



# Advancing analytics and AI in Bristol, North Somerset and South Gloucestershire

Report by Sophie Taysom and John Kellas\*

On 9 July, 47 people came together to discuss data analytics and AI in Bristol City Hall. Hosted by Healthier Together and Bristol Health Partners, the focus was on examining how we can advance analytics in the local context and support the workforce in doing so.



The need for this event was made clear at last November's Bristol Health Partners' event, [AI in health and care: how do we get it right?](#) Coming out of this was an immediate action for Bristol Health Partners to consider how to move forward with a clear focus on building and developing the data analytics workforce. This potentially includes access to training, creating career paths, and creating networks for data analysts; and supporting them to pool their skills and knowledge openly, in public, and collaboratively.

And the timing couldn't have been better with the needs of the data analytics workforce being picked up at the national level with recent reports from [The Health Foundation](#) and the [Royal Society](#).

This work is critical to take full advantage of what data, and big data, has to offer. And this is very much at the forefront of NHS thinking with Simon Stevens calling for the [NHS to be a world leader in artificial intelligence and machine learning within the next 5 years](#). There will be significant funding which will go to areas that can demonstrate sufficient capacity and expertise in applied analytics and AI.

Alongside this report, [a document with helpful resources](#) has been developed. We would welcome your comments and suggested additions to this document.

## The sessions

The day was made up of two parts. The focus of the afternoon was a series of presentations and table discussions with analysts in Healthier Together partner organisations and invited academics. The late afternoon, early evening session, was open to a broad audience of those with an interest in how we can use analytics to support health and care.



### Session 1

Dr Julian Walker, Avon & Wiltshire Mental Health Partnership NHS Trust, Chair of the proceedings, set the scene. Julian is also Chair of the local Digital Health Research and Development Group.

Julian began by discussing the importance of routine clinical data. Drawing on the failures of data sharing that could have potentially saved the life of Victoria Climbié, he stressed the need for data across organisations to be better joined up to provide safer and better services

to high risk individuals. Joining data together is critical not just for individual clinical care, but for delivery and prioritisation across wider populations.

Julian noted that there's a general expectation from the public that data is already joined up across organisations, but that this isn't routinely the case.

Julian then introduced Chris Davies and Dr Richard Wood from the Bristol, North Somerset and South Gloucestershire (BNSSG) Clinical Commissioning Group who discussed how we can advance analytics. They began by addressing the question of: Why do we want to do this? It's because it can add value. For them, advanced data analytics is a means to an end. The purpose of it should be to provide better skills and tools to enable the creation of better answers and solutions.

Chris and Richard then provided some examples of analytics and modelling in practice. First, with support from the Health Foundation, work has been undertaken on pathway capacity modelling, the aim of which is to estimate capacity requirements along patient pathways in a way that is used to support planning. Work has also been done to understand patient surges to A&E. Using data from NHS 111 about the number of calls and crossing this with A&E visits, they identified patterns to be able to predict that A&E would get an increase in the number of patients. Such work is critical for good planning and meeting health needs.

They suggested that in the future, using these sorts of analytics might allow us to predict and potentially offset the occurrence and severity of complex and chronic conditions.

In the Q&A session, they were asked about what they saw as some of the main barriers to the effective use of data analytics. In their view, we don't make the best use of evidence based decision making as many of us are too busy in our day jobs to do so. There are opportunities to work with local academics to address this issue.

Julian then introduced John Macleod GP and Professor of Clinical Epidemiology and Primary Care Director Designate, ARC West, and Jonathan Sterne, Professor of Medical Statistics and Epidemiology and Deputy Director, NIHR Bristol Biomedical Research Centre. For them, the data infrastructure that will be created to support Healthier Together presents enormous applied analytics opportunities. "Applied analytics" means quantitative enquiries based on data to answer questions around how to make health and care services better.

They stressed that there is no meaningful distinction between NHS or local authority analytics projects and "research" and no important difference between the "academic" and "service/commissioning" agendas. For them, this is an unprecedented opportunity for people across the system to work together to help address and solve some of the common challenges such as child poverty and its effect on health.

By way of background, the [National Institute of Health Research's Bristol Biomedical Research NIHR \(BRC\)](#) is a £21m partnership between University Hospitals Bristol NHS Foundation Trust and the University of Bristol. It conducts early stage translational research. There is a theme on informatics which seeks to support local priorities. Another useful resource is the recently announced Applied Research Collaborative West (an evolution of [CLAHRC West](#)). This initiative will have an applied data science theme.

