

Costs of digitising the NHS and social care

Technical Report produced for The Health Foundation

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Executive summary

Digital innovation and technology serve as critical enablers for the NHS and social care, empowering them to address the increasing demand and complexity of health and social care services.

The four UK nations have all set out ambitious digital plans for their NHS and social care systems. They plan to digitise health and care records, which will enable health and care professionals to access lifelong, joined-up health and social care data. They also want to increase the digital maturity of both the workforce and the people using health and care services (from here on referred to as 'patients' and 'service users' respectively) by making sure the right digital tools, skills, and capabilities are available and accessible. Equally important, is enabling people to have more control over their health and care through digital technologies.

As the UK government prepares for future Spending Reviews, and the NHS in England develops a new 10-year plan, we expect more consideration of the question:

What is the cost to digitise the NHS and adult social care in the UK?

To understand how much the UK government will need to invest to achieve these digital ambitions and carry out these plans, the Health Foundation commissioned PA Consulting to undertake a research project to answer this question.

The context, however, is complex. As healthcare systems are devolved across the four nations, and the current digital landscape of the NHS and social care across the UK is variable - different places have different levels of digital maturity, and diverse systems and technologies - there isn't a simple answer. There's more information about this context in Section 1.

However, we have come up with an answer and developed some cost estimates.

Our cost estimates

Based on the results of our work, we estimate that a total capital investment of around £8 billion is required. This is the total capital investment required to close the gap between the current digital maturity and the target state for health and social care.

We have also estimated an investment of around £3 billion in non-recurrent revenue expenditure is required. This is the cost of digitisation activities to design, develop, and implement the digital technologies for health and social care.

And we have estimated that around £2 billion in annual recurrent revenue expenditure would be required to maintain the capital and non-recurrent revenue investments outlined above, once implemented.

These digitisation costs fall into 14 common 'cost themes':

- 1. Foundational technical infrastructure
- 2. EPR and specialist EPR
- 3. Digital social care and shared care record
- 4. Remote monitoring and virtual care
- 5. Primary care
- 6. Public-facing solutions and systems
- 7. Digital skills/confidence and digital inclusion
- 8. Data and analytics solutions and platforms
- 9. Corporate IT
- 10. National platforms and programmes
- 11. Digital leadership and governance
- 12. Safe practice and cybersecurity
- 13. Sustainability and net zero

14. Other.

The capital and non-recurrent costs are broken down by theme in Table 1, and there's more information about our key findings in Section 5.

We have applied several assumptions to reach these figures, and there are other sensitivities to be aware of. We summarise these <u>after the table</u> and provide a more extensive description of our research limitations and sensitivities in <u>Section 6</u>.

Most important of these assumptions is the handling of the costs across the home nations. Our original approach assumed all four nations had the same approximate starting point for digital maturity and the same definition of digitisation. Through the course of our research we determined this is not the case, with differences in organisational structures, operating models, funding mechanisms, and current maturity levels between nations being more substantial than expected. Therefore, these cost estimates are more appropriately represented as a range of costs to account for differences across home nations, which we outline in <u>Section 6</u>. However, for ease of communication, we will continue to use the higher cost estimates of these ranges throughout this report unless otherwise noted.

Our methodology: define 'digitisation', establish current digital maturity levels, estimate the costs of bridging the gap

As there is no single, agreed definition for 'digitisation' in the context of the NHS and adult social care in the UK, we needed to define what we mean by 'digitisation' to answer the question. We also had to establish current levels of digital maturity and estimate the costs of bridging the gap between the current state and the target state.

Our methodology broke this down into discrete and quantifiable components, following three steps:

 First, we distilled the digitisation ambitions and expectations from existing policies and guidance into common 'digitisation themes' – our definition of what would count as 'digitisation'. The policies and guidance we used are listed in <u>Section 1</u>.

We broke these themes down further into distinct '**digitisation items**', such as 'Electronic Patient Record (EPR)' within clinical and care systems.

This gave us a view of the gap. We then used the digitisation themes and items to develop 14 '**cost themes**' (listed above) and 42 '**cost items'** (see <u>Section 5</u>).

- 2. We analysed other public data and policies to identify current progress for each cost theme and item, applying one or more of the following methods:
 - a. Assessing the current digital maturity level by looking at which digital solutions and technologies were already deployed and being used by the workforce and the public.
 - b. Determining percentage of completion, deployment, or adoption for a theme or item, e.g., number of trusts using an EPR.
 - c. Speaking to stakeholders and professionals to get their views on maturity, where information was unavailable or insufficient, e.g., for digital capabilities.

We cover the progress and gaps we identified in Section 5.

3. Then we used a sample of existing published cost data and statements to estimate the cost of bridging the gap between the current state and the desired end state. For each cost item, we identified 'unit costs' (i.e., averages derived from sample cost data) and multiplied these by a 'scaling factor', depending on the specific item (e.g., total number of NHS hospitals or care homes, or total number of NHS trusts across the UK) to calculate a UK-wide figure.

Further information about our methodology, including the scaling factors used, can be found in <u>Section 3</u>, while the data sources are provided in <u>Section 4</u>.

Cost items have been categorised as revenue expenditures either because they were categorised that way in the original data, or, in our professional judgement and experience, they are items that do not deliver any economic value once used. These include spending on training, implementation, optimisation, and software licences.

Total estimated costs breakdown

Using this methodology, the total estimated one-off costs for digitising the NHS and social care across the four home nations are listed in **Error! Reference source not found.**:

Top level cost theme	Total capital (in £m)	Total non-recurrent revenue (in £m)
Foundational technical infrastructure	£1,423	£237
EPR and specialist EPR	£1,615	£920
Digital social care/shared care record	£224	£454
Remote and virtual care (and other clinical and care solutions)	£981	£277
Primary care	£61	£10
Public-facing solutions and systems	£422	£614
Digital skills/confidence and digital inclusion		
Data & analytics solutions and platforms	£94	£574
Corporate IT	£1,037	£45
National platforms and programmes	£1,333	£2
Digital leadership and governance	£6	£10
Safe practice and cybersecurity	£23	
Sustainability and net zero	£713	
Other	£145	£17
Grand total	£8,077	£3,160

Table 1 – Summary of estimated one-off cost investments by theme for the UK (in 2024/25 real terms)

Timescales for our cost estimates

Throughout this report, we haven't given a firm timescale for our cost estimates. Sources used in this research do not consistently include timescales, or where they do, they do not consistently apply a common level of granularity.

Therefore, we've represented all cost estimates as the required investments to achieve the digital ambitions at a fixed point in time as set out up to the General Election in June 2024. Our headline figures represent values in 2024/25 real terms, regardless of any practical constraints on funding, resources, etc.

However, in some instances, we've provided indicative phasing of some costs that would arise from typical or industry-standard product delivery lifecycles, implementation timescales, or notable anticipated end-of-life decommissioning activities. This indicative phasing does not account for any spend controls and is not a recommendation for spend in any given year. Further detail on this approach is described in <u>Section 6</u>.

Our assumptions and sensitivities

There are some caveats for our headline figures:

- Because the costs depend on existing digital maturity levels, required revenue expenditure both recurrent and non-recurrent will vary between organisations and health and care systems
- Because there was not enough available data on existing revenue spend or what proportion of it could be freed up to be redeployed, we cannot say if the £2.1 billion figure for recurrent revenue

expenditure is higher or lower than current spending, nor whether the recurrent revenue is included within or in addition to current spending

• We focused solely on the costs of reaching the target state. We did not analyse the benefits of digitisation (e.g., efficiency and productivity gains that could reduce costs), because this was out of scope, and we have not factored in any potential benefits or savings arising from these benefits into our figures.

It is important to note that we have not explored what digitisation policies *should be* in place, but rather only what the ambition and plans for the NHS and adult social care currently *are*.

There are also several key sensitivities to consider when looking at our results:

Optimism bias is based on Green Book principles

Optimism bias attempts to account for the tendency for project appraisers to be over-optimistic. We have factored optimism bias into our analysis to judge how confident we should be in estimates used, in line with guidance from HM Treasury's *The Green Book*¹. There's more information about our approach to optimism bias in <u>Section 3</u> and <u>Section 5</u>.

While this approach recognises the variety in data and information, it is necessarily subjective. To mitigate this, we used other publicly available statements and guidance to corroborate our findings (detailed in <u>Appendix A</u>).

Cost estimates of home nations are extrapolated from English source data

Our sample of existing cost data is based on digital plans from health and care systems in England and publications of values of awarded contracts for digital technologies in England. We then applied this data to the regional structures of health and social care systems across Scotland, Wales, and Northern Ireland.

This is because, in broad terms, each nation is aiming for similar levels of digitisation. For this reason, this research assumes that the costs of digitising at the regional level (e.g., Integrated Care Systems (ICSs) in England, Health Boards in Scotland and Wales, and the Health Authority in Northern Ireland) are broadly similar. This means that, for cost items that have limited economies of scale, we may have overestimated costs in Scotland, Wales, and Northern Ireland.

We sought validation of this approach from representatives of NHS Scotland, NHS Wales, and HSC Northern Ireland through a series of 'assurance sessions'. They confirmed that, although we have likely overestimated costs in the home nations, we're likely to be within the correct rough order of magnitude.

Source data for adult social care is more limited than for the NHS

The available information for both the current digital landscape and future digital ambitions for adult social care is very limited compared to information for the NHS. Similarly, there are limited policies and guidance set for adult social care relative to the NHS.

This means that we are likely to have underestimated the costs of digitisation for adult social care, as we have, for example, largely excluded areas of service delivery that don't have clearly set ambitions (e.g., domiciliary care) and overestimated the costs for other areas because of a lack of data on existing practice.

There is a full breakdown of all the sensitivities we considered and their potential impact on the findings in <u>Section 6</u>.

We also applied several assumptions when determining costs – most often because of a lack of available data. Some of these assumptions have a significant impact on our estimates. There is a full breakdown of our assumptions in <u>Appendix A</u>.

Our conclusions and recommendations appear in <u>Section 7</u>.

¹ Source: <u>https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020</u>

1 Context and background

Providing the costs of digitisation is challenging

As the government prepares for the Spending Review in Spring 2025 and the 10-year NHS plan in England, there will be increasing debate on digitising the NHS and social care and the guestion at the heart of this report: "What is the cost to digitise the NHS and adult social care in the UK?"

As the current digital and technology landscape of the NHS and social care varies both across different home nations and different health and care systems, digitisation is not starting from the same digital maturity level, or with the same systems and technologies.

This means there is no single baseline for 'digitisation', but varying levels and scales of digitisation across cost items, home nations, and care settings. We've tried to take all these into account in our research. More details are in Section 5.

Health and social care need digital innovation to meet increasing demand and complexity

Current and past UK governments have acknowledged that digitisation and technology are critical for the health and social care sector to sustain service provision as demand and complexity increase. The government has set ambitious expectations for digitisation and technology in health and social care. The four home nations have set their own digital health and social care strategies to meet these expectations. The main strategies include:

- A plan for digital health and social care² (England) •
- People at the Heart of Care: adult social care reform white paper³ •
- Digital health and care strategy⁴ (Scotland) .
- Digital and data strategy for health and social care in Wales⁵ •
- Digital Strategy HSC Northern Ireland 2022–20306 •
- What Good Looks Like framework7
- Digital working in adult social care: What Good Looks Like⁸.

Our review of these strategies concluded that they all have similar aims, including to:

- Improve health and care provision and outcomes for people (patients, citizens, residents, etc.) •
- Reduce health disparities
- Innovate and transform health and care service delivery and performance .
- Improve workforce experience .
- Meet increasing and more complex demand. •

All strategies expect digitisation and technology to be key enablers to achieve these aims.

Across the UK, the main digital ambitions for the NHS and social care include:

Digitising health and social care records, including adopting electronic health record systems (EPRs) across the NHS, and digital social care record solutions across Care Quality Commission-registered adult social care providers

² Source: <u>https://www.gov.uk/government/publications/a-plan-for-digital-health-and-social-care</u>

³ Source: https://www.gov.uk/government/publications/people-at-the-heart-of-care-adult-social-care-reform-white-paper

⁴ Source: https://www.gov.scot/publications/scotlands-digital-health-care-strategy/

⁵ Source: https://www.gov.wales/digital-and-data-strategy-health-and-social-care-wales-html

⁶ Source: <u>https://www.health-ni.gov.uk/digitalstrategy</u>

⁷ Source: https://transform.england.nhs.uk/digitise-connect-transform/what-good-looks-like/what-good-looks-like-publication/

⁸ Source: https://www.gov.uk/government/publications/digital-working-in-adult-social-care-what-good-looks-like

- Enabling the health and care workforce to securely access a lifelong, joined-up health and social • care record, available and accessible where and when they need it
- Providing the digital foundations for social care, including technical infrastructure, digital solutions, • and skills9
- Empowering people to have more control over their health and care through national digital channels, such as NHS apps, and local solutions such as digital health self-help and technologyenabled care services
- Accelerating both technological innovation and adoption of proven technology by partnering with tech researchers, innovators, and MedTech organisations, and ensuring that the NHS and social care are buying the right digital technologies.

Barriers to digital transformation

A report from the Health and Social Care Select Committee on digital transformation in the NHS¹⁰, concluded that there are currently two big barriers to transformation:

- The health and care workforce and the public lack the skills to use digital services .
- There is a shortage of people skilled at designing and implementing digital transformation, and managing and operating new digital and data capabilities, especially in social care.

Past efforts at digitisation

Policies and ambitions for digitising the NHS and social care have not always been published with a clear plan or targets.

There have been multiple attempts to digitise the health and social care system over the last 20 years, and these have had varying degrees of success. Several deadlines and targets have been missed and then moved. For example, the target for a paperless NHS and adopting EPRs was first set for 2018, then extended to 2020, extended again to 2023, and is now set for 2026. Recent reviews of progress have concluded that a paperless NHS may not be achieved before 2027¹¹.

Nevertheless, the government has allocated, and continues to allocate, funding for digitisation and technology for health and social care. For example, £3.4 billion of funding was announced in the Spring Budget 2024. This funding aimed to achieve significant savings (a total of £35 billion over five years) by increasing productivity¹². However, this £3.4 billion won't be allocated until after the next Spending Review, set for Spring 2025¹³.

Scale and success of past efforts

Because health and social care are devolved across England, Scotland, Wales, and Northern Ireland, each nation largely sets its own agendas and policies and how these policies are executed and delivered. For example, England and Wales have delegated delivery to the regional or local Integrated Care Systems (ICSs) and Health Boards, but Scotland and Northern Ireland coordinate most of their digital efforts centrally.

This has resulted in a varied scale of digitisation and varied digital maturity between both home nations. and across organisations within each home nation. For example, in its Digital Maturity Assessment¹⁴, Digital Health & Care Scotland found there was a wide variation in digital maturity across the Scottish health and social care landscape. While the home nations are likely delivering similar digitisation activities (e.g., NHS apps), adoption differs due to variations in digital maturity across nations.

⁹ https://www.gov.uk/government/publications/people-at-the-heart-of-care-adult-social-care-reform-white-paper/people-at-the-heart-of-careadult-social-care-reform

Source: https://committees.parliament.uk/publications/40637/documents/198145/default/

¹¹ Sources: https://www.digitalhealth.net/2017/04/nhs-will-not-be-paperless-before-2027/ and

https://publications.parliament.uk/pa/cm5803/cmselect/cmhealth/223/report.html ¹² Source: https://www.gov.uk/government/topical-events/spring-budget-2024

¹³ Source: <u>https://www.nhsconfed.org/publications/budget-</u>

^{2024#:~:}text=The%20NHS%20productivity%20review%20will,can%20increase%20its%20annual%20productivity ¹⁴ Source: <u>https://www.digihealthcare.scot/our-work/digital-maturity/</u>

As shown in Figure 1 below, England has the lowest health and social care spend per capita, possibly because of economies of scale – national solutions (e.g., NHS apps) have mainly fixed costs, so they are proportionally more expensive per person for nations with smaller populations.

Capital spending as a proportion of total health and social care is lowest in Scotland and Wales. However, Scotland and Wales intend to spend proportionately more of their capital budget on digitisation and technology.

Based on the 2023 and 2024 Budgets, including health and social care, England, Scotland, and Wales are relatively close in anticipated IT capital budget spend per capita.

Home Nation	Estimated Population (ONS 2022 data)	Health and Social Care Spend – Revenue*	Per Capita Health and Social Care	IT Annual Revenue related Spend	Health and Social Care Spend – Capital*	Health and Social Care Capital % of total	Digital fundings	As a % of Capital Spend	Per Capita Annual Digital Health Investment
England (1)	56,536,400	£179.6bn	£3,176	£1.7bn	£12.6bn	7%	£1.1bn**	9%	£19.45p
Scotland (2)	5,479,900	£19.1bn	£3,485	No data	£578m	3%	£112.9m	19.5%	£20.60p
Wales (3)	3,105,400	£10.1bn	£3,252	currently	£375m	3.7%	£65m***	17.3%	£20.93p
Northern Ireland (4)	1,904,600	£7.3bn	£3,833	available	£468.6m****	6.4%	No da	ta currently av	ailable

Figure 1 – Health and social care spend by home nation ¹⁵ ¹⁶ ¹⁷ ¹⁸

For the digital funding listed in Figure 1, we have derived numbers from publications, as the budgets do not break down spend by category (digital and IT, for example).

For example, the £1.1 billion funding for England is based on the funding announcement in the 2024 Spring Budget, divided over three years, and covers investments to transform administrative tasks, update outdated IT systems, and transform access for patients¹⁹.

This is not the full scope of this research report, so **the cost estimates in Figure 2 are not comparable with our cost estimates** in Table 1 or the findings in <u>Section 5</u>, for example. However, they are provided for context to demonstrate the rough order of magnitude of current NHS and social care spending.

Digitisation priorities in the NHS

Across the NHS and social care, digitisation priorities are also diverse. In the NHS, the focus for digitisation has been, and continues to be, NHS acute trusts – ensuring they have the minimum digital capabilities, in particular through EPRs.

However, in his independent investigation of the NHS in England²⁰, Lord Darzi concluded that areas outside of acute care, such as community, primary, and social care, for example, were underinvested in.

Although most GP practices in England have adopted EPR systems and over 80 percent allow patients to access their health records online²¹, there are anecdotal examples of community care and primary care services still using paper communication approaches – especially when sharing data between

¹⁵ Notes for England's figures: based on the latest Spring Budget 2024 (<u>https://www.gov.uk/government/topical-events/spring-budget-2024</u>). **We have assumed that the £3.4bn over three years equates to £1.1bn per annum and note this is 'additional funding'. It is not clear whether this is additional to an underlying IT capital spend included in some other part of the CDEL budget, or additional in the sense of the incremental nature of CDEL agreed from one year to the next. Note also that the £1.7bn Annual IT expenditure is based on a *Digital Health Intelligence* but is not specifically identified in DHSC or clearly in another source such as Model Hospital.

¹⁶ Notes for Scotland's figures: based on the 2023/24 Budget (not yet announced for 2024/25), Chapter 4 Health & Social Care (<u>https://www.gov.scot/publications/scottish-budget-2023-24/pages/5/</u>) ¹⁷ Notes for Wales's figures: Wales Budget 2023-24/pages/5/)

¹⁷ Notes for Wales's figures: Wales Budget 2023–2024 (<u>https://www.gov.wales/sites/default/files/publications/2022-12/draft-budget-2023-2024-leaflet.pdf</u>) states the following but does not disclose amounts: "We are also investing in digital technology for the NHS. Unfortunately, the record-high levels of inflation will have an impact on our capital plans."

^{***£65}m from a BBC article but cannot find in Welsh docs.

¹⁸ Notes for Northern Ireland's figures: Budget 23/24 (<u>https://www.health-ni.gov.uk/sites/default/files/publications/health/doh-budget-2023-24-briefing.pdf</u>); 2023–24 Secretary of State Budget Resource for Capital Purposes (<u>2023-24 Secretary of State Budget Resource for Capital Purposes (finance-ni.gov.uk</u>)); 2023–24 Secretary of State Budget Resource for Current Purposes (<u>2023-24 Secretary of State Budget Resource for Current Purposes (2023-24 Secretary of State Budget Resource for Current Purposes (<u>1023-24 Secretary of State Budget Resource for Current Purposes (finance-ni.gov.uk</u>)); Department of Finance 2023–24 Budget Factsheet (<u>Department of Finance 2023-24 Budget Factsheet (finance-ni.gov.uk</u>) – Note: The department was projecting a funding gap of £732m for 2023/24 financial year (as of May '23).</u>

¹⁹ Source: <u>https://nhsproviders.org/media/698277/otdb-spring-budget-2024.pdf</u>

²⁰ Source: https://www.gov.uk/government/publications/independent-investigation-of-the-nhs-in-england

²¹ Source: https://www.england.nhs.uk/2023/12/millions-more-people-given-access-to-their-gp-records-

online/#:~:text=More%20than%20four%20in%20five,recovering%20access%20to%20primary%20care.

health and care organisations. That's because digital transformation within community health²² and primary care has, until now, been less of a priority in national policies and strategies. NHS England has acknowledged this. In its digital strategy, it stated that only 20 percent of NHS organisations are digitally mature, and only 45 percent of social care providers have any form of a digital care record²³.

