hfma

Data to outcomes - Dorset Intelligence and Insight Service

Case study

Delivering value with digital technologies

Digital technologies such as digital medicine, genomics, artificial intelligence and robotics have a huge potential to transform the delivery of healthcare.[1]

These technologies can empower patients to participate actively in their care, with a greater focus on wellbeing and prevention. They also support the prediction of individual disease risk and personalise the management of long-term conditions.

The HFMA, supported by NHS Digital Academy, is delivering a programme of work to increase awareness amongst NHS finance staff about digital healthcare technologies, and enable finance to take an active role in supporting the use of digital technology to transform services and drive value and efficiency.[2]

As part of the programme, the HFMA is publishing a series of case studies. Working with organisations who have started on the digital transformation journey, we will identify examples of good practice and highlight the challenges that services face. This will include specific challenges relating to NHS finance.

This case study describes how the Dorset Intelligence and Insight Service has been set up to enable people working across the health and social care network to access digital tools. These provide clinicians and planners with access to a range of patient data to assist in delivering services that can improve health outcomes for the county's population.

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[1] HFMA *Introduction to digital healthcare technologies*, July 2021
[2] HFMA Delivering value with digital technologies

Introduction

The Dorset Intelligence and Insight Service (DiiS) is a collaborative project set up to deliver a near real time health and social care dataset across the Dorset Integrated Care System (ICS).

The aim of the service is to make health and social data open, easy to access, and available to create actionable insights. These insights are developed in partnership with clinicians to:

- support the delivery of better health and wellbeing outcomes for the people of Dorset
- facilitate data-driven decisions
- support proactive as opposed to reactive healthcare and
- provide foresight rather than hindsight when informing clinical stakeholders.

DiiS was conceived as part of a collaborative digital strategy across the Dorset health economy. It is core to the system approach to population health management[3], with data analytics enabling the team to group the population by medical, mental health, demographic and socio-economic markers and therefore identify points of earlier intervention in a pathway.

The service has contributed to many workstreams across the system and notes the following achievements.

- Development of the tool at the forefront of Dorset's Covid-19 analytical response. This enabled data from primary care, acute and community providers to be linked on a near real time basis.
- Data analysis and case finding to identify and target individuals or cohorts. Pseudonymised data can also be securely re-identified by healthcare professionals where required for management of care for an individual patient or service user.
- Provision of wider population-based insights to enable the use of social prescribing.

Evolution of Dorset Intelligence and Insight Service

The initial project

The concept of a Dorset-wide approach to facilitate the linking of data from health and social care was scoped out to develop a vision of what could be achieved and how data could be used to improve population health.

The team was initially established on a short-term basis to support the first wave of the county's Population Health Management Programme. They received initial capital funding to build a data warehouse for the programme. This was built 'in-house', providing a secure and flexible system architecture and allowing for expansion capacity whilst saving the system significant cost compared with an 'off-the-shelf' solution.

The team's approach from the outset was to develop analytical and data visualisation capability amongst existing staff within the team and wider system, bringing together a mix of skills and experience for sustainable local benefit.

The Covid-19 pandemic took hold in 2020 during this project phase. The team were used to develop dashboards to monitor cases and impact. They also provided actionable insights to enable targeted interventions for high risk patients. More detail of these outputs is included below.

From project to service

As the initial DiiS project evolved there was an increased interest across Dorset regarding the intelligence that the service could offer. Sharing the outputs with clinicians would often result in the questions, including "*could I also have….*". This was consistent with the expectation from the original digital strategy but in order to secure the recurrent funding that would establish them as a permanent

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[3] Population health management improves population health by data driven planning and delivery of proactive care to achieve maximum impact.

county wide analytical service, the team needed to produce a formal business case and identify funding streams.

A compelling business case should set out the financial and non-financial impact of any investment. This should include funding implications and how the proposed solution is expected to deliver value for the NHS body and its patients. This can be especially challenging for investments that are focused on providing insights that support health improvement where the benefit may be in avoidance of future costly intervention for individual patients or may result in more appropriate use of existing staff and facilities without releasing cost savings. However in this case, the evolution the successes and learning from the initial project could be incorporated. Some of benefits identified to date by DiiS are outlined below.

