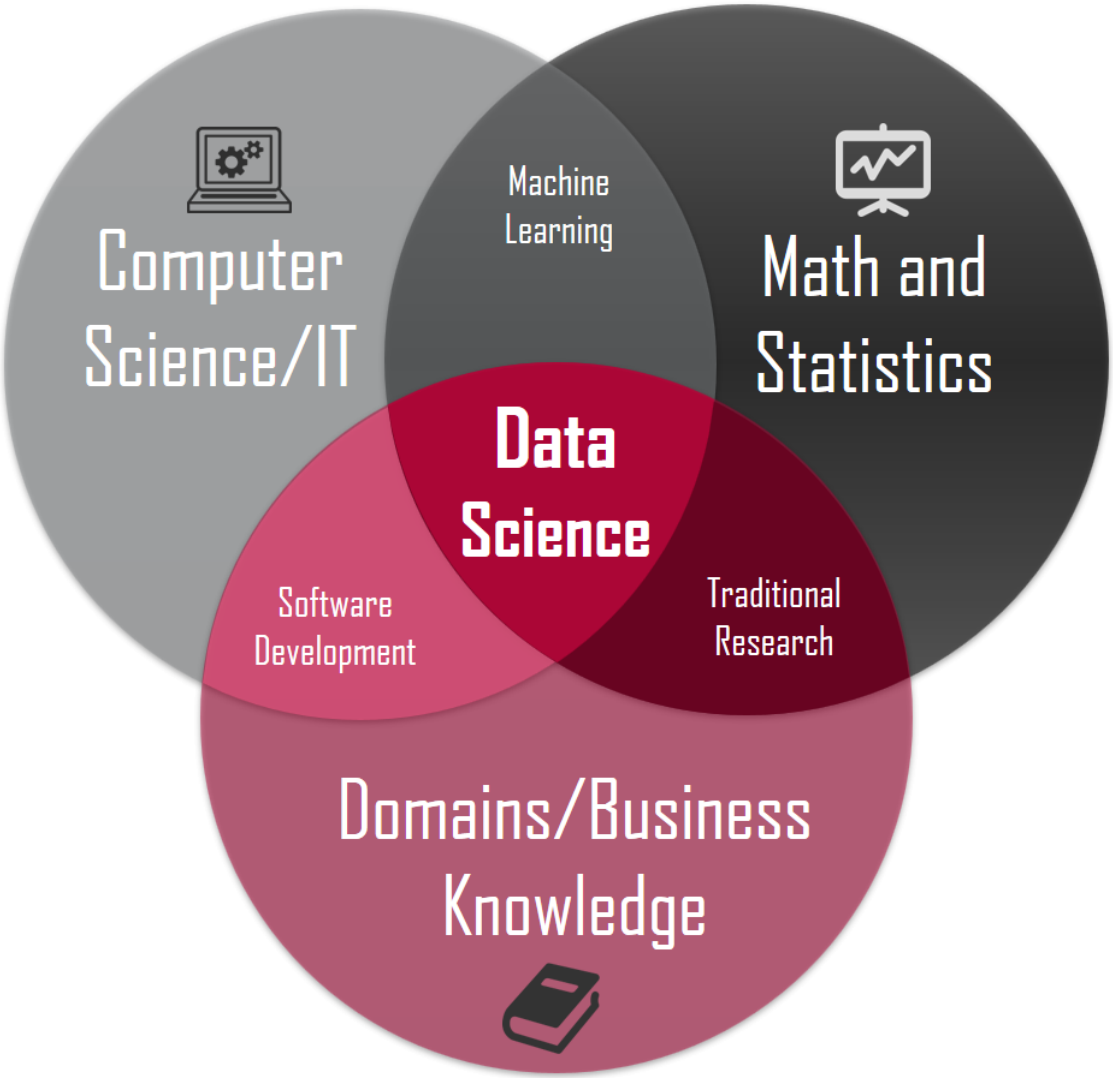


The future of Integrated Care Systems is Data Science.

Data science will drive Population Health Management.

Population Health Management is about behaviour change.

Behaviour change is why we are creating Integrated Care Systems.

Therefore, the success or failure of Integrated Care Systems will ultimately depend on the quality of our Data Science.

Interested?

Read on and let me know what you think.

Data Science. What's that?

