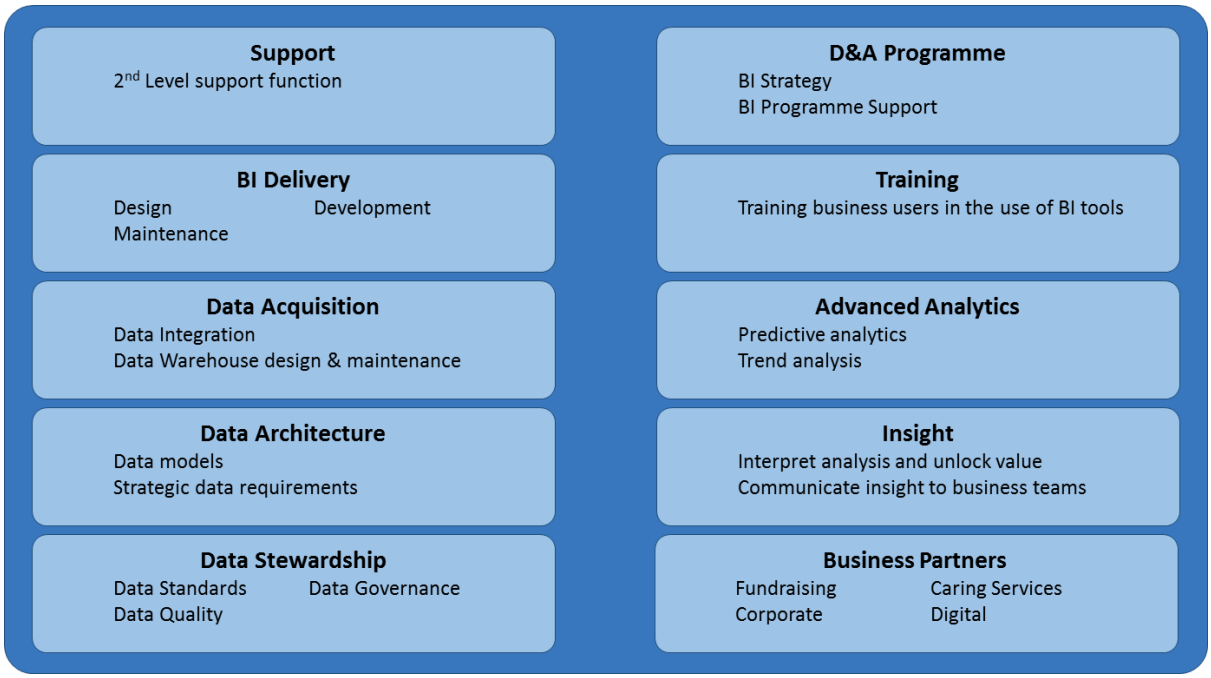
10.2 Data and Analytics Operations

In order to create a successful data and analytics team, there are some best practices and capabilities that should be applied. Examples are provided here for reference - these would need to be further considered and customised for LAS as part of the strategy implementation work.

The matrix below highlights that the people, process, and technology are all key parameters for a functional team.

	Basic	Developed	Advanced	Optimised
People	Inconsistent behaviours and outcomes. Poor communication and ad-hoc coordination	Development of plans for team and individual improvement. Some shared decision making	Building trust among team members. Conflict resolution strategies. Collaboration, shared decision making.	Alignment – executive and employee buy in. Accountability. Effective knowledge sharing and individual empowerment
Process	No formal process. Awareness that processes are necessary but few activities are defined and success is dependent on individual effort	The process is documented standardised and integrated within an organisational wide methodology	Detailed measures of the process and output quality are collected. The process and products are understood and controlled	Continuous process improvement is enabled by qualitative feedback of the process and from piloting innovative new ideas and technologies
Technology	No formal strategy or execution on technology investments. Basic reporting tools no formal infrastructure hardware or software standards.	Desktop hardware/software standards defined. Some infrastructure standardisation and rationalisation.	Formal infrastructure standards. Formal management process/tools architecture aggregated capacity management	Proactively promoting new technologies and impact to business

The diagram below illustrates the typical functional capabilities which a Data and Analytics team will need to develop:



1. ***D&A Programme*** - The D&A programme function oversees and coordinates all of the activities the Data & Intelligence team. The D&A programme function defines D&I objectives and strategy and tracks the success of that strategy over time. Business users can get advice and coaching on how to use D&I analysis and interpret the results. The D&A programme function also acts as the project office for all BI related projects.
2. ***Data Stewardship*** - The Data stewardship function is responsible for data standards, data quality and data governance.
3. ***BI Delivery*** - The BI delivery function oversees the design, development, testing and maintenance of self-service dashboards and all other applications that transform data into BI.
4. ***Support*** - The support function acts as the second-level support for BI problems. The support function analyses the problem in detail and gets back to the user with a solution. If a solution cannot be solved in-house it is passed to the software vendor.
5. ***Data Acquisition*** - The data acquisition function handles the back-end data activities. It takes care of data integration and data store development, testing and maintenance as well as the overall warehouse design.
6. ***Advanced Analytics*** - The analytics function specialises in statistical analysis, modelling and forecasting to discover previously unknown patterns and make predictions about the future. It handles complex analytical requests from the business that can't be answered using self-serve dashboards.
7. ***Insight*** - The insight function puts context around the analytics to develop understanding and enable the business units to make informed decisions.
8. ***Training*** - The training function trains business users in BI concepts and applications. It provides coaching and BI product specific training and certification.
9. ***Data Architecture*** - The data architecture function designs data models, provides a standard common business vocabulary and defines strategic data requirements.
10. ***Business Partners*** - The business partners are part of the business units with 'dotted line' reporting to D&A. They act as a bridge between the business and the D&A team. They undertake analysis of data relating to their area of expertise.

11 Appendix D – External Opportunities

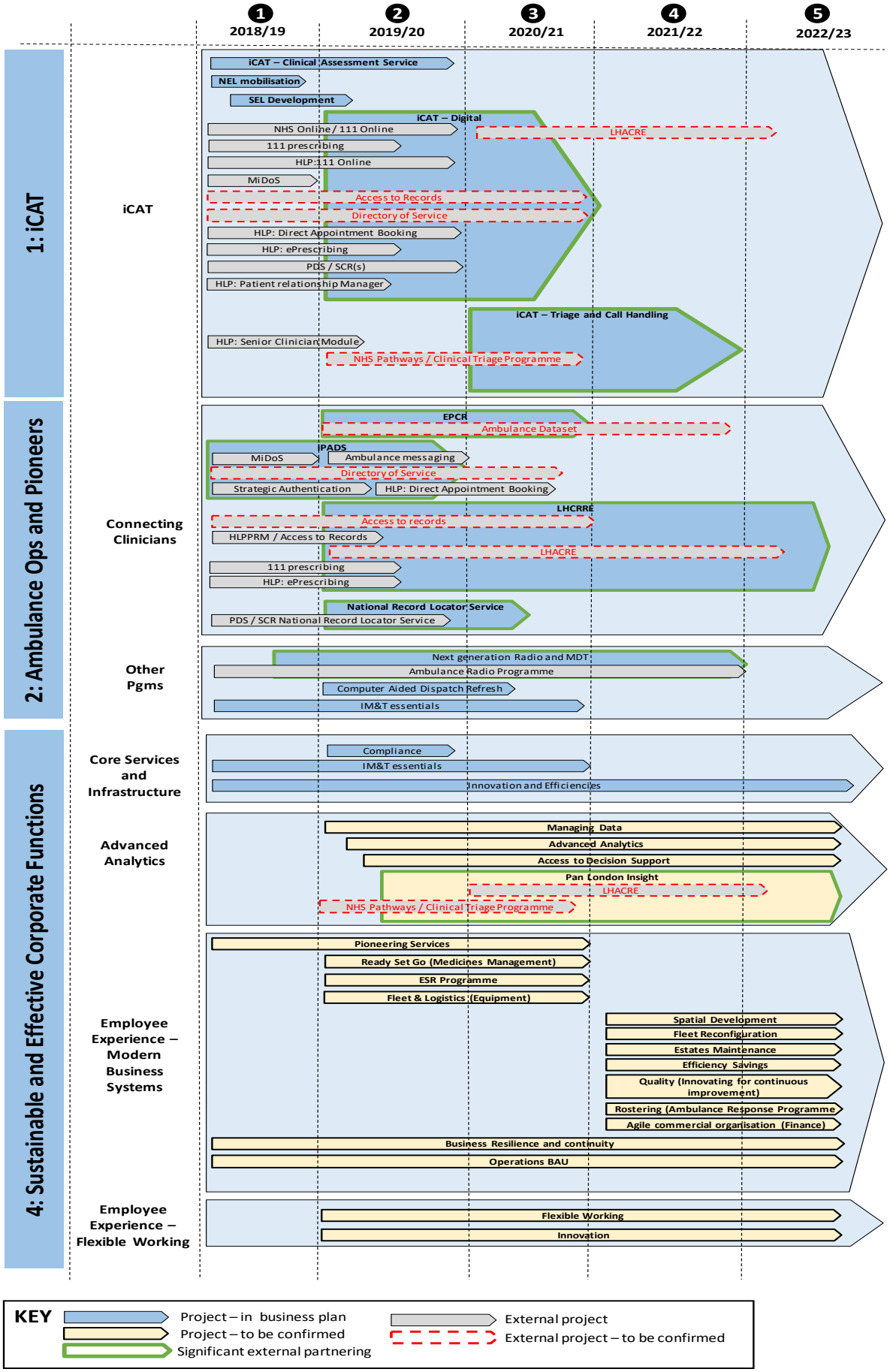
The tables below "pair" these external opportunities with the internal projects within LAS which appear best placed to incorporate their outputs.