To identify funding streams, DiiS has collaborated with the Digital Access to Services @Home service to established of a bid writing team. This team help to define the opportunities expected through new investment. As a direct result, the service has been successful in obtaining funding from outside the heath sector, including local enterprise partnerships.

Future growth and sustainability

The work of DiiS has driven an enthusiasm for information and intelligence amongst services in Dorset and promoted a new culture for digital investment. There is a recognition that digital investment has been neglected and there is a now an expectation that new service investments include 5% funding for digital support.

DiiS managers are proactive in developing the skills of local data and analytics professionals, enabling better sharing of this experience across Dorset and the South West region via a Data and Analytics Centre of Excellence (DACOE) .

As part of this, they provide free peer support and learning via show and tell sessions, virtual events and webinars. There is also an annual in-person event – the 2022 event was attended by just under 200 analysts, developers, data scientists and managers from across health and care partners along the South Coast.

They have created a network of champions and ambassadors across system partners and primary care networks with the intent to enable and empower colleagues to make the best use of the data and tools available.

Using digital technology to provide insights

This section outlines how DiiS use digital technology to translate data into information and shows examples of the wide range of data presentation available to service users.

Data collection and reporting

DiiS collects and collates data from a variety of sources across Dorset's health and social care system. In addition to patient and service user data from primary, secondary and social care services, public health and population demographics are collected using tools including Mosaic[4].

This data is stored in a flexible and secure Cloud-based Microsoft Azure data warehouse and is automatically refreshed overnight. This data is pseudonymised[5] when it is added into the data warehouse using an adapted version of Nottingham University's OpenPseudonymiser[6] tool. The ability to re-identify any individual or cohort of patients is retained but permission to do this is restricted to the clinician who provides their care.

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[4] *Mosaic* is a population segmentation tool developed by Experian that uses a range of data and analytical methods to provide insights into the lifestyles and behaviours of the public

[5] Pseudonymisation is a data management and de-identification procedure by which personally identifiable information fields within a data record are replaced by one or more artificial identifiers

[6] *www.openpseudonymiser.org*

The analyst team use business intelligence tools to develop automated and interactive dashboards in Microsoft Power BI using patient level data. Dashboards are developed with clinicians and can therefore be customised for specific projects and services.

By combining demographic, socio-economic and deprivation data with patient data, the team supports a population health management approach, assisting in identifying the most vulnerable sections of the community, targeting focussed interventions, informing clinical decisions and preventing future acute illness.

In addition to identifying population need and improving health outcomes the dashboards support strategic and operational planning across the ICS:

- monitoring demand within different care settings
- assessing workforce capacity and
- developing a holistic view of the Dorset population.

Examples of dashboards

The following examples of interactive dashboards developed by DiiS give an indication of the scope of customisation that is possible when experienced data analysts use business intelligence techniques and tools such as Microsoft Power BI.

Dorset Covid-19 dashboard
Developed during the height of the Covid-19 pandemic, this dashboard showed key information pulled from data across multiple health and social care organisations Dorset. The dashboard continues to be updated from live datasets where available.