The excellent Venn diagram (above) was produced by Michael Barber in his blog Data science concepts you need to know! Part 1. Data Science is the nexus of three areas:

1. Computer Science
2. Maths & Statistics
3. Business/Domain Knowledge

The most direct application of computer science to the functioning of any organisation has been software development that delivers relevant business applications. Likewise, Mathematics and statistics are routinely applied by organisations to answer quantitative questions. A less familiar term, Machine Learning, comes about through the use of computing to help solve numerical challenges not amenable to more direct calculation.

For example, if we looked at a cohort of patients suffering from COPD over the last 5 years they have been in contact with our health and care services, we could look at their clinical outcomes in the context of their age, sex, types of treatment, their smoking status, and any other relevant factors that the system might have collected.

We can take whatever patterns we find and apply this to new cohorts of patients when they first (or even before) contact the health system and receive a diagnosis of COPD. At the point of clinical intervention, the clinician would have this information available to them to guide treatment and potentially change the interaction with the patient based on this wider cohort knowledge. At a strategic health system level, resources could be more confidently reallocated into those services and intervention points with the best outcomes.

You are working in the Data Science nexus when you can command both computer science and maths & stats skills to answer relevant business or domain knowledge related questions, as in the example above.

You can write code to process data into required formats in order that machine learning and other methods can be applied and the results visualized in a way that supports decision-making.

Isn't this what a traditional data analyst does?

Yes and no.

Yes, analysts use computers to process data and apply maths & stats to answer questions.

No, most data analysts have limited, if any, relevant coding skills.

No, most data analysts do not have enough maths & stats knowledge to appropriately and confidently use multi-variate statistical methods and machine learning.

No, most data analysts will not be able to effectively process huge multivariate data sets on the fly to answer new questions in different ways.

Some of us will be able to do these things, but most of us won't — it wasn't in our training programmes (if we even had analyst training, because for many of us, we learned as we came up through the business).

Data Science. Driving Population Health Management?

Well, yes. Data Science drives it in two ways.

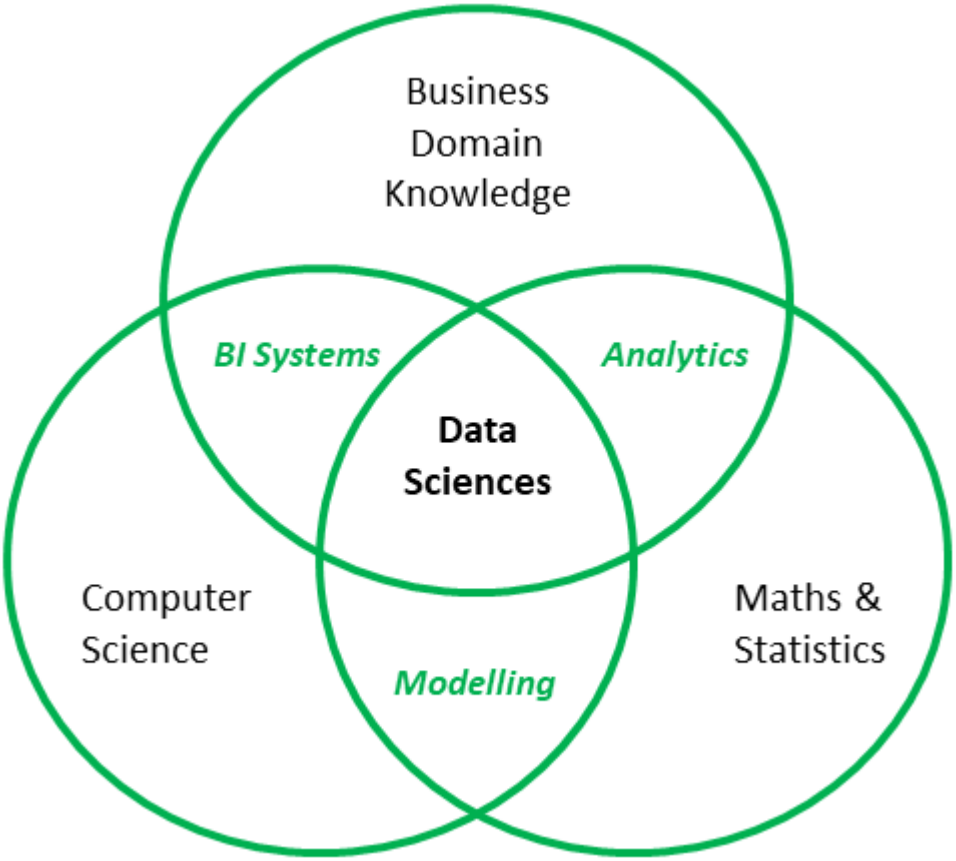
First. Data science constitutes the core methods of population health management.