Connecting Clinicians				
Internal Programme	**Internal Project**	**External Programme**	**Partner Organisation**	**Relevance**
Ambulance Radio Programme	**ESN / Airwaves / Ambulance Radio Programme**	**Ambulance Radio Programme**	National: Emergency Services	Upgraded connectivity for ambulances
Connecting Clinicians	**EPCR**	**Ambulance Dataset**	National (NHS Digital)	Standards for data required from an EPCR
	IPADS	**MiDoS**	Regional: Pan-London	Service information within London
		Directory of Service	National (NHS Digital)	Accuracy, Availability, Access, and Appointment Booking
		Strategic Authentication	National (NHS Digital)	Secure logon mechanisms for mobile working
	National record locator service	**PDS / SCR(s), National Record Locator Service**	National (NHS Digital)	Discovery and access to patient records
	Local Health and Care Records Exemplar	**Access to Records**	National (NHS Digital)	Discovery and access to patient records
		HLP: Patient Relationship Manager / Access to Records	Regional: Pan-London	Discovery and access to patient records
		London Care Records / LHACRE	Regional: Pan-London	Discovery and access to patient records
	Not currently in scope	**Ambulance Messaging**	National (NHS Digital)	Messaging standards for Emergency Department transfer
		111 Prescribing	National (NHS Digital)	ePrescribing
		HLP: ePrescribing	Regional: Pan-London	ePrescribing
		HLP: Direct Appointment Booking	Regional: Pan-London	Appointment booking

Integrated Clinical Assessment and Triage (iCAT)				
Internal Programme	**Internal Project**	**External Programme**	**Partner Organisation**	**Relevance**
iCAT	**iCAT - Digital**	**NHS Online / 111 Online**	National (NHS Digital)	Public-facing website for 111
		HLP: 111 Online	Regional: Pan-London	Public-facing website for 111
		London Care Records / LHACRE	Regional: Pan-London	Discovery and access to patient records
		PDS / SCR(s), National Record Locator Service	National (NHS Digital)	Discovery and access to patient records
		Access to Records	National (NHS Digital)	Discovery and access to patient records
		HLP: Patient Relationship Manager / Access to Records	Regional: Pan-London	Discovery and access to patient records
		MiDoS	Regional: Pan-London	Service information within London
		Directory of Service	National (NHS Digital)	Accuracy, Availability, Access, and Appointment Booking
		111 Prescribing	National (NHS Digital)	ePrescribing
		HLP: ePrescribing	Regional: Pan-London	ePrescribing
		HLP: Direct Appointment Booking	Regional: Pan-London	Appointment Booking
	iCAT - Triaging and Call Handling	**NHS Pathways / Clinical Triage Programme**	National (NHS Digital)	Development of standards and approaches for modular triage, call automation, and outcomes analysis
		HLP: Senior Clinician Module	Regional: Pan-London	New triage module

Pan London Insight				
Internal Programme	**Internal Project**	**External Programme**	**Partner Organisation**	**Relevance**
Not currently in scope	**Not currently in scope**	**London Care Records / LHACRE**	Regional: Pan-London	Population Health analytics
		NHS Pathways / Clinical Triage Programme	National (NHS Digital)	Collation of data for clinical outcomes analysis

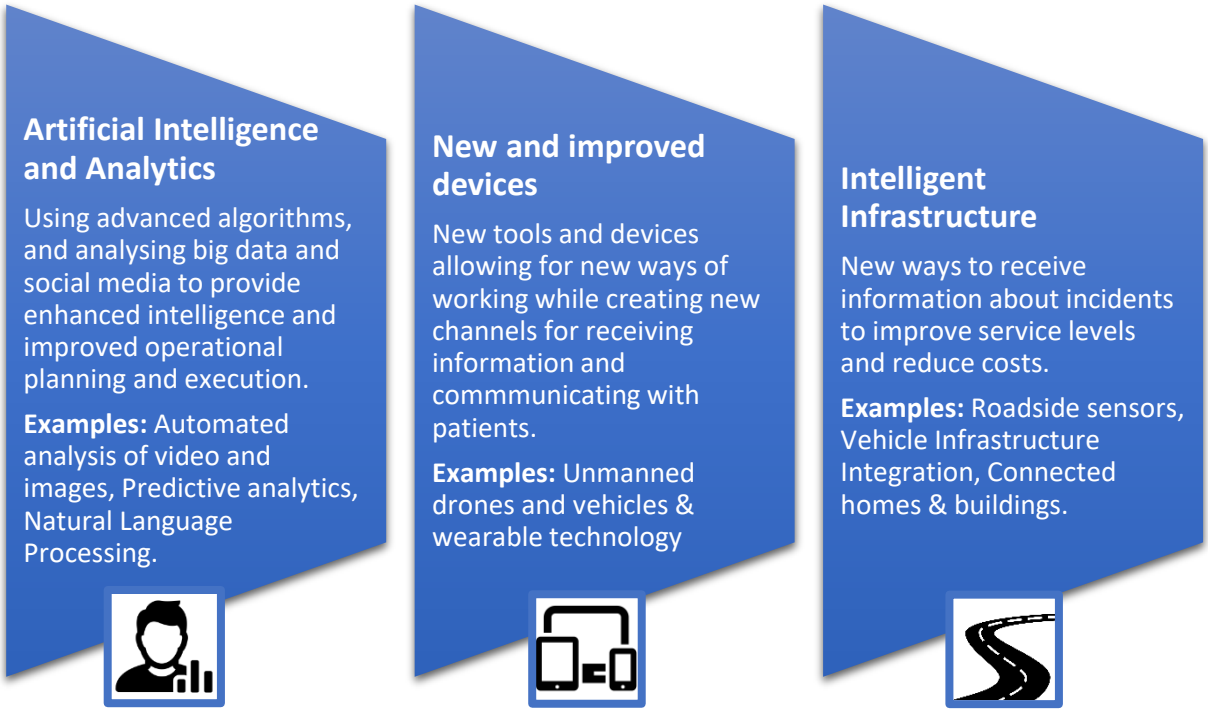
The diagram below additionally overlays these external opportunities onto the roadmap:


1 2018/19
2 2019/20
3 2020/21
4 2021/22
5 2022/23
1: iCAT
2: Ambulance Ops and Pioneers
4: Sustainable and Effective Corporate Functions
iCAT
Connecting Clinicians
Other Pgms
Core Services and Infrastructure
Advanced Analytics
Employee Experience – Modern Business Systems
Employee Experience – Flexible Working
iCAT – Clinical Assessment Service
NEL mobilisation
SEL Development
iCAT – Digital
NHS Online / 111 Online
111 prescribing
HLP:111 Online
MiDoS
Access to Records
Directory of Service
HLP: Direct Appointment Booking
HLP: ePrescribing
PDS / SCR(s)
HLP: Patient relationship Manager
LHACRE
iCAT – Triage and Call Handling
HLP: Senior Clinician Module
NHS Pathways / Clinical Triage Programme
EPCR
Ambulance Dataset
iPADS
MiDoS
Ambulance messaging
Directory of Service
Strategic Authentication
HLP: Direct Appointment Booking
LHCRRE
Access to records
HLPPRM / Access to Records
LHACRE
111 prescribing
HLP: ePrescribing
National Record Locator Service
PDS / SCR National Record Locator Service
Next generation Radio and MDT
Ambulance Radio Programme
Computer Aided Dispatch Refresh
IM&T essentials
Compliance
IM&T essentials
Innovation and Efficiencies
Managing Data
Advanced Analytics
Access to Decision Support
Pan London Insight
LHACRE
NHS Pathways / Clinical Triage Programme
Pioneering Services
Ready Set Go (Medicines Management)
ESR Programme
Fleet & Logistics (Equipment)
Spatial Development
Fleet Reconfiguration
Estates Maintenance
Efficiency Savings
Quality (Innovating for continuous improvement)
Rostering (Ambulance Response Programme
Agile commercial organisation (Finance)
Business Resilience and continuity
Operations BAU
Flexible Working
Innovation
KEY
Project – in business plan
Project – to be confirmed
Significant external partnering
External project
External project – to be confirmed

12 Appendix E – Emerging Technology Trends

NB: The material below is reproduced from the National Ambulance Digital Strategy.