Digitisation priorities in adult social care

Within adult social care, almost all local authorities that manage social care have adopted some digital social care capabilities.

A key digitisation programme was set out in the 2021 white paper, *People at the Heart of Care*²⁴. This programme has made significant progress. In 2021, 40 percent of CQC-registered providers had digital social care records (DSCRs). But in 2024, over 60 percent of providers have DSCRs, although the white paper's target of 80 percent of care providers having DSCRs by March 2024 was missed²⁵.

Research from the Department of Health and Social Care (DHSC)26 found that the largest and smallest providers are least likely to adopt DSCRs, and that there are wide regional variations in uptake. For example, 32 percent of care providers are still using spreadsheets to manage their data²⁷.

To address these challenges, DHSC has adjusted the programme: large care providers now access funding directly, rather than through Integrated Care Boards (ICBs), and The Adult Social Care Technology Fund has been launched with a goal of identifying technology solutions which could be scaled up in adult social care. Its first wave of project funding was announced in late 2023²⁸.

Further complicating the situation, social care providers are mostly privately owned, with some residents receiving government funding for their social care services.

UK standing for health and social care spending

The UK government's current total capital commitments for healthcare place the **UK in the middle quartile** of average percentage of GDP spend on health systems²⁹, on par with countries such as Türkiye and South Korea. The Organisation for Economic Co-operation and Development's (OECD's) data covers all aspects in health and social care, including digital and technology aspects.

Based upon capital spend levels, if the UK wanted to achieve similar standards to global digital leaders such as Australia, Norway, and Denmark, the UK government may have to double its current commitments for digitising the health and care sector.³⁰

- ²⁵ Source: https://www.oneadvanced.com/news-and-opinion/digital-social-care-the-progress-so-far/
- ²⁶ Source: <u>https://socialcare.blog.gov.uk/2023/11/09/digitising-social-care-reflections-on-progress/</u>

²² Source: <u>https://www.nhsconfed.org/system/files/2021-11/Digital-transformation-in-community-health-services.pdf</u>

²³ Source: <u>https://transform.england.nhs.uk/digitise-connect-transform/our-strategy-to-digitise-connect-and-transform/</u>

²⁴ Source: https://www.gov.uk/government/publications/people-at-the-heart-of-care-adult-social-care-reform-white-paper

 ²⁷ Source: <u>https://www.oneadvanced.com/news-and-opinion/digital-social-care-the-progress-so-far/</u>
 ²⁸ Source: <u>https://beta.digitisingsocialcare.co.uk/news/successful-bids-adult-social-care-technology-fund-announced</u>

 ²⁹ Source: <u>https://stats.oecd.org/Index.aspx?DataSetCode=SHA_HK</u>

³⁰ Source: OECD (2023), Health at a Glance 2023: OECD Indicators, OECD Publishing, Paris, https://doi.org/10.1787/7a7afb35-en.

2 Scope of research project

Our scope covers the NHS and social care in the UK

The scope of our research project covers the NHS and social care in the UK. However, the boundaries of the NHS and social care are not well defined or precise.

The NHS consists of over 500 individual legal entities, and public funding for digital health capabilities flows to many more non-NHS branded entities. Similarly, social care includes public- and privately funded organisations servicing adults and children in locations ranging from personal homes to large clinics and care homes. Adult social care alone covers tens of thousands of organisations, all with varying levels of digital maturity and digitisation.

Therefore, PA and the Health Foundation agreed to more tightly define the scope of this project to cover only:

- Health in the form of the NHS across all care settings: acute, community, primary, pharmacy, and specialist care
- Publicly funded adult social care in care homes state-funded residential care services that are either provided directly by local authorities, or commissioned to social care providers in residential homes or nursing homes
- The four UK home nations: England, Scotland, Wales, and Northern Ireland. Areas such as **the Channel Islands and the Isle of Man are not in scope**. Our cost estimates for all nations also assume that cost items are sufficiently generic to extrapolate costs. This means that, for example, we have assumed that a server will cost the same in England as it does in Scotland, Wales, etc.

Within this scope, we have estimated the required investment to close the gap between the current levels of digitisation and the digital ambitions set out in UK-wide policies and guidance.

Scope of our research for the NHS

NHS services are delivered by a variety of organisations, ranging from small, privately owned GP surgeries to very large acute trusts. And regardless of how the clinical services are delivered, the digital services can be completed by a range of public, private, and third-sector entities.

For this research report, the **scope of NHS services covers all publicly funded NHS services in all four nations**, regardless of the legal entity that delivers the service.

Scope of our research for social care

Social care covers a range of personal and practical support and services for children, young people, and adults. Its main objective is to help people who are older, or living with disability, or physical or mental illness to live independently and stay well and safe.

Social care services are similar across the home nations. However, there are some notable differences in the way they are delivered and funded, and, most importantly, in how digital services are commissioned:

- In England and Wales, local authorities are responsible for assessing people's needs and funding their care. Most social care services are commissioned from the independent sector, where most home care and residential care providers are private, for-profit organisations, although some voluntary sector organisations are also used
- In Northern Ireland, six Health and Social Care Trusts provide social care services
- In Scotland, local authorities provide social care, partnering with NHS services in local integration authorities to ensure services are joined up.

In 2021/22, it was estimated that over 800,000³¹ people in England received publicly funded, long-term social care, primarily in care/nursing homes or their own home. Over 224,000 episodes of short-term care were also provided.

³¹ Source: <u>https://www.kingsfund.org.uk/insight-and-analysis/data-and-charts/key-facts-figures-adult-social-care</u>

However, publicly funded social care is available only to people with the highest needs and lowest assets. They must also have assets below a threshold, which varies by nation (for example, in England it's £23,250). This means they're expected to contribute towards the costs of publicly funded services from their income and there is no clear line between care which is publicly funded and that which is privately funded.

The estimated social care workforce in the UK is about 1.76 million people. They have a wide range of capabilities and skills, including assessment and management of people's care needs, and work in residential care homes, domiciliary care, community support and outreach, and various ancillary and other care and non-care services.

Therefore, the scope for social care for this research project covers only publicly funded adult social care in care homes. We've stuck to this limited scope because:

- Most published data on social care is available only for adult social care. Only very limited information is available for children's social care
- Existing policies and guidance primarily focus on services in residential care homes. For example, targets set in the social care reform white paper apply only to CQC-registered care homes.

We recognise that with over 750,000 people working in care homes across the UK, our **scope covers** only 43 percent of the total UK social care workforce. This means that the cost to fully digitise all forms of social care is likely to be higher than the costs outlined in our report.

Our scope's timescale includes only the digital ambitions of the new government

Our scope covers the digital ambitions and policies that are 'point in time' ambitions stated in the run up to the general election in June 2024, that will likely be fully achieved in the life of the new government (i.e. from financial year 2024/25 to 2029/30). We have not included any ambitions that are significantly further in the future in the scope of our research. Where ambitions include costs partially within this time period and partially beyond this time period, we've estimated the correct proportion of costs to include.

Our scope does not include specific breakdowns of costs per year based on source information. In some instances, we've presented indicative phasing of costs across the time period using industry-standard product lifecycles, implementation timetables, or anticipated end-of-life decommissioning activities.

Unless otherwise noted, we have applied our default phasing which assumes a flat and equal pro rata annual phasing across a five-year period, i.e. 20 percent of the total costs estimated for the digital component per year across the five-year period.

Our scope has focused on the cost to close the gap in further digitisation, not the baseline cost of delivering today's digital services

The scope of our project is limited to the cost of closing the gap from the present digital landscape (the current state) to one where the digital ambitions set out in the various policies and plans are fully achieved (the target state).

We haven't included any cost items which aren't explicitly covered in national digitisation policy documents, and our assessment of the gap is based solely on public statements and publications.

NHS and social care organisations across the UK also have differing digital maturities, and information and data about current actual spend is sparse. There's more about all this in <u>Section 1</u>.

This means that the findings and cost estimates set out in this report:

- Are 'absolute' values the cost to close the gap from the current state to the target state
- Do not assume any 'frontier shift' we haven't accounted for any new ambitions for digitisation or digital transformation beyond what's defined in current policies
- Do not include any productivity or efficiency savings that could be made by achieving digitisation ambitions.

We have not defined the current digital landscape or spending

As noted in <u>Section 1</u>, the diverse digital landscape and maturity across the project's scope means there is no single baseline for the digital landscape across organisations or home nations.

There is also little public information on current levels of spending on digitisation. As a result, we are unsure what existing spending could be redirected or repurposed for further digitisation.

We identified some information regarding potential costs and budget for digital transformation. The National Audit Office reported that NHS England will require an estimated £8.1 billion of capital and revenue investment to deliver its digital transformation³² from 2019/20 to 2028/29. But we could find limited information for the costs and budgets to digitise social care – the current Digitising Social Care programme has invested £150 million³³ since the publication of the 2021 white paper.

As we could not define a baseline, we haven't been able to identify and assess the efficiencies and savings that digitisation may offer to the NHS and social care. Instead, we have applied some key assumptions about the current digital landscape.

Whilst funding (existing or new) has been announced recently, including the £3.4 billion capital funding in the 2024 Spring Budget³⁴, there are no clear plans for how and when this funding will be invested. For this reason, our assumptions on current baseline investment (i.e. our starting point for the current state) are as follows:

- We have **assumed the baseline or current state of capital investment is zero**. We have not attempted to judge which previously committed or communicated capital investments could be used to offset the capital costs we've estimated for digitisation. Our capital cost estimates cover only the investments required to transform the NHS and social care from the current digital state to the target state. Any announced funding may help cover these costs, but we have not factored this into our estimates our capital cost estimates represent the absolute numbers to close the gap in real terms for 2024/25
- We have assumed the baseline or current state of non-recurring revenue investment is zero. Because these revenue investments vary by organisation and care system, we have not included any existing costs or capacities that could be reallocated to digitisation into our estimates
- We have assumed the baseline or current state of recurring revenue investment is the existing 'business as usual' spend. It has been acknowledged that currently there are ongoing, recurring revenue investments being made to operate, maintain, and improve the current level of digitisation, but the exact amount is unknown as no published information is available. Therefore, we haven't factored in any potential productivity or efficiency savings, which could be used to bring down recurring revenue investment. Our estimates are in addition to this existing 'business as usual' spend – the maximum investment required to maintain the target ambitions.

Testing our scope with wider stakeholder groups

We tested all aspects of our scope definitions with stakeholders in health and social care across the four home nations, through a series of assurance workshops. There is more detail about this in <u>Section 6</u>.

In general, the stakeholders supported our definitions for the scope of the project. Some groups, including social care stakeholders, identified additional areas of scope that would be valuable to include. However, due to limitations in source data, we were not able to expand the scope.

³² Source: <u>https://www.nao.org.uk/wp-content/uploads/2019/05/Digital-transformation-in-the-NHS.pdf</u>

³³ Source: https://socialcare.blog.gov.uk/2023/11/09/digitising-social-care-reflections-on-progress/

³⁴ Source: <u>https://www.gov.uk/government/topical-events/spring-budget-2024</u>

3 Methodology

Our approach has three steps, illustrated in Figure 2:

- 1. Define digitisation as a set of discrete and quantifiable 'cost themes' and 'cost items'
- 2. Research cost items to define the 'unit costs' required to move each item from the current digitisation state to the target state
- 3. Aggregate and extrapolate unit costs into a total cost and incorporate this into a 'cost model'.



Figure 2 – Overview of our approach

Step 1: Define digitisation

Using the policies and guidance listed in <u>Section 1</u>, we broke down the broad definition for 'digitisation of NHS and social care' into a smaller set of items to individually define and cost.

We first turned the 'digitisation' appearing in the policies and guidance into a set of common 'digitisation themes'. Then we broke down each theme into distinct 'digitisation items' – the discrete digital components or initiatives that need investment to achieve digitisation ambitions.

Step 2: Research the gaps

Next, we analysed the digitisation themes and items further to better understand the gaps, looking at published data, including reviewing reports, digital maturity assessments, and media articles. To determine the gaps, we used one or more of the following methods:

- Assessing current digital maturity level (i.e. organisations' ability to adopt modern digital technologies). To assess maturity, we looked at what organisations were doing. For example, typically organisations start their online presence with simple solutions, such as using websites to share information, rather than relying on paper leaflets. As organisations mature, these websites may begin to include 'transactional features' such as online forms. The most mature organisations are using things such as mobile apps and self-service tools
- Determining percentage of completion, deployment and adoption. We looked at how many digital maturity goals in the policies and guidance had been achieved. In some areas, the policies and guidance set quantifiable targets. For example, the number of trusts adopting and using a modern EPR meeting the NHSE standards, and the number and percentage of social care providers adopting a digital social care record
- Judging maturity using our professional experience and wider stakeholder engagement, for areas where we lacked data. In a small number of areas (for example, establishing and embedding digital capabilities), we had to make a professional judgement based on our experience and previous work. We validated these judgements through assurance workshops with wider stakeholders across the NHS and social care. There is more detail about this in <u>Section 6</u>.

Step 3: Estimate the costs and capture them in our cost model

Once we understood the gap for each digitisation theme and item, we estimated the costs to close these gaps. We did this by distilling the digitisation themes and items into:

- 14 'cost themes' categories or groups of costings for broad types of digital investment
- 42 'cost items' individual digital components or initiatives that incur costs.

A full list of cost themes and items is in <u>Section 5</u>.

Breaking down the cost themes into smaller, discrete cost items allowed us to:

- Research, identify, and cost individual elements of digitisation
- More accurately consider the current maturity of cost items
- More accurately estimate the discrete incremental cost required for each item to achieve the target state
- Identify and define the foundational and advanced elements (enablers) of digitisation
- Reduce the effect of individual cost item inaccuracies or outliers on the results.