Figure 1: Dorset Covid-19 dashboard
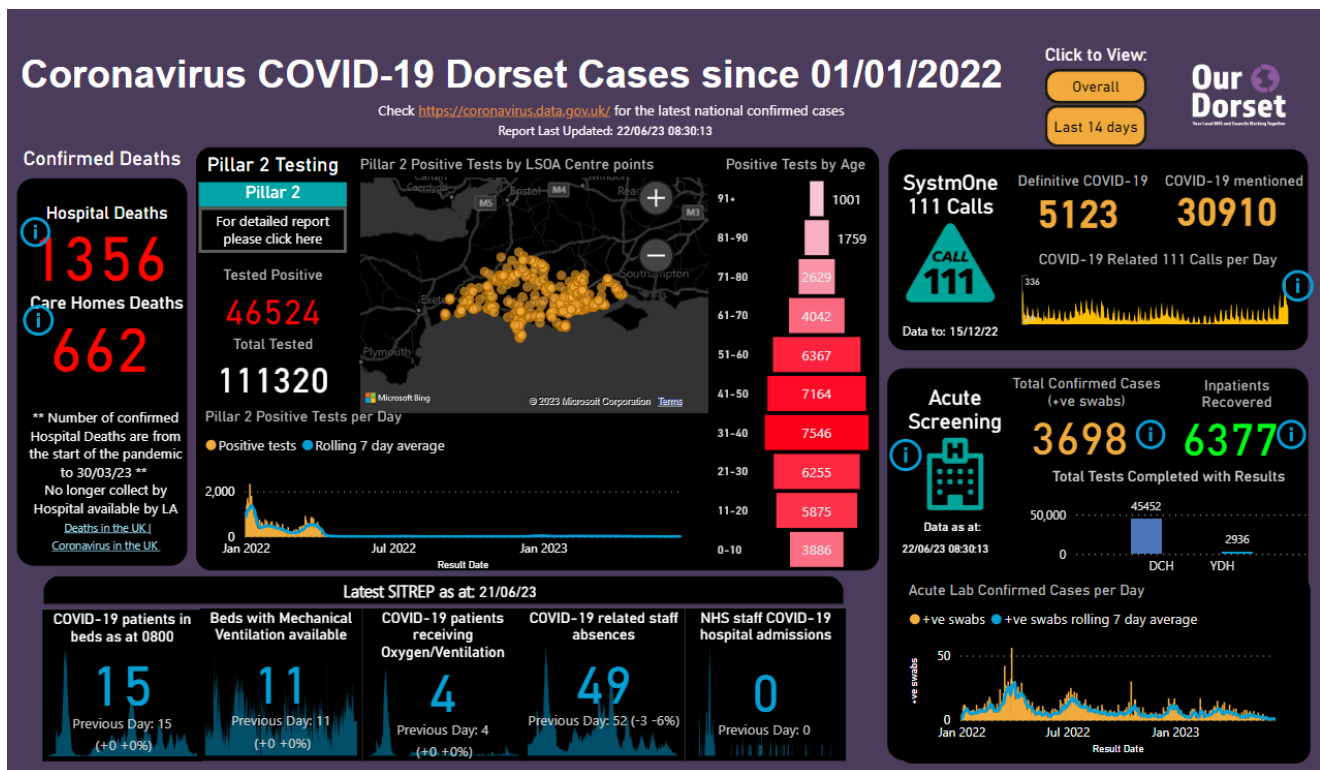
Demonstrating links between mental and physical health

The skills and experience of DiiS staff enables them to identify links between datasets which may not be otherwise be spotted using standard data presentations.

As an example, viewed together figures 2 and 3 provide evidence that the wellbeing of people living with a serious mental health condition in Dorset can be improved by physical health interventions. DiiS can support the wider health economy by ensuring that this information is available to GPs and commissioners.

