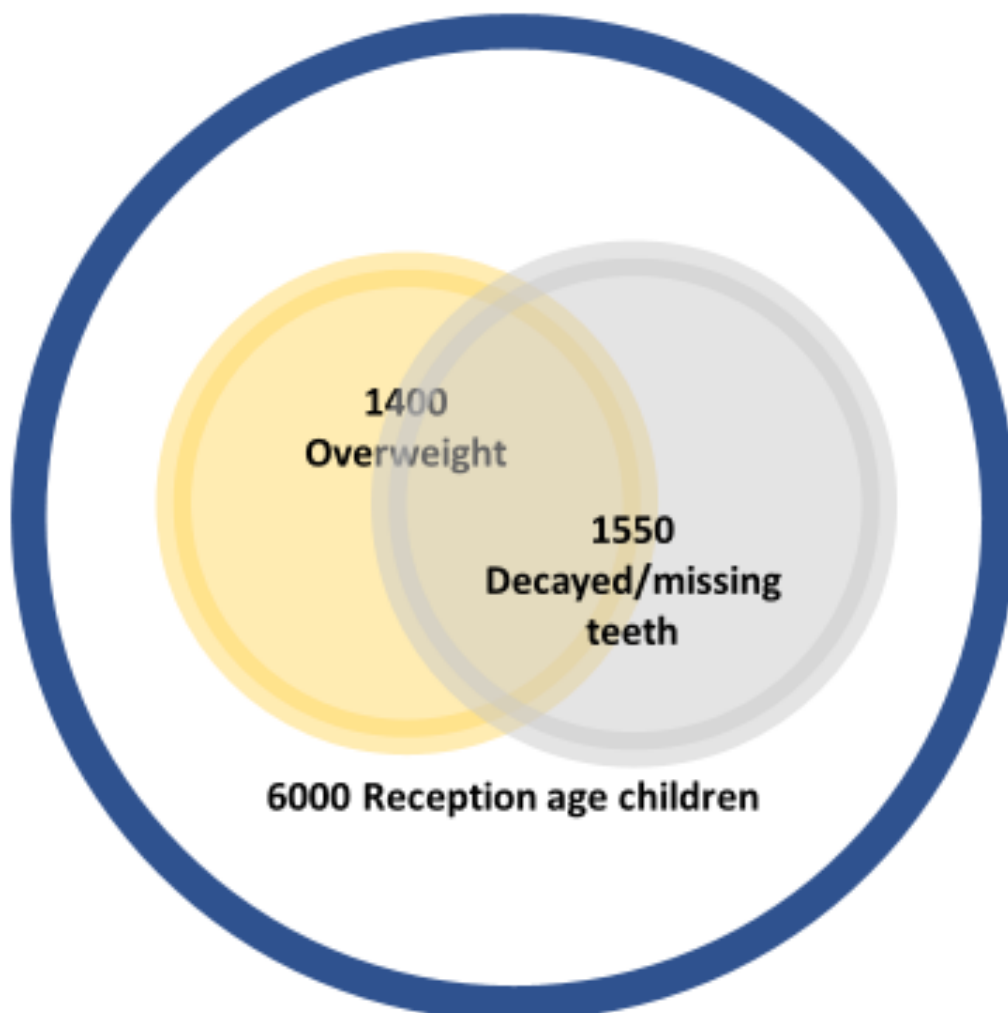


Somerset: Our County Joint Strategic Needs Assessment 2019



Data integration



Contents

Foreword	3
Introduction – why look at this in a JSNA?	4
What is the problem?.....	4
What are the dangers of not joining data?.....	5
What do we mean by information?	7
What does this mean in practice?	9
How do we join information now?	10
1. Using approximations and proxies.....	10
2. Aggregating data in specific projects.....	12
3. Information sharing in person: One teams and Joint appointments	14
What could we do better with joined up data?	16
Joining data and quality improvement.....	16
Improving data quality by integration	16
Artificial Intelligence	17
Good practice beyond Somerset.....	18
What are Somerset’s priorities in data integration?	21
Priorities identified in the Business Intelligence Strategy	21
Project-based Priorities	22
A Somerset Integrated Dataset	25
How does data integration align with other strategies?	26
Summary	27
Information governance and data integration	28
Legal considerations.....	28
Information governance for effective integration	29
Current Somerset Information Governance arrangements	32
A Somerset Information Governance Approvals Board?	33
What can the Health and Wellbeing Board do to help governance?	33
Summary – what can be done to improve data integration?	35
GLOSSARY	38
Annexe.....	40
REFERENCES	41

Foreword

Welcome to our 2019 Somerset: Our County Joint Strategic Needs Assessment (JSNA).

Our yearly JSNAs tend to focus on health and wellbeing issues facing particular population groups, such as older people or vulnerable young people. Almost all finish with a recommendation that we 'join up' information in order to better understand their needs. We're pleased to say this JSNA addresses that question directly.

Joining up information about people and places is an essential part of joining up services so that they can be properly 'person-centred' or 'place-based'. And, of course, it happens already between agencies in Somerset. However, the difficulty is this is often ad hoc, and not done in either a timely manner nor with the appropriate level of precision. Whilst the focus here is on the strategic use of data, the practices needed to achieve that are the same as those for personal, direct care.

On the other hand, we recognise that a comprehensive 'database of everyone and everything' is neither achievable nor desirable. People have the right to anonymity, and, for instance, should not be put off getting help for a mental health problem by concerns about the involvement of other services.

This JSNA seeks to identify the most pressing needs in information sharing, and the clearest opportunities to make improvements. As a report to our Health and Wellbeing Board, it stresses the role of leadership in setting the right 'mood music' for information sharing, where security risks need to be balanced against the arguably more serious risks associated with failing to share information when it is needed.

We hope you will find this new and somewhat 'different' JSNA not only interesting but also inspiring in its reach to improve services through joining up data and working together more effectively, for the good of all the people of Somerset.



Trudi Grant - Director of Public Health



Christine Lawrence – Chair Health and Wellbeing Board

Introduction – why look at this in a JSNA?

This year, the Somerset yearly JSNA (*Somerset: Our County*) looks at a pervasive ‘need’ within health, care and wellbeing, rather than the needs of a population group. It examines the need for better quality information, particularly about individuals, to support health and care professionals – and communities, too – in order to make better decisions. In particular, it is concerned with:

- How can we join data from different organizations to understand the complexity of individuals’ needs, whilst adhering to the information governance standards we must, rightly, uphold?
- How can we analyse and communicate that information so that it leads to insight and effective action, for people, for communities and for the whole ‘system’ of agencies that promote health and wellbeing?

This JSNA coincides with the development of a Somerset-wide Business Intelligence (BI) strategy, which addresses similar issues, focusing on specific improvements to be made in understanding individual health need. In legislation, the General Data Protection Regulations (GDPR) of 2018 make a legal case for the appropriate sharing of information where it can assist public bodies to undertake their statutory duties.

What is the problem?

An example from the 2016 JSNA on vulnerable children illustrates how the inability to join information holds back our ability to improve health and wellbeing. We know that out of about 6,000 school reception-age children in Somerset, about 1,400 are overweight, and a broadly similar number – 1,550 – have decayed or missing teeth. Unfortunately, as illustrated by the Venn diagrams in

Figure 1, we do not know how far these groups overlap. Clearly, managing weight or dentistry can be done without knowing this, but focusing the right prevention messages for children and their parents and carers will be very different depending on the answer. As well as having an impact on service providers, this incomplete picture has impacts on patients or service users, as described in a range of contexts later in the report.

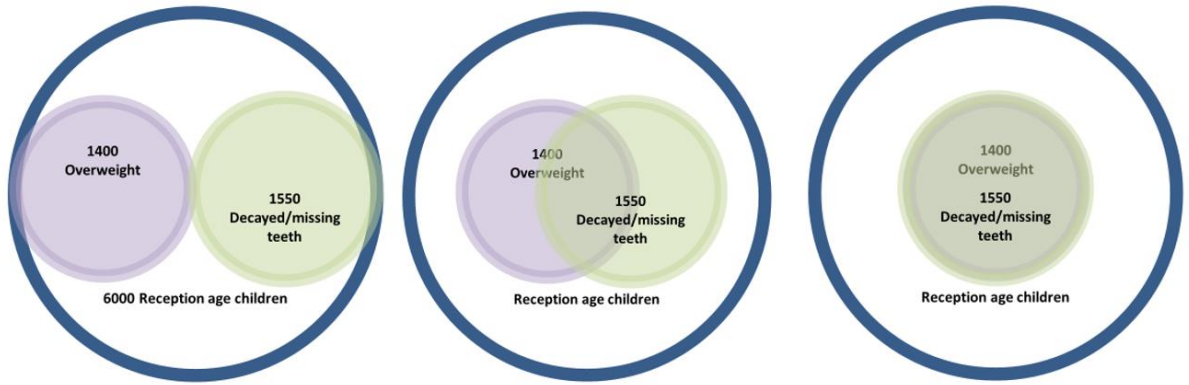


Figure 1: Scenarios for overweight and decayed or missing teeth in Somerset Reception Age children

Looking from the patient's perspective, a further problem emerges. A holistic approach to treating illness and improving health usually involves a range of agencies. For example, statins may be prescribed to lower blood pressure (NHS), but longer term health improvement may also involve 'social prescribing' such as joining a walking group, which may be run by a local authority or the voluntary sector. Clearly, if the different agencies are basing what they do on incomplete information they will find it hard to coordinate their activity.