For each cost item, we researched and identified **unit costs** to go from the current state of digitisation to the target state. The unit of a unit cost is a single instance of the cost. In general terms, we've estimated unit cost using the following formula:

```
Unit Cost = Activity or Asset Cost (Target 'Digitised'Level – Current Level)
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The details and sources we used to determine each unit cost are in Appendix A.

For each cost item, we determined:

- A 'scaling factor' to find the number of instances of a cost item across the UK. For example, things such as the NHS App in England or the NHS 24 Online app in Scotland will have one instance per nation, whereas local applications such as EPRs will have one instance per trust
- Whether to classify the item as capital or revenue expenditure:
 - We defined cost items that have a useful economic life of over one year as capital costs, (for example, IT hardware asset purchases)
 - We determined which items were revenue costs either by using sources that explicitly stated this, or using our judgement based on experience
 - We defined non-recurrent revenue costs as costs that are incurred only once, (for example, resources to install and deploy digital technologies, or training)
 - We defined recurrent revenue costs as annual costs, as they are incurred as soon as the digital technologies are in use, (for example, support desks or ongoing annual licensing costs)
- How the cost is **phased** over time. We did this either by using sources that explicitly stated phasing, or using our judgement based on experience
- A confidence and optimism bias rating. We followed HM Treasury's *The Green Book* guidance on optimism bias³⁵ in 'Equipment/Development' project types, which recommends a 10–200 percent increase in expenditure. By default, we applied an optimism bias increase of 200 percent, unless we had greater confidence in the data source for a unit cost or the unit cost had been proven in the past. Specifically, we used the following bias ratings:
 - 10 percent high confidence
 - 75 percent medium confidence
 - 200 percent low confidence.

³⁵ Source: <u>https://www.gov.uk/government/publications/green-book-supplementary-guidance-optimism-bias</u>

Definitions for all cost themes, cost items, unit costs, scaling factors, capital/revenue, phasing, and confidence are documented and detailed, with a rationale, in Appendix A.

To calculate the total cost, we multiplied each cost item unit cost by the relevant scaling factor (extrapolate and aggregate). We also applied phasing to each cost item to provide a view over time. Note, however, that our estimates are presented in 2024/25 real terms and do not include inflation beyond 2024/25.

In general terms, we calculated the total cost using the following formula:

 $Total Cost = \sum_{i=1}^{n} (Unit Cost \times Cost Driver \times Optimism Bias [\times Phasing where applicable])$

We have presented aggregate costs at a sub-divisional level, for example per home nation or per cost item.

When aggregating at the home nation level, we have not applied the Barnett Formula³⁶, only the scaling factor. This is because this gives a more accurate estimate of the underlying costs required, rather than the available budget to be set aside.

This does have the effect of distorting some costs on a per capita basis, specifically national costs or regional costs, as we cannot factor in economies of scale. For example, the cost to develop a new national app is broadly the same whether it's developed for the population of Scotland or of England. But the cost to license software for a patient will scale directly with population. We explain how costs change based on the approach used in Section 6.

Key assumptions underpinning our methodology

We applied several assumptions when developing cost themes and estimating total costs:

Unit costs

To determine unit costs, we found the average across all costed plans, then extrapolated this across the UK, applying the appropriate scaling factor and phasing. For example, to estimate the unit cost for EPR, we calculated the average from published NHS investment decisions or procurement data, then validated it using press releases about EPR implementations³⁷.

Phasing factors

The phasing we used reflects current digital maturity and lifecycle. Based on a recent NHS England tender³⁸, about 10 percent of NHS trusts do not have a working EPR, and about 55 percent of trusts with an EPR will need to replace or upgrade it to meet NHS England minimum standards. We used these percentages in the phasing to determine the national costs. This assumption means that within the fiveyear (parliamentary) period, all NHS England Trusts (i.e.100 percent of them) will have deployed a working EPR that meets the minimum standards set by NHS England.

Scaling factors

For each cost item, we applied a suggested scaling factor in our extrapolation. The factor we used depends on the cost item. So, if the cost per unit is for a trust, for example, then the scaling factor is the number of trusts.

Scaling factors include 'regional clusters', workforce, population, number of care homes, or number of NHS trusts, which are based upon publicly available data. A full list of scaling factors is in Appendix A.

Our most frequently used scaling factor is 'regional clusters', defined as follows:

- In England, each ICS (42 in total) is treated as one regional cluster •
- In Scotland, each regional NHS Board (14 in total) is treated as one regional cluster
- In Wales, each local Health Board (seven in total) is treated as one regional cluster .
- In Northern Ireland, Health and Social Care (HSC) is treated as one regional cluster.

- https://www.digitalhealth.net/2022/03/major-push-on-epr-convergence-and-levelling-up/ ³⁸ Source: RFI procurement document (NHSE Tiger Teams to support EPR delivery), issued on 23 April 2024

³⁶ https://commonslibrary.parliament.uk/research-briefings/cbp-7386/

³⁷ Sources: <u>https://www.digitalhealth.net/2016/02/cambridge-big-bang-reality/</u>, <u>https://www.digitalhealth.net/2024/02/torbay-and-south-devon-</u> picks-epic-for-epr/, https://www.digitalhealth.net/2023/12/birmingham-womens-and-childrens-picks-epic-for-epr/ and

Two implied assumptions of this definition for regional clusters are:

- The **proportional level of digitisation is similar across all four nations**. For example, we have assumed that the proportion of EPR needs is the same across all nations. Based on our professional experience, this assumption may be correct, as home nations are likely to balance each other out. However, we could not validate it for each home nation, as data is not available
- The available **sample data is representative for the whole UK** and the sample of plans we used includes enough diversity to be extrapolated across all nations. There is more information about this in <u>Section 4</u>. Equally, the estimated costs for Scotland, Wales, and Northern Ireland are sensitive to one or two cost plans.

We explain the outcomes of sensitivity analysis and test the impact if these key assumptions were changed in <u>Section 6</u>.

4 Data sources

Categories of data sources

We looked at a wide range of data sources in our research. They fall into five main groups:

1. **Published digital strategies from a range of ICSs in England.** All ICSs in England publish a form of a digital strategy or digital plan with levels of detail ranging from high-level statements of intent through to more detailed programme plans and costs. These strategies and associated financial or investment plans published in the public domain were the main data source for identifying cost items, estimating unit costs for each cost item, and for verifying our assumptions. In some instances, where source data was limited or available only for a single local organisation or system, or where the source data was unique to one nation, we used a clustering mechanism to ensure that any extrapolation based upon that data would be representative of the UK as a whole. We developed six cluster definitions to cover the entire UK and give us a mechanism to validate our extrapolations. These are shown in Table 2 below. We mapped each individual or local data point to one of these clusters, based on the criteria listed.

Cluster type	#	Population	Healthcare	Social care (typical)	Mapping
a. Large cluster with mainly urban areas	1	~1.2m–1.5m	 4 NHS trusts, including teaching hospitals 2 specialist trust sites 1 community trust site 170+ GP practices 	6 borough councils	5 ICSs 1 Scotland Health Board
b. Large rural cluster around a city or town	3	~1m–1.1m	2–4 NHS trusts, including teaching hospitals 1–2 community trust sites 80–140 GP practices	1 city council 1 county council	12 ICSs 1 Scotland Health Board
c. Small cluster with mainly rural areas	1	~300,000– 500,000	1 NHS trust 2 specialist trust sites 50+ GP practices	2 borough/city councils	3 ICSs 6 Scotland Health Boards 4 Wales Health Boards
d. Medium cluster with commuter towns	2	~600,000– 800,000	1 NHS trust ~60 GP practices	6 different borough and county councils	7 ICSs 1 Scotland Health Board 2 Wales Health Boards
e. Extra-large cluster	1	~1.6m–2m+	4 NHS trusts 140 GP practices	2 county councils 2 city councils	15 ICSs Northern Ireland
Other			No sample cost data	No sample cost data	5 Scotland Health Boards 1 Wales Health Board

Table 2 – high-level types of digital transformation plan

2. **Published NHS England financial planning, procurement notifications and budgeting data** We used the published information and strategy documentation from NHS England together with the ICS digital strategies and financial plans to determine cost estimates for national scale cost items.

3. Information and statements published by media outlets

We used publicly available data, such as press releases from industry journals (e.g., *HSJ*, *DigitalHealth* and LGA), to validate our estimated costs and support our assumptions. However, we recognise that these press releases may be biased, and that their messages may have been sensationalised. Therefore, we have always used them alongside other sources, such as government plans, to verify information.

4. Published procurement and expenditure data from NHS and social care bodies

We used this data to validate cost items sourced from NHS and social care plans and budgets.

5. Published statements and policies released by central government and individual organisations

We looked at policies and guidance from central government departments (e.g., DHSC) and national bodies (e.g., NHS England and NHS Scotland). We used these to derive our cost themes and cost items, and the digital ambitions for the NHS and social care across the UK. We also reviewed published accounts from major NHS organisations to validate our cost estimates. For example, since all public organisations must report their major spending, we used these figures on EPR expenditure to validate our estimated unit costs for EPRs.

5 Key findings

Key finding 1 – Around £8 billion of capital expenditure is required to close the gap on digitising the NHS and social care

We estimate that £8.1 billion is the absolute value to digitise the NHS and social care to the level set out in the digital health and care plans listed in <u>Section 1</u>.

We've assumed a baseline or starting point of zero capital investment, so this figure is the total investment to close the gap between the current digital maturity and the target state for digital health and social care.

This means any funding that has been announced already or is announced in the future could contribute to this investment, providing:

- The announced funding is not repurposing previous investment commitments
- There are clear plans and statements for what the announced funding will cover, when it will be allocated, and how it will be spent
- Announced funding isn't linked to new digitisation priorities or stretching current priorities further we
 note that this has happened in the past.

Key finding 2 – To maximise the potential of this capital investment, around £3.2 billion in non-recurrent revenue expenditure is required to implement digital technologies

On top of this capital expenditure, we estimate that it will cost £3.2 billion in non-recurrent revenue costs to implement the digital health and care plans. This figure covers digitisation activities that have been categorised as revenue, such as resources for strategy development, project delivery and implementation, upskilling and training following an implementation.

These costs could vary significantly by organisation and health or social care system, as the capacity and capabilities may already be in place and reallocated, or they may be new and need external resourcing. For this reason, we cannot conclude whether these costs are absolute, incremental, or reallocations of existing commitments.

However, we can conclude that to harness the potential of digitisation, resources and investments will be needed to ensure adoption and deployment of digital technologies and tools, including:

- Skills and expertise to design and develop digital strategies and digital solutions
- Skills and capacity to implement and deploy new technologies and solutions
- Capacity and experience to phase out or close down legacy systems, and to transition to and adopt modern technologies
- Training and upskilling the workforce to adopt and use new solutions
- Awareness and digital inclusion to ensure the public adopts new tools.

Key finding 3 – To sustain the achieved digitisation, around £2.1 billion per annum is required to maintain and run digital capabilities and technologies

Every year, we estimate that it will cost around £2.1 billion in recurrent revenue expenditure to operate, maintain, support, and improve the achieved level of digitisation. This is the cost of things such as technical support resources, annual licensing, and other support costs.

This figure does not include any potential efficiency, economies of scale, or productivity savings as a result of the capital investments in digitisation as this was out of scope (see <u>Section 3</u>). Therefore, like our estimation of total non-recurrent costs, we cannot conclude whether these costs are on top of what has already been spent.

We also cannot ascertain whether all or part of these costs are new commitments, although at least some of the digital technologies and capabilities in the strategies and plans are not present in the current digital landscape.

It's likely the majority of the annual recurrent revenue costs will be covered by reallocating current commitments, including:

- Skilled and experienced digital resources to support and maintain digital technologies and systems
- Resources and capacity to operate and continuously improve digital solutions
- Knowledge and skills to continuously integrate data and digital technologies with existing systems and tools, and make them part of users' day-to-day jobs.

Summary of cost themes and items, with gaps

Table 3 on the next page summarises these key findings and the gaps we identified across the cost themes and cost items. This table provides a summary of the indicative content of the cost items within each cost theme.

Cost theme	Cost item	Identified gaps	Total capital (in £m)	Total non-recurrent revenue (in £m)	Annual recurrent revenue (in £m)
1. Foundational technical			1,423	237	203
	1.1. Local network and connectivity	Most NHS and local authorities have these			
	1.2. Regional networks and connectivity	where care homes and domiciliary homes may not have these capabilities. In addition, existing			
	1.3. End-user computing	modern digital technologies.			
		The aim is for all NHS and social care providers to have these modern foundational capabilities (i.e. network, connectivity, and end-user computing), to support their digitisation journeys.			
	1.4. Data centres, (cloud) hosting, and storage	There is a mix of on-premises and cloud hosting, although the former may not be suitable for modern digital technologies. Equally, it may not be feasible to host legacy systems on the cloud.			
2. EPR and specialist EPR			1615	920	356
bias towards EPR costs, these costs are listed separately. The breakdown of cost items in this table are shown to demonstrate areas that were considered in this	2.1. Enterprise EPR	Publicly available data ³⁹ showed that in England, 21 NHS trusts (10%) do not have an EPR and are in the process of getting one, and 116 NHS trusts (55%) have an EPR that needs upgrading or replacing to meet the minimum standards set by NHS England.	1,483	542	150
assessment but in most cases these costs were already captured in publicly		The aim is for NHS organisations to have adopted a working EPR by March 2026.			
referenced data on EPRs)	2.2. Specialist EPR	Most NHS trusts in England are currently using specialist systems, as their patient administration	Incl. in item 2.1	Incl. in item 2.1	Incl. in item 2.1
	2.3. Transfer of care/ electronic discharge summaries	 System or EPR doesn't offer the right capabilities. This leads to hundreds of systems being used in NHS hospitals. 	132	378	206
	2.4. Electronic Prescribing and Medicines Administration (EPMA)	The aim is to rationalise systems to reduce the complexity of operating and maintaining a diverse range of technologies and converge on one	Incl. in item 2.3	Incl. in item 2.3	Incl. in item 2.3
	2.5. Diagnostics systems and management	system.	Incl. in item 2.3	Incl. in item 2.3	Incl. in item 2.3

³⁹ Source: RFI procurement document (NHSE – Tiger Teams to support EPR delivery), issued on 23 April 2024

Cost theme	Cost item	Identified gaps	Total capital (in £m)	Total non-recurrent revenue (in £m)	Annual recurrent revenue (in £m)
	2.6. Clinical correspondence and clinical noting	In our estimates, we've assumed the costs for this rationalisation, convergence, or deploying these functionalities will be part of EPR deployment.	Incl. in item 2.3	Incl. in item 2.3	Incl. in item 2.3
3. Digital social care and shared care record			224	454	102
	3.1. Digital social care record and social care case management solution 3.1. Digital social care record and social care case management solution 3.1. Digital social care record and social care providers to adopt a dig record by March 2024. Currently, a are using one.				
		Similar to primary care, social care providers are private entities, who may not be incentivised to digitise their operations. Moreover, their services are commissioned by local authorities, so funding may not sit within DHSC's remit.			
	3.2. Shared care record	The aim is to create the capability for shared care records, where health and social care organisations can view data about individuals they are caring for. This will require organisations to digitise their records – which is currently not always the case (see previous cost items).	Incl. in item 3.1	Incl. in item 3.1	Incl. in item 3.1
		Moreover, information governance and data- sharing barriers also hinder collaboration between NHS organisations and care providers.			
4. Remote and virtual care			981	277	119
	4.1. Remote and virtual care	New technologies and advances such as voice- assisted and sensor technologies have accelerated application of these solutions. They are still managed separately in health and social care – for example, virtual wards in healthcare and Technology Enabled Care in social care – under distinct cost items. However, data sharing remains minimal.			
		The aim is for individuals to be cared for and treated at home or in a location that is most convenient for them.			
	4.2. Fall prevention technology	The aim is to adopt digital solutions to protect and prevent falls among the most vulnerable patients in residential care homes. Currently, this relies on			

Cost theme	Cost item	Identified gaps	Total capital (in £m)	Total non-recurrent revenue (in £m)	Annual recurrent revenue (in £m)
		human monitoring and interventions, putting more pressure on an already stretched workforce.			
	4.3. Telecare and Technology Enabled Care	Local authorities are starting to recognise the potential of telecare and Technology Enabled Care. The aim is to continue adopting these technologies, as well as considering opportunities to integrate them with other health and care services to provide a full picture of a patient/service user's status.			
5. Primary care			61	10	19
	5.1. Primary care – GP IT	The providers in this care setting are mainly independent businesses, i.e. GP practices and pharmacies. Their adoption of digital solutions is low.			
		New GP contracts now include requirements for practices to implement digital solutions. But there is still significant work to be done to ensure that all GP practices and pharmacies have the connectivity and foundational capabilities to start transforming and digitising their operations.			
6. Public-facing solutions			422	614	746
	6.1. Public advice and guidance	Locally, NHS organisations and local authorities			
	6.2. Patient/citizen/service-user- accessible digital health and care record	presence (e.g., websites) that provide information about the services they offer. The national NHS website is included in cost item 10.5.			
	6.3. Patient/citizen portal or app	To empower the public, ICSs are responsible for designing and developing solutions and tools that enable the public to take control of the health and care services they use.			
7. Digital skills, confidence and digital					8
inclusion	7.1. Public campaigns to increase digital awareness and understanding				
	7.2. Training/upskilling in digital literacy	_			

Cost theme	Cost item	Identified gaps	Total capital (in £m)	Total non-recurrent revenue (in £m)	Annual recurrent revenue (in £m)
8. Data and analytics			94	574	275
solution and platforms	8.1 Population health platform	The aim is to ensure the workforce and patients			
	8.2. BI and analytics capability	where they need to, enabling them to make informed decisions about their health and care			
	8.3. Decision support tools	Currently, data is often captured and managed separately across health and social care.			
		In addition, there is a shortage of skilled BI and analytics resources.			
9. Corporate IT			1,037	45	36
	9.1. Corporate service optimisation	With advances in technology, the NHS and social care organisations aim to adopt digitisation and technology to help them optimise their corporate services and operations.			
	9.2. Asset and resource management	Individual organisations have pockets of capability to track assets and resources, but this has not been adopted widely across the NHS and social care. The ability to understand the most up to date status of assets and resources will support in the coordination of capacity and manage demands, preferably across organisations.			
	9.3. Collaboration platforms	Currently, each organisation has its own instances of corporate collaboration and productivity tools (e.g., Microsoft Teams and SharePoint). This hinders collaboration across organisations and the integration and coordination of health and care services. The aim is for the workforce to work together from anywhere and on any device.			
10. National platforms and			1,333	1	57
P. 09.4111100	10.1. NHS Digital Cyber Services	These national programmes are in different			
	10.2. NHS App	continue to invest in delivery and improvements.			
	10.3. NHS e-Referral Service	In particular, the Federated Data Platform is expected to give local organisations the data and			

Cost theme	Cost item	Identified gaps	Total capital (in £m)	Total non-recurrent revenue (in £m)	Annual recurrent revenue (in £m)
	10.4. Electronic Prescription Service	analytics capability required for population health management (potentially replacing local			
	10.5. NHS Web	solutions).			
	10.6. Federated Data Platform	-			
11. Digital leadership and			6	10	23
governance	11.1. Digital leadership	Ongoing external support is required for the NHS			
	11.2. Digital strategies development	expertise and capabilities.			
12. Safe practice and			23		150
Cybersecurity	12.1. Clinical safety incident management solution	There are pockets of expertise. All NHS trusts have a clinical safety incident management			
	12.2. Cybersecurity management tools and solutions	Solution (e.g., Datix), but may not be able to support an increasing digital hospital. With increasing digitisation, these capabilities will			
	12.3. Cybersecurity and digital trust capability	be become crucial, but NHS and social care organisations are hindered by the shortage of skilled resources in the UK.			
	12.4. Clinical safety and cybersecurity workforce training	-			
13. Sustainability and net			713		
	13.1. Sustainability initiatives for existing systems	The aim is to adopt digitisation and technology so that organisations can make their systems more			
	13.2. Digital-enabled sustainability solutions	- sustainable and hit het zero targets.			
14. Other			145	17	10
	14.1. Research and innovation – emerging technology	The aim is to explore the potential of new and emerging technologies, such as AI and automation.			

Table 3 – high-level summary of our key findings

6 Limitations – sensitivities and caveats

There were a number of limitations to our approach, most notably poor availability of data and information. This meant some assumptions were based on our professional experience and judgements, as well as on assurance sessions we held with wider stakeholders.

Stakeholder assurance sessions

We ran these sessions with stakeholders from all four nations, spanning both the NHS and social care. We tested our initial findings with them to see if they lined up with their expectations. We also asked them to confirm that:

- Our approach and methodology were robust
- Our key assumptions (see <u>Appendix A</u>) were correct
- We had used representative data (key policies, guidance, sources etc.). This was publicly available data, obtained without Freedom of Information (FoI) requests
- We had correctly applied a realistic level of optimism bias, reflecting the right level of confidence in the data we had.

In general, the **stakeholders agreed with our approach and assumptions**, **and our application of optimism bias**. In some cases, they recommended we include additional data sources, make minor adjustments to our scope, or clarify how we represent information.

The stakeholders from the NHS in England also confirmed that, overall, **our estimated costs were what they expected**. They commented that they expected some detailed costs (such as foundational infrastructure) to be slightly higher than our estimates.

The **NHS stakeholders in the other home nations commented that their costs might be higher**, as they do not necessarily have the same national infrastructure and platforms as England. For example, in Scotland, there is no national Spine infrastructure, and it would require significant investment to establish one.

We also asked stakeholders from each nation about our approach to extrapolating and estimating national costs using English NHS and social care data. They asked us to compare our cost estimates with potential costs if the Barnett formula was applied. These comparisons appear in Table 4, on the next page.

This section outlines the key sensitivities and caveats that may affect our estimated costs to digitise the NHS and adult social care.

Caveat 1: Individual cost items may over-weight our estimates

Our cost estimates are based on a sample of estimated existing costed data, validated by publicly available statements, where possible. Although we are confident that the quantity and quality of the data we used was satisfactory overall, a larger dataset would have enhanced the accuracy of our estimates and the richness of our analysis.