Figure 2: Dashboard showing the makeup of the population with a serious mental illness across Dorset
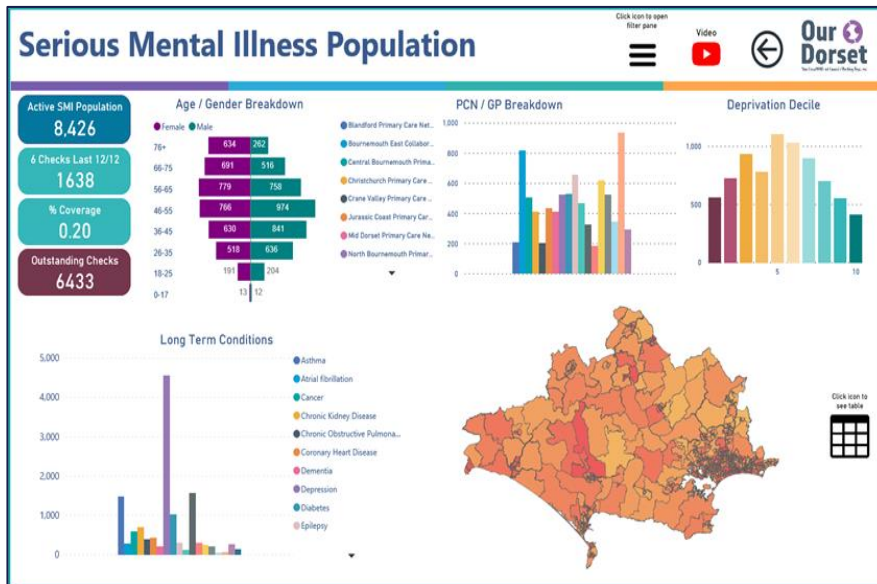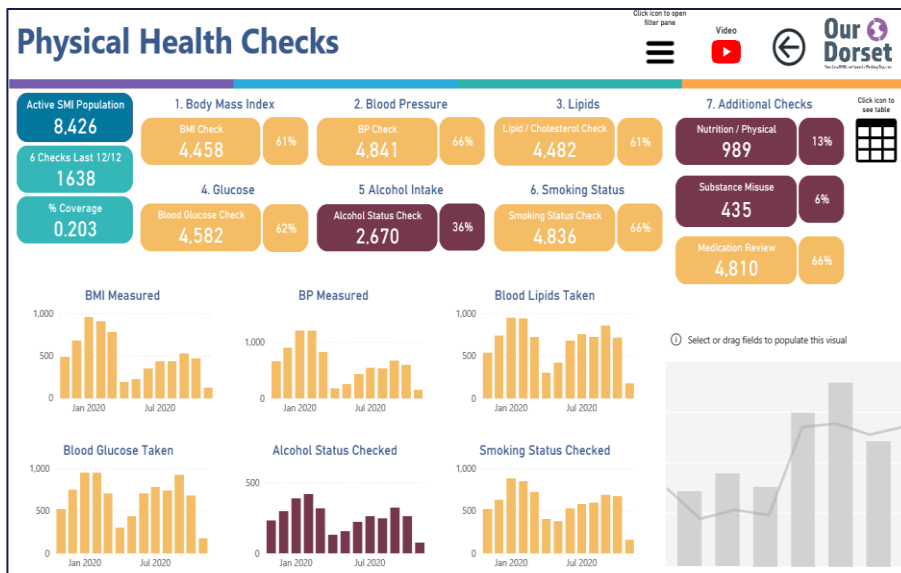

Figure 3: Achievement of physical health checks within the population with a serious mental illness across Dorset

> *'Exploration of the link between physical health for patients with mental health problems can result in a care plan designed to manage both physical and mental health more effectively and ensure that deterioration in mental health does not cause deterioration in physical health and vice versa.'*
> Local GP

Supporting health improvement initiatives

This section describes two programmes of work where the tools and skills of the DiiS team have been used to support health improvement programmes within the Dorset wide health and social care system.

The Altogether Better programme in Dorset

Within one of the Dorset primary care networks (PCN), DiiS analysis identified that 30% of clinical appointments were related to a cohort of patients with multiple non-clinical needs. The PCN wanted to utilise their team of social prescribers and health champion volunteers to offer social as well as medical support to the most socially vulnerable and isolated patients.

Linking with the national Altogether Better[7] network the PCN worked with a local social enterprise company, Help & Care, to bring link workers, self-management coaches, social prescribers and health champions into a multi-disciplinary team.

The role of DiiS in supporting Altogether Better

In addition to identifying the cohort of patients with a high occurrence of multiple non-clinical needs, the DiiS Covid-19 Insights tool was used to identify those patients from that cohort who also had risk factors that could result in serious illness if they contracted Covid-19. This population was segmented further into specific cohorts for clinicians to develop targeted interventions for each group. The interventions used digital solutions including smartphone tools and apps to support self-monitoring and management.

A second phase of this project identified people who had been shielding and had a history of mental health issues such as anxiety and depression which could have been exacerbated by the isolation and worry associated with shielding. This enabled support calls to be made to this cohort of people by the social prescribing team and health champion volunteers.