What are the dangers of not joining data?

Failure to join information between different agencies has a direct impact on the quality of care provided. An example in the Somerset Annual Public Health report for 2017, on End of Life Care, illustrates this. This described how a patient identified as being in the last months of life 'was administered a high dose of antibiotics and taken into hospital, only for the hospital consultant to [discover] the next day that the patient had asked to avoid such intensive treatment'ⁱ.

The situation is, if anything, more difficult for the voluntary sector, which is, of course, a highly diverse collection of charities, community groups and specialist providers of services. Some, such

'A female who was referred as she needed 'support' with local activities /a way forward with her chaotic lifestyle. This turned out to be a woman who had been helped by the Mental Health Team, Police, Citizens' Advice Bureau, domestic violence charity etc. and whose partner had been sectioned a couple of days before I visited for waving a knife around in a public place and threatening people.'

Village Agent

as St Margaret’s Hospice, are already closely integrated with other providers. However, we heard [examples from Village Agents](#) and the Balsam Healthy Living Centre in Wincanton (Figure 2), and these are shown here. The absence of shared information at the Balsam Centre is felt acutely as it was formerly a children’s centre, and so received valuable information such as case files from the County Council as part of its contract. Now, the Centre continues to offer support to people in need, but without that status is unable to receive the same amount of information about those people. It can mean that staff need to develop strong bonds with service users to start afresh in understanding their needs, often to find that they really need to be referred on to other services; the therapeutic bonds formed can, though, make that referral on difficult.



Figure 2: Balsam Healthy Living Centre in Wincanton

‘In the ideal world there would be one system to cover health/Social Care and Mental Health which would increase communication massively and make work so much more effective. I still struggle to get information when a person has been discharged from hospital as there is nothing which details the assessment carried out before departure.... what package of care was put in place.....who their allocated Rehab Therapist is etc. which again wastes time trying to find out details. It can also duplicate work as they may already be supported by Pathway 1 or being supplied equipment etc. at a later date which I am not aware of.’

Village agent

At a simple level, not knowing important characteristics of an individual can mean that they miss out on the type of special attention that they need or have earned.

For instance, a child having a special educational need or disability (SEND) or mental ill-health, being home-schooled, permanently excluded from school, unvaccinated or looked after by the Local Authority can have implications for almost all their contacts, but if this is not known – and it is not automatically shared – then they can be put at a disadvantage, which may amount to discrimination. Current and former military personnel also have rights under the Military Covenant, and are accorded effective ‘protected characteristic’ status in Somerset. Unless such people identify themselves as coming into this category, they may well miss out on priority access to services or reduced costs.

Missing out on ‘shared intelligence’

We have heard the example of one young person in Somerset, who had many signs of need, and multiple contacts with different parts of the public sector, including being excluded from school, convicted of criminal acts and being in care. Taken together, his level of need was obvious. However, he did not reach the threshold to signal particular need to the agencies *individually*. Only with a shared view of individuals (or families, or even communities) can this ‘shared intelligence’ provide a true picture of the issues they face, and identify the best way to address them.

This lack of information sharing can damage the sense of trust between different agencies and severely limits the ability to provide person-centred care. When two agencies have very different perceptions of an individual’s type and level of need it difficult for them to act together in that individual’s best interests.

What do we mean by information?

Evidence that is used to support local decision making takes many forms. Some is qualitative, such as patient or customer satisfaction. Much quantitative information held within organizations is on resources such as finance or staffing. This report focuses on quantitative information about individuals, whether they are service users, patients or members of the public because that is where most of the difficulties lie. Table 1 gives a rough description of three types of data about people used in planning, monitoring and providing public services.

Table 1: Ranges of information in use

Use	Detail	Scope
Strategic Planning and prevention	High level, long term. <i>For example: population projections</i>	Mostly between organizations
Performance management	Mid-level, short-term <i>For example: hospital waiting times</i>	Within and between organizations
Case management	Individual, short term <i>For example: case notes</i>	Within services and organizations

Strategic, usually aggregated information

This is the type of information typically contained within a JSNA and gives a broad picture of need. This does not identify individuals and so can be published and shared widely to enable agencies to have a shared understanding of priorities.

Performance management information

This assesses how well a service is performing. It may cover how many people have received the service, how long it took and what impact it had, as well as what people thought of it and how much it cost. It should be possible to drill into the data to see where performance is good or bad. Such information is mainly used internally and only published in summary. However, when *system* performance - say in reducing 'delayed transfers of care (DTOCs)' from hospital to community and social care – is considered, then the ability to exchange information in a fine-grained and timely way becomes essential.

Case management information

For individuals, it is essential that a hospital (for example) knows who is occupying a bed and what treatment they have received. This *has* to be

personal, identifiable data, and needs to be held securely. For 'person-centred care', in which an individual's *total* needs are assessed and prioritized, and the interplay of the different needs and services considered. For this, of course, the systems need to talk to each other. For a truly holistic approach this should include services as diverse as housing and mental health.

Multi-purpose datasets

In practice, of course, most of the 'higher level' data are built from the 'lower level' building blocksⁱⁱ. In the example of 'population health' data, someone taking responsibility for a neighbourhood team of GPs and other health and care workers may need to know the strategic trends in diabetes, for instance, for planning purposes, whereas a clinician will be concerned with the progress of an individual's needs. This may be achieved by having anonymized data available to the former group, and identifiable data to the latter.

Of course, to help us understand strategic need the data need to be joined at the identifiable, individual level, even if the information is not used for individual care. This means, though, that the mechanisms needed to develop the right evidence for population health management are the same as those to develop individual, personalized care.

What does this mean in practice?

A public health approach recognizes that whilst individuals who are ill need medical treatment, the most effective interventions to improve health overall include the 'wider determinants' such as employment and deprivation. This requires information on the *whole person*, rather than simply one aspect of health. Unfortunately, most of our statistics come from the systems used to manage services: whilst they tell us a lot about the services we often don't know enough about the *people* receiving them. Whilst our evidence of need is often based on GP attendances or calls to 999, these services are rarely the right ones to deal with the root causes. For example, a study by Dr Fosterⁱⁱⁱ suggested that the most intense users of NHS services are driven by social isolation: something that needs addressing at a social and community level.

How do we join information now?

It would be wrong to suggest that there is no joining of information now; indeed Somerset has much innovative work. Some integration uses proxy measures, some is for specific purposes and some is at a 'human' level. All are described below.

1. Using approximations and proxies

The most common way to gain more insight from the data we have – working around rather than resolving the problems - is to aggregate to a common denominator, usually geographical location. In many of the maps produced for the JSNA, the same urban housing estates appear as being characterized by social deprivation and frequent ill-health, as can be seen in Figure 3. We can also see how social exclusion, unemployment and low income can be associated with determinants of health such as isolation and poor diet that lead to ill-health. Evidence such as this lies behind much of the actions taken to address local health inequalities.

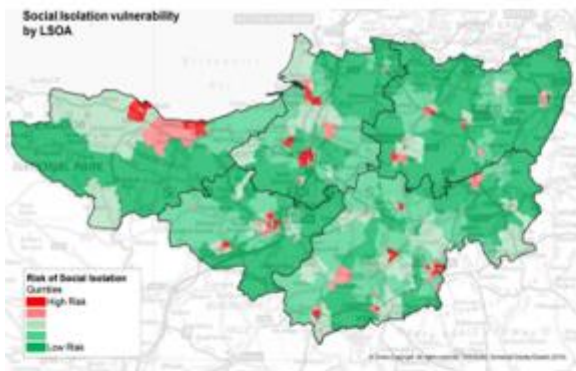


Figure 20 - Risk of Social Isolation (All Ages)

Figure 5: Somerset Young People's Mental Health Service – rate of young people receiving services

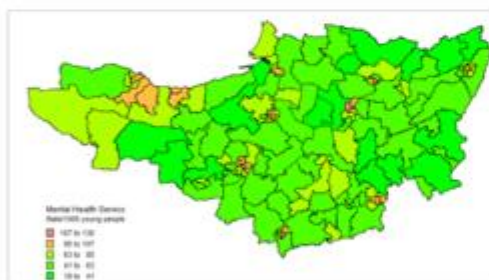


Figure 14: Troubled Families – Domestic Violence (number per LSOA)

