Digital and technology

This section provides an overview of the digital and technology requirements to build the People Story Dashboard, in addition to considerations made in developing it and its evolution through versions.

Tools and platforms

The dashboard was built using a combination of tools for data visualisation, analysis and storage. Each played a specific role in managing large datasets and creating custom visuals.

- **Power BI** – this was the primary platform for dashboard development and visualisation.
- **Python** – used for data cleansing, transformation, and custom map creation.
- **Excel** – used for review of manually downloaded files in .xlsx or .csv format when application programming interface (API) calls (a request by one software application to another to access its functions or data) or other automated methods are unavailable.
- **SharePoint** – for data storage and integration with Power BI.

Data sources

The project began without consolidated data, requiring phased sourcing from multiple organisations and locations.

- **NHS electronic staff records (ESR)** – five local trusts entered a formal data-sharing agreement with the HNY ICB, allowing them to receive regular ESR system extracts in the form of standardised Excel spreadsheets containing trust workforce data.
- **Capacity Tracker for social care data** – Capacity Tracker, a web-based, data-capture and insight platform created by North of England Care System Support in partnership with NHS England, was used to source social care data relating to care homes.
- **Office for National Statistics (ONS) for population data** – ONS provided a significant quantity of publicly available population data for the dashboard.
- **Skills for Care and local authorities for workforce and adult social care data** – some social care data was sourced from Skills for Care's Adult Social Care Workforce Data Set (ASC-WDS), with additional data provided by local authorities.
- **Freedom of information (FOI) requests used to fill gaps in unavailable datasets** – where data was unavailable but potentially accessible via FOI requests, the HNY ICB made the necessary requests for access.
- **Internal BI systems** – data on acute activity and health indicators from primary care was sourced from internal data sources held by the business intelligence function of the HNY ICB via its open analytics models.

Versions and development

Multiple issues were raised during user testing that have informed development across the lifetime of the dashboard.

- **Version one developed proof of concept at local authority level –** version one focused on the health and care workforce within Humber and North Yorkshire. Population estimates and profile were also included. This initial version was a proof of concept and enabled discussions with stakeholders on what was needed in terms of future developments.
- **Version two enabled public sharing** – the underlying data infrastructure was updated for version two, leading to the deployment of the 'open' link, which enabled those not on NHS.net email to access the dashboard.
- **Version three introduced LSOA granularity and triangulation** – version three introduced a complete redesign to accommodate new insights at LSOA level. LSOAs, as defined by the ONS, comprise between 400 and 1,200 households (1,000 and 3,000 persons), offering a much greater degree of granularity. More data sets added for socioeconomic and population health metrics. A new triangulation page was added that enabled the viewing of workforce alongside population need on a single page. Further data sets added more socioeconomic and population health metrics. A new triangulation page was added, making it possible to view the workforce alongside population need on a single page.
- **Version four redesign and ranking page added** – released in early 2026, version four added data sets for socioeconomic and population health metrics. Redesign improved scalability and simplified page navigation. A new ranking page was added to enable the viewing and ranking of selected metrics for local authorities, neighbourhoods, electoral wards and LSOA.

Ensuring data quality and standardisation

Data quality varied between sources and work was required to cleanse and standardise it before it could be used.

- **ESR data inconsistencies** – ESR data is standardised as it is produced via reporting templates on export. However, many trusts use the ESR system in different ways. This can create datasets that, although they appear similar initially, are different by virtue of the way the trust entered its data.
- **Large public datasets required extensive cleansing** – some of the publicly available data sources, such as ONS data, presented quality challenges due to the size of the datasets. Much of the data consisted of spreadsheets with tens or hundreds of thousands of rows, making them difficult to analyse and cleanse appropriately. Python was necessary to analyse and cleanse this data due to its ability to handle large datasets. Also, some of the publicly available data sets differed in terms of LSOA definitions. Some use 2011 definitions and therefore required mapping as a best fit to the 2021 definitions.

Data privacy, ethics and responsible use

Privacy risks were minimal due to the public availability of most of the data, but appropriate cautions were still taken.

- **Data displayed at LSOA level to prevent identification** – data was anonymised, aggregated and displayed at LSOA level from the source, which prevented it from identifying individuals.
- **Capacity Tracker data required sign-off** – the HNY ICB is working closely with Capacity Tracker to get sign-off, which would enable greater visibility of the data. Until this has been approved, names and postcodes have been removed.
- **Strict adherence to internal information governance policies** – the data was handled in accordance with a strict internal information governance (IG) policy. This policy outlined appropriate processes for storage, protection and usage of sensitive data.

Infrastructure and security

- **Overcoming existing Power BI infrastructure limitations** – one of the primary technical challenges was the existing Power BI infrastructure being 'tied in' to the NHS. This stopped the dashboard from being shared externally as it required the user to have an NHS.net email account to access. A solution was found through collaboration with colleagues, resulting in the creation of an isolated digital space that kept data secure but still allowed the dashboard to be shared externally.

User interface and accessibility

The dashboard was designed for inclusivity with improvements made through consultation with users across the sector.

- **Simplicity** – the interface was built with all abilities in mind. This included ensuring that views present high-level information that is readily apparent upon first glance, while deeper layers allow more detailed analysis with probing.
- **Feedback informed improvements** – feedback from demos with NHS England and Skills for Care informed improvements, such as clearer navigation and colour-blind friendly palettes.
- **Intuitive design philosophy** – the design philosophy drew inspiration from web and app development, as well as video game user interface (UI) principles, to ensure intuitive interaction.

Ongoing maintenance and future development

The dashboard is largely self-sufficient, relying only on regular updates to data sources. There is a roadmap for future developments in the short and long term.

- **Maintaining data sources** – the maintenance that is required for the system to operate is limited to ensuring data remains up to date.
- **Goals and future features** – short-term plans for release include a ranking system for metrics, customised views for specific agendas such as stroke care and economic inactivity, and a headline summary page for quick insights. Key themes will be included on the ranking page, with pre-set metrics for key priorities such as prevention. Headline pages offering quick insights on specific themes are in development. Longer-term ambitions involve predictive modelling and 'what-if?' scenarios using machine learning, requiring collaboration with clinicians, population health experts and academic partners.

Key decisions

- Adopted Power BI as the primary platform for dashboard development and visualisation.
- Selected Python for handling large datasets and creating custom map visualisations not available in Power BI.
- Established formal data-sharing agreements with five NHS trusts to access ESR workforce data.

Key learnings

- Neighbourhood level insights significantly improved usability.
- NHS.net restrictions on Power BI required early engagement with technical teams to enable external sharing.
- With a two-person team, being willing to learn the intricacies of the available technology is important to overcoming challenges.

"Some of the datasets I had to download for the entire country, down to LSOA level… too much to be able to manage within Excel. So, then, I had to do the transformation cleansing work through Python because that was the only thing that was able to handle that much data."

John Holliday-Robinson, Workforce Analyst, Humber and North Yorkshire ICB