Emerging technologies offer opportunities for transformational change – dramatically improving patient outcomes and ways of working. We see three main areas of emerging technology trends that are key for the Ambulance Sector to consider in the longer term. These emerging technologies could enhance the digital capability of the service we provide while improving patient outcomes. It however worth remembering that Digital incorporates a much wider scope than the below themes.



Examples: Artificial Intelligence & Analytics	
Artificial intelligence	Artificial Intelligence (AI) based solutions can for example be used to create digital assistants that can enhance decision making and triage in real time. These assistants can help takers to perform triage by analysing the conversation in real time, looking for verbal and nonverbal (tone of voice/breathing patterns) signals while considering metadata and symptom descriptions. Data provided during the call can be compared to historic calls to find patterns and enabling recommendations, in real time. Other examples include semantic analysis and natural language processing of social media that cover incidents to identify public sentiment. Incident reporting can, for example, come through social media or other relevant internet applications. Uses of social computing also include language detection and assisted incident classifications.
Automated analysis of CCTV – Image recognition	Intelligent video recognition systems including identification of location from video and images. For example, Services could include automated analysis of CCTV data to pick out rapidly emerging situations, such as traffic accidents.
Analytics and	With increased numbers of connected devises and infrastructure comes the opportunity to analyse, draw conclusions about, and even predict

predictive Ambulancing	incidents. Predictive responses and resource management could be facilitated after the analysis of historic data sets to identify potential emergency or traffic hotspots.

Examples: New and improved devices	
Unmanned drones and vehicles	Although relatively immature emerging technology, unmanned drones and vehicles could enable remote surveillance and intervention from the control room. Drones could also enable the ability to examine large geographical areas, which may otherwise be inaccessible, rapidly remotely and safely. Moreover, unmanned vehicles would be especially useful for delivering medical equipment to remote locations
Wearable technology	Wearable technology, usually installed on clothing or directly in contact with the body (e.g. glasses, wristbands etc.) is becoming ubiquitous, cheaper and could be used by patients and staff members to address a wide variety of problems faced by Ambulance Trusts today. Patients' appetite for wearables provides an opportunity for Ambulance Trusts to improve services by collecting more and relevant heath data. Smart watches/clothes that monitor health indicators of patients, or smart glasses with augmented reality overlay used by Ambulance Staff can provide new capabilities and allow for more hands-free action.

Examples: Intelligent Infrastructure	
Roadside sensors	Intelligent transport systems can be harnessed to prevent accidents and improve emergency response to incidents. Roadside sensors collecting data that could help the Ambulance Control Rooms in guiding drivers to alternative routes while automatically feeding that information to GPS navigation systems. Traffic light preemption using, for example, acoustic sensors linked to preemption systems is another example.
Vehicle Infrastructure Integration	Enabling roads, traffic signals and vehicles to talk to each other and share crucial information automatically. This could, for example, improve road safety by allowing vehicles to perform automated emergency maneuvers preventing incidents.
Connected homes & buildings	Connected homes and buildings can allow occupants to remotely control and program a variety of automated home electronic devices for safety purposes. Sophisticated intelligent systems can learn about users' behaviors and lifestyles, and connected homes solutions in the safety and security space are already available on the market. Their integration with the wider emergency services systems may bring additional benefits in the future, such as: • Improving emergency response by providing real time information on what is happening inside a building, without the need for the occupant to alert and communicate with Ambulance Trusts. • Allowing fast intervention of emergency personnel within the premises. • Tailored emergency solutions, e.g. elderly care assistance service to avoid ambulance callouts or delayed transfers from hospitals.

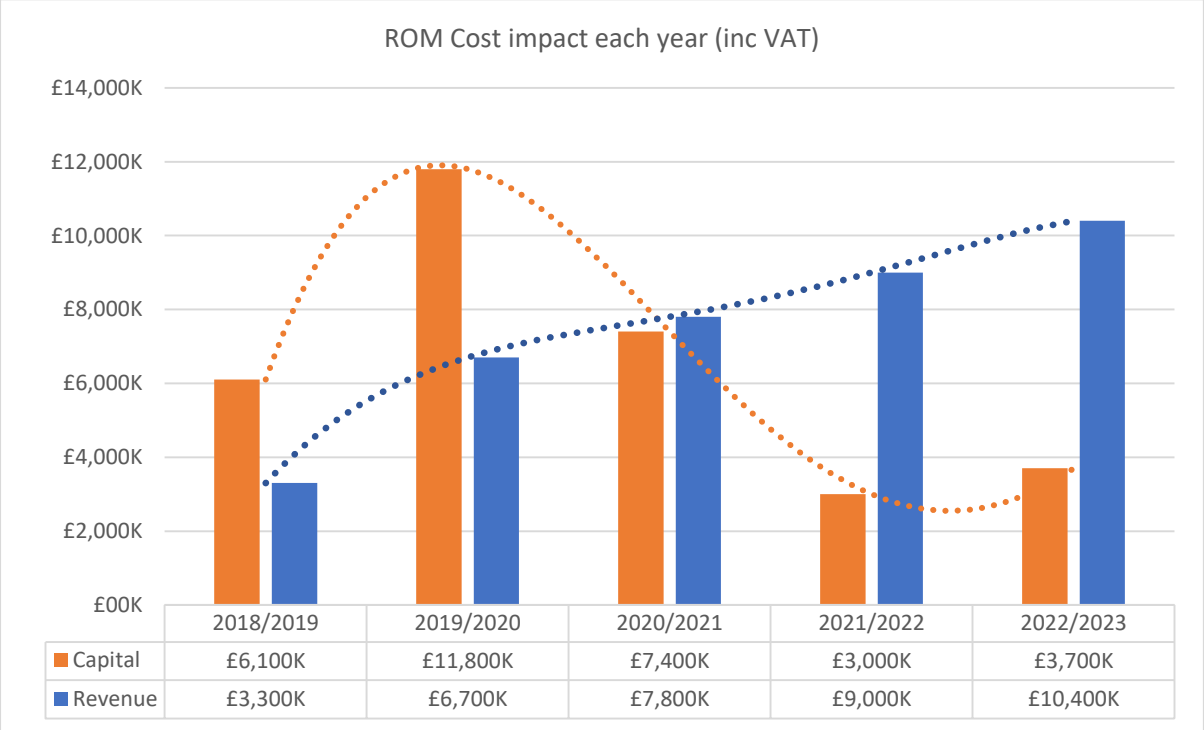
13 Appendix F – ROM Cost Estimation

An exercise has been taken to identify the cost impact of the strategy over time. This is a Rough Order of Magnitude (ROM) rather than a fully qualified cost estimate.

The detail of the phasing across years and detailed costs will be refined through Trust business planning activity and the development of individual business cases across the 5 years of the strategy.

13.1 Overall Capital and Revenue Impact

The following table shows the estimated total impact per year, split between the constituent Capital and Revenue impact.



	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023
Capital	£6,100K	£11,800K	£7,400K	£3,000K	£3,700K
Revenue	£3,300K	£6,700K	£7,800K	£9,000K	£10,400K

Note: This does not include the impact of cash releasing benefits

The average annual impact is approximately £14M (Capital and Revenue) with the major outlying impact being in 2019/20 due to the implementation of the Trust's ePCR and the initiation of other work on the major themes.

It should be noted the most significant revenue increases are in the first year of full iPad use, due to the airtime and services charges associated with providing mobile services for our mobile staff.