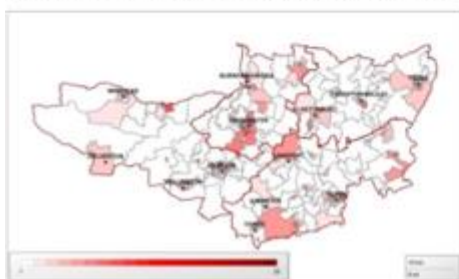
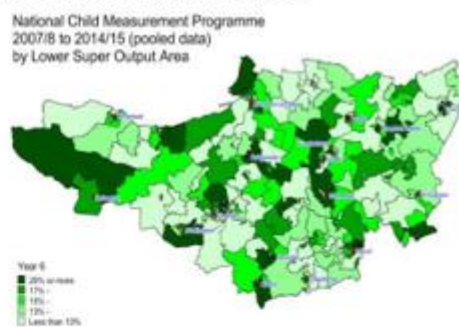


Figure 2: Overweight and Obesity in Year 6 children



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Figure 11: Map of contact with Mental Health Service Users with an open Mental Health referral by MSOA, between April and December 2014

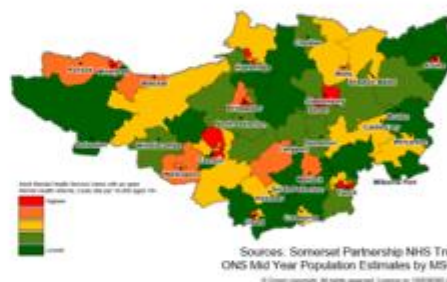


Figure 3: Claimant Count Unemployment by Ward January 2018

Figure 3: Geographical concentrations of need in recent Somerset JSNAs

For all its usefulness, this information is not as compelling as it might seem.

- It implies that everyone in an area has the same characteristics and needs, and that the same solutions will apply to all. This is clearly not true, and just as it may imply non-existent needs for the well-off and healthy in deprived communities, so more needy people in prosperous parts – especially rural areas – may be overlooked. This is the so-called 'ecological error'. It only identifies association, not causes.
- It guides thinking towards a geographical, community-based solution, when other factors, such as ethnicity or disempowerment may be more important. This is a fault of the *thinking*, not the analysis, but failing to join the data at an

individual level leads in this direction.

- It gives us no information on how people move within the health and care system. Tracking an individual is possible but is not done routinely. Tracing pathways can help to identify patterns in where things go wrong – be they harmful, costly or unpleasant for the individual.

2. Aggregating data in specific projects: Troubled families, Symphony and SiDeR

There are cases where we *have* been able to work at the individual or family level, digging beneath the surface and seeing how needs are related. They have revealed more entrenched inequalities than were even evident in the proxy data.

Figure 4 shows how the ‘troubled families’ database (‘Transform’) gets under the skin of the patterns of worklessness, crime, truancy, children in need and anti-social behaviour. Geographical analysis shows how these attributes cluster in the most deprived areas; looking at individual families, though, we can see not only that they are often the same families, but that those with two or more ‘troubles’ seem at the top of a slippery slope that leads to having four or more^{iv}.

The Somerset Integrated Dataset (originally developed for the Symphony programme) similarly allows analysis of *people*, rather than just their long-term conditions such as diabetes and cancer. It produces very similar results. Figure 5 shows that more people have *no* long-term conditions than would be the case if the distribution were random, and fewer have just one condition. Those with two or more are more prevalent than expected, and that ratio increases with the number of conditions. This may be because a number of long-term conditions result from factors such as smoking, obesity or poor diet, or because becoming ill can lead to lifestyle changes such as a lack of exercise that similarly lead to further ill health.

People and families with multiple needs are typically ‘high intensity users’ of public services. Joining up their information can lead to them receiving better services more efficiently.

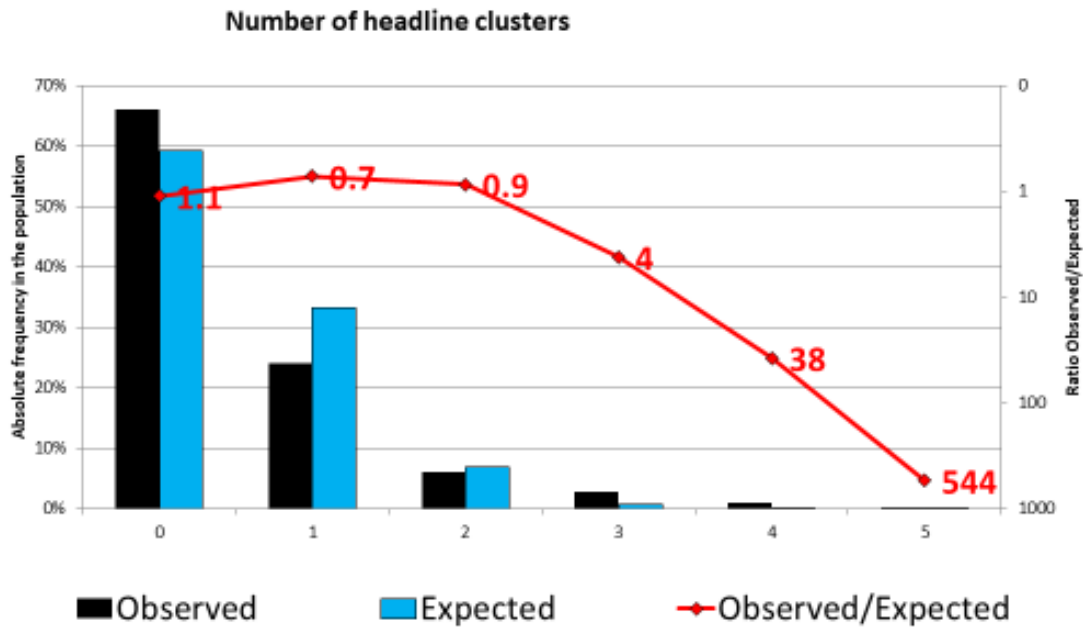


Figure 4: Troubled Families

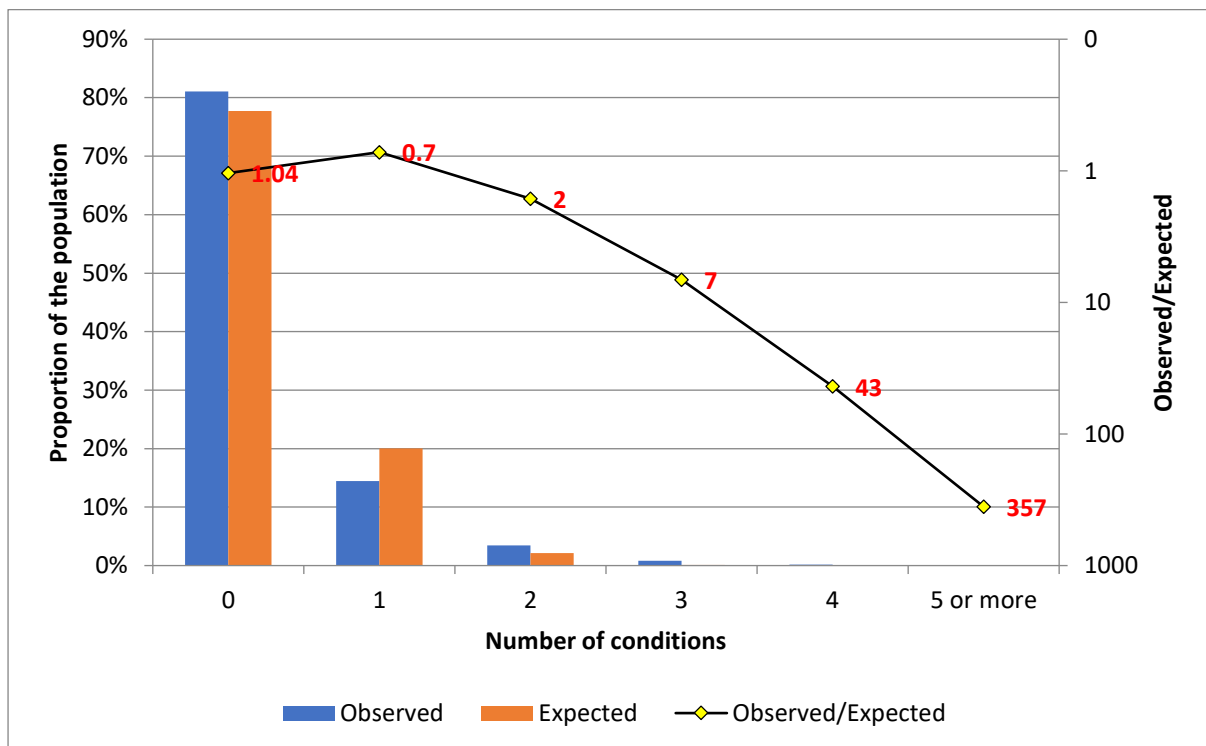


Figure 5: Symphony co-morbidity

The Somerset Integrated Digital e-Record (SIDeR) links up the main clinical and social care IT systems used in Somerset to improve and support direct care. Hospitals and out of hours services, (for example, NHS 111 and community care) can now view GP records electronically using GP Record Viewer, so someone taken unexpectedly to hospital, for example, can be treated by professionals with appropriate access to information about their conditions and medication. Patients do not need to repeat information as it is shared by the professionals involved in their care. This type of sharing can be especially valuable for patients nearing the end of life, where information in Advance Care Plans can guide professionals on whether potentially