Altogether Better – benefits realisation

Using the intelligence derived from the DiiS teams' work in the first phase of the project identified the following positive outcomes for patients.

- lower risk groups were given details of relevant support groups, helplines and websites
- frailty advanced nurse practitioners contacted those with higher medical risks to identify unmet clinical needs.
- the social prescribing team contacted those with lower clinical risks and social vulnerabilities to offer a conversation about support.

Evidence collected on the impact of the phone calls made to the group of shielding patients in phase two of this project showed:

- 40% of calls resulted in a reassuring conversation that left the patient more likely to contact the social prescribing team in future
- 20% of calls provided patients with specific information relating to an identified support need
- 6% of calls resulted in a referral to appropriate support.

This project highlighted that clinical intervention was not always essential and utilising other staff resources, as well as volunteers can reduce demand and pressure on GPs

Digital Access to Services @Home

NHS @Home[8] is an approach to providing better connected, more personalised care in people's homes including care homes. The Dorset team works with clinical teams to support people to

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[7] *Altogether Better* is an NHS national network organisation for health and care services introducing a model of collaborative practice. It supports services and local people to work together to make a difference to people's lives, release resources, and improve services. It can be developed within a single practice, a primary care network or across an integrated care system.
[8] *www.england.nhs.uk/nhs-at-home/*

empower self-care and enable them to confidently manage their health, wellbeing and long-term conditions using digital technology.

The intended impact of using digital tools is to enable the Dorset services to manage a higher demand using different elements of the workforce than would be the case from traditional pathways, as well as improving health outcomes for patients and reducing the costs of future care

A range of digital tools have been introduced to help people manage conditions such as COPD, diabetes, asthma, heart conditions and arthritis.

The role of DiiS in supporting Digital Access to Services @Home

A trial funded by the Dorset Local Enterprise Partnership enabled GPs to remotely monitor patients with high blood pressure. Figure 4 shows the pressure cuffs that are provided to a cohort of patients living with uncontrolled high blood pressure across Dorset, alongside a smartphone app that supports them to monitor their condition remotely.

Figure 4: Pressure cuffs and a smartphone app allow remote monitoring of blood pressure
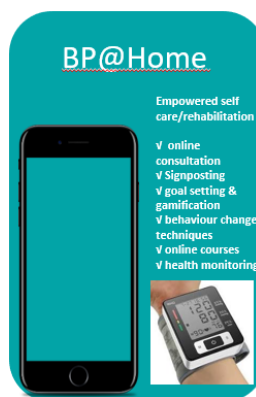
The DiiS team developed tools to enable the GPs to identify patients with hypertension across Dorset and drill into the data to predict who would benefit most from joining this programme (see figure 5). Benefits were measured in terms of predicted improvements in health outcomes and life chances.

Dashboards were also developed to allow GPs and the wider system to monitor the take up of invitations on to the trial.

Figure 5: View of the population of patients with hypertension by PCN
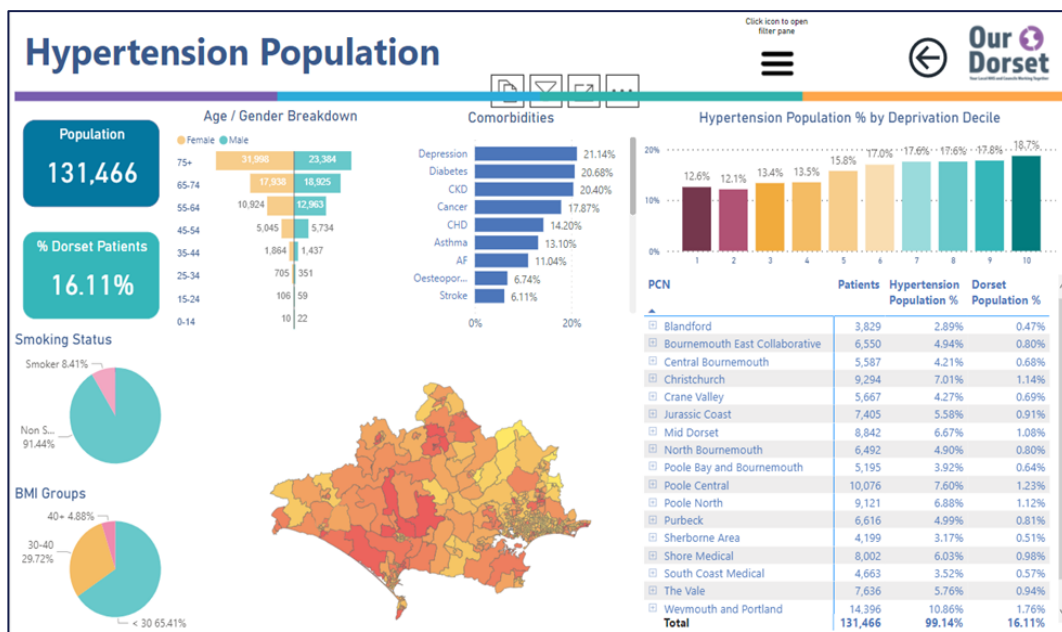
Benefits realisation