It should also be noted that the additional Capital spend reduces significantly from 2020/21 onwards as more services are delivered in the cloud; consequently the Revenue impact increases over time. This is evidenced by the trend lines

At this stage the analysis does not include the impact of Trust efficiencies (whether directly or indirectly) attributable to the Strategy, however, this should be compiled through the business planning processes and the development of individual business cases across the 5 years of the strategy.

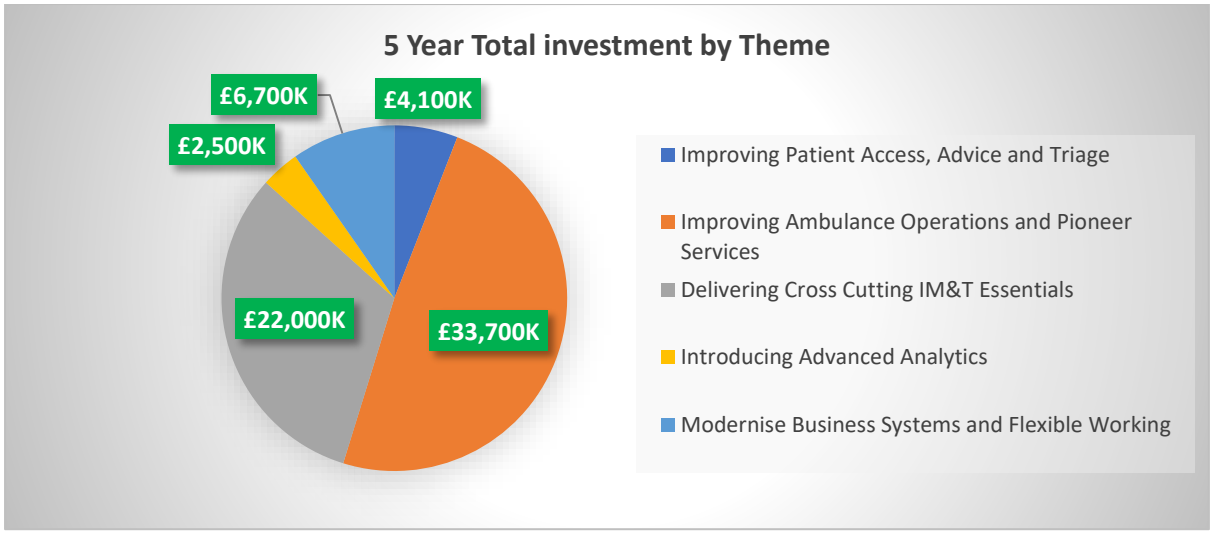
13.2 ROM Cost associated with Themes and Pillars

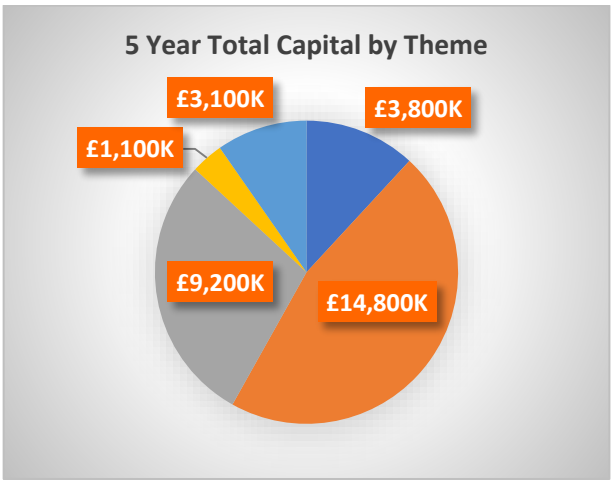
A more detailed view of the costs against each of the major themes is shown below with tabulated annual costs and overall five year costs. This is followed by a view of the propositional costs against each of the major themes.

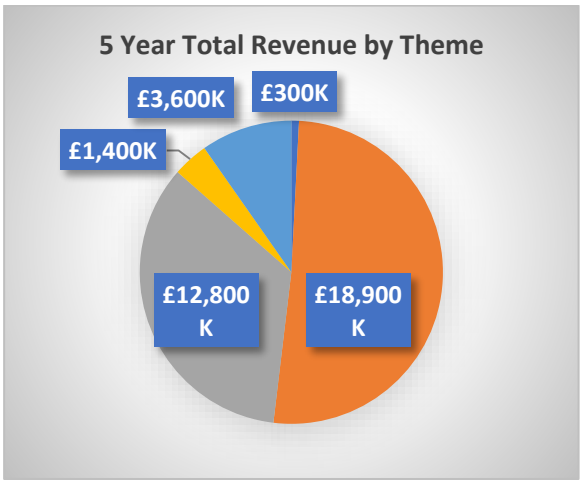
5 Year Capital by year and theme					
Theme	Sum of Capital 18/19	Sum of Capital 19/20	Sum of Capital 20/21	Sum of Capital 21/22	Sum of Capital 22/23
Improving Patient Access, Advice and Triage	£1,200K	£1,800K	£500K	£00K	£00K
Improving Ambulance Operations and Pioneer Services	£100K	£4,700K	£4,100K	£1,700K	£2,800K
Delivering Cross Cutting IM&T Essentials	£3,700K	£2,600K	£1,200K	£600K	£300K
Introducing Advanced Analytics	£00K	£500K	£300K	£200K	£100K
Modernise Business Systems and Flexible Working	£600K	£1,200K	£600K	£300K	£100K
Grand Total	£5,600K	£10,700K	£6,700K	£2,800K	£3,300K

5 Year Revenue by year and theme					
Theme	Sum of Revenue 18/19	Sum of Revenue 19/20	Sum of Revenue 20/21	Sum of Revenue 21/22	Sum of Revenue 22/23
Improving Patient Access, Advice and Triage	£00K	£100K	£100K	£100K	£100K
Improving Ambulance Operations and Pioneer Services	£2,100K	£3,400K	£3,500K	£3,800K	£4,400K
Delivering Cross Cutting IM&T Essentials	£800K	£1,900K	£2,400K	£2,900K	£3,500K
Introducing Advanced Analytics	£00K	£200K	£300K	£400K	£400K
Modernise Business Systems and Flexible Working	£00K	£500K	£900K	£900K	£1,000K
Grand Total	£3,000K	£6,100K	£7,100K	£8,200K	£9,400K

The following shows the proportional ROM investment required to deliver the digital aspects of the themes

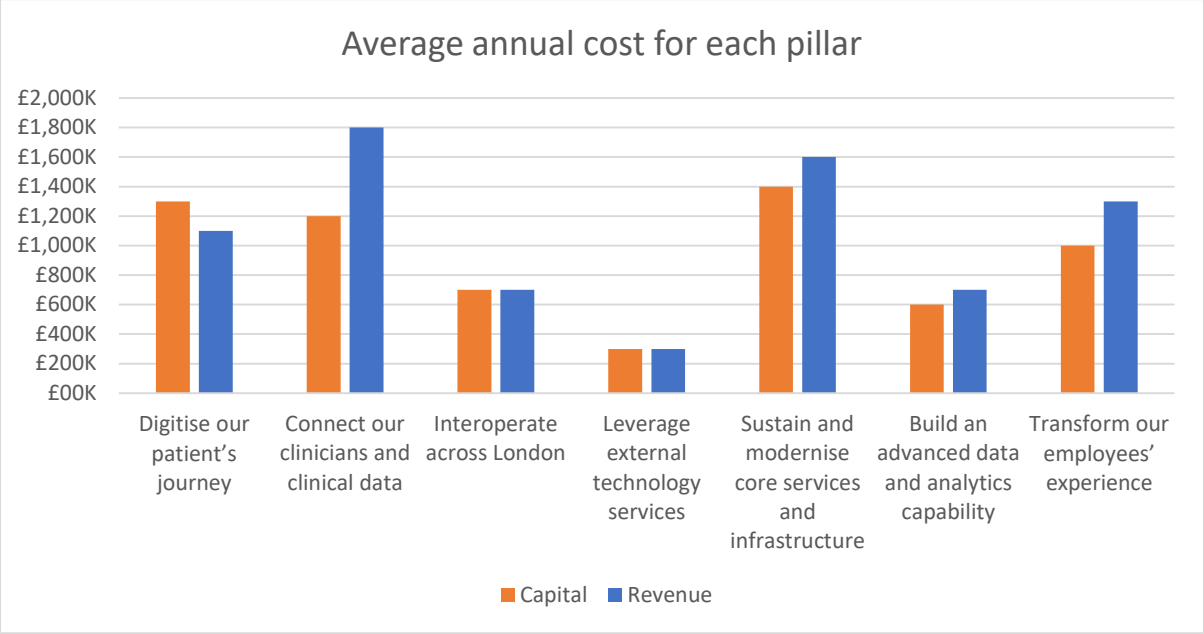






Note: This does not include the impact of cash releasing benefits

The following shows the average annual investment in each of the seven pillars.