‘Pseudonymizing’ data

Individual care clearly requires individual, identifiable information – social care workers need to know they are dealing with the same person who was discharged from hospital, for instance. However, for most performance management purposes, and all strategic purposes, ‘pseudonymized’ data are just as good. This involves joining two datasets using a shared, identifiable field, such as National Insurance or NHS numbers; once the join has been made, the identifiable field is replaced with a unique random reference that cannot be traced back to an individual. This allows questions that cut across the datasets to be answered – questions such as whether patients discharged from hospital at the weekend receive the same social care as those discharged during the week – without the need to identify the individuals concerned.

unpleasant or intrusive treatments are in accordance with the patient’s wishes. This is not a new software system that does everything: care providers can only see what they need and can only edit their own data. This joining of data has been possible because of the common use of the NHS number, mutual trust of partners and with the right safeguards in place to avoid misuse.

3. Information sharing in person: One teams and Joint appointments

One Teams, have been working in Somerset since the Halcon One Team was first established in 2013. They are designed to bring a multi-agency focus on our areas of highest demand to the public sector. Across the county there are variations on the name, including ‘Shape Mendip’ and ‘Together Teams’ in Sedgemoor, but they all share the same vision and approach.

Teams are structured on an award-winning model that provides an effective way for agencies working closely together to support vulnerable communities. They have been established in the most deprived areas of Somerset as identified in the Index of Multiple Deprivation. Teams meet regularly to consider local concerns and co-ordinate partnership working for sustainable solutions for individuals, families and communities, to prevent problems escalating and costs to the public sector increasing.

There is an information sharing agreement which has been signed off by Adults' and Children's Social Care, Avon and Somerset Police and Devon and Somerset Fire and Rescue. Locally all partners, such as housing associations, are also signatories. Teams have a co-ordinator, and are made up of local practitioners from a range of services including local authorities, social housing landlords, Neighbourhood Policing Team, getset, schools and local mental health services, and have links with services such as the Safeguarding and Co-ordination Unit, Adults and Children's Social Care and Somerset Drug and Alcohol Service.

There are currently 10 established teams in Somerset with an additional Streetwise Team in Taunton town centre which has adopted the One Team approach to multi-agency locality working within the town centre – this has a particular focus on Rough Sleeping and Homelessness.

Information sharing in person is achieved elsewhere in the county by having joint staff appointments, as between the NHS and Adult Social Care, or Adult Social Care and St Margaret's Hospice. This can give the provider and receiver of care the joined-up service they need, but does not address the strategic alignment of the organizations concerned.

What could we do better with joined up data?

We know that 'health pathways do not start at diagnosis', and when data are joined we can use all full set of tools available to us. For example, a library can do more than just manage the lending and return of books: it can work alongside schools to promote reading and learning amongst young people in a community, thereby improving both educational and health outcomes. Projects such as Symphony and Troubled Families are able to identify people with the highest and most complex needs, where the opportunities are greatest to both improve wellbeing and reduce costs to public services^v.

Joining data and quality improvement

Bringing data together needs to be for a purpose. These purposes can be simply divided into improving the quality of the data and improving services.

Improving data quality by integration

Integration of data goes along with improved data quality. Figure 6 shows how Musgrove Park Hospital might be written or described in giving its address: whilst most people would know what was meant, for a simple matching algorithm these different words would not allow a join between two datasets that, in reality, referred to the same place. In this case, the 'standard' address from the Ordnance Survey AddressPoint© dataset actually gives three separate entities, presumably for different parts of the site. This illustrates the need for effective communication as well as standardization. Where a 'standard' form does not exist, partners can agree to conform to the most reliable source – school transport, needing to locate the pupils concerned – could be treated as best for addresses, for instance.

This has very practical applications. Vaccination programmes in Somerset have, in the past, been held back by having imperfect lists of children needing vaccination. Now, the education rolls held by the County Council are being used to produce the best available quality of database to arrange and monitor the programme through schools.

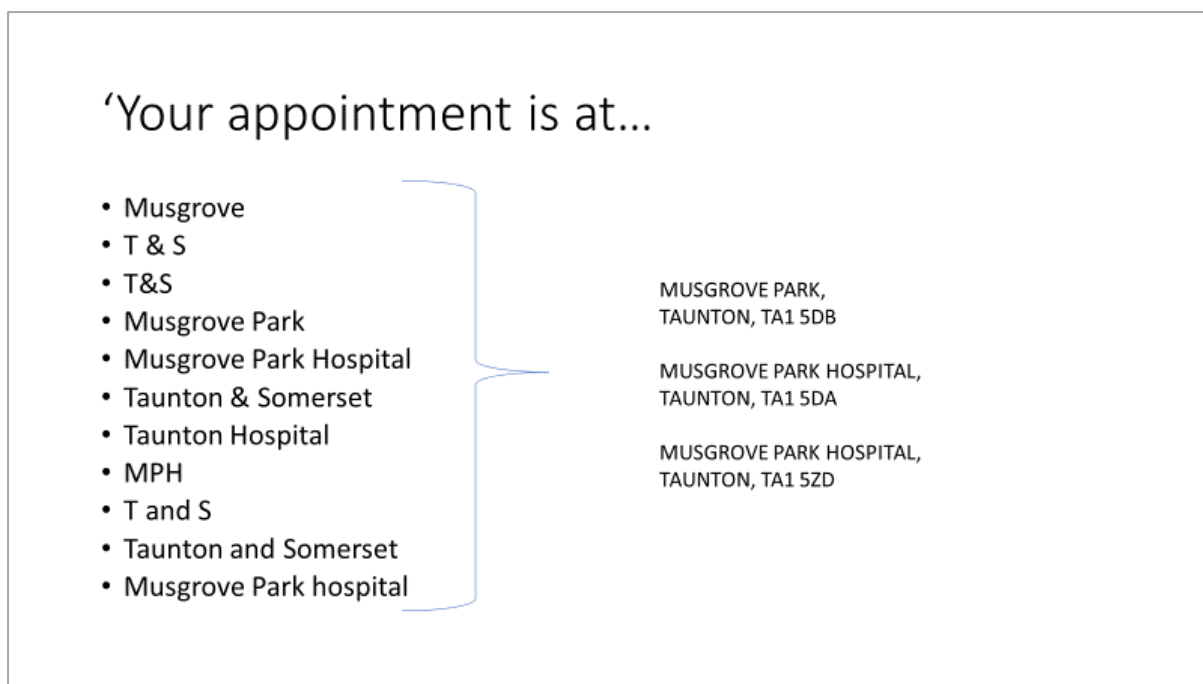


Figure 6: Musgrove Park Hospital - names and addresses

At an even simpler level, putting data on road traffic collisions on a map, rather than a spreadsheet was able to highlight errors in the data – by showing the supposed incidents were recorded as happening at sea. In isolation, such errors can easily pass unnoticed.

Artificial Intelligence

Already in Somerset there are innovative projects that bring information together from different sources and present it in ways that allow it to be used to provide services to the public. Whilst the integration of data should always be guided by need, these projects show how effectively data can be presented to decision-makers.

Artificial Intelligence is used in Axbridge Surgery to help patients and GPs understand the risk factors for emergency hospital admissions. Using the Somerset Integrated Dataset (the new name for Symphony), Brave AI has developed an algorithm to predict the likelihood of an emergency admission within 12 months. For those at high risk, the contributory factors can be identified and appropriate risk-reduction actions planned. Importantly, collection of new patient data is done by the patients themselves, on a tablet computer in the waiting room, so that they have already had the opportunity to consider smoking, alcohol, diet and other lifestyle factors on their health when they come to talk to their GP. This technology could potentially be used to plan community-level work by neighbourhood teams, or to

help in patient triage, particularly for out-of-hours services. It also shows how advanced technology can increase patient involvement in care. An example dashboard is shown in Figure 7.



Figure 7: Brave AI Practice level dashboard

These examples are already taking place and supporting services in Somerset. However, they are not used everywhere. The next section gives a broader overview of the areas in which information sharing could be improved across the whole Somerset public sector.

Good practice beyond Somerset

One of the best known examples of data integration between government agencies at a national level is for motor vehicles, where information about the car, MOT, insurance and the owner are joined up by the DVLA to enable swift, useable and effective renewal of licences and transfer of ownership, as well as monitoring congestion charging. This began operation in its current form in 1999. Whilst many other government public services are available on-line, this still represents an exemplar project for integration.