For example, because of the size of the scaling factor used, a small variation in accuracy for unit costs has a large impact on total cost values. Notably, three particular cost items, when combined, make up a very significant proportion of overall digitisation costs, and all three used large scaling factors such as the number of trusts or the number of regions:

- Enterprise EPR and specialist EPRs
- Foundational technical infrastructure
- Remote and virtual care.

We've mitigated this limitation by validating these three cost items with stakeholders from NHS England, NHS Scotland and NHS Wales and representatives of local trusts to confirm they're accurate. Feedback from our assurance sessions also suggested our estimates for these items were accurate.

For example, although NHS providers in Scotland may have almost 100 percent adoption of EPRs, a need for further investment remains, as some need to upgrade or replace their existing solutions to meet the digitisation targets.

Caveat 2: Our approach to extrapolating data across home nations will likely overestimate costs compared with a straight 'Barnett formula' approach

We took our sample of cost data from regional clusters in England, then extrapolated these costs to get UK-wide estimates. There were a few assumptions that applied to this extrapolation:

- a) the proportional level of digitisation is the same across the UK as it is in England alone
- b) the English sample data we used is representative of the whole UK
- c) the other nations will use the same approaches to digitisation for all cost themes and items as those in the English sample, and their approaches will cost the same as the approach in England.

We did this because information and cost data for other home nations was not as widely available as in England. It also allows us to apply different scaling factors (number of trusts or care homes, size of workforce, etc.) for different digital components.

Stakeholders in the assurance sessions confirmed this was a practical approach and that our estimates were in the rough order of magnitude they expected. However, they also asked us to compare our cost estimates with the application of the Barnett formula. Table 4 shows this comparison:

	Estimates – extrapola	based on curre	ent approach cluster	Estimates base based on popula	Estimates based on Barnett formula – costs based on population/cost per capita			
Home nation	Capital	Non-recurrent revenue	Recurrent revenue (p/a)	Capital	Non-recurrent revenue	Recurrent revenue (p/a)		
England	£5,163 [£83]	£2,251 [£36]	£1,510 [£24]	£5,163 [£83]	£2,251 [£36]	£1,510 [£24]	Pop: 62 million	
Scotland	£2,200 [£440]	£554 [£111]	£345 [£69]	£416 Δ = -£1,784/- 81%	£182 Δ = -£372/-67%	£122 Δ = -£224/-65%	Pop: 5 million Impact: costs may be at least 77% lower	
Wales	£552 [£184]	£281 [£94]	£193 [£64]	£249 Δ = -£303/-55%	£109 Δ = -£173/-61%	£73 Δ = -£121/-62%	Pop: 3 million Impact: costs may be at least 58% lower	
Northern Ireland	£162 [£81]	£74 [£37]	£55 [£28]	£167 Δ = +£5/+3%	£73 Δ = -£1/-2%	£49 Δ = -£6/-11%	Pop: 2 million Impact: costs may be at least 1% lower	
TOTALS	£8,077	£3,160	£2,103	£5,996 Δ =-£2081/-26%	£2,614 Δ = -£546/-17%	£1,754 Δ = -£349/-17%	Impact: costs may be at least 22% lower	

Table 4 - Comparison of our cost estimates with estimates based on the Barnett formula.

Note: All costs are in \pounds ,000, except the costs per capita, which are in \pounds /person (these are the numbers in square brackets, italics, and light grey font).

Our costs for Scotland and Wales are two to five times higher than the Barnett approach, a significant overestimate. However, there are some caveats for the Barnett approach:

- From our research and discussions in the assurance sessions, we found that different nations are approaching digitisation differently. For example, Scotland coordinates digitisation centrally, which creates economies of scale because they need only to develop and deploy digital components once. In contrast, England's 42 separate ICSs may each make their own distinct investment for a comparable item. The Barnett approach does not account for this centralisation
- Similarly, there is a significant difference in digital maturity across nations. Anecdotally, the NHS in Wales is digitally less mature than the NHS in Scotland, which, in turn, is less mature than the NHS in England. For example, some home nations will need to invest in digital components that already exist in England, such as national Spine infrastructure. The Barnett approach does not take a nation's starting digital maturity into account
- The Barnett approach also doesn't consider any fixed costs, e.g., deploying a national NHS app or a federated data platform, which would cost the same in any nation, no matter its population size.

For these reasons, we believe **costs are likely within the range of the Barnett estimates at the low end, and our estimates at the high end**. Note that in our assurance sessions, stakeholders commented that the costs for Scotland, Wales, and Northern Ireland are likely at the higher end of this range, as they need additional investments to 'catch up' on digitisation.

Caveat 3: It is difficult to validate adult social care costs

The publicly available information on both the current digital landscape and future digital ambitions for adult social care is limited, which means **our cost estimates for social care could be significantly underestimated**.

In addition, there are two other major factors that further complicate estimating the costs of digitising adult social care, including:

- Social care providers are mainly private entities that service both state-funded and privately funded residents. However, digitisation in care homes would benefit both state-funded and privately funded residents
- Adult social care includes a wide range of services in both residential and non-residential care settings. In particular, non-residential services are provided by over 700,000 carers, and their digitisation requirements are significantly different from the requirements for residential care services.

We discussed our adult social care cost estimates and these caveats in the assurance sessions. Stakeholder feedback was that we should estimate and include costs for non-residential care services, in particular things such as preventative and mental health services that the public can access.

However, publicly available information on this is limited, and there is almost no guidance or policy on the digital ambitions for non-residential adult social care services. Therefore, we decided to stick to the original scope. This means our cost estimates for social adult care cover only state-funded residential adult social care and therefore underestimate the costs of digitisation across all possible social care services.

Caveat 4: Our application of optimism bias is subjective

As outlined in <u>Section 3</u>, we've applied optimism bias to our estimates based on HMT's *The Green* $Book^{40}$, which includes guidance on applying optimism bias for investment cases.

Because we used a variety of sources for data and information, we've applied different levels of confidence (and optimism bias) to different cost items. We assessed confidence levels using subjective analysis and our professional judgement, which means **we may not have applied optimism bias** consistently across all cost items.

To mitigate this risk, we used further research and tried to find statements or guidance to validate our cost estimates. At the assurance workshops, we also asked stakeholders to validate the sample of optimism bias that we'd applied, and they agreed with our application of optimism bias.

Caveat 5: Whether a cost item is accounted as a capital cost or a revenue cost is sometimes subjective

Where possible, our assessment of whether a cost item is accounted as a capital or revenue cost, and the split of revenue or capital costs for items with both, is based on publicly available data sources. However, for some items lacking sufficient data, we have relied on our professional judgement or stakeholder feedback from the assurance sessions. This research is not investment advice nor is it intended to form a business case, and therefore we haven't attempted to apply any formal accepted accounting principles in this categorisation.

Caveat 6: We are unable to confirm whether revenue costs are included in current commitments or would be new commitments

We have not been able to conclusively state whether revenue costs (recurrent or non-recurrent) are new commitments, reallocations of existing commitments, or a mix of both. That's because information about current commitments, especially revenue expenditure, is not always publicly available. Where funding or

⁴⁰ Source: <u>https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020</u>

additional budget has been announced, it's not always clearly stated if this is for new commitments, or how and when it will be allocated.

We discussed this in the assurance sessions and agreed to provide estimated revenue costs based on the available data with a narrative of what they cover. This allows us to provide a full picture of all costs. This is particularly important given concerns that, historically, insufficient revenue support has meant that the productivity-enhancing opportunities created by investment in digitisation and technology have not been fully realised. A lack of revenue funding – in particular for recurring revenue costs – is also often a barrier to investment in digitisation.

In conclusion, the actual revenue investment to close the digital gaps could be lower, if existing and planned commitments can be redirected or repurposed.

Caveat 7: We have not accounted for innovation, transformation, and implementation costs for digitisation

The main goal of the research project was to determine the costs to digitise the NHS and adult social care. However, digital innovation is often linked to increased productivity, and there's a presumption that investing in digitisation will lead to significant productivity benefits (e.g., in the latest Spring Budget41).

In our professional experience, investment in digitisation and technology alone won't deliver the required business benefits, productivity, and efficiency savings. This is an opportunity to transform the way health and care services are provided and used. But it requires digital skills and resources, funding, and most importantly, digital leadership – not just investment.

Because it is out of scope (see <u>Section 2</u>), we have not investigated the costs of digital-enabled transformation in the NHS and social care.

Caveat 8: We are unable to provide a firm timescale for our cost estimates

The digitisation policies and guidance we looked at do not include clear timescales and plans, so **we** have not provided a firm breakdown of costs over time. Our estimates are the costs to achieve the digital ambitions for a point in time – as stated in June 2024 by the UK government and the NHS and social care across the UK.

This means the headline figures of £8.1 billion of capital costs, £3.2 billion of non-recurrent revenue costs, and £2.1 billion a year in recurrent revenue expenditure are the amounts the UK government would need to invest to achieve these ambitions in 2024/25 real terms, regardless of any practical constraints on funding, resources, etc.

However, the table below shows an indicative phasing of costs based upon the likely impact of industrystandard product lifecycles, implementation timescales, and anticipated end-of-life decommissioning actions if the total investment was phased across the five years the current UK government will remain in place.

TOTAL UK	25/26	26/27	27/28	28/29	29/30	30/31
Capital	£942m	£3,150m	£2,852m	£1,040m	£171m	£148m
Non-recurrent Revenue	£1,061m	£882m	£732m	£346m	£160m	£163m
Recurrent Revenue	£1,052m	£2,103m	£2,145m	£2,188m	£2,232m	£2,277m

There are three assumptions and caveats for these plots:

- We've used the current inflation rate of 2 percent for all years, as we can't confirm or estimate future inflation rates
- We haven't included any updated or new digital ambitions or policies announced after June 2024. This is critical as the new UK government has already announced new plans and is expected to set out more following the Spending Review, so our cost estimates may change significantly
- We've used the same assumptions for estimating capital, non-recurrent revenue, and recurrent revenue costs as the ones in <u>Section 2</u>.

⁴¹ Source: <u>https://www.gov.uk/government/topical-events/spring-budget-2024</u>

7 Closing notes

As noted, digitisation and technology have been recognised as critical enablers for the NHS and social care to transform, meet increasing demand, and provide more complex health and social care services. However, the cost of this digitisation has been difficult to quantify.

Our research has found that the cost to digitise the NHS and social care in the UK in 2024 is around £8 billion of capital expenditure, £3 billion of non-recurrent revenue expenditure, and £2 billion of annual recurrent revenue expenditure.

However, in conducting this research, we encountered a number of challenges in defining digitisation, identifying reliable source data, and breaking down costs across home nations and across time. Although the costs have been validated by a range of independent stakeholders, these challenges and caveats allow only limited further analysis of the results of this research.

To allow more detailed analysis and to better inform the 2025 Spending Review, we recommend further research on the topic covering a wider scope, using more primary source data, and using a more comprehensive breakdown across geographical and time dimensions. We've outlined some of these challenges and recommendations for next steps below.

Defining digitisation

The first challenge we had to overcome was defining digitisation in the NHS and social care across the UK, as there is no single definition. To further complicate this, the NHS and social care is devolved across the four home nations, and digitisation and digital maturity vary significantly across each nation, and across different health and social care organisations.

However, the digital ambitions across all four nations are similar: they want to use digitisation to deliver better care and outcomes, reduce health disparities, and introduce innovation.

We used these existing ambitions, policies, guidance, and publications to define digitisation in the NHS and social care. We identified 14 common cost themes, broken down into 42 cost items. These cost items are the digital components required to achieve the ambitions.

A more comprehensive and accurate definition of the scope may help target specific data sets.

Finding cost data

Once we'd defined digitisation, we faced a second challenge. Without resorting to lengthy Fol requests, we had access to only limited publicly available information and data. To tackle this challenge, we looked at a wide range of data sources, including digital strategies and plans for a range of ICSs in England.

We extrapolated the data in these plans to estimate UK-wide costs by taking the average estimated costs across the plans to determine a unit cost, then multiplying by an appropriate scaling factor, for example, the number of trusts or the size of the workforce. This approach allowed us to estimate costs across all four home nations.

We understand this approach may overestimate the costs, as approaches and digital maturity are different across the home nations. And, while we considered alternative approaches, such as using the Barnett formula, these may underestimate the costs instead. That's because the Barnett formula assumes digitisation cost rises in line with population size, but the cost of some digital components is the same, regardless of population size.

Finding existing revenue spend data

A third challenge was a lack of publicly available data on existing revenue spending. As a result, we couldn't determine if existing and planned spending commitments could be redirected or repurposed to cover the revenue costs of digitisation. This means the actual revenue costs of digitisation may be lower than our estimates.

Focusing on a point in time and on existing ambitions

We've estimated the required cost investments to digitise the NHS and social care in the UK at a point in time, specifically up to the June 2024 general election.

We also haven't considered whether digital ambitions are maximising the potential of digital transformation. For example, a key focus for digitising the NHS is still ensuring all NHS trusts have a working EPR. While this is important, it is not a radical disruption of services that will transform healthcare.

Further recommendations

We recommend further research is completed to refine our findings and gain a better understanding of the costs required to digitise the NHS and social care. This could include:

- A full data collection of existing costed plans to better determine current commitments and better assess the gaps from the current state to the digital ambitions. This will require FoI requests for the appropriate national bodies and organisations
- Analysis of the data to determine if existing commitments and spending can be redirected to cover the costs of digitisation.

In addition, we recommend further research is completed to assess if the current digital ambitions will maximise transformative potential and radically innovate the UK's health and social care systems. This should include reviewing and learning from other sectors.

Appendix A – Definitions and assumptions

Cost theme 1: Foundational technical infrastructure

Overall ambition statement:

Across health and social care in the UK, there is an ambition to provide reliable, modern, secure, sustainable, and resilient infrastructure. This will be the strong foundation that delivers modern digital, data, and technology services, which in turn enable transformation and improvement of patient health and care delivery, and outcomes. Digital and data tools and systems should also be fit for purpose and support staff to do their jobs well.

This theme covers investment in IT and digital components that are crucial for digitisation, including connectivity, hosting platforms, and IT networks. It has four cost items:

1.1. Local network and connectivity

Scaling	Number of	Optimism	High	Data and	Existing published cost data
factor:	regional clusters	bias:	confidence	judgement:	and statements

Cost item definition:

This item covers local area networks within individual organisations, including network cables, routers, internet and Wi-Fi connections, etc. It covers any investment in people, processes, and technology to either replace or upgrade existing networks, or implement new ones, and the cost of retiring technologies and systems that are no longer supported.

Current digital landscape:

NHS England's *What Good Looks Like* framework includes a dimension for 'Smart Foundation'. This states that organisations should have reliable, modern, sustainable, and resilient digital systems, data, and infrastructure. The other nations have defined similar requirements and expectations.

The current digital landscape is:

- NHS organisations and local authorities all have local networks. Some use on-premises IT services, others use cloud-based digital services
- Many adult social care providers (e.g., care homes) still do not have internet access or have poor connections⁴²
- All organisations must switch from analogue to digital phone services by 2025 (the PSTN switchoff⁴³). As this work is already under way, we haven't included any costs for this in our cost estimates
- In Scotland, 6,000 sites and 94 public sector organisations benefit from 'significantly faster' and improved fibre broadband and mobile connections and resilience⁴⁴. The agreement, costing around £350 million over the next six years, sees BT become the sole provider to deliver public sector connectivity across Scotland. Similar programmes have been initiated in other home nations, including an £8 million roll-out of high-speed broadband to public services sites across Denbighshire, Anglesey, Conwy, Gwynedd, Flintshire, and Wrexham⁴⁵
- In general, organisations will have to improve their local networks and connectivity, as the NHS and social care are increasingly digitising their services and current IT components may need updating to meet the needs of modern digital health services. For example, cloud-based services may increasingly become the norm⁴⁶.

Deployment location: Local – each NHS and social care organisation needs to deploy these IT components.

⁴⁴ Source: https://www.scotsman.com/business/bt-to-wire-up-and-futureproof-thousands-of-scottish-nhs-sites-under-ps350m-contract-4116050
 ⁴⁵ Source: https://www.psba.gov.wales/news/vital-public-services-including-gp-surgeries-libraries-and-hospitals-are-benefiting-from-ultrafast-inter-spage">https://www.psba.gov.wales/news/vital-public-services-including-gp-surgeries-libraries-and-hospitals-are-benefiting-from-ultrafast-inter-spage

internet-speeds-and-better-connectivity/ ⁴⁶ Source: https://www.digitalhealth.net/2022/10/special-report-cloud-4/

⁴² Source https://www.caredocs.co.uk/guide-to-wifi-care-homes/

⁴³ Source: <u>https://business.bt.com/why-choose-bt/insights/digital-transformation/uk-pstn-switch-off/</u>

Assumptions:

We've assumed that:

- Although most NHS and social care organisations already have IT infrastructure, additional investments will still be required in order to:
 - Ensure areas with limited digitisation have the foundations to start their digital transformations
 - Modernise existing infrastructure and adopt reliable and secure IT infrastructure that is fit for increasingly digitised health and social care services.
- Regional clusters will pay for the modernisation, but each organisation remains responsible for upgrading its local networks and connectivity
- Digital strategies and plans are similar across regional clusters. We can take any cost data in these strategies and plans, average them, and use the number of regional clusters as the scaling factor to get UK-wide estimates.

Phasing: We have assumed there will be capital cost investments in the first year, along with nonrecurrent revenue costs for deployment and technology. We've assumed the costs of supporting and maintaining local networks and connectivity are ongoing annual recurrent revenue costs.

1.2. Regional networks and connectivity

Scaling	Number of	Optimism	Medium	Data and	Published data and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers regional networks that connect several organisations within a regional cluster. It covers the people, processes, and technology to set standards and design principles for future networks, as well as the capability and workforce to design, implement, and support these networking technologies.

The digital ambition is for regional clusters to encourage interoperability, allowing better sharing, collaborating, and joined-up working across organisations, and simplifying infrastructure by sharing and consolidating spending, strategies, and contracts⁴⁷.

This item covers investments in software and hardware, installation, staff training, and ongoing operational support and maintenance.

Current digital landscape:

- In England, there is a national service, Spine, which allows secure sharing of information through services such as the Electronic Prescription Service, NHS e-Referral Service, and Personal Demographics Service. Spine connects 44,000+ health and social care systems across 26,000 organisations⁴⁸
- English ICSs have now been assigned the responsibility to invest in these technologies for their regional clusters. Some regional clusters have established their own Community of Interest Networks (CoINs), private networks where they can collaborate with other health networks. Social care organisations and local authorities are usually not connected to these CoINs
- In Scotland, the National Digital Platform has been established to deliver cloud-based digital components and capabilities across Scotland's health and care digital system. Commitments and investments are typically set and delivered nationally across Scottish organisations
- The NHS Wales Informatics Service is responsible for establishing key IT and digital systems and services across all health and social care organisations in Wales. The service has established national elements for infrastructure and technical design
- Health and Social Care Northern Ireland manages and delivers digital health infrastructure in Northern Ireland. One of its key investments is maintaining and upgrading current infrastructure, cybersecurity, and remote access for staff

 ⁴⁷ Source: <u>https://transform.england.nhs.uk/digitise-connect-transform/what-good-looks-like/what-good-looks-like-publication/</u>
 ⁴⁸ Source: <u>https://digital.nhs.uk/services/spine</u>

In all four nations, there is very limited stated ambition to adopt modern networking technologies, such as software-defined networking, which could improve reliability, efficiency, and scalability.

Deployment location: Regional – regional clusters are deploying these IT components.

Assumptions:

We've assumed that:

- Each regional cluster will require investments to ensure the IT infrastructure in its region can support increasingly digitised health and social care services
- Digital strategies and plans are similar across regional clusters. We can take any cost data in these strategies and plans, average them, and use the number of regional clusters as the scaling factor to get UK-wide estimates.

Phasing: We've used the default phasing. We expect that this item will generally require a business case of some kind and is likely to follow the default business case phasing.

1.3. End-user computing

Scaling	Workforce	Optimism	Medium	Data and	Existing published cost data
factor:	number	bias:	confidence	judgement:	and statements

Cost item definition:

This item covers components and resources to provide IT and digital capabilities for the health and social care workforce, including devices, printers, productivity tools, and connectivity (e.g., Microsoft suite and Wi-Fi) to enable them to complete their work digitally.

This item covers investments required for:

- Providing digital capabilities for parts of the workforce that currently don't have access to them •
- Modernising existing end-user computing to enable remote and mobile working patterns •
- Hardware and software, including training to use devices and software, and ongoing operational support and maintenance.

Current digital landscape:

Similar to local networks (cost item 1.1), most health and social care staff have access to some sort of end-user IT across all UK nations. However, while tech industry advice is to replace or upgrade devices every two to four years⁴⁹, NHS and social care organisations often use the same devices for 10 years or more.

Similarly, but more importantly, operating systems should be upgraded before support is withdrawn, but there have been reports of organisations still using software well beyond its lifecycle, e.g., an HSJ article⁵⁰ in 2020 outlined the need for Microsoft to extend Windows 7 support as NHS organisations had not migrated to a newer, supported version of Windows.

The majority of health organisations - especially NHS hospitals - provide their workforce with 'fixed' computers, meaning they have network cables plugged into wall-mounted connections, not Wi-Fi. In fact, it's common for computers mounted on wheeled trolleys (called computer on wheels or CoWs) on hospital wards, to trail cables when used by clinicians on their ward rounds. As a result, there is a push to adopt more modern technologies, including virtual desktops, remote working capabilities (e.g., Remote Clinical Desktop⁵¹), and mobile working (e.g., Health and Social Care is deploying 2,000 laptops in Northern Ireland⁵²).

The digitisation of adult social care providers is less mature⁵³:

- Twenty-three percent of care home staff cannot access the internet consistently at work •
- Forty-five percent of social care providers express concerns that care staff lack digital skills. •

⁴⁹ Source: <u>https://www.techradar.com/features/how-often-do-you-really-need-to-upgrade-your-pc</u>

⁵⁰ Source: https://www.hsj.co.uk/technology-and-innovation/exclusive-most-nhs-computers-running-decade-old-version-ofwindows/7026680.article (note: subscription required) ⁵¹ Source: https://digital.nhs.uk/services/remote-clinical-desktop

⁵² Source: https://www.health-ni.gov.uk/sites/default/files/publications/health/doh-hscni-digital-strategy-final.pdf

⁵³ Source: https://www.gov.uk/government/publications/people-at-the-heart-of-care-adult-social-care-reform-white-paper

Moreover, the current funding mechanisms (capital investments), are not always able to consider alternative options for sourcing end-user computing, meaning social care organisations may not be able to source managed services where outsourced support, maintenance, and upgrades ensure devices are upgraded regularly.

Deployment location: Local – each local organisation will need to source and provide the appropriate end-user computing for its workforce.

Assumptions:

We've assumed that:

- Investments will be required to modernise current end-user computing across all health and care organisations. This includes the cost of adopting new technologies (e.g., virtual desktop infrastructure) to enable more mobile and remote working
- Digital strategies and plans are similar across regional clusters. We can take any cost data in these strategies and plans, average them, and divide these costs by the workforce size of that cluster. This gave us £120 per employee in capital costs and £145 per employee in revenue costs. This cost is in line with industry standards⁵⁴. We then multiplied these costs per worker by the workforce in each nation to get a UK-wide estimate.

Phasing: We've used custom phasing because IT items typically have a three-year life cycle of capital needs. Applying this phasing gives us 33 percent of the total capital cost, since items will require continued replacement. Revenue costs are 20 percent per year, which is the typical industry average recurrent revenue spend.

1.4. Data centres, (cloud) hosting and storage

Cost item definition:

This item covers IT capabilities or workforce services to host digital services and store data. The digital ambition across the UK is to adopt cloud computing. Computing resources (storage, infrastructure, solutions etc.) should be available on-demand over the internet and accessible by workforces, users, and professionals.

This item covers investment required for:

- Switching on-premises data centres to cloud hosting, if feasible
- Moving existing on-premises data centres to more modern and suitable facilities. This reduces threats from natural disasters, improves physical security, and ensures a more stable environment (temperature, air, lighting, etc.) for servers
- Training people and establishing processes for using new cloud-based platforms
- Ongoing support and maintenance for new systems and technologies
- Data security, compliance and governance, and capacity-planning.

Current digital landscape:

- Regional clusters are leading the switch to the cloud. However, it's likely some organisations will not be able to switch as they will continue to use legacy systems that need on-premises data centres
- All four nations have seen an increase in cloud technology adoption and implementation.

Deployment location: Regional – the regional clusters are driving investment in this area.

Assumptions:

We've assumed that:

⁵⁴ Source: <u>https://www.syn-star.co.uk/it-support-what-is-the-average-cost-of-computer-support-in-the-uk/</u>
- We can use costs from a Barts Health NHS Trust cloud transition contract, awarded to Capgemini in 2020⁵⁵, for our estimates. We used this contract as a proxy for the value of the likely investment required for a wholesale cloud transformation
- Barts is broadly equivalent to a regional level unit as it has similar headcount, population, and geographical coverage
- The spending on the contract totals £4.1 million. Although the size of the contract is not publicly available, we've been able to estimate it by extracting spending on Capgemini in Barts' £25,000+ financial transparency reports between 2020 and end of year 2023. We tested and verified this with PA subject matter experts and using our professional judgement
- Some trusts have already transitioned to the cloud, but 80 percent of trusts still need to go through the same purchase and implementation process that Barts did. Reflecting this, we've reduced the total cost by 20 percent before extrapolating costs for Scotland, Wales, and Northern Ireland, using regional clusters as the scaling factor.

Phasing: We've used the <u>default phasing</u>. We generally expected that this item will require a business case and is likely to follow the default business case phasing.

Cost theme 2: EPR and specialist EPR

Overall ambition statement:

Across health and social care in the UK, there is an ambition for the workforce to be able to work optimally with data, digital, and technology. Digital and data solutions and systems should be fit for purpose and support staff to do their jobs well.

We've included three specific digital ambitions and targets in this theme:

- NHS providers in England to have established minimum digital capabilities, including electronic patient records (EPRs) by March 2026, as defined in the Frontline Digitisation Programme⁵⁶
- Diagnostics to be digitised to enhance precision, speed, and accessibility
- Digital services that are provided should be clinically safe, and technologically secure.

This theme covers investments to provide digital services and capabilities for the workforce. It has six cost items:

2.1. Enterprise EPR

Scaling	Number of NHS	Optimism	High	Data and	Existing published cost data
lactor.	trusts/nospitals	Dias.	connuence	juugement.	

Cost item definition:

This cost item covers EPRs and Electronic Health Records (EHRs). By giving health and care professionals a digital version of an individual's medical and care history, EPRs and EHRs play a crucial role in enhancing healthcare quality, improving patient and service user safety, and efficiency.

EPR systems are designed to be comprehensive, accessible, and secure ways to share data across different healthcare systems and settings. EPRs can help staff make better-informed decisions, reduce errors, and streamline coordination of care across health and care settings.

This cost item covers investments for:

- Adopting an enterprise EPR for NHS organisations that do not yet have one. This includes the cost of designing, procuring, and implementing a digital solution, workforce training, and the change and transformation required to embed the EPR solution into service provision
- Updating or improving clinical functionality, in particular integrating EPRs with other specialist systems such as diagnostic systems and Order Communications

⁵⁵ Source: <u>https://www.bartshealth.nhs.uk/key-documents/</u>

⁵⁶ Source: https://digital.nhs.uk/services/frontline-digitisation

- Providing ongoing operational and maintenance support for the new EPR solution or additional functionality
- Continuously improving EPR functionality and performance.

Current digital landscape:

- In England, significant investments have been made in EPR solutions as a foundation system for digitising healthcare delivery and making sure care is cohesive and integrated. As a key part of NHS digitisation, EPRs have been the focus of successive policy initiatives and budget planning. NHS England has set a target for all hospitals to have a working EPR that meets minimum standards by March 2026
- NHS England is prioritising the least digitised trusts. In a recent published procurement process for Tiger Teams supporting the Frontline Digitisation programme, NHS England stated that 21 NHS trusts (10 percent) do not have a working EPR, and a further 116 trusts (55 percent) with an existing EPR need to upgrade or replace it to meet the minimum standards. This level of EPR digitisation was corroborated by a published report on EPR systems within NHS Acute Trusts⁵⁷
- In the past, the UK government has announced significant budgets (£2.6 billion) for EPRs, but these have later been reduced or redirected, first to £1.9 billion in early 2023, and in November 2023, the budget looked likely to be reduced again. This means many of the 132 trusts in England who have an EPR and were initially promised funds to optimise or extend it are uncertain of the national support they will receive. An article illustrated this challenge from a specific acute trust's perspective in May 2024⁵⁸
- NHS England is also encouraging convergence for EPRs within ICSs and regional clusters, to rationalise the number of systems in use and improve productivity and efficiency
- The Welsh Patient Administration System, Myrddin, is already used to manage patient scheduling by six out of the seven Welsh Health Boards⁵⁹. Wales has also established a Master Patient Index, which has identifiers for each patient that can be cross-referenced with records on other systems
- In Northern Ireland, the flagship programme, Encompass, delivers an electronic health and care record for the whole nation. Epic delivers secondary, tertiary, and community care⁶⁰
- In Scotland, similar centralised activities are in place to deliver a central electronic health and care record across the Scottish Health Boards.

Deployment location: Local

Assumptions:

- We can use existing published NHS England cost data and data in other research reports and articles to estimate the investment requirements for EPRs across all NHS trusts in England. We found that EPR costs range from £50 million to £150 million per trust. Using these figures, we've assumed that the average cost of an EPR is around £100 million (a total of £1.8 billion). Based on business cases for EPRs, we've assumed a split of £64 million of capital costs and £36 million of revenue costs per trust. This publicly available data comes from:
 - Great Ormond Street Hospital for Children NHS Foundation Trust £46 million to £50 million over 20 years⁶¹
 - University College London Hospitals NHS Foundation Trust £150 million to £400 million transformation programme with Epic implementation included as a cost element⁶²
 - Cambridge University Hospitals NHS Foundation Trust £200 million EPR and infrastructure development contract⁶³.

⁵⁷ Source: <u>https://digitalhealthintelligence.net/report/epr-snapshot-report-2023/</u> (note: subscription required)

⁵⁸ Source: <u>https://www.hsj.co.uk/university-hospitals-of-north-midlands-nhs-trust/trust-appeals-to-nhse-chiefs-over-epr-funding-fears/7037141.article</u> (note: subscription required)

⁵⁹ Source: <u>https://www.gov.wales/sites/default/files/publications/2019-03/informed-health-and-care-a-digital-health-and-social-care-strategy-for-wales.pdf</u>

⁶⁰ Source: <u>https://encompassni.hscni.net/digital-portfolio/encompass/</u>

⁶¹ Source: https://www.digitalhealth.net/2017/02/exclusive-great-ormond-picks-epic/

⁶² Source: <u>https://www.digitalhealth.net/2017/07/uclh-signs-electronic-records-deal-with-epic/</u>

⁶³ Source: https://www.digitalhealth.net/2016/02/cambridge-big-bang-reality/

- We can apply the per-unit cost at a trust level to extrapolate across the nations. Therefore, the cost per trust needed for the model to reflect the figures above is £4.6 million of capital costs and £2.6 million of revenue costs. These cost estimates assume the other three nations need the same ratio of new EPRs as England does
- At least a third of each trust's EPR contracts will expire in the next three years⁶⁴
- There is a push to converge ICSs onto single or interoperable EPR solutions to benefit from interoperability and shared care records
- These costs include transformational and implementation costs for EPRs, e.g., deploying the technology and training the workforce, as well as service transformation to integrate the EPR.

Phasing:

We've used custom phasing. That's because:

- Our revenue assumption includes both recurrent and non-recurrent elements. We've assumed this because EPRs will require ongoing revenue, initially non-recurrent, before the uplift in capability created by the EPR becomes business as usual. Then, they will require an increase in recurrent revenue costs to fully optimise, support, and enhance the EPRs
- The capital costs reflect the time it will likely take to implement an EPR (roughly three years) and transition services over to it. So, we've assumed that there are some costs that can be capitalised beyond the cost of the EPR itself (for example, the costs of bringing an EPR into use as an asset).

2.2. Specialist EPR

Scaling	Number of	Optimism	High	Data and	Linked to enterprise EPR
factor:	regional clusters	bias:	confidence	judgement:	data and information

Cost item definition:

This item covers specialist EPRs or Patient Administration Systems that require investment in addition to or replacing an enterprise EPR (<u>cost item 2.1</u>). This may be required as an organisation's enterprise EPRs may not meet certain specialist requirements it has. The item covers any digital patient record systems used in healthcare specialties such as urgent and emergency care, maternity, oncology, medicines, and paediatrics/child health.

This item covers investments required for:

- Developing and implementing integrations to integrate specialist EPR solutions with enterprise EPR systems
- Converging specialist EPR solutions with enterprise EPR systems, if feasible. This includes the costs of migrating specialist services to enterprise EPRs, teaching the workforce to use any additional functionalities, and retiring and archiving the old specialist EPR solutions.

Current digital landscape:

- Enterprise EPR systems may cover specialties, but trusts often deploy additional specialist EPRs for specific areas because their enterprise EPR doesn't meet particular requirements e.g., complying with external reporting needs, or capturing context for mental health services
- It's common for trusts to operate and maintain 100+ different clinical systems and solutions. This
 means effort and resources are spent integrating these systems, and enabling the workforce to
 access the systems seamlessly with a single sign-on
- The use of legacy systems is also a barrier for the NHS to adopt modern infrastructure and end-user computing, e.g., some solutions cannot be operated in a cloud-based or virtual environment.

Deployment location: Local

⁶⁴ Source: <u>https://digitalhealthintelligence.net/report/epr-snapshot-report-2023/</u> (note: subscription required)

Assumption:

We haven't been able to find specific data or information on specialist EPR costs, so we've assumed that specialist EPR systems across all types and all cost ranges are covered by the overarching Enterprise EPR cost item (2.1). That means we've assumed the cost for this item is zero.

Phasing: Because we've assumed the cost for this item is zero, we haven't applied any phasing. This cost item is covered by the Enterprise EPR cost item.

2.3. Transfer of care/electronic discharge summaries

Scaling Number of total organisations minus GPs Optimisation	sm Medium confidence	Data and judgement:	Existing cost data and professional judgement
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Cost item definition:

This item covers the capability to support and record digital handovers of care between care settings, including:

- Electronic discharge summaries. These are sent electronically to provide GPs with information about a patient's episode of care, including their diagnosis and any medication they had while in hospital
- Electronic handovers to other health and care organisations, including local authorities, adult social care, NHS trusts, and temporary or ongoing domiciliary community care.

This item covers investments required for:

- Implementing digital solutions and technologies for the transfer of care or electronic discharge summaries
- Training the workforce to use these solutions and technologies
- Operational support for organisations using the solutions and technologies
- Ongoing support and maintenance, or replacing existing services
- Data security and compliance.

Current digital landscape:

The Frontline Digitisation Programme is supporting NHS England trusts to reach a core level of digitisation. The requirements of the Digital Capabilities Framework include a capability for digital transfer of care or discharge⁶⁵. This capability can either be included in an EPR/EHR or recorded separately. It is also uncertain whether this functionality will be integrated into or replaced by shared care records (<u>cost item 3.2</u>).

A key dependency for this item is that organisations receiving electronic discharge summaries and record digital handovers need a level of digitisation to be able to receive them. This is not always guaranteed, as GP practices and care homes – both individual businesses – are digitising at different speeds.

Deployment location: Local

Assumptions:

- We can use cost data from regional clusters in England for our estimates. We can also use cost data from the NHS Digital Buying Catalogue, e.g., solutions such as AireConsult and Engage Consult, which are included in the catalogue's 'e-Consultations (professional to professional)' category. The costs for these items are £0.25–£0.29 per patient
- We can scale cost items using the population of the regional clusters, which gives us a total of £2.2 million. We added this as an input in our cost model
- To get a per-unit cost, we can divide this cost by the number of total organisations across the regional clusters (excluding GPs) as our scaling factor

⁶⁵ Source: <u>https://future.nhs.uk/EPRSupportHub/viewdocument?docid=142295013</u> (note: registration required)

- This item has only revenue costs, as implementing this technology is extremely quick
- The sample cost data is a reasonable representation, but current scale and digitisation needs remain unknown.

Phasing: We've used the minor capital element phasing because this item has only a small number of potentially capitalizable items. Our phasing also reflects the fact that we expect a higher amount of recurrent costs for support than non-recurrent revenue costs (mainly implementation costs).

2.4. Electronic prescribing and medicines administration (EPMA)

Scaling factor:Number of regional clustersOptimism bias:Low confidenceData and judgement:Existing cost data and professional judgement	nt
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Cost item definition:

This item covers electronic prescribing and medicines administration (EPMA) solutions, which replace current paper-based solutions. EPMA solutions allow health professionals to prescribe, administer, and dispense medications, to record drug histories, and to order medications. In hospitals, they replace paper medicine charts, prescriptions, and traditional medication trolleys within wards.

This item covers investments required for:

- Designing and implementing new digital solutions or upgrading current solutions
- Change and transformation to embed the new or upgraded solutions
- Operations and ongoing support and maintenance for the solutions
- Training for the workforce to use the solutions.

Current digital landscape:

The Frontline Digitisation Programme is supporting NHS England trusts to reach a core level of digitisation. The requirements of the Digital Capabilities Framework include digital capabilities for EPMA⁶⁶.

Most NHS trusts have some sort of EPMA, as it is a functionality covered by EPRs. Acute trusts often operate multiple EPMA systems across specialist areas e.g., for inpatients, outpatients, ICU, and oncology/haematology.

The national e-Prescribing Service (EPS) for GPs and pharmacies already exists. It requires no further investments and is included in the cost theme national programmes. An EPS for secondary care is being rolled out, but it's not linked to GPs' systems, so any changes made within it will not update GP records.

Deployment location: Local

Assumptions:

- EPMA systems are well established at NHS trusts as EPMA products, tools and regulations have been in place for a considerable period and it's unlikely all NHS organisations will require a new or upgraded EPMA solution. For this reason, we've applied a discount of 80 percent to the capital and revenue costs for this item
- EPMA investment is mostly concentrated in community and mental health trusts, and in medicine management tools that go beyond simple communication
- We can use capital cost data from the NHS's Long Term Plan to fully implement digital prescribing across hospitals for our estimates. The UK-wide cost totals £78 million (before our 80 percent discount), and we divided this by the 64 UK regional clusters to approximate the cost per cluster or per unit. We then multiplied this by the number of regional clusters in each UK nation to estimate the costs in each home nation
- We can get accurate EPMA revenue costs by researching published information and using our PA subject matter experts' experience of implementing EPMA systems. We estimated revenue costs are

⁶⁶ Source: <u>https://future.nhs.uk/EPRSupportHub/viewdocument?docid=142295013</u> (note: registration required)

around £300,000 for resources and around £90,000 for licensing each year. Over a five-year period, this gives us an estimate of £1.85 million per trust (before our 80 percent discount)

- We can extrapolate unit costs to regional clusters and across all home nations using the number of regional clusters as the scaling factor
- Data and information sources provide a good overview of the technologies and current state, but no information on scale and need for digitisation.

Phasing: We've used the default phasing.

2.5. Diagnostics systems and management

Scaling	Number of	Optimism	Medium	Data and	Existing cost data and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers the core capability for diagnostic solutions and management, including imaging, scans, testing, etc.

This item covers investments required for:

- Sourcing and implementing an Order Comms system if organisations don't have one. These are solutions to manage ordering and requesting diagnostics services, including flagging duplications and potential conflicting requests
- Sourcing and implementing a system to manage results for images, test results, scans, etc.
- Training staff to use systems
- Ongoing support and maintenance, or replacing existing services
- Data security measures, and compliance for systems.

Again, these functionalities may already exist in enterprise EPR solutions (cost item 2.1).

Current digital landscape:

The Frontline Digitisation Programme is supporting NHS England trusts to reach a core level of digitisation. The requirements of the Digital Capabilities Framework include diagnostic capabilities⁶⁷.

In England, there's a trend to develop regional networks. For example, pathology networks in South London and the Black Country allow organisations to share systems and capabilities, rather than developing and implementing them individually. These initiatives are driven by the regional clusters.

Deployment location: Regional

Assumptions:

- We can use costs from a 2018 ICS business case for pathology services for our estimates. We've
 adjusted these costs for inflation, so they represent 2024/25 real terms. Costs in the plan were over a
 10-year period, and represent the total cost of implementing diagnostic systems at a regional cluster
 level. We calculated costs for the regional cluster to estimate a per-unit cost. We then extrapolated
 them to estimate costs for Scotland, Wales, and Northern Ireland
- The regional units or clusters already possess pathology teams or skills, so we can exclude revenue costs
- While the sample cost data is a reasonable representation, the current scale and digitisation needs are unknown
- It's unlikely that these solutions or networks will be needed across all regional clusters, so we've
 discounted costs by 50 percent
- Improving diagnostic modality system links, will require further investment.

⁶⁷ Source: <u>https://future.nhs.uk/EPRSupportHub/viewdocument?docid=142295013</u> (note: registration required)

Phasing: We've used capital and revenue phasing that's broadly in line with the ICS business case but shortened to cover the time period of this research.

2.6. Clinical correspondence and clinical noting

Scaling	Population in	Optimism	Low	Data and	Existing cost data and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers systems and solutions for health and social care professionals to record written or spoken notes and comments, as well as the cost of converting these to digital formats.

Digitally recorded notes are often included in EPRs, digital social care records, and shared care records for easy sharing between health and social care professionals. This allows them to understand an individual's medical history, diagnosis, treatment, and other relevant information. They're also used for formal correspondence between professionals, e.g., discharge letters and medical records.

This item covers investments required for:

- Implementing new technologies for digital clinical notes
- Integrating digital notes with EPRs, EHRs, etc.
- Maintaining and supporting new and updated systems for clinical correspondence or noting.

Current digital landscape:

- These functionalities are sometimes included in enterprise EPR systems, but are very likely to be too basic to meet the workforce's needs
- There is increasing demand for voice recognition systems to achieve required productivity savings and to avoid delays when sharing clinical and care notes
- Correspondence between health and care professionals (especially across organisations), often still relies on paper and email
- Adult social care providers often don't have access to these notes.

Deployment location: Local

Assumptions:

We've assumed that:

- We can use publicly available data showing listed costs of £0.28 per patient for our estimates. We've then extrapolated these per patient costs to a UK-wide estimate by using the regional population in each nation as the scaling factor
- Implementation periods are extremely short an average of eight working days so all costs for this item are revenue costs
- Costs for the item are to uplift existing capability for e.g., voice recognition, rather than a brand-new investment. For this reason, we've assumed this item is not materially significant and have excluded it from the final figures for this cost theme.

Phasing: We've assumed that this cost item is more likely to be non-recurrent and that it has no capital investment. And we've assumed that the need for technical infrastructure is covered by the Foundational Technical Infrastructure cost theme (<u>1</u>), and Enterprise EPR (<u>2.1</u>) and Shared Care Record (<u>3.2</u>) cost items.

Cost theme 3: Digital social care and shared care record

Overall ambition statement:

The ambition is for the workforce to be able to work efficiently using data, digital, and technology. This is even more critical in social care, in particular the ability to share care records across care settings, e.g., between NHS trusts and care homes is a key goal.

The key digital target for this theme was for 80 percent of CQC-registered providers to have a digital social care record by March 2024⁶⁸. At the same time, the digital services that are provided should be clinically safe and technologically secure.

This cost theme covers the digital components required to meet this ambition, ways to capture information about social care service users digitally, so the workforce has access to a digital social care record, and the ability to share this information between health and social care.