Julian then introduced Michael Hall from the Environment Agency. Michael discussed web-based analytical tools for modelling flood risk and social deprivation inequalities in England. Learning from work across sectors is key, and the web based analytics that the Environment Agency is impressive. This example, as well as giving indications for how analytics works in other sectors, does have a health dimension as flooding is also a public health issue.

The work consisted of overlaying flood risks with property data. This also took into account work that had been undertaken on building flood defences. Interesting here is that the data indicated that flood risk is not significantly linked to social deprivation. The approach focused on using web-based tools to create more interactive reports that could be more readily shared to aid collaboration. In time, these data may be made public to allow others to make use of the information.

And during the break, an Analytics Timeline activity was undertaken with attendees so they could add notes on existing and planned projects and events, and possible roles to be undertaken going forward. A digital version of this timeline is being developed and will be shared in autumn 2019.

## Themed table discussions

Six themes were discussed in the final session of the afternoon. Participants were invited to engage in three of the discussions. Below are some of the outcomes. Where relevant, information concerning resources and so on have been added to the Open Resource: Advancing Analytics and AI in health and care.



## Finding the right questions

In 2015 it was stated by a local social care executive that it had been estimated to be more expensive to come up with the right question(s) for AI than to find the answers. Equally, the potential of AI provides a set of approaches which that have significant differences to the traditional hypothesis driven approach to analytics. Potentially, machine learning helps us find questions in our data.

This table discussion began with a focus on finding the 'who' in who will act. It was seen as key to have the people who will act on the analysis involved at the very beginning. There was a discussion on who would set the 'mandate' for work to proceed. Health and Wellbeing Boards were seen as one route for directing priorities. On a project basis, having a non-technical owner at the right level of seniority was seen as key. Within analytical teams, it was seen as crucial for all skills to be respected.

In terms of a starting point, there was a strong view of the importance of a partnership approach in developing a list of priorities which would then be narrowed down to cross cutting themes. The 'owner' would be that person who will implement.

By way of mandate, it was felt that part of any 'work request', there should be a requirement for a rounded discussion that explores topics. This could then be supported by wider political buy-in. There could also be an underlying principle of 'evidence based decision making.'

## Collaborative tools

On this topic, people felt that a starting point is to have a common aim and vision for a specific area, such as frailty, and then apply the relevant tools including PHM (Population Health Management). Here it would be important to work across organisations - the Sustainability and Transformation Partnership; PHM Steering Group; the Academic Health Science Network; Integrated Care Systems and so on.

However, it should be recognised that there is potential value in tools and related procurement principles that would apply across multiple areas (for example, open source technologies). More discussion and examples of this are available in the [resources document](#).

Key to this would be facilitate working, the sharing of data and outputs, and data platforms. Ensuring enduring and sustainable finance for the infrastructure for this was seen as essential.

Specific tools are referenced in the [Advancing Analytics and AI Open Resource](#). The tools mentioned in this context include:

- [Jupyter notebooks/labs](#): Analytics suite. Supporting open-source software, open-standards, and services for interactive computing across dozens of programming languages.
- [Github](#) / [GitLab](#): GitHub is a development platform where you can host and review code, manage projects, and build software alongside 36 million developers. GitLab is a complete DevOps platform, delivered as a single application. From project planning and source code management to CI/CD, monitoring, and security.
- [QGIS](#): A Free and Open Source Geographic Information System
- [Shiny by RStudio](#): Shiny is an open source R package that provides a web framework for building web applications using R. Shiny helps you turn your analyses into interactive web applications without requiring HTML, CSS, or JavaScript knowledge.

## Principles and Information Governance for a modern age

A number of questions, issues, opportunities and potential actions were identified in these discussions.

A point made was the importance of tackling risk aversion in terms of data; and demystifying what data will be used for.

In terms of information governance, there was a question around does the system need an IG forum? Or could the existing forum be used and remit extended i.e. Connecting Care

Group. It was felt that this is a real opportunity to share and solve problems together and set a precedent with the development and implementation of common policies, processes, and ways of working. It would also enable working across programmes.

Another important aspect of this would be the ability to work through 'sticky' issues with those who have faced them before.

Primary Care networks were considered to be important to this process.