There is not one, single local area in England that can be pointed to as a comprehensive example of 'getting it right'. The pattern nationally appears to be one of examples of very good information sharing for a number of particular projects, but not an overall, lasting way of addressing the issues. Unitary authorities are generally better placed to join information, for example, social care and housing data, because they are directly responsible for both.

In Milton Keynes, the West Midlands (a complex area with health trusts) and East Sussex, information sharing has developed well across the agencies dealing with 'high intensity users'. These are people – very often the same people – who are frequent attenders at A&E, at their GP surgeries and regularly call the emergency services. Much of their need frequently derives from anxiety, and a consistent approach to dealing with the root cause of that can improve the quality of their lives, as well as reducing pressure on services.

There are relatively few examples of where data sharing projects have succeeded and become embedded widely across 'the system' rather than being based on specific projects. Assessing the impact of fuel poverty, for instance, should involve the integration of income (a household indicator), housing condition (location data) and health status (individual data). Work on a shared, community budget approach to this issue is being done in Oldham (a metropolitan unitary authority) is commended by the Local Government Association; the database required to administer the scheme is described as 'planned', rather than completed, either as a one-off exercise or an ongoing resource^{vi}.

Greater Manchester as a whole has taken the largest steps towards an Integrated Care System (ICS), so it is unsurprising that the area, which is made up of 10 metropolitan boroughs, including Oldham, has addressed the wider need for information sharing. The plans of the Greater Manchester Health and Social Care Partnership describe this very much as a technical issue of common standards and technology, although the willingness of partners to share information with each other is also described as a concern. Early evaluation of the programme (as a whole), however, makes much of issues of governance, with the difficulties of making decisions across organizational barriers holding back progress, and it is likely that this is having an impact on data integration as part of the process^{vii}.

Kent is also seen as a good example and described later in this document because of the similarities with Symphony. This too, however, is a county where clear and ostensibly workable plans have been made, rather than where good practice has become embedded in the partnership of health and local authority.

Data integration and commissioning

Ultimately, the purpose of data integration in the health, care and wellbeing sector has to improve the services provided by agencies in those sectors. As well as higher levels of health and wellbeing, improvement can be in reduced costs, improved experiences for patients or services users and staff, and increased equity. The route to these outcomes is through better commissioning.

Somerset County Council defines commissioning as

'How we identify needs and creatively work with everyone involved to make things happen to meet those needs in the most appropriate and cost effective way.'

As this report has shown, 'identifying needs' can only be done in the round, and at the level they are experienced, by integrating data from a range of sources. Designing services in silos leads inevitably to a question of, 'How can I best use the resources available to me?' rather than, 'How can the needs of my "customers" be met?' Thus, identifying the overall needs of an individual, family, community or neighbourhood is a prerequisite for effective commissioning. This will allow individual agencies to have a better view of where they can act, and even more can enable those agencies to work together to seize the opportunities of joint commissioning. As we move towards Integrated Care Systems, and population health management, such joined up information will be the starting point and the lifeblood of commissioning decisions.

Data integration and the voluntary sector

There have been several references already to voluntary and community bodies so far in this report. As already described, this is a huge and highly diverse sector. It includes very large organizations with a paid workforce, such as Age UK or the Red Cross, local organizations such as St Margaret's Hospice, which receives some NHS funding and is closely integrated with public sector health and care, and small community groups that act largely independently.

Whilst it is therefore impossible to generalize about the nature of integrating data between the 'formal' and voluntary sectors, the latter needs to be acknowledged from the start if its role as a generator, holder and provider of information, as well as a provider of services, is to be developed.

What are Somerset's priorities in data integration?

There is no definitive list of Somerset's priorities, but various forums and groups have come up with ideas. How these could be put into order of importance is a matter for governance and is addressed later in this JSNA. Some suggestions of where future integration would be beneficial have been identified in production of the Somerset Business Intelligence Strategy, as shown below.

Priorities identified in the Business Intelligence Strategy^{viii}

- **Services for children**

Data on children's services have generally made less progress in integration than for adults. Important elements include health (including mental health – CAMHS), education, and social care. Some of the most vulnerable children have characteristics - such as being looked after by the local authority, having special educational needs and disability, or being educated at home – that have wide impacts. Just being able to flag this status to other agencies could greatly improve the quality of help provided and avoid the risk of children 'falling through the gaps'. This information has significant sensitivity, and strong safeguards are required so that only the right people have access.

- **Secondary Care and Adult Social Care**

There have been considerable improvements in the process of discharging adults – usually older people - from hospitals to social care at home in the last two years. Nevertheless, there is still room for further improvement, particularly in reducing re-admissions, and further integration of data will help.

- **Primary Care and the Voluntary sector**

As described in this JSNA, whilst many people may go to health services, particularly their GP, in seeking help, and a range of personal issues may manifest themselves as physical illness, medical professionals are not necessarily best placed to deal with them. Social isolation and loneliness are often identified as root causes of problems. The voluntary sector, be they large bodies such as the Red Cross or Age UK, or local community groups, is often the most appropriate to help. The sector needs information about potential clients (as well as funding) to provide assistance, and GPs need to have the best possible access to information on what is available. Appropriate data integration could produce more effective services and reduce the costs and pressures for the NHS.

An alternative way of setting priorities is according to the *use* to which the integrated data could be put. In the BI strategy this emerged as the requirement for three 'dashboards', at a system-wide, neighbourhood and individual level. These are shown in

Table 2.

Table 2: Software 'products' proposed in the Somerset BI strategy^{viii}

Date	Project
As soon as possible	<p>A prototype Neighbourhood Dashboard</p> <p><i>For example: Consultation appointments; cohorts of conditions; agencies involved in care.</i></p>
By 'Winter 2020' (December 2019)	<p>A full 'Command Centre Dashboard' for system wide integrated urgent and emergency care in Somerset</p> <p><i>For example: Bed availability; transfers of care.</i></p> <p>A full Neighbourhood Dashboard that can also be aggregated to a system level to give Somerset wide population insight and benchmarking</p> <p><i>For example: Bed availability and transfers of care within a neighbourhood.</i></p>
Beyond March 2020	<p>AI supported, live clinical decision support tools</p> <p><i>For example: Predictive intelligence for emergency admissions</i></p>

Project-based Priorities

The need to integrate data frequently emerges in projects aimed at service improvements, where the need to understand the problem, and how to work effectively together, is discussed.

- **High Intensity Users**

Services often find that a small proportion of their 'customers' provide a disproportionate part of their demand. It is often the case that high intensity users of GP services are also frequent attenders at A&E, or callers to the emergency services, or both. The most effective way to reduce demand and – critically – improve the quality of their lives, is to address their needs as people, which often requires dealing with their anxiety. Many partner agencies in Somerset have tried to tackle this but have been confronted by the need to share data on individuals as the first stage.

High Intensity Users – Case study

One patient was a very frequent attender at Musgrove A&E department, often conveyed by ambulance and usually accompanied by an adult child whose forceful interventions on the father's behalf were themselves taking up a disproportionate amount of staff time. Referral to a village agent meant that the family's needs could be addressed together, reducing anxiety and, unexpectedly, helping the wife and mother; for whom her husband's trips to A&E were a respite (indeed simply a chance to sleep). This help has not only made the family members' lives better, but much reduced the time spent in hospital, ambulances and GP surgery.

- **Rising incidence of cancer**

There are clearly many aspects to the incidence of cancer – the age and gender of the population, patterns and rates of detection, lifestyle factors that affect risk and survival rates from other conditions amongst them. And it goes without saying that cancer has major impacts on patients and families, and a wide range of public services. Understanding the patterns can only be effective if the information is joined up.

- **Implementation of Healthy Child Records**

In November 2016 NHS England published *Healthy Children: Transforming Child Health Information*, a digital strategy to help make health information on 0-5 and 5-19 year olds more accessible to help parents and professionals. Providers of children's health care need to adopt common standards by December 2019 as a prerequisite to making IT systems inter-operable. It applies to Health Visitors, School Nurses, maternity, screening and

immunization programmes, as well as GPs' and A&E attendance records.

- **Violent Crime**

Victims of violent crime are very likely to attend for treatment. However, they are less likely to report details of any attack to the police, either because of fear of the assailant or to avoid criminal investigation of their own actions. At least half of violent crime is therefore unknown to the police. In the 'Cardiff model'^{ix} information from A&E is shared with the police, who are able to intervene early in places – such as pubs and nightclubs – and times when violence is likely. Although there is an obligation for A&E to share such records the practice needs considerable improvement.