Second. Data science provides an methodological framework for understanding and delivering the health intelligence that is going to be required.

I've redrawn Michael Barber's excellent data science graphic (below) to illustrate three key technical activities that sit around the data science nexus.

1. Business Intelligence Systems – Business Analysts
2. Analytics – Data Analysts
3. Modelling – Modellers/Researchers

Of these three areas, the "modelling" activity is the least common activity across our Integrated Care System, and it is often contracted out due to the specialist nature of the activity.

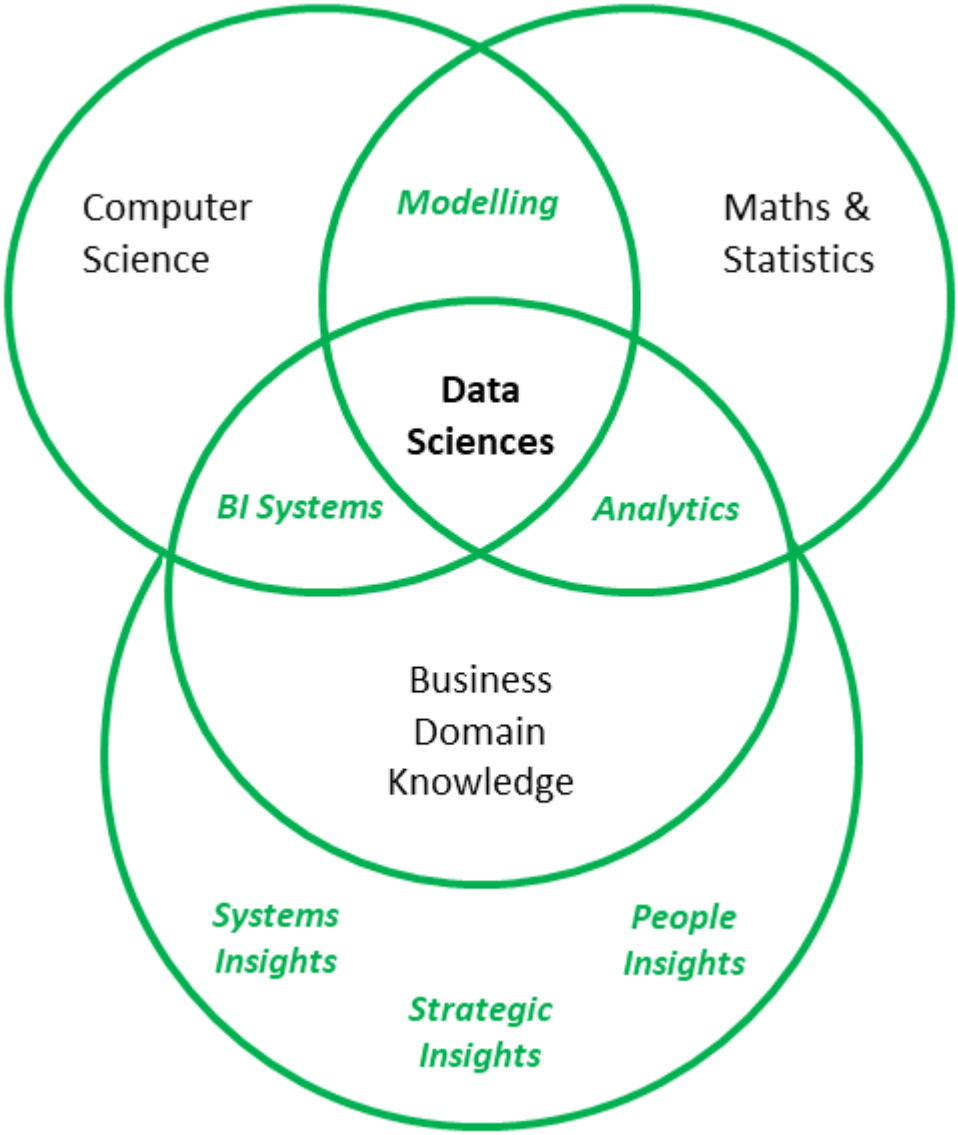


Nonetheless, Data Sciences provides a methodological 'home' for key skills we need now and in the future. Many of us will continue to work around Data Sciences (BI Systems, Analytics, Modelling) and focus our energies elsewhere, but we all need to continue developing our skills and knowledge in relation to emerging Data Science methods.