Note: This does not include the impact of cash releasing benefits

14 Appendix G – National Alignment

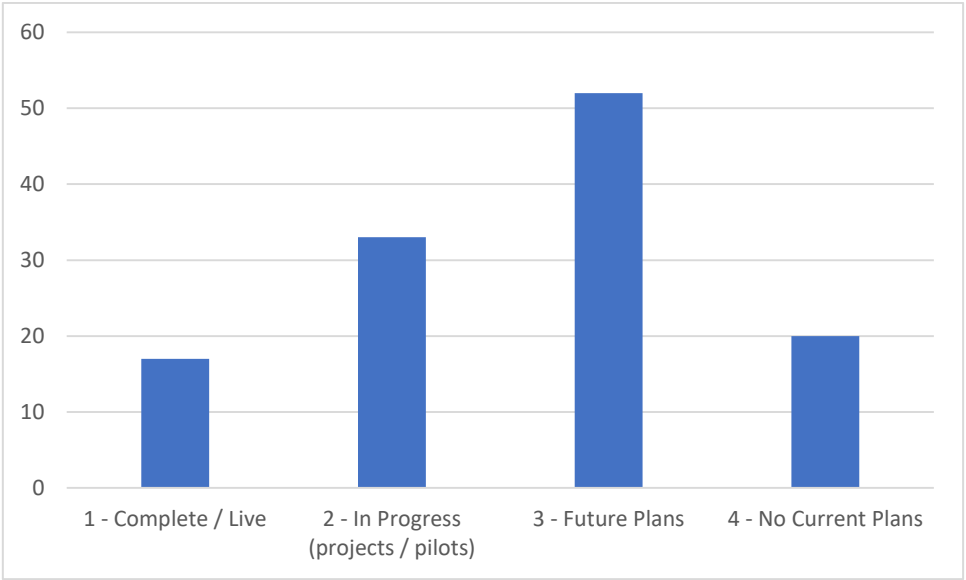
14.1 National Ambulance Digital Strategy

A National Ambulance Digital Strategy is currently being developed and co-authored by NHSD and the national Ambulance IM&T leads. This is being developed based on the domains of activity categorised in the Commissioning Framework:

https://www.england.nhs.uk/wp-content/uploads/2018/09/commissioning-framework-and-national-urgent-and-emergency-ambulance-services-specification.pdf

Through our involvement in co-authoring the National Strategy we have insight into what it will contain. A mapped comparison has been carried out and of the 122 elements of the National Strategy against the LAS Digital Strategy.

Over 83% of the national Strategy elements have either been implemented or are in progress or are in our future plans. The breakdown is as follows:



The more detailed mapping analysis which also takes into account phasing shows that:

Alignment is generally good, with essentially the same topics covered.

- The majority of the “short term” National items are either already complete or in progress at LAS, and the majority of the longer term National items included in future plans
- The LAS focus on “Partnering” fits well with the National strategy
- The comparison emphasises the importance of the LAS work on EPR and Data / Analytics – which contribute to a significant number of the National topics

There are a few minor areas of misalignment to consider as detailed planning progresses, e.g.:

- ***Timing -*** Minor differences in timing, where LAS priorities may validly cause something to be done slightly earlier or later

- ***Drones -*** noted nationally, not currently in LAS plans
- ***Call handovers to other Trusts*** – noted nationally, not explicitly in LAS plans.

Other points of detail should be considered for incorporation in the medium to long term

There are also a couple of significant areas of note:

- ***Channels –*** LAS strategy is to receive 999 phone calls, plus other contact channels via "111 Online" – and this approach may be justified based on LAS offering both 999 and 111. The National Strategy does highlight opportunities for other new channels specifically into 999, plus additional longer-term opportunities such as monitoring devices and sensors, integration with partner organisations, etc. However the National Strategy also recommends further National work to investigate further at a policy level what is appropriate and to define a "999 Channels Architecture". Awaiting the results of this before proposing significant investment may therefore be seen as a reasonable approach.
- ***Wider Referrals –*** Whilst in the plan for the CHub and ePCR, the LAS strategy is "lighter" on referrals integration than the National Strategy. E.g. booking appointments with GP, UTC, Patient Transport, Social Care etc. This is emerging as a cornerstone of the IUC co-ordination so should be taken into account in plans moving forward.

The following heat maps based on the national roadmap below visually show the phased alignment.

14.2 The NHS Long Term Plan and Tech Vision (3)

The new NHS long term plan, published in January 2019, outlines how across all parts of the NHS technology will be upgraded and that "over the next ten years investment in technology will result in an NHS where digital access to services is widespread. Where patients and carers can better manage their health and conditions. Where clinicians can access and interact with patient records and care plans wherever they are, with ready access to decision support and AI, and without the administrative hassle of today."

There are a number of milestone set which the plan to deliver this Strategy will need to comply with

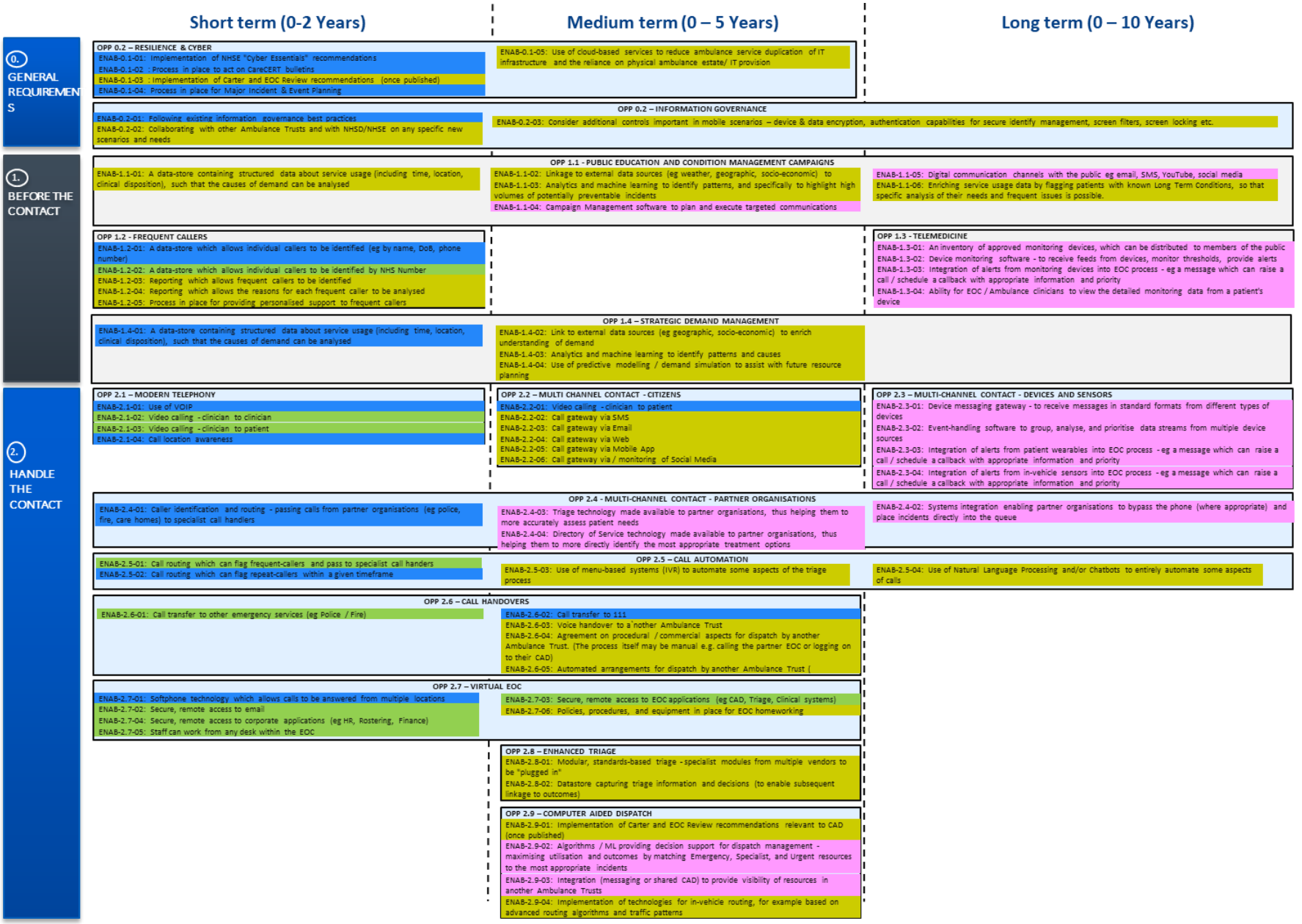
NHS Long term Plan	LAS Alignment: The LAS are…..
During 2019 we will introduce controls to ensure new systems purchased by the NHS comply with agreed standards, including those set out in The Future of Healthcare.	Working with NHSD through the Nationals Ambulance Strategy to agree the standards needed in our sector. Working as part of the One London LHCRE programme of defined standards
By 2020, five geographies will deliver a longitudinal health and care record platform linking NHS and local authority organisations, three additional areas will follow in 2021.	Playing a central role in pan-London healthcare data interoperability through the One London LHCRE programme.