- **Urgent Care**

Urgent care – of people who need treatment quickly, but whose conditions are not life-threatening – could be improved if information, such as GP or community health records – were more widely available. The ambulance service (SWAST) does not have on-the-spot access to community records, and often has to convey patients to the most acute service (such as A&E) when greater knowledge of the patient might reveal that a next-day referral to a GP may be more appropriate. Other sectors, such as prescribing pharmacists, could also play a bigger role with access to patient records. This applies typically to frail, complex, elderly patients. Access to information is even more difficult to patients registered outside Somerset.

- **Emergency Care**

Especially during the winter, the emergency care system in Somerset, as elsewhere, can find itself under great pressure, with patients forced to wait and beds at a premium. At such times, it may be better to travel further to an A&E where waiting times are shorter, or to a Minor Injuries Unit if the condition is not too serious; other decisions have to be taken about where patients could be moved from acute to community hospitals to make space available. Daily planning is done on the telephone, with comprehensive, electronic, information shared with a 24 hour delay. Real-time dashboards, as described earlier, would enable far better integrated working.

Urgent and Emergency Care needs are tactical, rather than strategic, but the practicalities required for data sharing are the same.

A Somerset Integrated Dataset

One possibility that would reduce the complexity of multiple, point-to-point integration would be the creation of a Somerset Integrated Dataset, which was approved by NHS digital in 2017 (the first such dataset in England to be approved this way), as shown in Figure 8. Clearly this would not be a 'database of everything', but would be a means to connect information in ways that improved data quality and allows analysis of pseudonymized data, within the parameters of the information sharing agreements. No-one should expect to have access to all the linked data: 'blockchain', the system that regulates personalized, almost instant, controlled and secure access to financial data and transactions in cash machines demonstrates what is possible. Joining 11 datasets 'point to point' would require 55 separate integrations, whereas joining each to a central hub would require just 11; and any additional dataset could be added with just a single integration. Furthermore it would establish shared ownership of the data by the whole health and care system within the county – something that does not apply to all datasets currently, especially after processing. The Somerset Integrated Dataset – the re-named and updated Symphony dataset – is the starting point of such an information hub, and its enhancement is proposed within the Somerset BI strategy.



Figure 8: A schematic Somerset Integrated Dataset

A diagram such as Figure 8 is, inevitably, a great simplification of what would have to be put into practice. There are many legal powers, agreements, security, access

control and individual rights that need to be defined in the arrangements shown. In some cases – such as aspects of the direct provision of care – there would be very open channels between datasets and the providers concerned. In other cases - such as safeguarding or community safety – the linkage may only be at an individual level in emergencies. For strategic purposes, the linking is most likely to be pseudonymized; the **exchange of person-identifiable data is unlikely ever to make up more than a very small proportion of data shared between organizations** or sectors. Whilst the overall framework can be set by an overarching information sharing protocol, this type of detail will need to be defined in specific ‘tier 2’ sharing agreements between agencies, where the possible impact on privacy has been fully assessed.

The approach shown here is similar to that of the Kent Integrated Dataset^x, which brings together data from primary care, secondary care, social care, community health and mental health, enabling local modelling of patterns and trends across these services. Importantly, the data controllers are the local partners (rather than the data being the responsibility of national agencies such as NHS Digital) meaning that risk can be owned and managed locally. The arrangement also relies on a comprehensive Overarching Information Sharing Protocol to define the terms under which data are shared and used. This can greatly facilitate data integration by setting the framework for individual agreements (which may cover details such as format and timing).

Such arrangements could, for example, join environmental health and personal health data in such a way that something could be done about it. This might be identifying the dwellings, or types of dwellings, that seem to be associated with the development of lung disease, giving environmental health officers the insight to enforce improvements that could improve the wellbeing of current and future residents.

How does data integration align with other strategies?

Whilst benefits of data integration are evident, any improvements will need to be aligned with wider developments. This alignment is shown below, where integration of services is both prominent and dependent on the integration of data.

Improving lives

The Somerset Health and Wellbeing Strategy for 2019-28 – ‘Improving Lives’ – makes it explicit that, ‘We can achieve more collectively than we can

individually', and the integration of information held by the organizations concerned is a requirement if this is to be achieved^{xi}.

NHS Long term plan

The current strategic plan for the NHS, whilst focusing naturally on the direct provision of health services themselves, includes a commitment to increase the attention paid to prevention, recognizing that this requires involvement from agencies well beyond the NHS. The desire to work in neighbourhoods, in particular, requires a new way of joining information together to support services.

Fit for my future

The local transformation of health services in Somerset – 'Fit for my future' – is part of the Sustainability and Transformation Partnership, and is very much in accordance with the principles of the NHS long term plan. Similarly, therefore, it requires the ability for agencies to work together, including sharing and integrating data, to understand that the pathways of ill-health 'do not start at diagnosis'.

Business Intelligence Strategy ^{viii}

This strategy contains detailed information on proposals that address many of the needs identified in this JSNA. This strategy it is built on the Somerset Digital Roadmap, including SDeR, which is part of the county's Sustainability and Transformation Partnership, implementing the NHS five-year plan locally. It provides the direction and framework within which projects can be assessed and prioritized, and as such is continually evolving as opportunities and risks emerge. This JSNA has drawn heavily on discussions in the Business Intelligence Working Group.

Summary

There are many examples of effective information sharing in Somerset, ranging from the One Teams in parts of the county, joint appointments of social care staff with the NHS and St Margaret's Hospice and the technical data integration of Symphony and SDeR. The technical elements can be made easier by all parties using the same high standards in data collection and storage, and by developing the shared skills of the analytical workforce, as described in the BI strategy. In order to address the wider picture of shared information across the system, though, it is necessary to move on to the question of how decisions about information sharing are made in the thorny matter of information governance.

Information governance and data integration

Whilst the benefits of data integration have been described here, there are risks that need to be acknowledged. In particular, these risks relate to the potential disclosure of information to the wrong people. For example, whilst a patient with multiple conditions would want their doctor to understand the complexity in order to prescribe the right drugs, they might feel very differently about their podiatrist knowing their sexual history. People may have concerns that when supposedly anonymous information from different sources is combined, then it might be possible to identify them^{xii}. Advances in computing power and artificial intelligence mean that someone with malicious intentions could, potentially, identify an individual more easily than would have been the case earlier. Other people worry that *their* information, about *them*, could be taken and used to boost the profits of pharmaceutical companies, for example, rather than treating them.

The users, not just the subjects, of the data may also have concerns about sharing. Some of this will be a simple desire to reduce the risk of disclosing information that they hold, knowing that it would be a breach of trust and incur often substantial fines from the Information Commissioner's Office. Some may also want to avoid sharing information from a very laudable desire to improve their services: a drugs service, working to help people overcome their problems, will understandably want to reassure those seeking help that they will not face immediate criminal investigation.

Other fears include the thought that the data, often based on treatment, could simply reinforce rather than challenge existing priorities (a concern that is most often expressed in police criminal 'profiling'). Some worry that tracing causes of ill health might be used to distinguish the 'deserving and undeserving ill', to promote lifestyle changes that they don't want to make or simply to make cuts in current treatments.

These are real concerns, and any efforts to promote information sharing have to accommodate them, not try to overcome them.

Legal considerations

The most significant legislation in relation to the sharing and integration of personal data is the General Data Protection Regulations (GDPR), in force since May 2018. This legislation builds upon the Data Protection Act (1998) and provides protection for individuals against misuse of their information, or use of their information against their will.

Information sharing is, in part, governed by the Data Security and Protection Toolkit (formerly the Information Governance Toolkit), which allows organizations to assess themselves against the standards. Demonstrating compliance with the standards can

be quite burdensome for large organizations, and some small ones may not have the resources to reach the necessary level, meaning that they cannot receive disclosive data.

A particular provision of the GDPR is that most re-use of personal information requires specific consent from the individuals concerned. As data related to health and care is normally, and rightly, collected principally for the purpose of individual help, the wider possibilities are rarely considered at the time. Furthermore, this would be a potentially inconsistent and cumbersome approach if data sharing for either strategic purposes or immediate care were solely dependent on consent.

Information governance for effective integration

Fortunately, both the provision of individual care and strategic planning can be achieved within the terms of the legislation. Individual direct care is explicitly covered – and indeed most patients would expect that. Population health, indirect care and strategic planning are less clearly stated, but are covered in the text below, taken from advice given to One Teams in Somerset:

Guidance for One Teams

‘Article 6(1)(e) gives you a lawful basis for processing where: “processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller”

‘This can apply if you are either carrying out a specific task in the public interest which is laid down by law; or exercising official authority (for example, a public body’s tasks, functions, duties or powers) which is laid down by law.

‘If you can show you are exercising official authority, including use of discretionary powers, there is no additional public interest test. However, you must be able to demonstrate that the processing is ‘necessary’ for that purpose.

“Necessary” means that the processing must be a targeted and proportionate way of achieving your purpose. You do not have a lawful basis for processing if there is another reasonable and less intrusive way to achieve the same result.

‘In the ICO guide they use the term “public task” to help describe and label this lawful basis. However, this is not a term used in the GDPR itself. Your focus should be on demonstrating either that you are carrying out a task in the public interest, or that you are exercising official authority.’