This theme covers investments to provide these digital services and capabilities for the workforce. It has two cost items:

3.1. Digital social care records

Cost item definition:

This item covers Digital Social Care Records (DSCRs), which are software solutions used to record a person's care information. They're sometimes called electronic or digital care plans, care records or care management systems (Mosaic, LiquidLogic etc.).

They replace paper records, which are often still used in social care. We expected that DSCRs will play an important role in joining-up care across social care and the NHS, as information can be shared across systems.

This item covers investments required for:

- Designing and implementing a new system for social care organisations that don't have a DSCR
- Upgrading, improving or replacing existing DSCRs to enable integration with NHS systems
- Business change and training for the workforce to use the DSCRs
- Ongoing support and maintenance for the DSCRs.

Current digital landscape:

Most local authorities' adult social care teams have DSCRs and are keen to integrate them with NHS patient care records. This will provide the social care workforce with the full picture of an individual's health and care, allowing providers to make better-informed decisions.

Most adult social care providers have low digitisation, with NHS England estimating that around 30 percent of social care providers are still using paper-based systems⁶⁹. Substantial funding to improve this situation was announced⁷⁰, including the Digitising social care fund, and regional clusters are responsible for using this funding to drive digitisation in social care.

Recent reports say that over 55 percent of regulated care providers have either moved away from paperbased systems or are in the process of moving away from them⁷¹. The ambition is for 80 percent of CQC-registered adult social care providers and 80 percent of people to have a digital social care record by March 2024⁷².

Finally, there are two main barriers to integrate independent adult social care providers with NHS systems and data: a lack of scale and maturity of digitisation, and poor information governance.

Deployment location: Local

Assumptions:

We've assumed that:

• Digital strategies and plans are similar across regional clusters. We can take any cost data in these strategies and plans, average them, and use the number of regional clusters as the scaling factor to

⁶⁸ Source: <u>https://www.gov.uk/government/publications/people-at-the-heart-of-care-adult-social-care-reform-white-paper</u>

⁶⁹ Source: https://transform.england.nhs.uk/key-tools-and-info/adult-social-care-digital-transformation/digitising-social-care-fund/

⁷⁰ Source: https://transform.england.nhs.uk/key-tools-and-info/adult-social-care-digital-transformation/digitising-social-care-fund/

⁷¹ Source: <u>https://www.gov.uk/government/news/over-3-million-to-transform-technology-in-adult-social-care</u>

⁷² Source: <u>https://beta.digitisingsocialcare.co.uk/the-clock-is-ticking</u>

get UK-wide estimates. We divided the total costs by the total number of care homes across clusters to obtain a per-unit cost. This figure covers:

- We can get a UK-wide estimate by multiplying the per-unit cost by the number of care homes in each • **UK** nation
- These two clusters are reasonably representative of the costs for digital care record investments. . However, this is a relatively small sample, covering just over one percent of the UK's 16,726 care homes
- Costs for this item are based on licence fees. We've assumed that some investment will be required . to enable the physical capability and connectivity, alongside these ongoing licensing costs
- The first two years of the digitisation period will require some training for the adult social care . workforce. These costs would broadly be covered by our estimate and are included in it
- Providers will get centrally funded capital and revenue investments for DSCRs, e.g., government funding.

Phasing: The cost data we used suggested a slightly different profile for capital costs to the default phasing, so we've used that profile. Revenue costs included an element of non-recurrent costs alongside recurrent revenue costs once the DSCRs were up and running.

3.2. Shared care record

Scaling factor:Number of regional clustersOptimism bias:Medium confidenceData and judgement:Existing cost data and professional judgement	Ī
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Cost item definition:

A shared care record allows the NHS and social care organisations within a regional cluster to share upto-date information about individuals' health and care. This item covers technologies, solutions, and systems to exchange data (such as health information exchange systems) and collaborate and interoperate across healthcare and social care providers.

This item covers investments required for:

- Designing, developing, and implementing shared care record infrastructure and solutions •
- Establishing agreements to share information across organisations •
- Embedding change, in particular for information governance and data privacy .
- Training the workforce to use shared care records •
- Supporting and maintaining, or replacing existing shared care record services. •

Current digital landscape:

NHS England's ambition was for all ICSs to have established a shared care record across health and care organisations by September 2021⁷³. This was to be driven by the regional clusters and ICSs themselves.

While this ambition was not achieved, as only 37 of 42 ICSs had basic shared care records in place by the deadline⁷⁴, the remaining five ICSs have since adopted them. However, they vary greatly in digital maturity, e.g., the number of health and social care partners they connect up^{75} .

While information is often easily shared across health organisations, it's more challenging for social care providers. In particular, substantial efforts are required to resolve information governance challenges in social care.

At the moment:

Solutions are in place to allow organisations to read each other's data, and some are starting to look at functionalities to write and correct data too

⁷³ Source: https://www.england.nhs.uk/long-read/shared-care-records/

⁷⁴ Source: https://www.healthcareitnews.com/news/emea/nhsx-confirms-37-42-icss-have-shared-care-records

⁷⁵ Source: https://www.digitalhealth.net/2023/02/special-report-shared-care-records-6/

- In England, the deployment of the National Record Locator Service project is under way. This project aims to connect shared care records across England, enabling health and care professionals to access patient information nationally for direct care purposes. It will help to address the challenge posed by the 20 percent of acute care provision for patients that takes place outside their home integrated care system or regional cluster⁷⁶
- In Scotland, a shared care record project to link up patient data from four of the country's health boards has been under way since 2019⁷⁷
- Northern Ireland and Wales are delivering similar initiatives to establish shared care records and data platforms across health and social care⁷⁸.

Deployment location: Regional

Assumptions:

We've assumed that:

- We can take an average figure from these digital strategies and plans in England. We have also included adult social care costs from two plans for initiatives aiming to connect care homes to shared care records. We divided this cost by the number of care homes in each regional cluster, then multiplied it by the number of UK care homes (16,726) to get a UK-wide estimate
- We could estimate a per-unit cost by adding the health and social care components together, then dividing this by the number of regional clusters. We then multiplied this cost across the home nations, using the number of regional clusters as the scaling factor
- The existing data sample is a reasonable representation, but there is no exact information on the scale of shared care records that are already in place across the UK. Using our professional judgement, we've applied a notional 25 percent discount to our estimates to reflect that some regional clusters already have fully functional shared care records.

Phasing: We've used existing cost data to find the capital costs. For revenue costs (both recurrent and non-recurrent), we've used the same approach as for the Digital social care record cost item (3.1).

Cost theme 4: Remote monitoring and virtual care

Overall ambition statement:

The UK government has set an ambition for individuals to receive health and care services at the location that is the most convenient for them. This could be in their own homes or at a facility close to home. This requires digital capabilities and technologies to treat and monitor patients and service users remotely, including virtually.

The key ambitions and targets for this cost theme include:

- Ensuring that 20 percent of the most vulnerable people in care homes have access to fall prevention technology
- Establishing remote and virtual care services, including remote consultations, remote monitoring, and Technology Enabled Care
- Providing clinically safe and technologically secure digital services.

This theme covers investments to provide these digital services and capabilities for patients and service users, and the workforce. It has three cost items:

4.1. Remote and virtual care

Scaling	Number of	Optimism	Low	Data and	Published information and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

⁷⁶ Source: <u>https://www.digitalhealth.net/2023/12/ics-leaders-discuss-integration-sustainability-of-shared-care-records/</u>

⁷⁷ Source: https://www.digitalhealth.net/2018/03/health-boards-link-health-care-systems-scotland/

⁷⁸ Source: https://www.nuffieldtrust.org.uk/resource/digital-health-care-across-the-uk-where-are-we-now

Cost item definition:

Providing health and care services remotely, enabled by digital technologies, is a core capability for the NHS and adult social care. This item covers the digitisation required when individuals who receive care are not in the same locations as the people providing the care. For example, NHS trusts monitoring patients while they recover at home, or social care providers interacting and connecting with service users remotely using devices such as Amazon Echo.

The technologies included in this cost item are commonly referred to as telemedicine, telecare or telehealth platforms, which include virtual wards and Technology Enabled Care (TEC).

This item covers investments required for:

- Designing and implementing remote services
- Facilitating change and providing training to use remote technologies
- Ensuring ongoing maintenance and operational support.

Current digital landscape:

- Regional clusters often coordinate NHS investments, with individual organisations implementing technologies such as virtual wards and remote monitoring
- During the Covid-19 pandemic, there was widespread adoption of virtual and remote services, including virtual consultations with GPs. However, these may decrease after the pandemic, as often models have not been adapted to accommodate these technologies, e.g., there is no dedicated time, nor are there resources to manage virtual clinics and consultations⁷⁹
- Local authorities encourage adult social care providers to use TEC, including things such as personal alarms, motion detection, and Argenti telecare solutions.

Deployment location: Local

Assumptions:

We've assumed that:

- We can source costs for particular types of remote monitoring and TEC from ICS digital strategies and plans and other items we researched, as follows:
 - For remote monitoring and TEC, we used adult social care costs from existing strategies and plans from the regional clusters in England. We then averaged total costs to estimate the size of investment per cluster
 - To estimate costs for virtual wards, we could use publicly available data from South Eastern Health & Social Care Trust in Northern Ireland. Its virtual ward revenue costs were £566,273. However, we have not used this data. That's because our research found that the main costs for this item are the costs of training people to deliver care in new ways, rather than digitisation and technology costs – organisations can often use existing EPRs and connectivity infrastructure. For this reason, we've assumed this cost item's value is zero.
- Publicly available data and information gives an overview of the ambition and potential technologies. However, there is less information about overall scale and digitisation needs. And the potential for future applications, such as monitoring long-term conditions or short-term domiciliary care following surgical procedures, is less well understood and documented. However, this is not included in the scope of our research project.

Phasing: Our phasing for capital costs is based on an accelerated rate of spending, since many organisations are adopting remote monitoring and TEC initiatives (we believe because of the productivity savings they offer).

For the revenue costs, we've used a split of one-third non-recurrent revenue costs to two-thirds recurrent revenue costs over the period. And we've assumed recurrent costs will increase as remote monitoring/TEC services mature from year three onwards.

⁷⁹ Source: <u>https://www.england.nhs.uk/long-read/remote-consulting/</u>

4.2. Fall prevention technology

Scaling	Number of care	Optimism	Medium	Data and	Published information and
factor:	homes	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers various technological tools and devices designed to identify, mitigate, or prevent falls, particularly in healthcare and for aging populations. The ambition is for 20 percent of the most vulnerable people in care homes to have access to fall prevention technology.

This item covers the investment required for:

- Purchasing and implementing these technologies
- Training staff to use the technology
- Adjusting infrastructure to integrate the technology in a healthcare setting.

Current digital landscape:

This technology is widely used in adult social care for service users who are cared for in their own homes. But it's less widely used in residential care facilities such as care homes and nursing homes.

A potential reason for this is a lack of funding. There's no consensus on who should be paying for the technology, as private social care providers are not incentivised to digitise their services. In addition, the technology requires connectivity, which some care homes may not have.

Deployment location: Local

Assumptions:

We've assumed that:

- We can estimate costs per person using our professional experience of providing similar solutions to individuals, care homes, and NHS trusts. Our estimated costs were £3,141 of capital costs and £1,346 of revenue costs per care home
- We should apply a discount of 15 percent to both the capital and revenue costs to reflect that care homes that have already made some progress in implementing these solutions. This assessment is based on discussions with PA subject matter experts. Currently, no data is collected or published regarding fall prevention in care homes
- We can estimate UK-wide costs by multiplying the unit cost by the number of care homes in each UK nation.

Phasing: For capital costs, we've assumed there will be a ramp-up period over three years, with revenue costs (mainly managed service and licence costs) expected to reach 100 percent in line with deployment.

4.3. Telecare and Technology Enabled Care

Scaling	Number of	Optimism	N/A	Data and	Published information and
factor:	regional clusters	bias:		judgement:	professional judgement

Cost item definition:

This item covers telecare and Technology Enabled Care (TEC) services that provides remote monitoring, protection, and support. Examples include Argenti, Alexa, personal alarms, and motion detection devices. These services are often commissioned by local authorities for adult social care.

The item covers the investment required for the cost of managed services, including installation, training, maintenance, and ongoing support for telecare and TEC services.

Current digital landscape:

According to a UK government publication, an estimated 1.8 million people in the UK are using telecare services – 1.3 million in their own homes and 0.5 million in care homes. They're typically commissioned as managed services, meaning there are costs per service user and fixed prices, which we categorise as revenue costs.

Deployment location: Local

Assumptions:

We've assumed that:

- Although they often appear as separate cost items, solutions for fall prevention and TEC are often sold together, so we've combined both costs in the Fall prevention technology cost item (<u>4.2</u>)
- This cost item requires adult social care providers to digitise their general infrastructure and end-user computing, which are covered in other cost items (for example, <u>1.3</u>). To avoid double-counting costs for these items and related items such as Fall prevention technology (<u>4.2</u>) and Telecare and Technology Enabled Care (<u>4.3</u>), we have assumed this cost item's value is zero.

Phasing: Because this cost item is zero, we haven't used any phasing for it.

Cost theme 5: Primary care

Overall ambition statement:

The providers in primary care are mainly independent businesses (GP practices and pharmacies). The UK government and national bodies within each home nation have set ambitions for Primary Care organisations to adopt digital solutions, as GP practices and pharmacies will play a key part in transforming health and social care services.

New GP contracts now include requirements for practices to implement digital solutions. But there's still significant work to be done to ensure that all GP practices and pharmacies have the connectivity and foundational capabilities to start transforming and digitising their operations.

This theme covers digital solutions in primary care used for booking appointments etc. This cost theme has one item:

5.1. Primary care – GP IT

Scaling	Number of GP	Optimism	Medium	Data and	Published information and
factor:	practices	bias:	confidence	judgement:	professional judgement

Cost item definition:

In England, there's currently a national service that provides GPs, practice staff, and primary care staff with technologies and systems to work digitally. The core foundational infrastructure components for this (for example, networking and connectivity and end-user computing) are covered in the Foundational Technical Infrastructure cost theme ($\underline{1}$).

Therefore, this item covers additional solutions and systems for online appointment booking, ordering repeat prescriptions online, and remote consultations and virtual services (e.g., online consultations and video consultations) in primary care.

Current digital landscape:

- As part of improving access to primary care⁸⁰, NHS England is encouraging GPs to adopt digital solutions
- The digitisation of Primary Care is currently driven by ICSs or ICBs, often under the banner of 'Digital First' programmes. In England, there's a national framework that provides pre-approved technology and suppliers, but this is expiring. A tender process to replace this was started but was suspended because of a challenge with the process⁸¹
- Digitisation is increasing, with 20 percent of GPs allowing patients to see their records online and 99 percent allowing them to order repeat prescriptions online. Over 58 percent of GPs are also using secure messaging through the NHS App, and over 90 percent have enabled online appointment booking and management capabilities

⁸⁰ Source: <u>https://www.england.nhs.uk/long-read/delivery-plan-for-recovering-access-to-primary-care-2/</u>

⁸¹ Source: <u>https://www.hsj.co.uk/technology-and-innovation/nhse-forced-to-suspend-300m-digital-framework-after-claim-against-it/7036583.article</u> (note: subscription required)

- Core digital elements and digitisation commitments are written into GP contracts, but anecdotally, there are still too many examples of paper-based approaches and no access to virtual services
- There is a push for GP practices to work collaboratively with pharmacies, so pharmacies can supply
 prescription-only medicines for seven common conditions, pharmacy oral contraception, and blood
 pressure services. This requires further digitisation and integration between practices and
 pharmacies. However, unlike GP practices, there isn't always a contractual route to incentivise
 pharmacies to digitise their operations.

Deployment location: Local

Assumptions:

We've assumed that:

- We can use the data in the digital strategies and plans for regional clusters in England for our estimates. We also researched costs using the NHS Digital Buying Catalogue. We divided this cost data by the number of GPs in the ICSs in the plans
- This cost item covers the digital components in the existing GP IT framework and NHS Digital Buying Catalogue. We've assumed we don't need to apply any discount to the ICS plans because no ICS or trust has fully digitised all these components.

Phasing: We used a custom phasing to reflect the capital costs we found. We estimated the revenue cost using the existing costed digital transformation plan. We expect that this cost would be largely recurrent and incremental to GPs' current spending.

Cost theme 6: Public-facing solutions and systems

Overall ambition statement

Across health and social care in the UK, there is an ambition for a system-wide approach for people and patients to be able to access and contribute to their health and care data using digital communication tools. The aim is for them to be able to get advice and guidance, and for organisations to ensure the citizen offer (communication, feedback collection, and service delivery) is consistent.

The digital ambitions in this theme are:

- Enabling patients and service users to self-serve by giving them digital tools, information, support, and advice so they or their families and unpaid carers can manage their care
- Providing services virtually and remotely, using remote monitoring and tech-enabled care to allow patients, citizens or service users to access health and care services in the place that is most appropriate and convenient for them
- Adopting and scaling-up care technologies to deliver social care benefits. Initially the goal is for 20 percent of the most vulnerable people in care homes to have access to fall prevention technology.

This theme covers investments to provide these digital services and capabilities for individuals or their families and unpaid carers. It has five cost items:

6.1. Public advice and guidance

Scaling	Number of	Optimism	Medium	Data and	Existing cost data and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers patient, citizen, and public-facing websites with information and guidance about health and care, potentially including service catalogues explaining what services are available in a region.

The item covers investments for:

Producing educational resources and content to raise awareness and understanding of available services

- Improving existing websites or creating new ones to provide consolidated overviews of services and information in each regional cluster
- Ongoing support and maintenance for new technologies and content for websites and catalogues

Current digital landscape:

- Currently, most health and care organisations operate standalone public-facing websites that provide information about the services they offer. As each organisation has its own website, individuals are left to navigate multiple platforms to locate the information they need
- Regional clusters are considering how to provide consolidated or overarching websites or apps that provide this information for the whole cluster in one place
- One option is to use the NHS website for all providers, although a possible challenge may be whether it's acceptable to list services provided by social care organisations and the private sector on an NHS-branded website.

Deployment location: Regional

Assumptions:

We've assumed that:

- We can use the costs in existing digital strategies and plans, including initiatives for multi-channel access to public advice and guidance, for our estimates. We then extrapolated for each nation by multiplying by the number of regional clusters in it
- Although the need for consolidated websites or apps is well-known in other sectors, it's less common in the health and social care sector. This means the approach and effort required are uncertain.

Phasing: We've assumed that capital costs will fall in the first year, but there will be ongoing revenue costs after that to continue managing the websites etc.

6.2. Patient, citizen, or service-user-accessible digital health and care record

Scaling	Number of	Optimism	Medium	Data and	Published information and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

A patient health record or digital service user care record is a record of care that patients or service users can access and use to empower themselves to influence and manage their health and care. This item covers the cost to provide this to individuals via an NHS app. However social care may not be covered through these apps, as they are NHS-branded.

This cost item covers investments for:

- Agreeing what information will be shared often the data shared on a public-facing patient health record will be different from a shared care record (<u>cost item 3.2</u>) used by health and care professionals.
- Developing and implementing an accessible record
- Training the workforce
- Running public awareness campaigns for patients and service users
- Providing ongoing support for the new solutions and technologies.

Current digital landscape:

Regional clusters are often tasked to run these initiatives, coordinating activities and costs across the health and social care organisations involved. They're also encouraged to use the NHS App (<u>cost item</u> <u>10.2</u>). But organisations often have to invest in a separate portal or app that can accommodate both NHS healthcare and social care – national apps are NHS-branded and do not cover social care aspects.

Deployment location: Regional

Assumptions:

We've assumed that:

- Although there's a strong desire to move this functionality into NHS apps, ICSs are still deploying these records locally
- We can use existing digital strategies and plans for our estimates and verify them using information from the NHS Digital Buying Catalogue (Black Pear Core Care Record). The Black Pear Core Care Record is a shared care record solution that offers similar functionality to that required for this cost item. Its costs are approximately £5 million, which lines up with cost data in the digital transformation plan
- Although the cost data is categorised as revenue only, there will be some capital costs for this item. Using our professional judgement, we've increased the revenue costs in the plan by 30 percent and allocated this as capital costs. We then extrapolated for each home nation by multiplying by the number of regional clusters in each nation.

Phasing: We've used the same phasing as we did for Digital Social Care Records (cost item 3.1).

6.3. Patient or citizen portal or app

Scaling	Number of	Optimism	High	Data and	Published information and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers a transactional patient or citizen portal or app that allows users to manage their care and self-service, including: self-triage, referrals, condition management, access to care plans, test results, medications, history, correspondence, appointment management, and screening alerts.