### **Data - what, who, where, why, when**

A key question coming from these discussions was: where to start? In response to this, it was flagged as important to:

- determine and negotiate the question being asked;
- determine if the data is available, and;
- determine why this 'question' is being asked and what we are trying to find out.

In terms of the 'who', this covers a number of people including clinicians and operational leads; data administrators; end users including patients; the Clinical Commissioning Group; regulators and national bodies, and; analysts themselves.

There was a view that mandates will come from different places depending on the specifics of projects. Additionally, it's worth noting that there are data sources and types beyond those conventionally recognised which could be significant for advancing analytics.

### **Training and support for analysts**

What became clear from the discussions is that responsibility for encouraging and supporting training and professional development for analysts needs to begin at the organisational level. A key to this is for senior managers and line managers to recognise its importance. Thus it needs to start with leadership. Furthermore, there are real opportunities for collaborative training across health and social care to encourage more partnership working.

Underlying this, there's a need for analysts to have the time, and the financial support to undertake the training.

In terms of mandate, the view was it would come from

- those that need the training;
- Board level support;
- informal networks;
- Professional bodies - [Association of Professional Healthcare Analysts \(AphA\)](#) - A membership organisation that aims to raise the profile of healthcare analysts and provide a professional support network, and;
- local and peer groups.

The point was made that much analytical training is generic and too broad to meet requirements. However, there were some specific training opportunities mentioned including

that provided by the AphA; and to develop training along the lines of that provided by provided by the West Midlands Academic Health Science Network. The National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care West ([NIHR CLAHRC West](#)) which works with partner organisations, including the NHS, local authorities and universities, to conduct applied health research and implement research evidence, to improve health and healthcare across the West, could also be a good resource.

As noted above, there was a view that training could also be focused on both health and social care at the local level - this would support the development of networks and cross-organisational working, critical to taking full advantage of data analytics to support services.

Following feedback to the wider group, there was a suggestion that it would be helpful to develop training that would be relevant for PDPs, and could be developed across a range of organisations in working across health and care.

### Communicating our analysis

Communicating analyses is no easy task. What became clear from the discussions is ensuring specialists have dedicated time to undertake this work.

Stakeholders are critical whether this be policy leads, clinical leads or others. There's a real opportunity to design work directly with stakeholders at the start of projects.

In terms of analysts themselves it was suggested that the following be available:

- access to visually rich data summaries using systems like Power BI report, and RShiny Dashboard;
- training on tools so outputs are understandable, and;
- training on data visualisation.

Key to this is for analysts to be and be seen as subject matter experts with a need to 'own' their work.

## Session 2

This session was made up of short presentations. The aim was to give attendees a real sense of the possibilities of data in addressing complex issues.

The first of these was on 'Modelling capacity along a patient pathway with delays to transfer and discharge with application to stroke centralisation'. This was presented by Josh Tyler, Simulation Modelling Specialist, Modelling and Analytics, Bristol, North Somerset and South Gloucestershire CCG.



The presentation presented work that had been undertaken to model capacity through the use of data along the patient pathway. The focus is on identifying and addressing delays in patient transfer and discharge which can result in beds being 'blocked'.

Working with the [Health Foundation](#), the team is developing a web tool which will be free to use and will be used to support managing capacity.

The [presentation can be found here](#). For further detail, please see the [full paper](#).

This was followed by a presentation on 'System-Wide data for Population Health Management Analytics'. This was with Ben Murch, BNSSG CCG Modelling and Analytics. In population health management, one of the areas covered is population segmentation i.e. identifying population cohorts through using information such as age and sex to partition populations into similar groups. BNSSG CCG colleagues have reviewed different methods for doing this segmentation.

The [presentation can be found here](#). A recently published paper on this can be found [here](#).

The third presentation was from Harry Angus from Insight Bristol. He was discussing the Think Family Database and associated tools and projects. This database is used by the Troubled Families programme to encourage services to deal with families as a whole, rather than responding to each problem, or person, separately.

A copy of his [presentation can be found here](#).

The final presentation was from Lenka Hašová discussing the Bristol Solar Panel Analysis. A copy of the [presentation can be found here](#). This work emerged from a [Hackathon run by Bristol City Council](#). The aim is to provide data that may support increased usage of renewable resources such as solar power. The data indicates enormous potential for the use of solar panels in Bristol.

\* This report has been put together by Dr Sophie Taysom, with support from John Kellas and Oliver Watson. Sophie and John are co-directors of This Equals and are contracted with Bristol Health Partners.