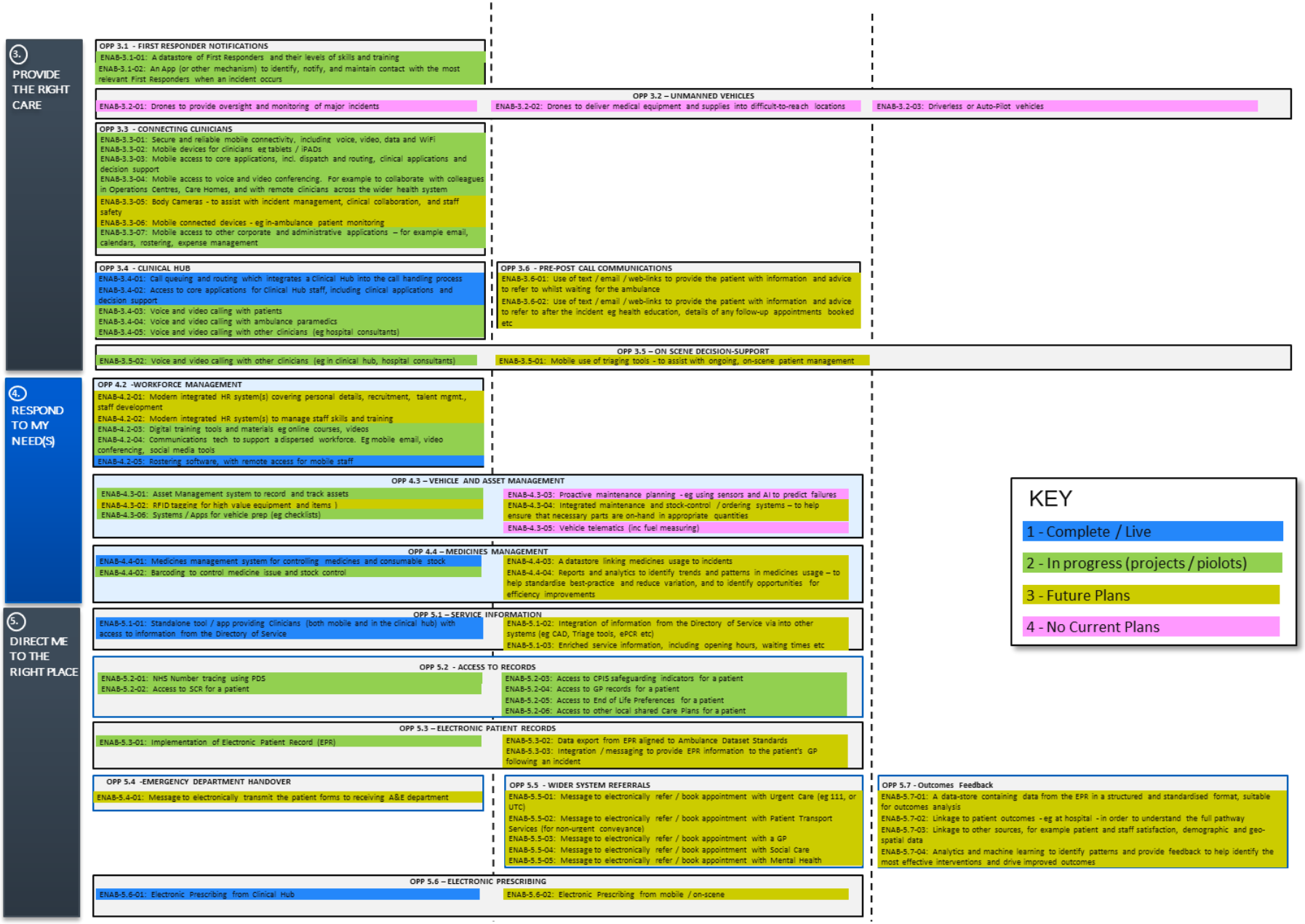
[3] https://www.gov.uk/government/publications/the-future-of-healthcare-our-vision-for-digital-data-and-technology-in-health-and-care/the-future-of-healthcare-our-vision-for-digital-data-and-technology-in-health-and-care

In 2020/21, people will have access to their care plan and communications from their care professionals via the NHS App; the care plan will move to the individual's LHCR across the country over the next five years.	Planning for access and input to care plans through the On-London LHCRE programme
By summer 2021, we will have 100% compliance with mandated cyber security standards across all NHS organisations in the health and care system.	Planning to obtain the defined NHS Security standard (Cyber Essentials Plus) and implement accredited email services.
In 2021/22, we will have systems that support population health management in every Integrated Care System across England, with a Chief Clinical Information Officer (CCIO) or Chief Information Officer (CIO) on the board of every local NHS organisation.	Planning to integrate and link information and intelligence using improved information management and intelligence capabilities. Committed to digital transformation with a CIO as a member of the Trust Executive Committee, who attends the Trust Board in a non-voting role, and a CCIO supporting the clinical change in the organisation.
By 2022/23, the Child Protection Information system will be extended to cover all health care settings, including general practices.	Planning to provide front liner clinician access to CPIS processes and appropriate information.
By 2023/24 every patient in England will be able to access a digital first primary care offer (see 1.44).	Working with digital providers across the London care system through the On-London LHCRE programme
By 2024, secondary care providers in England, including acute, community and mental health care settings, will be fully digitised, including clinical and operational processes across all settings, locations and departments. Data will be captured, stored and transmitted electronically, supported by robust IT infrastructure and cyber security, and LHCRs will cover the whole country.	Working with digital providers across the London care system through the On-London LHCRE programme

The following provides a wider view of how the digital strategy pillars support the "practical priorities to drive NHS Digital transformation" stated in the NHS long term plan.

	Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5	Pillar 6	Pillar 7
Practical priorities to drive NHS digital transformation	Digitise the patient journey	Connect Clinicians and Clinical Data	Interoperate across London	Leverage external technology services	Sustain and modernise our core services and infrastructure	Build an advanced data and analytics capability	Transform the employee experience through remote working and use of
Create straightforward digital access to NHS services, and help patients and their carers manage their health.	Introduce new channels such as video-calling to enhance interaction with patients Integrate workflows across 999 and 111 to				Refresh our 999 and 111 telephony infrastructure		
Ensure that clinicians can access and interact with patient records and care plans wherever they are.	Implement electronic patient records, migrating from paper to a digital clinical records system Capture the NHS Number whenever possible and use it to help identify patients	Expand upon front-line iPad deployment to enable mobile access to core clinical apps Provide access to external patient records so clinicians arebetter informed about a patient's history	Connect with other H & SC providers across London (for example via the LHCRE), enabling interoperability between systems to provide access to patient records, information about		Upgrade our mobile communications and devices, to ensure that we put modern connectivity in the hands of crew staff		Enable flexible working for our people. The majority of our staff are mobile and we have other pressures such as costly estate which means we should be more flexible in where and how our people can
Use decision support and artificial intelligence (AI) to help clinicians in applying best practice, eliminate unwarranted variation across the whole	Introduce additional clinical decision-making support tools Explore the potential of voice automation and evaluate its suitability in call handling	Use video-calling to allow clinicians to provide peer support and advice to each other (e.g. real-time access to specialist consultants, mental				Better exploit data, developing tools and infrastructure for BI, applying advanced analytics such as forecasting and machine learning, and	
Use predictive techniques to support local health systems to plan care for populations.	Identify frequent callers to better manage their care					Better exploit data, developing tools and infrastructure for BI, applying advanced analytics such as forecasting and machine learning, and	
Use intuitive tools to capture data as a by-product of care in ways that empower clinicians and reduce the administrative burden.	Explore the potential of voice automation and evaluate its suitability in call handling Enable electronic referrals and handovers, supported by access to the DoS	Expand upon iPad deployment to front-line clinicians to enable mobile access to core clinical applications				Implement self-service analytics to provide an integrated single source of truth for all data and intelligence decisions Improve the management of our data - assuring its quality, linking it across	Modernise our internal business systems to support more efficient ways of working and the wellbeing of our staff. New robust systems to run our organisation more efficiently, properly
Protect patients' privacy and give them control over their medical record.			Connect with other H & SC providers across London (for example via the LHCRE), enabling interoperability between systems to provide access to patient records, information about		Continue to address cyber vulnerabilities by investing in modern infrastructure, protective controls and education across the organisation Implement NHS accredited email e.g.		
Link clinical, genomic and other data to support the development of new treatments to improve the NHS, making data captured for care available for clinical			Link our data with that of partners across London to provide a complete picture of the patient journey and outcomes, thus gaining insight into the wider health and social care	Play a leading role in pan-London healthcare data interoperability such as the One London programme funded by NHS England's Local Health and Care Records Exemplar		Become patient data oriented with the patient at the centre of all our decisions Transform to a proactive, evidence-based organisation, recognising data as a	
Ensure NHS systems and NHS data are secure through implementation of security, monitoring systems and staff education.	Invest in resilience and interoperability of our Computer Aided Dispatch (CAD) system				Continue to address cyber vulnerabilities by investing in modern infrastructure, protective controls and education across the organisation Implement NHS accredited email e.g. NHSMail2 or MS O365 Consolidate, secure, and modernise our infrastructure to support resilient operations		
Mandate and rigorously enforce technology standards (as described in The Future of Healthcare) to ensure data is interoperable and accessible.	Enable electronic prescribing by appropriate clinical staff across our services	Upgrade mobile technologies including the national Programme replacing the national radio system. Adopt the national in-vehicle mapping and		Accelerate delivery by aligning with national and regional initiatives which can help us.		Improve the management of our data - assuring its quality, linking it across patient, operational, corporate and external systems, and packaging it in ready-to-use	
Encourage a world leading health IT industry in England with a supportive environment for software developers and innovators.				Identify technologies and solutions which are needed but can already be provided by others or are commodities. This includes the use of cloud wherever			Be bolder and more innovative in our use of technology - to benefit Patients and the Public, Our People, and Our Partners., taking advantage of the


Short term (0-2 Years)
Medium term (0 – 5 Years)
Long term (0 – 10 Years)
0. GENERAL REQUIREMENTS
OPP 0.2 – RESILIENCE & CYBER
ENAB-0.1-01: Implementation of NHSE "Cyber Essentials" recommendations
ENAB-0.1-02 : Process in place to act on CareCERT bulletins
ENAB-0.1-03 : Implementation of Carter and EOC Review recommendations (once published)
ENAB-0.1-04: Process in place for Major Incident & Event Planning
ENAB-0.1-05: Use of cloud-based services to reduce ambulance service duplication of IT infrastructure and the reliance on physical ambulance estate/ IT provision
OPP 0.2 – INFORMATION GOVERNANCE
ENAB-0.2-01: Following existing information governance best practices
ENAB-0.2-02: Collaborating with other Ambulance Trusts and with NHSD/NHSE on any specific new scenarios and needs
ENAB-0.2-03: Consider additional controls important in mobile scenarios – device & data encryption, authentication capabilities for secure identify management, screen filters, screen locking etc.
1. BEFORE THE CONTACT
OPP 1.1 - PUBLIC EDUCATION AND CONDITION MANAGEMENT CAMPAIGNS
ENAB-1.1-01: A data-store containing structured data about service usage (including time, location, clinical disposition), such that the causes of demand can be analysed
ENAB-1.1-02: Linkage to external data sources (eg weather, geographic, socio-economic) to
ENAB-1.1-03: Analytics and machine learning to identify patterns, and specifically to highlight high volumes of potentially preventable incidents
ENAB-1.1-04: Campaign Management software to plan and execute targeted communications
ENAB-1.1-05: Digital communication channels with the public eg email, SMS, YouTube, social media
ENAB-1.1-06: Enriching service usage data by flagging patients with known Long Term Conditions, so that specific analysis of their needs and frequent issues is possible.
OPP 1.2 - FREQUENT CALLERS
ENAB-1.2-01: A data-store which allows individual callers to be identified (eg by name, DoB, phone number)
ENAB-1.2-02: A data-store which allows individual callers to be identified by NHS Number
ENAB-1.2-03: Reporting which allows frequent callers to be identified
ENAB-1.2-04: Reporting which allows the reasons for each frequent caller to be analysed
ENAB-1.2-05: Process in place for providing personalised support to frequent callers
OPP 1.3 - TELEMEDICINE
ENAB-1.3-01: An inventory of approved monitoring devices, which can be distributed to members of the public
ENAB-1.3-02: Device monitoring software - to receive feeds from devices, monitor thresholds, provide alerts
ENAB-1.3-03: Integration of alerts from monitoring devices into EOC process - eg a message which can raise a call / schedule a callback with appropriate information and priority
ENAB-1.3-04: Ability for EOC / Ambulance clinicians to view the detailed monitoring data from a patient's device
OPP 1.4 – STRATEGIC DEMAND MANAGEMENT
ENAB-1.4-01: A data-store containing structured data about service usage (including time, location, clinical disposition), such that the causes of demand can be analysed
ENAB-1.4-02: Link to external data sources (eg geographic, socio-economic) to enrich understanding of demand
ENAB-1.4-03: Analytics and machine learning to identify patterns and causes
ENAB-1.4-04: Use of predictive modelling / demand simulation to assist with future resource planning
2. HANDLE THE CONTACT
OPP 2.1 – MODERN TELEPHONY
ENAB-2.1-01: Use of VOIP
ENAB-2.1-02: Video calling - clinician to clinician
ENAB-2.1-03: Video calling - clinician to patient
ENAB-2.1-04: Call location awareness
OPP 2.2 – MULTI CHANNEL CONTACT - CITIZENS
ENAB-2.2-01: Video calling - clinician to patient
ENAB-2.2-02: Call gateway via SMS
ENAB-2.2-03: Call gateway via Email
ENAB-2.2-04: Call gateway via Web
ENAB-2.2-05: Call gateway via Mobile App
ENAB-2.2-06: Call gateway via / monitoring of Social Media
OPP 2.3 – MULTI-CHANNEL CONTACT - DEVICES AND SENSORS
ENAB-2.3-01: Device messaging gateway - to receive messages in standard formats from different types of devices
ENAB-2.3-02: Event-handling software to group, analyse, and prioritise data streams from multiple device sources
ENAB-2.3-03: Integration of alerts from patient wearables into EOC process - eg a message which can raise a call / schedule a callback with appropriate information and priority
ENAB-2.3-04: Integration of alerts from in-vehicle sensors into EOC process - eg a message which can raise a call / schedule a callback with appropriate information and priority
OPP 2.4 - MULTI-CHANNEL CONTACT - PARTNER ORGANISATIONS
ENAB-2.4-01: Caller identification and routing - passing calls from partner organisations (eg police, fire, care homes) to specialist call handlers
ENAB-2.4-03: Triage technology made available to partner organisations, thus helping them to more accurately assess patient needs
ENAB-2.4-04: Directory of Service technology made available to partner organisations, thus helping them to more directly identify the most appropriate treatment options
ENAB-2.4-02: Systems integration enabling partner organisations to bypass the phone (where appropriate) and place incidents directly into the queue
OPP 2.5 – CALL AUTOMATION
ENAB-2.5-01: Call routing which can flag frequent-callers and pass to specialist call handers
ENAB-2.5-02: Call routing which can flag repeat-callers within a given timeframe
ENAB-2.5-03: Use of menu-based systems (IVR) to automate some aspects of the triage process
ENAB-2.5-04: Use of Natural Language Processing and/or Chatbots to entirely automate some aspects of calls
OPP 2.6 – CALL HANDOVERS
ENAB-2.6-01: Call transfer to other emergency services (eg Police / Fire)
ENAB-2.6-02: Call transfer to 111
ENAB-2.6-03: Voice handover to another Ambulance Trust
ENAB-2.6-04: Agreement on procedural / commercial aspects for dispatch by another Ambulance Trust. (The process itself may be manual e.g. calling the partner EOC or logging on to their CAD)
ENAB-2.6-05: Automated arrangements for dispatch by another Ambulance Trust (
OPP 2.7 – VIRTUAL EOC
ENAB-2.7-01: Softphone technology which allows calls to be answered from multiple locations
ENAB-2.7-02: Secure, remote access to email
ENAB-2.7-04: Secure, remote access to corporate applications (eg HR, Rostering, Finance)
ENAB-2.7-05: Staff can work from any desk within the EOC
ENAB-2.7-03: Secure, remote access to EOC applications (eg CAD, Triage, Clinical systems)
ENAB-2.7-06: Policies, procedures, and equipment in place for EOC homeworking
OPP 2.8 – ENHANCED TRIAGE
ENAB-2.8-01: Modular, standards-based triage - specialist modules from multiple vendors to be "plugged in"
ENAB-2.8-02: Datastore capturing triage information and decisions (to enable subsequent linkage to outcomes)
OPP 2.9 – COMPUTER AIDED DISPATCH
ENAB-2.9-01: Implementation of Carter and EOC Review recommendations relevant to CAD (once published)
ENAB-2.9-02: Algorithms / ML providing decision support for dispatch management - maximising utilisation and outcomes by matching Emergency, Specialist, and Urgent resources to the most appropriate incidents
ENAB-2.9-03: Integration (messaging or shared CAD) to provide visibility of resources in another Ambulance Trusts
ENAB-2.9-04: Implementation of technologies for in-vehicle routing, for example based on advanced routing algorithms and traffic patterns