This ambition builds on the public-facing EPR, allowing for patients or service users to contribute to their own care record, e.g., by submitting blood pressure readings they've taken themselves, or booking appointments and referrals themselves. The ambition is for these solutions to cover both NHS and social care services.

This item also covers requirements for digital and consumer technologies to support families and unpaid carers, particularly in areas such as health and well-being.

The item covers investments required for:

- Designing, developing, and installing solutions
- Public campaigns, awareness, workforce training, and business change
- Ongoing support and maintenance for the solutions.

Current digital landscape:

- The NHS expects to expand the NHS apps to provide these transactional functionalities, including self-referral and online appointment booking. However, these improvements are being made separately on each NHS app used in each home nation
- There are also some limitations. In particular, there's a potential issue with showing services commissioned via adult social care or offered in the private sector in NHS-branded apps. Currently, the various NHS apps cover only health services, not adult social care. This means the NHS may have to rebrand its apps if they're going to include adult social care services.

Deployment location: Regional

Assumptions:

We've assumed that:

• We can use existing digital strategies and plans for regional clusters in England for our estimates. We added this together, then divided by the number of regional clusters to obtain a unit cost per regional cluster. We then extrapolated to a UK-wide estimate by using the number of regional clusters in each UK nation as the scaling factor • Because the technologies involved are proven, the main cost for these solutions is maintaining and updating the content. That's borne out by revenue costs in the plans being just over twice those of capital costs. We've reflected that in our model.

Phasing: We've assumed there will be a full roll-out over two years, with revenue spending ramping up quickly to match capital spending.

Cost theme 7: Digital skills/confidence and digital inclusion

Overall ambition statement:

Across health and social care in the UK, there is an ambition to ensure that both patients and service users and the health and social care workforce have the capabilities, skills, and confidence to use digital solutions. At the same time, there's a need to enable better access for digitally disempowered communities to ensure people who aren't able to use digital tools can still access health and social care services. There's also an emphasis on training the workforce and establishing a continuous learning culture.

This theme covers investments to train and educate the workforce and individuals to improve their confidence, and to increase digital inclusion. This theme has two cost items:

7.1. Public campaigns to increase digital awareness and understanding

Scaling	Number of	Optimism	Medium	Data and	Published information and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers public campaigns to increase digital awareness and understanding and digital literacy, including existing campaigns run by voluntary, community, and social enterprises.

Current digital landscape:

Digital inclusion and ensuring that nobody is left behind because they lack the confidence, skills, or capabilities to use digital services is a widely acknowledged goal. Nationally, charities and local authorities are doing a lot of work to address this.

The requirement is for all regional clusters to have defined a Digital Inclusion Strategy.

Deployment locations: National and regional

Assumption:

Although we sourced costs for this item from various digital strategies and plans, to avoid double counting them with closely related items such as Public advice and guidance (6.1), we've assumed this cost item's value is zero.

Phasing: Because this cost item is zero, we haven't used any phasing for it.

7.2. Training and upskilling in digital literacy

Scaling workforce factor:Optimism bias:High confidence	Data and judgement:Published information and professional judgement
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Cost item definition:

This item covers work to increase digital literacy and understanding of digital technology, especially for workforces and leadership teams. It includes training courses (both online and in-person), subscriptions, webinars, seminars, and general training. It doesn't include system-specific training, as this is covered in each system's respective cost item.

Current digital landscape:

• NHS England has established an NHS Digital Academy in partnership with Health Education England. The academy provides a range of learning programme and development plans

• Each organisation has its own set of training and onboarding, but there is likely a need to improve these, while also rolling out new initiatives or getting staff to change how they work when changes are introduced.

Deployment location: Local

Assumptions:

We've assumed that:

- This item is a key barrier to digitisation. We researched the costs for this item by looking at ongoing digital training programmes across the NHS. We used cost data from existing, costed plans that included initiatives to improve digital literacy and inclusion programmes for our estimates. These often included creating formal training pathways and networks of champions
- We could get total costs by taking the costs in the plans and dividing by the relevant actual workforce to give a unit cost, then multiplying this across the UK nations.

Phasing: Based on the plans, costs are likely to be revenue-related, with little capital costs. To estimate annual costs, we spread the total costs equally across the duration of the five-year plans because continuous investment is needed to sustain digital literacy as more digitisation initiatives are rolled out.

Cost theme 8: Data and analytics solutions and platforms

Overall ambition statement:

Across health and social care in the UK, there is an ambition to enable population segmentation, risk stratification, and population health management by analysing health data, identifying high-risk populations, and implementing targeted interventions to improve overall health outcomes. NHS England has set a target for as many NHS providers as possible to meet minimum capability standards for digitisation by March 2025.

This theme covers investment in an intelligence platform, analytics capability, and decision support tools to help clinicians follow best practice and avoid quality variations in healthcare settings. It has three cost items:

8.1. Population health platform

Scaling factor:	Number of regional clusters	Optimism bias:	Medium confidence	Data and iudgement:	Existing cost data and published information
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Cost item definition

This item covers a system-wide intelligence platform, with a fully linked, longitudinal dataset across primary, secondary, mental health, social care, and community data.

The item covers investments required for:

- Designing and developing the platform
- Understanding the platform's use cases and developing a business case for it
- Implementing the platform
- Driving change and transformation to use the platform
- Training the workforce to use the platform
- Ensuring ongoing maintenance and support for the platform.

Current digital landscape:

ICSs are the driving force behind this item, coordinating and commissioning work. The NHS and adult social care organisations capture and collect data, but often record and store it in separate systems. Significant investment is also required for these organisations to address information governance challenges to consolidate and merge this data and create a single, longitudinal dataset.

Note that this item is in addition to the ongoing programme to establish a national federated data platform (cost item 10.6).

Deployment location: Regional

Assumptions:

We've assumed that:

- The prevalence of population health management initiatives across all the costed plans we analysed reflects the fact that, even though the NHS is developing a federated data platform, regional clusters still plan to establish local population health management capability
- We can use data from existing digital strategies and plans. We divided these by the number of
 regional clusters to obtain an average per region unit cost, then extrapolated across the UK using the
 regional clusters as a scaling factor.

Phasing: We've used custom phasing to reflect the detail and profiles in the cost plans.

8.2. Bl and analytics capability

Scaling	Number of	Optimism	Medium	Data and	Existing cost data and
factor:	regional clusters	bias:	confidence	judgement:	published information

Cost item definition

This item covers establishing and developing Business Intelligence (BI) and analytics capabilities for health and social care. It covers the cost of having a workforce and specialists with the required BI skills and expertise.

It covers investments for:

- Recruiting people
- Training the workforce or specialists
- Developing a career framework for BI and analytics
- Ongoing support for the workforce or specialists

Current digital landscape

- Some individual health and social care organisations (e.g., NHS trusts, ICSs, and local authorities) have some form of BI or analytics capability. But this capability is unlikely to exist in adult social care providers or primary care
- There is a trend for these capabilities to be established at the regional cluster level
- Organisations face significant competition to attract the right talent as these specialist skills are becoming scarce.

Deployment location: Regional

Assumption:

We've assumed that we can use data from existing digital strategies and plans. These are mainly revenue costs. We reduced costs to unit costs for the actual regional clusters, before using regional clusters as a scaling factor to get UK-wide estimates.

Phasing: We used a similar custom phasing as for the population health platform cost item (<u>8.1</u>) because BI and analytics falls into establishing population health platforms more broadly. However, there were clearer recurrent and non-recurrent costs identified for this cost item, and almost no capital costs. All these costs were clearly separated from population health platform costs in the plans we reviewed.

8.3. Decision support tools

ScalingWorkforceOptimismMediumfactor:bias:confidence	Data and judgement:Existing cost data and published information
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Cost item definition:

This item covers a variety of decision tools, including resource management tools (for workforces, beds, theatres, etc.), patient analytics and digital decision-making tools (such as patient flows), and clinical decision support systems (e.g., image clustering).

Technology advancements such as AI and automation will significantly increase the use cases and potential for this item.

This item covers the investment required for:

- Developing technology and integrating it with existing systems and data infrastructure
- Providing training and education to use the tools
- Implementing security measures for the tools
- Facilitating continuous improvement and user support.

Current digital landscape:

The Frontline Digitisation Programme is supporting NHS England trusts to reach a core level of digitisation. The requirements of the Digital Capabilities Framework include clinical decision support systems. Some EPR/EHR systems also include basic decision support functionality.

Deployment location: Local

Assumptions:

We've assumed that:

- We can use the decision support solution costs in the NHS Digital Buying Catalogue for our estimates. This includes solutions such as Accurx Patient Triage and OneContact triage, which cost £0.25 per patient and £0.3 per patient, respectively. To extrapolate these costs for the local scale, we multiplied the per patient costs by the population of each regional clusters. To get a per-worker cost, we then divided by the number of workers across the regional clusters. And we finally extrapolated to get a UK-wide estimate by using the UK nations' workforces as the scaling factor
- Costs are revenue costs only because these solutions have extremely short implementation times
- Costs for related systems on which this technology depends, such as Asset and resource management and EPMA, are included in their cost items (<u>9.2</u> and <u>2.4</u> respectively)
- There's a risk that the items in this spend area are wider, and in fact, many are at different stages of digitisation and maturity.

Phasing: We've used the <u>default phasing</u> because of the uncertainties noted in the assumptions above. It's also highly likely that it will be possible to capitalise a significant part of the costs for this item.

Cost theme 9: Corporate IT

Overall ambition statement:

Across health and social care in the UK, there is an ambition to find efficiencies and productivity savings by adopting digital solutions and technologies.

A key ambition is to promote the use of systems and tools that allow staff to move seamlessly across a regional cluster. This means staff from different organisations can work flexibly – including remotely, where appropriate – and collaborate effectively, regardless of the organisation they work for or the location they work from.

This theme covers investment in digital solutions and technologies for collaboration, and ways to better manage services across regional clusters. It has three cost items:

9.1. Corporate service optimisation

Scaling	Number of	Optimism	Low	Data and	Published information and
factor:	regional clusters	bias:	confidence	judgement:	professional judgement

Cost item definition:

This item covers optimising internal business functions (HR, Finance, etc.) as part of a digitisation strategy, particularly as part of general Covid-19 recovery initiatives and to achieve productivity savings.

This item covers investments required for:

- Technology infrastructure, process improvement, data analytics, and supply chain management
- Training and development on service optimisation
- Ongoing support and continuous monitoring and evaluation
- Change management and HR optimisation
- Cybersecurity measures and regulatory compliance.

Current digital landscape:

- Various projects have been or are being commissioned to reduce costs. These often focus on optimising operations in organisations' current states
- There are also calls to use technology to optimise efficiency across corporate services, including using shared corporate functions and automation. Adopting digital technologies is recognised as a key enabler or accelerator to do this, but they are often not adopted.

Deployment location: Local

Assumptions:

We've assumed that:

- We can use data from existing digital strategies and plans that outline an initiative to improve the digital functionality, and by extension the sustainability, of internal business services for our estimates. We then used the regional population within each home nation as a scaling factor to calculate a UK-wide estimate
- It's more difficult to separate and identify cost information for corporate services, because
 optimisation initiatives are delivered organisation-wide, rather than for specific business functions.

Phasing: We've used the <u>default phasing</u>.

9.2. Asset and resource management

Scaling factor:	Number of regional clusters	Optimism bias:	Low confidence	Data and judgement:	Published information and professional judgement
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Cost item definition

This item covers systems and solutions designed to track, manage, and optimise assets and resources, including patients. Example capabilities include tracking patients in real time, monitoring patients' allergies in hospitals (e.g., through the use of barcode wristbands), and managing the locations and utilisation of staff, facilities, and other resources such as beds and theatres.

This item covers the investment required for scheduling, rostering, and resource management solutions, including for:

- Designing and implementing solutions
- Driving change and training to use the solutions
- Facilitating ongoing operational support and maintenance for the solutions.

Current digital landscape:

- The Frontline Digitisation Programme is supporting NHS England Trusts to reach a core level of digitisation. One of the requirements of the Digital Capabilities Framework is capabilities for asset and resource management
- Typically, trusts in the NHS in England still rely on whiteboards and spreadsheets for asset and resource management. We have assumed that this is also true for the other home nations

 Digital solutions require various technologies, such as electronic tagging, sensor technologies, and geolocating solutions. They also require a minimum level of digitisation, including connectivity and a network to track assets and resources.

Deployment location: Local

Assumptions:

We've assumed that:

- Data and information about this cost item is limited
- There are a wide range of technologies available, and technologies are advancing rapidly, meaning solutions recently deployed may already be outdated and need replacing
- The technologies in this cost item are linked to corporate optimisations, so we've assumed that the costs for these items are half of the Corporate service optimisation costs (cost item 9.1)
- The foundational technologies on which asset and resource management are built, are covered in other cost items, so we've excluded these costs from this item.

Phasing: We've used the default phasing.

9.3. Collaboration platforms

Scaling factor:WorkforceOptimism bias:High confidenceData and judgement:	Existing cost data and published information
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Cost item definition:

This item covers collaboration platforms and tools for multi-disciplinary care planning (e.g., Microsoft Teams, SharePoint, and digital whiteboards) that enable health and social care professionals to collaborate effectively, regardless of the organisation they belong to or their location.

This item covers investments required for:

- Configuring or improving existing systems to enable collaboration across organisations
- Operating and maintaining these platforms.

Current digital landscape:

- Health organisations mainly use Microsoft platforms, and these can be configured to allow collaboration across NHS organisations. The Microsoft contract is managed nationally
- Collaboration across adult social care and NHS organisations is more challenging. Currently, only
 email or paper communication is possible. The main barriers to this are information governance and
 data-sharing challenges, as well as technical challenges related to technology setup or configuration.

Deployment location: Local

Assumptions:

We've assumed that:

- We can use existing digital strategies and plans and divide by the population of regions. This gave us a unit cost of £10.50 per user of capital costs and £5.71 of revenue costs. We then extrapolated these costs by using workforce as the scaling factor
- Notable collaboration platforms such as Microsoft 365 and Slack range in cost from £0 to £6 per user, based on our research. This supports the validity of the costs in the plans
- The revenue costs for this item are recurring licence-based costs.

Phasing: We expect all costs to be recurrent revenue costs.

Cost theme 10: National platforms and programmes

Overall ambition statement:

Across health and social care in the UK, there is an ambition to achieve a consistent level of digitisation, and to maintain the standards for safe and secure care set out in the Digital Technology Assessment Criteria for health and social care.

The national NHS bodies have initiated various initiatives to ensure these standards are met, and to accelerate digitisation. A centralised approach to digitisation is more common in Scotland and Wales than in England and Northern Ireland.

This theme covers the investment in these initiatives. It has six cost items:

10.1. NHS digital cyber services

Scaling National	Optimism	Medium	Data and	Existing cost data and
	Dias.	connuence	juugement.	published information

Cost item definition:

The National Cyber Security Programme ensures that security measures are in place to protect NHS digital assets and services, including those commissioned by NHS England. This item covers this service, including the cost of routinely reviewing system-wide security, sustainability, and resilience of NHS assets and services.

This item covers the investment required for:

- Ongoing operations
- Cybersecurity technologies, endpoint security, and network security
- Security training and awareness, incident response and recovery, and cybersecurity staffing
- Ongoing maintenance and support
- Data encryption, continuous monitoring, third-party security, and regulatory compliance.

Current digital landscape:

- NHS England has included Digital Cyber Services as a dimension in its *What Good Looks Like* framework, which sets out minimum requirements and expectations
- NHS organisations often regard cybersecurity services as an 'assurance' and extra work for 'compliance' rather than support
- Individual NHS organisations in England have established their own cybersecurity capabilities, which must all comply with NHS England's Data Security and Protection Toolkit
- Increasing digitisation is increasing the demand for this capability and expertise, making it more difficult to attract the right resources. This incentivises NHS organisations to work together and share these capabilities across regional clusters.

Deployment location: National

Assumptions:

We've assumed that:

- We can use past NHS national cyber improvement engagements to estimate costs. This provided a cost estimate of £30 million across the UK. We tested this estimate against NHS Digital's funding for the maintenance of cyber and digital functionality, which totalled roughly £30 million in FY22/23
- Based upon our professional experience, maintenance and support for systems and tools will cost a further 20 percent of revenue costs
- We don't need a scaling factor because these estimates are already at UK-wide level.

Phasing: We expect all costs for this item to be recurrent revenue costs.

10.2. NHS App

factor: bias: confidence judgement: published information	Scaling National factor:	Optimism bias:	Medium confidence	Data and judgement:	Existing cost data and published information
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Cost item definition:

This item covers the NHS App, which allows patients to book GP appointments, order repeat prescriptions, and access their GP health record. There is an ambition to use national tools and services, including the NHS website, NHS login, and NHS App, supplemented by complementary local digital services to provide a consistent and coherent user experience.

In England, the target was for 75 percent of adults to be registered on the NHS App and NHS website by March 2024⁸².

This item covers investments required for:

- Further development and enhancements to the NHS App •
- Ongoing support and operations or maintenance for the app .
- Data compliance. •

Current digital landscape:

The NHS App gained a lot of traction during the height of the Covid-19 pandemic, changing the way people access healthcare. NHS England wants to build on this momentum to get more people to sign up for the app. To help achieve this goal, it has set out a plan of further improvements and enhancements to the app.

NHS organisations, especially regional clusters, are considering whether they should build on this and offer specific local digital services using the NHS App. However, some organisations are building their own apps because an NHS-branded app may not be suitable for offering NHS services alongside services from adult social care and private health and care providers.

Deployment location: National

Assumption:

We've assumed that we can base costs for this item on the four-year £52.4 million NHS App contract awarded to IBM in September 2022⁸³. To cover all four nations and account for contract and service management, we've extrapolated this cost by time, across the nations and with a nominal support cost uplift to £404 million across the five-year time period.

Phasing: We've assumed that this cost item has only an annually recurring revenue cost.

Scaling National	Optimism	Medium	Data and	Existing cost data and
factor:	bias:	confidence	judgement:	published information

10.3. NHS e-Referral Service

Cost item definition:

This item covers the NHS e-Referral Service (formerly known as Choose and Book). This provides an easy way for patients to choose their first hospital or clinic appointment with a specialist. They can book online, by phone, or directly in the GP surgery at the time of the referral.

The ambition was to increase NHS England providers' digital maturity so that as many as possible met the minimum capability standard for digitisation by March 2025.

This item is part of the wider ambition to empower patients to manage their own health including through the NHS App, self-referral pathways, and by accessing more services via community pharmacies.

This item covers investments required for:

- Existing clinical care systems (via API integration) .
- Ongoing support and maintenance for the service

⁸² Source: https://www.england.nhs.uk/long-read/nhs-app/

⁸³ Source: https://www.digitalhealth.net/2022/09/1-7bn-nhs-contract-integrated-workforce-solution/

- Online training and knowledge bases to support the service
- Data compliance.

Current digital landscape:

- Since 1 October 2018, NHS providers have been reimbursed solely for activities stemming from referrals made via the e-Referral Service (e.g., GP referrals to NHS acute consultant-led first outpatient appointments)
- No data or reports on the uptake of the e-Referral Service have been published since 2018, when there was a 52 percent utilisation rate. But anecdotal evidence suggests organisations are still using other systems or paper processes
- Existing clinical and care systems can be connected to the service via an API. This is the expected minimum investment for providers, and online training and a knowledge base is available.

Deployment location: National

Assumptions:

We've assumed that:

- This service requires no immediate significant investment because e-Referral Services already exist across the NHS. This means we've assumed that this cost item's value is zero
- More minor investments into upgrades are likely being made (e.g. to log-on processes), based on our research, but these are not incremental upgrades
- Large upgrades and maintenance for this item either haven't happened yet, or, if they have, this isn't publicly known, so no data is available.

Phasing: Because this cost item is zero, we haven't used any phasing for it.

10.4. Electronic Prescription Service

Scaling National	Optimism	Medium	Data and	Existing cost data and
factor:	bias:	confidence	judgement:	published information

Cost item definition:

This item covers the prescribing service for primary care in England, the Electronic Prescription Service (EPS). The EPS started life in 2005 and is used by both GPs and pharmacies. This item covers the national activities for the EPS.

Individual organisations may also require some business change, but this is covered in the cost item for EPMA (2.4).

The ambition is to modernise and streamline the process of prescribing and dispensing medications through the EPS.

This item covers investments required for:

- Technology infrastructure, software development, and interoperability
- Training and education for staff and patients, and change management
- Security measures, user support services, and continuous improvement
- Integrating the EPS with EHRs.

Current digital landscape