Importantly, the extent of information sharing relies on a broad definition of direct care, as shown below:

The Second [Caldicott Report](#),

Chaired by Dame Fiona Caldicott, this defined direct care as:

‘A clinical, social or public health activity concerned with the prevention, investigation and treatment of illness and the alleviation of suffering of an identified individual. It includes supporting individuals’ ability to function and improve their participation in life and society. It includes the assurance of safe and high quality care and treatment through local audit (identified patient safety), the management of untoward or adverse incidents.’

This definition – as agreed from extensive consultation with stakeholders in Somerset in 2018 – extends ‘direct care’ from just hospitals, GPs and social workers to the whole of the health and care ‘system’, including public health interventions such as drug and alcohol services, and wider influences on health such as housing and the provision of exercise. And elsewhere in the GDPR, Article 9 explicitly allows the sharing of personal information for the purposes of prevention - (2)(h) – and public health – (2)(i). This means that sharing pseudonymized data for strategic purposes can be achieved on the basis of implied consent.

Implied and informed consent

For strategic purposes, pseudonymized data based on implied consent can give all the information needed about the ‘type’ of people with particular health needs, and how different behaviour relates to need. Such information, however, does nothing for an individual already in need whose information is joined up. This link between the strategic and the personal in care is reflected in legislation. As NHS England have described, the most important data to share can often be the contact details for the patient concerned: any such patient can then give *informed consent* for their information to be shared between the people and agencies providing care, meaning that they can receive the best and most personalized, patient-centred care, perhaps including a personal health budget, with their own information governance issues resolved..

Implied consent can also be used to address self-care, for example in the case of someone who frequently attends A&E. Whilst their own perception of need may be for urgent physical attention, using the Caldicott definition of direct care, implied consent can be used to direct them to help with what may be very different underlying issues.

To provide clarity for teams implementing data integration, integrating data from different organizations requires a context, provided by an Information Sharing Protocol (ISP). An overarching ISP for Somerset – compliant with GDPR – has been drafted and is in circulation at the time of writing. There is also a general ISP drawn up by the Police for data sharing between them and their partners. Specific data integrations will also require their own specific ‘tier 2’ agreements – as exist between acute care and primary care already, for example – but these can be enabled within the framework of the overarching agreement.

Any integration will also be dependent on undertaking a Data Privacy Impact Assessment. These are thorough risk assessments of what might happen under what circumstances in sharing information. It is in these that the balance of risks and benefits needs to be considered, with the benefits of working together balanced against the dangers of disclosing personal information. A Somerset template for Data Privacy Impact Assessments has been drawn up and is available to help in managing the process. It is a long document (longer than this JSNA) and covers the risks and benefits of sharing data in detail.

The current focus of integration is around the direct provision of care for adults (and so includes SCC, acute and primary care, and local hospices). This is a ‘good thing’. It should not, though, distract from the longer-term benefits to be gained from wider integration of data. As an example, persistent lung conditions may best be remedied by improving poor housing quality, a responsibility of district councils.

One reason for the more rapid integration of immediate, personal care data is, of course, the relative similarity of the information held. For the wider determinant data, much is held at the household or even community level – such as access to public transport. Different speed and level of integration is inevitable and proper and will continue to be the pattern. However, given the importance of issues such as housing, employment, and indeed social equity, the immediate task should not be done in a way that closes the door on the wider picture, in particular so that these domains can be the way in which ill health and poor wellbeing can be prevented.

Critical to the management of data integration is the status of a ‘data controller’ – the organization that takes overall legal responsibility for the information. (This does not mean that information cannot be held – with consent - by other ‘data processors.’) ISPs are required between different data controller. This issue often

comes to the fore when there is organizational change, such as the transfer of health visitors from Somerset Partnership to Somerset County Council. Whilst this is largely the same people undertaking the same work and using the same information, the rights to view and edit the information, or rights acquired in one role, such as the ability to view primary care data, are not automatically transferred as well. In Kent, the idea of a 'joint data controller' is in development; this may prove to be more widely useful.

In summary, the perception of the legal framework being a barrier to information sharing is wrong. Legislation enables the sharing of data where better health and wellbeing will result, while offering the necessary protection and reassurance for individuals that their data and their privacy will be safeguarded. This JSNA has identified opportunities in better data sharing but has not identified a 'need' for new legislation. It is therefore necessary to consider how decisions about information sharing are made in Somerset.

In the words of a South West Director of Children's Services:

'If you are taken to court for breaching the terms of the Data Protection Act, done with the aim of improving child welfare, I will stand in court and defend you to the hilt. If a child suffers because you have failed to share information, you are on your own.'

Current Somerset Information Governance arrangements

Most day to day information governance takes place within organizations, but that is out of scope here. What is of interest is how decisions are made in partnership. The most developed arrangements are in the health sector.

As part of the Somerset Digital Delivery Board, there is a Somerset Information Governance Working Group, consisting of Information Governance leads from CCG, SCC and the three health Trusts in Somerset and, in the voluntary sector, St Margaret's Hospice. The current scope is to provide Information Governance support and advice primarily to SIDeR, with a focus on improving information flow for direct care between health and social care teams in Somerset. The Group and its members link to the Somerset Overarching Information Sharing Agreement, and in turn support the development of Tier 2 Agreements and Data Privacy Impact Assessments relating to particular projects between organisations to ensure the purpose and data flow are relevant and appropriate.

As part of the growth in the digital programme, and in particular if the Somerset Business Intelligence Strategy is to progress, there is a need to strengthen the involvement of more strategic decision making on information governance.

A Somerset Information Governance Approvals Board?

Through the new BI Strategy is a proposal to develop a Somerset Information Governance Approvals Board, to consist of Caldicott Guardians, Data Protection Officers, Information Governance leads, with strong link to the Senior Information Risk Owner (SIRO) role. It could also usefully include other professionals with wider responsibilities, including clinicians, so that overall risk can be assessed on the whole range of criteria. This Board would require some formal status, and the Somerset Health and Wellbeing Board and the Partnership Executive Group (overseeing the Sustainability and Transformation Partnership) could both have an important role to play.

The new Board and its membership would also be able to undertake an IG enabling role for strategic planning, implementation and delivery of new initiatives emerging from system level transformation programmes. In other words, this group would be able to take an overview of the ability of 'the system' to improve health and wellbeing, and see the dangers of *not* sharing information as much as the risks associated with doing so, This should therefore enable the development of a Somerset Integrated Dataset providing integrated data access to system partners and the evidence base for identifying system-wide priorities.

The proposed arrangements would encourage a shift in focus towards decision-making for the most productive and valuable projects for the integration of data, with a *system* assessment of risk (which would tend to promote sharing), rather than one focused on individual organizations.

Any future structure would, of course, need to be reviewed in the light of prevailing local arrangements, and respond to changing requirements from the integration of care at the county and neighbourhood scale. It particularly needs to take account of which 'parts' of the system exist as legal entities, meaning that they can be data controllers: whilst partnership working is an implied outcome of information sharing, this is not sufficient to address the needs of correct information governance.

What can the Health and Wellbeing Board do to help governance?

The main barrier to sharing information in Somerset appears to be the lack of a clear

and powerful local structure for making decisions. Legislation is drafted to protect against misuse of data but to promote sharing where there is a public benefit, especially in providing better and more preventative public services. Decisions are currently driven largely by individual bodies' perception, which necessarily inflates their own risks in sharing and understates the wider public benefits.

A system-wide governance structure could both strengthen the protection of personal data and enhance the benefits of a whole-system understanding of need.

- The Board should give confidence and leadership to officers in member organizations to share information where appropriate under the 'public task' provision, and publicly declare how the potential benefits of correct information sharing can outweigh the risks of *not* sharing.
- The Board could oversee, and give its imprimatur to a 'Somerset Information Governance Approvals Board' of information sharing to approve, regulate or deny information sharing projects and use.
- The Board could consider ways to help smaller organizations, especially in the voluntary sector, to comply with the Data Security and Protection Toolkit in order to engage in information exchange.
- Endorse the overarching information sharing protocol.

Summary – what can be done to improve data integration?

Integrating data is an obvious 'good thing' in principle, and hugely complicated in practice. There is no single, simple solution. Excellent examples exist already in Somerset – examples such as SIDeR and the innovative use of data in Brave AI.

However, many problems remain, with children's data often held in silos, and even more distant from adult data. While the integration of health and adult social care is progressing well, the same cannot be said for the wider determinants of health and the voluntary sector, which will be vital to future health strategy.

It has been shown here that whilst technically difficult, with appropriate integration software (and the necessary time, money and effort) different administrative systems can be joined to produce, for instance, shared dashboards. The legal barriers are more complicated, but as a basic principle if joining datasets produces real public benefits then it can be achieved (and effort should not be wasted on data integration that does not produce such benefits).