3. PROVIDE THE RIGHT CARE
OPP 3.1 - FIRST RESPONDER NOTIFICATIONS
ENAB-3.1-01: A datastore of First Responders and their levels of skills and training
ENAB-3.1-02: An App (or other mechanism) to identify, notify, and maintain contact with the most relevant First Responders when an incident occurs
OPP 3.2 – UNMANNED VEHICLES
ENAB-3.2-01: Drones to provide oversight and monitoring of major incidents
ENAB-3.2-02: Drones to deliver medical equipment and supplies into difficult-to-reach locations
ENAB-3.2-03: Driverless or Auto-Pilot vehicles
OPP 3.3 - CONNECTING CLINICIANS
ENAB-3.3-01: Secure and reliable mobile connectivity, including voice, video, data and WiFi
ENAB-3.3-02: Mobile devices for clinicians eg tablets / iPADs
ENAB-3.3-03: Mobile access to core applications, incl. dispatch and routing, clinical applications and decision support
ENAB-3.3-04: Mobile access to voice and video conferencing. For example to collaborate with colleagues in Operations Centres, Care Homes, and with remote clinicians across the wider health system
ENAB-3.3-05: Body Cameras - to assist with incident management, clinical collaboration, and staff safety
ENAB-3.3-06: Mobile connected devices - eg in-ambulance patient monitoring
ENAB-3.3-07: Mobile access to other corporate and administrative applications – for example email, calendars, rostering, expense management
OPP 3.4 - CLINICAL HUB
ENAB-3.4-01: Call queuing and routing which integrates a Clinical Hub into the call handling process
ENAB-3.4-02: Access to core applications for Clinical Hub staff, including clinical applications and decision support
ENAB-3.4-03: Voice and video calling with patients
ENAB-3.4-04: Voice and video calling with ambulance paramedics
ENAB-3.4-05: Voice and video calling with other clinicians (eg hospital consultants)
OPP 3.6 - PRE-POST CALL COMMUNICATIONS
ENAB-3.6-01: Use of text / email / web-links to provide the patient with information and advice to refer to whilst waiting for the ambulance
ENAB-3.6-02: Use of text / email / web-links to provide the patient with information and advice to refer to after the incident eg health education, details of any follow-up appointments booked etc
OPP 3.5 – ON SCENE DECISION-SUPPORT
ENAB-3.5-02: Voice and video calling with other clinicians (eg in clinical hub, hospital consultants)
ENAB-3.5-01: Mobile use of triaging tools - to assist with ongoing, on-scene patient management
4. RESPOND TO MY NEED(S)
OPP 4.2 -WORKFORCE MANAGEMENT
ENAB-4.2-01: Modern integrated HR system(s) covering personal details, recruitment, talent mgmt., staff development
ENAB-4.2-02: Modern integrated HR system(s) to manage staff skills and training
ENAB-4.2-03: Digital training tools and materials eg online courses, videos
ENAB-4.2-04: Communications tech to support a dispersed workforce. Eg mobile email, video conferencing, social media tools
ENAB-4.2-05: Rostering software, with remote access for mobile staff
OPP 4.3 – VEHICLE AND ASSET MANAGEMENT
ENAB-4.3-01: Asset Management system to record and track assets
ENAB-4.3-02: RFID tagging for high value equipment and items)
ENAB-4.3-06: Systems / Apps for vehicle prep (eg checklists)
ENAB-4.3-03: Proactive maintenance planning - eg using sensors and AI to predict failures
ENAB-4.3-04: Integrated maintenance and stock-control / ordering systems – to help ensure that necessary parts are on-hand in appropriate quantities
ENAB-4.3-05: Vehicle telematics (inc fuel measuring)
OPP 4.4 – MEDICINES MANAGEMENT
ENAB-4.4-01: Medicines management system for controlling medicines and consumable stock
ENAB-4.4-02: Barcoding to control medicine issue and stock control
ENAB-4.4-03: A datastore linking medicines usage to incidents
ENAB-4.4-04: Reports and analytics to identify trends and patterns in medicines usage – to help standardise best-practice and reduce variation, and to identify opportunities for efficiency improvements
5. DIRECT ME TO THE RIGHT PLACE
OPP 5.1 – SERVICE INFORMATION
ENAB-5.1-01: Standalone tool / app providing Clinicians (both mobile and in the clinical hub) with access to information from the Directory of Service
ENAB-5.1-02: Integration of information from the Directory of Service via into other systems (eg CAD, Triage tools, ePCR etc)
ENAB-5.1-03: Enriched service information, including opening hours, waiting times etc
OPP 5.2 - ACCESS TO RECORDS
ENAB-5.2-01: NHS Number tracing using PDS
ENAB-5.2-02: Access to SCR for a patient
ENAB-5.2-03: Access to CPIS safeguarding indicators for a patient
ENAB-5.2-04: Access to GP records for a patient
ENAB-5.2-05: Access to End of Life Preferences for a patient
ENAB-5.2-06: Access to other local shared Care Plans for a patient
OPP 5.3 – ELECTRONIC PATIENT RECORDS
ENAB-5.3-01: Implementation of Electronic Patient Record (EPR)
ENAB-5.3-02: Data export from EPR aligned to Ambulance Dataset Standards
ENAB-5.3-03: Integration / messaging to provide EPR information to the patient's GP following an incident
OPP 5.4 -EMERGENCY DEPARTMENT HANDOVER
ENAB-5.4-01: Message to electronically transmit the patient forms to receiving A&E department
OPP 5.5 - WIDER SYSTEM REFERRALS
ENAB-5.5-01: Message to electronically refer / book appointment with Urgent Care (eg 111, or UTC)
ENAB-5.5-02: Message to electronically refer / book appointment with Patient Transport Services (for non-urgent conveyance)
ENAB-5.5-03: Message to electronically refer / book appointment with a GP
ENAB-5.5-04: Message to electronically refer / book appointment with Social Care
ENAB-5.5-05: Message to electronically refer / book appointment with Mental Health
OPP 5.7 - Outcomes Feedback
ENAB-5.7-01: A data-store containing data from the EPR in a structured and standardised format, suitable for outcomes analysis
ENAB-5.7-02: Linkage to patient outcomes - eg at hospital - in order to understand the full pathway
ENAB-5.7-03: Linkage to other sources, for example patient and staff satisfaction, demographic and geo-spatial data
ENAB-5.7-04: Analytics and machine learning to identify patterns and provide feedback to help identify the most effective interventions and drive improved outcomes
OPP 5.6 – ELECTRONIC PRESCRIBING
ENAB-5.6-01: Electronic Prescribing from Clinical Hub
ENAB-5.6-02: Electronic Prescribing from mobile / on-scene
KEY
1 - Complete / Live
2 - In progress (projects / piolots)
3 - Future Plans
4 - No Current Plans