- Adoption by GPs is higher than pharmacies because it is written into their contracts to use the EPS
- Pharmacies receive funding to connect to Spine to download prescriptions, but slow download speeds discourage them from using it
- According to NHS England, 95 percent of all prescriptions in primary care are done using the EPS
- An EPS for secondary care is being rolled out, but this does not connect to or update GP records.

Deployment location: National

Assumption:

Because the EPS already exists, we've assumed it needs no further investment, so **we've assumed** that this cost item's value is zero.

Phasing: Because this cost item is zero, we haven't used any phasing for it.

10.5. NHS web

Scaling National	Optimism	Medium	Data and	Existing cost data and
factor:	bias:	confidence	judgement:	published information

Cost item definition:

This item covers the NHS website, a central source of a range of patient services and health information or advice. This includes A-to-Z medical condition information, primary care access and sign up, prescription orders, a service locator, and more.

The ambition is to ensure there's a system-wide approach to the use of digital communication tools and national tools and services to provide patients and service users with appropriate advice and guidance, including the NHS website.

This item covers investments required for:

- Web development, security infrastructure, and interoperability
- User training, continuous improvement, and support.

Deployment location: National

Assumptions:

- We can use historical contracts awarded for improvements to the NHS website, such as the £200,000 contract awarded to Dextrous Web in November 2017, to estimate costs
- The split for this estimate should be 60 percent capital costs, given that this item relates mainly to upgrades (and implementation of those upgrades) and 40 percent revenue costs, to cover activities such as maintenance and running costs. We tested these assumptions with PA subject matter experts with experience of upgrading websites.

Phasing: There is no phasing for this cost because the additional costs are small, and the NHS web estate is already well established.

10.6. Federated Data Platform

Scaling National	Optimism	High	Data and	Existing cost data and
factor:	bias:	confidence	judgement:	published information

Cost item definition:

This item covers the Federated Data Platform, which is being developed and implemented by NHS England. The platform provides population health management capability (<u>cost item 8.1</u>) for NHS trusts and ICSs in England.

The ambition is for the NHS to be able to carry out population segmentation, risk stratification, and population health management by analysing health data and identifying high-risk populations. Then it can implement targeted interventions to improve overall health outcomes in the UK.

This item covers investments required for:

- Managing and running the platform
- Implementing the platform at the local and regional levels
- Training people to use the platform.

We've excluded the costs for individual NHS organisations to integrate their local systems with the platform from this item. These costs are included in the BI and analytics capability cost item ($\underline{8.2}$).

Current digital landscape:

Two procurements have been issued: one to develop and build the platform (awarded to Palantir and its consortium), and one to provide client-side support with delivery.

Deployment location: National

Assumptions:

We've assumed that:

- We can use the capital component of the costs for this item from the £330 million Federated Data Platform contract awarded to Palantir for our estimates
- Maintenance for the platform will cost £35 million of annual revenue. This assumption was based on our professional judgement.

Phasing: The phasing for capital revenue is based on contract length, split equally. Revenue costs ramp up over the life of the contract and become fully recurrent by contract end.

Cost theme 11: Digital leadership and governance

Overall ambition statement:

Across health and social care in the UK, there is an ambition to improve digital and data leadership expertise.

There is a desire for strong, high-level accountability for digital transformation, which will be achieved by appointing a Chief Information Officer or Chief Clinical Information Officer to the NHS board, and developing a single, coherent, ICS-wide strategy for citizen engagement and citizen-facing digital services. This strategy will be led by and co-designed with citizens through a connected digital inclusion strategy, which aims to allow digitally disempowered communities to better access and take advantage of digital opportunities.

This theme covers investment in digital strategy, leadership, and governance. It has two cost items:

11.1. Digital leadership

Scaling factor:Number of regional clustersOptimism bias:High confidenceData and judgement:Existing cost data and published information	
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Cost item definition:

This item covers the cost of making sure that there are mechanisms in place to manage and govern the digital solutions being created.

This item covers investments for:

- Board-level digital governance workshops, regular reporting, and accountability
- Researching benchmarking and best practice
- Regular governance reviews of digital strategies, plans, and risks.

Current digital landscape:

- Regional clusters are leading activities in this area. They need to establish digital leadership to drive the digital agenda.
- Regional clusters often establish programme management offices (PMOs) to manage their regional portfolios of programmes, and develop or source capabilities to support these, e.g., digital and technical skills or programme managers.

Deployment location: Regional

Assumptions:

We've assumed that:

 We can use data in existing digital strategies and plans that include initiatives for PMO resources to govern and lead digitisation programmes for our estimates

- Each ICS will require PMO capability for digitisation, so we've used regional clusters as the scaling factor for calculating unit costs and extrapolation. To get a unit cost, we added the total costs together then divided by the number of regional clusters. We then multiplied costs across each home nation using the number of regional clusters in that nation
- We could validate our estimates by speaking to a source. Our source suggested £1.75 million has been committed nationally to invest in digital PMO leadership.

Phasing: To begin with, costs will mainly be revenue costs, and they will quickly ramp up to be 100 percent of costs. We also identified ICS-related capital costs for development that might be capitalisable here, but **this amount was not material, so we've excluded it from our final figures for this cost theme**.

11.2. Digital strategies development

Scaling	Number of	Optimism	High	Data and	Existing cost data and
factor:	regional clusters	bias:	confidence	judgement:	published information

Cost item definition:

This item covers developing digital strategies in the NHS. We've assumed that regional clusters will commission this work. Individual care homes won't have the funding or need. Local authorities will lead these efforts as part of ICBs.

This item covers investments required for:

- Digital strategy and transformation plans
- Cyber security strategies
- Technology strategies
- Procurement strategies
- Digital inclusion strategies
- Net zero and sustainability strategies
- Ongoing support and maintenance to update these plans and strategies.

Current digital landscape:

Generally, regional clusters create these strategies for their regions. Some individual organisations also develop their own strategies. However, **this cost item covers only the cost of ICS-driven strategy development**.

Deployment location: Regional

Assumptions:

We've assumed that:

- Developing a digital strategy will cost £150,000 of revenue costs for each strategy. This assumption
 is based on our professional judgement and experience of designing and implementing these types
 of strategies
- Each regional cluster will require at least one discrete digital strategy. We've extrapolated UK-wide costs by using the number of regional clusters as a scaling factor, which provided us with a perstrategy unit cost
- We can validate the £11.1 million cost for all nations calculated by our model by comparing this with the costs in NHS England's Digital Productivity Fund investment for digital transformation strategies, technology strategies, and digital inclusion and upskilling. The costs in the fund were £12 million.

Phasing: We have assumed that all health and care organisations will need to develop digital strategies to reflect the evolving nature of the sector, and to respond to guidance from the centre – particularly the need for digital initiatives that can find productivity savings. The cost of developing the strategy may be phased partially but is primarily considered a one-off activity in most instances.

Cost theme 12: Safe practice and cybersecurity

Overall ambition statement:

Across health and social care in the UK, there is an ambition for digital services and technologies to be safe and secure to use. This requires comprehensive cybersecurity capability, including:

- Management platforms, a framework for regular security audits, and compliance monitoring tools
- Safety standards, such as those set out in the NHS's Digital Technology Assessment Criteria, DCB0129, and DCB0160
- Adequately skilled cybersecurity staff (e.g., senior information risk owners and data protection officers), and an adequately resourced clinical safety function, including a named Chief Security Officer, to oversee system-wide digital and data development and deployment
- A security information and event management system
- Centralised threat intelligence platforms and a clear, system-wide process for reviewing and responding to safety recommendations and alerts, including from NHS Digital (cyber), NHS England, the Medicines and Healthcare products Regulatory Agency (MHRA), and the Healthcare Service Investigation Branch
- Advanced cybersecurity tools.

This cost theme covers investment in this cybersecurity capability. It has four cost items:

12.1. Clinical safety incident management solution

Scaling	Number of	Optimism N/A	Data and	Existing cost data and
factor:	organisations	bias:	judgement:	published information

Cost item definition:

This item covers clinical safety incident management solutions such as Datix. These are risk management systems that gather information on processes and errors to identify potential hazards and provide suitable mitigations for the associated risks.

This item covers investments required for:

- Developing and implementing a digital incident management solution. We expect this to be an offthe-shelf system which will need to be configured to meet organisational needs, rather than a bespoke one
- Continuous improvement and support or maintenance for the solution
- User training and support to use the solution
- Change management to ensure the solution is integrated with health and social care services.

Current digital landscape:

- Most NHS trusts have a solution in place already, but they may need to be updated or replaced as the NHS becomes increasingly digitised
- Trusts may also need to integrate existing solutions with national alerting systems from NHS England, the MHRA, etc.
- Adult social care providers often report and manage risks using spreadsheets or paper. To enable sharing and collaboration, these should be replaced with digital solutions, which will require investment.

Deployment location: Local

Assumption:

We've assumed that clinical safety incident management solutions are already well established across the NHS. This was validated by our review of existing costed digital transformation plans, which had no requirements for this item. So **this cost item's value is zero**.

Phasing: Because this cost item is zero, we haven't used any phasing for it.

12.2. Cybersecurity management tools and solutions

Scaling	Number of	Optimism	High	Data and	Existing cost data and
factor:	organisations	bias:	confidence	judgement:	published information

Cost item definition:

This item covers developing and establishing cybersecurity capabilities, including cybersecurity management solutions. This includes cybersecurity software, regular security assessments and audits, and technologies such as threat or intrusion detection systems, firewalls, and encryption tools.

This item covers investments required for:

- Procuring and deploying these tools
- Training the workforce to use these tools, including security awareness training
- · Ongoing support and management for the tools
- Firewalls and network security, endpoint protection, and data encryption
- Identity and access management, security information and event management, and incident response and recovery.

Current digital landscape:

Individual organisations will have in-house tools, however they may not be sufficient in the face of technological advancements and increasing digitisation. Organisations may need to invest to upgrade or replace existing solutions.

Organisations moving to the cloud also need to invest in this item, but it's often included as part of a cloud managed service.

Deployment location: Local

Assumptions:

We've assumed that:

- We can use existing digital strategies and plans and look at components including cybersecurity infrastructure assessments and procurements of medical device cybersecurity software
- We can validate and test our cost estimates by researching other costing data. We found costs of £1,300–£3,000 for a GP practice, which we judged as being within the same order of magnitude as the unit cost we estimated from the plans
- We can calculate unit costs by dividing the existing plans' data costs by the number of organisations (including primary care) within the regional clusters. This gives a broad per organisation unit cost, accepting that different-sized organisations likely have a range of costs. We then used the number of organisations across each UK nation as the scaling factor to get the final cost estimates.

Phasing: We used custom phasing and have sourced costs per annum. We expect 100 percent of these costs to be revenue costs.

12.3. Cybersecurity and digital trust capability

Scaling	Number of	Optimism	Medium	Data and	Existing cost data and
lacior.	Tegional clusters	DIa5.	connuence	juugement.	published information

Cost item definition:

This item covers establishing and developing cybersecurity capabilities in health and social care, including a workforce and specialists with the required skills and expertise.

This item covers investments required for:

- Recruiting specialists
- Training the workforce
- Developing career frameworks

- Ongoing support and maintenance for the capabilities
- Security and data compliance.

Current digital landscape:

- English NHS organisations often have in-house capabilities because they need to comply with NHS England's guidelines and standards, including the Data Security Protection Toolkit. NHS England's What Good Looks Like framework also includes a dimension with expectations for cybersecurity, 'Safe Practice'
- Within local authorities, adult social care providers also have in-house capabilities. But across adult social care more broadly, providers have varying degrees of expertise in this area, and some possibly have no capabilities in this area
- There's a push to consolidate this expertise within regional clusters and for NHS and adult social care services to share their capabilities and expertise.

Deployment location: Regional

Assumption:

We've assumed we can use our experience of sizing an internal cybersecurity team for a regional cluster, using NHS resource bands, to estimate costs. This included: one Band 9 FTE, one Band 8c FTE, two Band 8b FTEs, four Band 7 FTEs, and four Band 6 FTEs. This came to around £700,000.

Phasing: We have assumed costs are 100 percent annual revenue costs. This for a cybersecurity team at the ICS level, although practically this item will likely draw on trusts' expertise in the longer term.

12.4. Clinical safety and cybersecurity workforce training

Scaling Workforce	Optimism	High	Data and	Existing cost data and
factor:	bias:	confidence	judgement:	published information

Cost item definition:

This item covers training the workforce, so they're aware of their clinical safety and cybersecurity duties. This item covers investments required for:

- Training
- Clinical safety and cybersecurity awareness campaigns
- Regular refreshers.

Current digital landscape:

- NHS and local authority workforces are required to complete minimum training on safety and cybersecurity. However, further investment and effort is required to increase awareness, especially as integration and working across organisations increases
- Private adult social care providers may not offer similar training.

Deployment location: Regional

Assumptions:

We've assumed that:

- We use costed digital transformation plans for regional clusters to estimate costs
- Many related costs for this item are not represented in the Training/Upskilling in digital literacy cost item (7.2). However specific details on cyber awareness and training were highlighted in several plans and were noted to have a relatively low cost. We added these up and calculated the average cost per employee from the total
- This type of cybersecurity training is distinct from broader digital skills and awareness training, so we've included the costs for it in our estimates.

Phasing: Set to 20 percent for recurrent revenue costs only. To be in line with ICS plan forecast period.

Cost theme 13: Sustainability and net zero

Overall ambition statement:

Across health and social care in the UK, there is an ambition to make progress towards the net zero carbon, sustainability, and resilience ambitions set out by the UK government in its Net Zero Strategy (Build Back Greener)⁸⁴.

The national health bodies in each home nation have also developed their own net zero and sustainability strategies:

- NHS England has set targets for reaching net zero by 2040 for emissions they control directly, and . reaching net zero by 2045 for emissions they can influence⁸⁵
- NHS Scotland has outlined actions and some targets across five main themes⁸⁶ .
- NHS Wales has set out 46 initiatives and targets for decarbonisation, which will be assessed and reviewed in 2025 and 2030⁸⁷. Social Care Wales has set a separate target to be net zero by 2030⁸⁸
- NHS Northern Ireland has also set targets for health organisations and their supply chain⁸⁹.

This theme covers investment in digital sustainability initiatives and solutions. It has two cost items:

13.1. Sustainability initiatives for existing systems

Scaling factor:	Number of organisations	Optimism bias:	Low confidence	Data and judgement:	Existing cost data and published information
	0				I

Cost item definition:

This item covers strategies and practices to ensure the continued efficiency, relevance, and environmental responsibility of current health and social care information systems and processes. It includes factors such as conserving resources conservation, ensuring cost-effectiveness, and minimising environmental impact.

This item includes investments to make existing digital systems more sustainable, and to ensure any new digital technologies are helping meet net zero targets, including:

- Switching from legacy systems to new technologies (e.g., cloud hosting instead of on-premises and using more energy-efficient digital platforms)
- Upgrading legacy systems (e.g., to use more energy-efficient screens or computing) .
- Introducing sustainable technologies to run legacy systems (e.g., automatically switching devices off • when not in use, and using smart plugs)
- Finding ways to increase energy efficiency and optimise systems •
- Driving waste reduction, paperless strategies, and remote work infrastructure .
- Facilitating environmental impact assessments, green procurement policies, and data centre . efficiency
- Setting up eco-friendly technology infrastructure, renewable energy resources, and energy-efficient • technologies
- Encouraging digital transformation initiatives, such as using waste heat from on-premises data centres to heat local swimming pools.

Current digital landscape:

The UK government and national bodies in each home nation have published national plans for net zero and sustainability

⁸⁴ Source: <u>https://commonslibrary.parliament.uk/research-briefings/cdp-2023-0124/</u>

⁸⁵ Source: https://www.england.nhs.uk/greenernhs/a-net-zero-nhs/

⁸⁶ Source: https://www.gov.scot/publications/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/

⁸⁷ Source: https://www.gov.wales/sites/default/files/publications/2021-03/nhs-wales-decarbonisation-strategic-delivery-plan.pdf

⁸⁸ Source: https://socialcare.wales/about-us/our-outcomes/our-commitment-to-becoming-carbon-net-zero-by-2030/our-2030-net-zero-carbonaction-plan ⁸⁹ Source: https://healthcareleadernews.com/news/nhs-pledges-to-have-net-zero-climate-impact-by-2045/

- Each NHS organisation must publish an action plan explaining how it will meet these national targets. This is organised by the regional clusters. For example, in England, all 42 ICSs have developed a sustainability strategy⁹⁰
- Local authorities are expected to develop similar strategies, including in social care (although there are no specific requirements set for social care to develop strategies)
- Around 80 percent of local authorities have set targets of achieving net zero before 2050, but many do not have a clear plan to achieve this⁹¹.

Deployment location: Regional

Assumptions:

We've assumed that:

- Switching off legacy systems where new technologies have been implemented is covered by other technology platform-related cost items such as Data centres, (cloud) hosting and storage (<u>1.4</u>)
- We can use the UK government's £280 million sustainable infrastructure investment in NHS England, made in December 2021, to estimate costs. We will adjust this figure for inflation in our model using UK CPI core at a 6.5 percent time-weighted average since the end of 2021
- Investment will be required for all NHS organisations, so we've used total organisations as the scaling factor
- Smaller organisations will require considerably less investment than large trusts, so we've applied a 30 percent discount to the NHS England investment
- Because the investment is for England only, we've divided costs by the total number of organisations across the entirety of NHS England to get per-unit costs. And we've extrapolated to get a UK-wide estimate by using the total number of NHS organisations across all UK nations.

Phasing: We've used the <u>default phasing</u>.

13.2. Digital-enabled sustainability solutions

Scaling	Number of	Optimism	Low	Data and	Existing cost data and
factor:	organisations	bias:	confidence	judgement:	published information

Cost item definition:

This item covers digital technologies and solutions that enable NHS and social care organisations to meet their net zero and sustainability targets. For example, smart sensor technologies that can switch off lights and equipment if they're not in use, and digital twin technologies that can model buildings to find ways to decrease energy use.

This item covers investments required for:

- Developing and adopting digital solutions that enable more sustainable approaches to provide health and social care, such as telehealth and remote monitoring, and virtual consultation which will lower travel requirements and carbon footprints
- Implementing digital solutions and user training to enable staff to work from home, where feasible.

Current digital landscape:

- There are some pockets of good practice in the NHS and local authorities. For example, they've made it easier to work from home, which has reduced carbon footprints
- Costing these initiatives is speculative, and some initiatives are still very experimental
- Information and knowledge on building and operating a smart building is growing thanks to the NHS New Hospital Programme in England. All schemes within the programme need to demonstrate their sustainability and net zero credentials.

Deployment location: Local

⁹⁰ Source: <u>https://www.health.org.uk/publications/long-reads/net-zero-care-what-will-it-take</u>

⁹¹ Source: https://es.catapult.org.uk/work-with-us/local-authorities/

Assumptions:

We've assumed that:

- Trusts aim to pursue this item in the future, as there are currently only nebulous programmes that aim to explore forward-thinking, digital-enabled sustainability solutions
- Although these programmes are likely to be valuable in the future, it's currently difficult to quantify their costs and net benefits more broadly. Because little credible costing data currently exists for them, we have assumed the value of this cost item is zero.

Phasing: We've used the <u>default phasing</u>.

Cost theme 14: Other

Overall ambition statement:

Across health and social care in the UK, there is an ambition to invest in research and innovation to adopt new and emerging technologies and further digitise the NHS and social care.

To improve outcomes for patients, service users, and workforces, and achieve the expected productivity and efficiency savings, digitisation and technology must drive transformative change in health and social care.

This theme focuses on investment in digital research and innovation and includes one cost item:

14.1. Research and innovation – emerging technology

Scaling	Number of	Optimism	Low	Data and	Existing cost data and
factor:	regional clusters	bias:	confidence	judgement:	published information

Cost item definition:

This item covers the research and innovation necessary to develop and implement new technologies to enhance health and social care delivery, improve outcomes for patients, service users, and workforces, and address challenges across the health and social care sector as a whole.

This item covers investments required for:

- Research and innovation to digitise health and care, e.g., exploring the potential of emerging technologies such as generative AI and genomics
- Adopting new and emerging technologies
- Educational training programmes
- Pilot implementations and potentially full-scale roll-outs
- Collaborative partnerships, including with the private sector
- Continuous horizon-scanning, monitoring, and evaluation of new technologies.

Current digital landscape:

- The UK government and national bodies within each home nation have set up additional funding such as tech and innovation funds to incentivise research and innovation
- Investment and initiatives are also often driven by private sector organisations
- The NHS and social care have some catching up to do, as existing technologies such as cloud hosting and virtualisation have not been adopted widely
- Regional clusters are tasked with developing technology and innovation strategies to manage this for their regions.

Deployment location: Regional

Assumptions:

We've assumed that:

- This item accounts for the costs required to support new technology throughout the R&D lifecycle. Quantifying these costs is inherently challenging due to the unpredictability of future technology. Accordingly, we've used a low optimism bias
- For our estimates, we used the costs outlined in the digital plans of ICSs' for investments in innovation hubs and funds set aside for future R&D (or general contingency). We divided these costs by the number of regional clusters across the ICSs to determine a per-unit cost, which was then extrapolated across the UK nations using the regional clusters as the scaling factor.

Phasing: We've used the <u>default phasing</u>.



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