The benefits to patients and clinicians of sharing intelligence in an appropriate format that can generate actionable insights has been demonstrated in the examples shown above. The use DiiS' data can clearly inform changes to clinical pathways and identify those patients for who an intervention will improve their health or prevent further deterioration.

Providing a quantitative measure for these benefits would be useful for calculating the return on investment, but it can be challenging to achieve this, especially where the qualitive benefit relates to future care that will not be required. Hence DiiS and the wider Dorset system aim to recognise the many ways that benefits can be realised, as described below.

- Cash releasing benefits arise when costs of services or interventions can be reduced to make savings that can be invested elsewhere.
- Productivity gains arrive when capacity is released and can be utilised by other patients. Reducing appointments and interventions is one way of releasing capacity but productivity can also be improved by better workforce utilisation with clinical time replaced by non-clinical support. This was the case in the Altogether Better example above.
- Developing new models of care can improve service integration and lead to better patient outcomes and satisfaction.
- Providing insights that lead to accelerated access to services may prevent deterioration of health and therefore reduced resource use by patients. Similarly, interventions which result in better adherence to care plans can also benefit both the patient and service provider.

In order to realise the benefits described above, clinicians need to trust the data and have the appropriate skills and confidence to use it. The DiiS dashboards have increased the visibility of data throughout the system. Anomalies can be challenged and investigated. Where they are due to poor data quality this can be rectified.

Use of the DiiS dashboards has also improved workforce maturity in digital and data literacy, which should result in more efficient working. Figure 6 shows a dashboard developed by DiiS which reports on a range of digital literacy indicators.