The Somerset Business Intelligence strategy offers a vehicle to create an integrated, person- and community-focused picture of health and social need. The Health and Wellbeing Board is urged to support this, and to help its extension into areas such as police, housing and voluntary sector that may be more distant from direct care, but nevertheless an essential part of health and wellbeing in the county.

Suggestions for the Somerset Health and Wellbeing Board

Governance

The Board could give confidence to officers to share information where appropriate under the 'public task' provision, and stress how the potential benefits of correct information sharing can outweigh the risks of *not* sharing.

The Board could oversee a 'Somerset Information Governance Approvals Board' to approve, regulate or deny information sharing projects and use.

The Board could consider ways to help smaller organizations, especially in the voluntary sector, to comply with the Data Security and Protection Toolkit in order to engage in information exchange.

Endorse the overarching information sharing protocol when it is re-circulated.

The Board can engage Somerset residents in conversation about priorities, benefits and risks of sharing information.

Technical

The Board should ensure that its members collect information to the highest standards of quality and interoperability

Data should include unique fields – such as NHS number or Unique Pupil Reference Number - to enable linkage.

The Board should ensure that its members collect information in standard forms – as included in ISO documentation

Software should be used in common where possible. This opens up the possibility of economies of scale, and promote shared dashboards, making it easier for them to be understood across organizations.

We always welcome feedback and comments on the JSNA – please contact publichealth@somerset.gov.uk

The Board should support the development of analysts' technical skills within the county

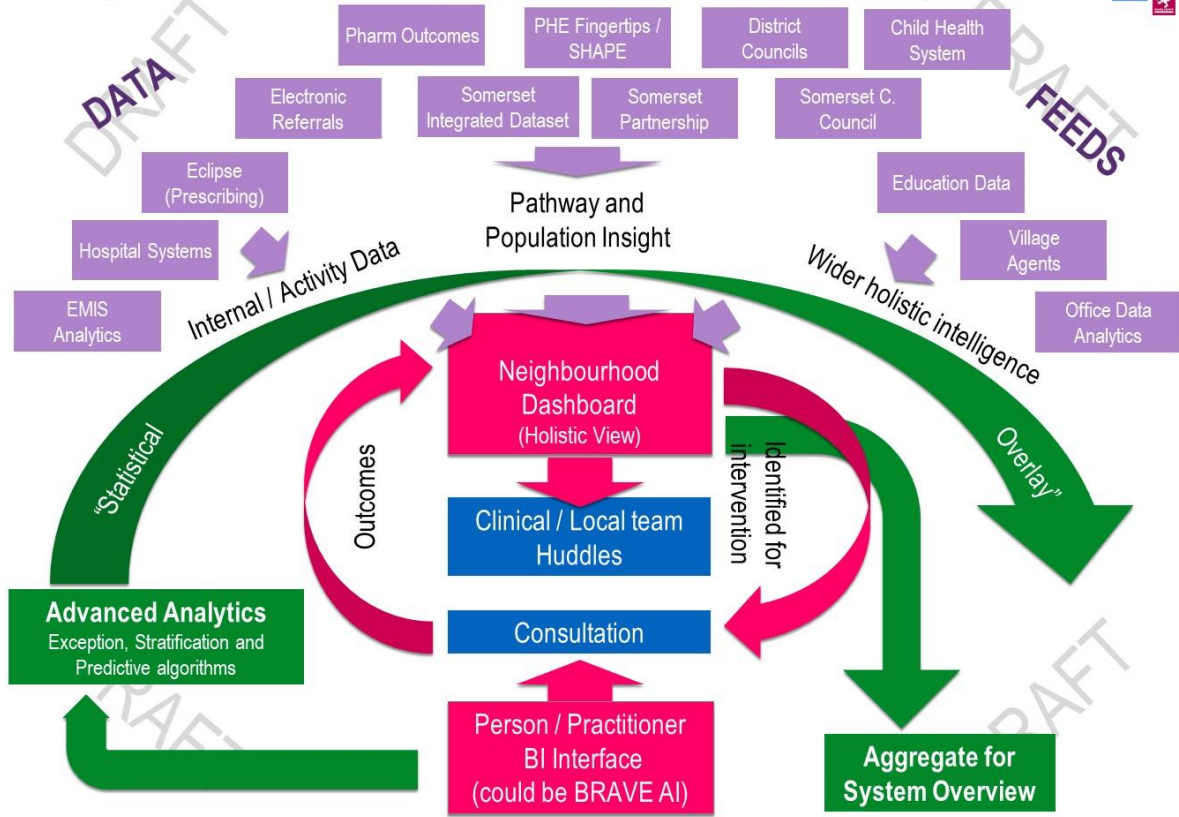
GLOSSARY

Term	Meaning
Aggregated data	Data about individuals added together and averaged within an area or population group, so that individual characteristics are no longer identifiable.
Artificial Intelligence	Not just reporting performance data, but automatically checking and refining the findings to improve them, especially for the purposes of forecasting.
Business Intelligence (BI)	Using administrative information to give insight into performance and trends rather than 'just' case management. This may often involve joining data from other sources.
Caldicott Guardian	A senior person, in each NHS organization and local authority providing social care, responsible for protecting the confidentiality of people's health and care information and making sure it is used properly.
Disclosive data; Person (or Patient) Identifiable Data (PID)	Data that can be used directly or indirectly to identify individuals. Such information needs to be treated with great care and can only be shared with other agencies under strict conditions.
Individual (Direct) Care (Identifiable information is generally permissible for direct care)	A clinical, social or public health activity concerned with the prevention, investigation and treatment of illness and the alleviation of suffering of individuals. It includes supporting individuals' ability to function and improve their participation in life and society. It includes the assurance of safe and high quality care and treatment through local audit, the management of untoward or adverse incidents, person satisfaction including measurement of outcomes undertaken by one or more registered and regulated health or social care professionals and their team with whom the individual has a legitimate relationship for their care.

Master Data Management	Using the joining of datasets to improve quality, using the most reliable source for each field in the database.
Population Health	[Source Kings Fund] Population health means the health outcomes of a defined group of people, as well as the distribution of health outcomes within the group. This means that health equity – the avoidable differences in health between different parts of the population – is a core part of understanding population health.
Population Intelligence	Many definitions exist but one that might be helpful in Somerset is: 'Population based data and analytics with 'individualised inputs' which benefit both the individual and the population'
Predictive Modelling	Exploiting patterns in historical and transactional data to identify risks and opportunities. Capturing relationships among many factors to allow assessment of risk or potential for improvement, thus guiding decision making for patient care
Pseudonymization	Using individually identifiable shared fields to link datasets in a secure environment, then republishing the data with unique but non-identifiable codes
Real Time Information	Not necessarily 'live', operational information can be provided to practitioners in time for 'impactful interventions'. For Emergency Care this is likely to be 'live' information (every 15 mins). In other care settings the key emphasis is on 'timely'
Senior Information Risk Officer (SIRO)	A Senior Information Risk Owner (SIRO) is an Executive Director or member of the Senior Management Board of an organisation with overall responsibility for an organisation's information risk policy.

Annexe

Neighbourhood Dashboard: a vision for 'Holistic BI' in a Neighbourhood



REFERENCES

- ⁱ <http://www.somerset.gov.uk/EasySiteWeb/GatewayLink.aspx?allId=127518> p.39.
- ⁱⁱ The main exception is information based on sample surveys.
- ⁱⁱⁱ Dr Foster, cited by NHS England.
- ^{iv} This interestingly illustrates a recent description of poverty as a 'gravitational force' (McGarvey *Poverty Safari* 2017).
- ^v Similar community-based work in Hertfordshire has demonstrated how attendance at A&E can be reduced.
- ^{vi} <https://www.local.gov.uk/sites/default/files/documents/tackling-fuel-poverty-thr-008.pdf>
- ^{vii} <https://www.local.gov.uk/sites/default/files/documents/tackling-fuel-poverty-thr-008.pdf>
- ^{viii} Business Intelligence Strategy Executive Summary
http://www.somersetintelligence.org.uk/Somerset%20System%20Wide%20BI%20Strategy_Executive%20Overview%20and%20Vision%20Statement_270619.pdf
- ^{ix} Shepherd, JP (2001). "Criminal deterrence as a public health strategy". *Lancet*. 358: 1717–22. doi:10.1016/s0140-6736(01)06716-2.
(<http://www.thelancet.com/journals/lancet/article/PIIS0140673601067162/abstract>)
- ^x <https://www.thewholesystem.co.uk/systems-thinking-modelling/hosted-online-models/kent-cc-cohort-test/>
- ^{xi} <http://www.somerset.gov.uk/EasySiteWeb/GatewayLink.aspx?allId=134347>
- ^{xii} A notorious example is of a rape victim identified in one newspaper as 'a vicar's daughter in London' and in another as 'a woman in Ealing'; neither identified her on their own, but in combination her right to privacy was breached.