Figure 6: Monitoring digital literacy
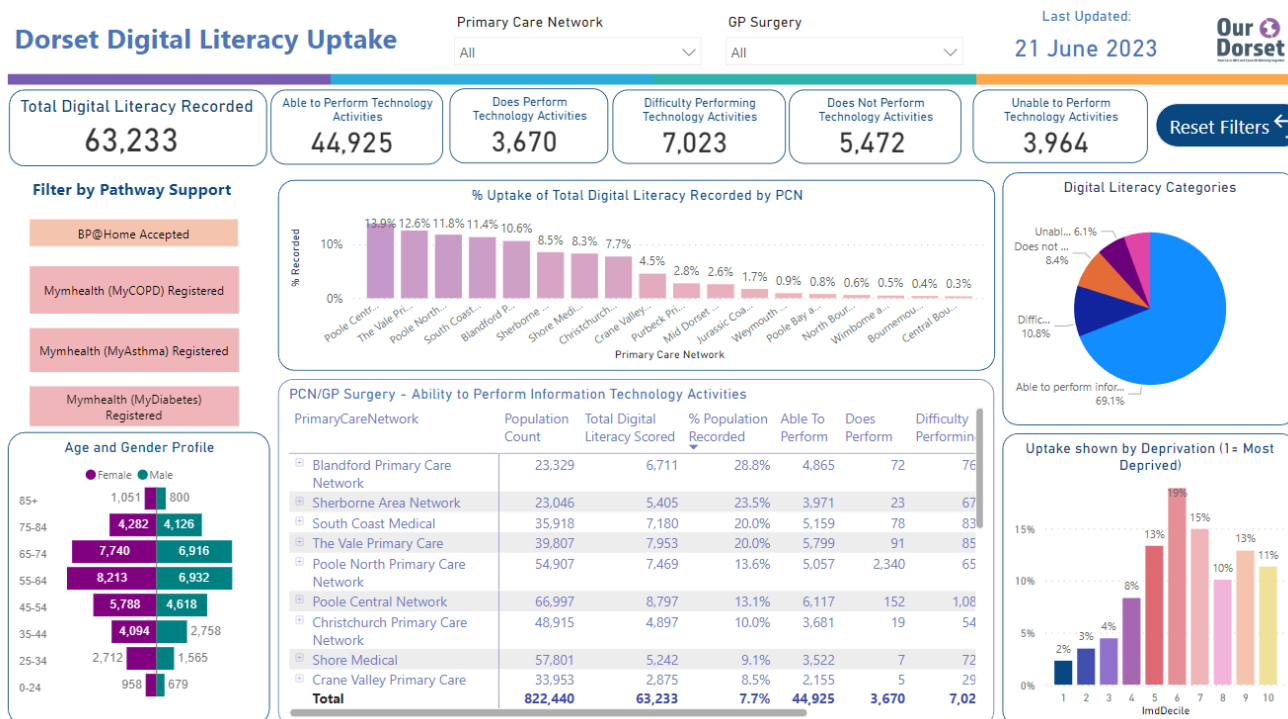
Future plans

As noted above the work of DiiS has driven an enthusiasm for information and intelligence amongst services in Dorset and the service will continue to evolve as more services are given access to the data and make requests for further insights.

The service is planning to introduce further dashboards and visualisation tools. One example is theographs[9] which will enable tracking of service utilisation and benefits both before interventions and afterwards.

As the availability and quality of data within the data warehouse increases there is scope to explore opportunities for machine learning and predictive analytics to support population health management across the system. This would require DiiS analysts to conduct matched sample analysis, comparing an intervention population with a simulated control group identified within the DiiS data. The two group can be matched based on demographic and socio-economic criteria to enable comparative analysis and monitor the impact on healthcare utilisation within both groups. The aim is to include cost data relating to acute hospital and GP activity within the DiiS and therefore identify effective and efficient pathways of care.

How to find out more

Please contact Heather Case, head of Dorset Intelligence and Insight Service (DiiS)

diis@dorset.nhs.uk

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[9] A theograph is a visual representation of the contacts that individual patients have with health and care services over a period of time. They can be used to identify patterns of behaviour and activity, which can in turn reveal where any changes could be made in a patient pathway or care package to improve patient outcomes. Imperial College Health Partners

This case study is part of the *Delivering value with digital technolog*ies programme that the HFMA is undertaking, supported by the NHS Digital Academy. The programme aims to increase awareness amongst NHS finance staff about digital healthcare technologies and enable finance to take an active role in supporting the use of digital technology to transform services and drive value and efficiency. For more information click here.

For more information visit the NHS Digital Academy website or follow the programme on Twitter @NHSDigAcademy.

About the HFMA

The Healthcare Financial Management Association (HFMA) is the professional body for finance staff in healthcare. For over 70 years, it has provided independent and objective advice to its members and the wider healthcare community. It is a charitable organisation that promotes best practice and innovation in financial management and governance across the UK health economy through its local and national networks.

The association also analyses and responds to national policy and aims to exert influence in shaping the wider healthcare agenda. It has particular interest in promoting the highest professional standards in financial management and governance and is keen to work with other organisations to promote approaches that really are 'fit for purpose' and effective.

While every care had been taken in the preparation of this briefing, the HFMA cannot in any circumstances accept responsibility for errors or omissions and is not responsible for any loss occasioned to any person or organisation acting or refraining from action as a result of any material in it.

HFMA

HFMA House - 4 Broad Plain, Bristol, BS2 0JP

T 0117 929 4789

E info@hfma.org.uk

W hfma.org.uk