So that's it then? All the methods we need to deliver Population Health Management?

Well no. There are three more methods, not well captured in the above diagram.

These are critical 'soft methods' that organisations can use to develop a better shared-understanding of strategic issues — this is borderline "future of health intelligence" work, but we'll save that for another blog. I think that following diagram includes all the essential methods needed to support behaviour change at a system level. I have blogged about these before, and will again.



Behaviour change. The Integrated Care System?

Yup.

We work in a complex environment. Trying to get everyone in every organisation that influences the health and wellbeing to work together in a coordinated maybe even coherent fashion to improve the health of residents is a gargantuan undertaking: hospitals, community health teams, primary care, public health, multiple facets of local authority activity (including but not only social care, housing, environment, transport, community development, and community safety), ambulance services, and a cornucopia of third sector organisations

working across disease, disability, mental health, bereavement, environment, physical activity, social connections, and democratic interests/challenges.

Apologies to everyone I've forgotten.

People wanting to help fellow citizens. It's crowded out there.

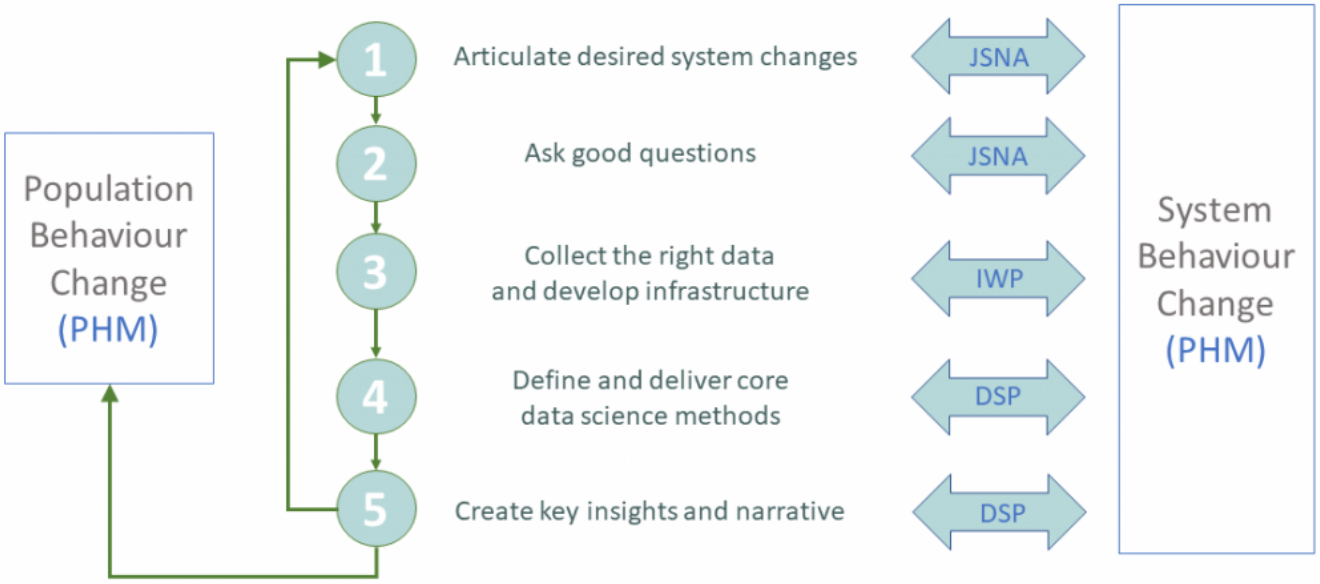
Honestly, the focus is just on the NHS at this stage. Not even all of the NHS. Maybe just Primary Care!

Big job. Not enough resources. Complex work environment; complex organisations. This is going to take time. Years.

But what is the alternative to changing the behaviour of the entire health and care system?

So, here's a high-level model from a Health Intelligence perspective on how we get that behaviour change we so desperately need. It's a simple five step loop that we need to get right, and we have a number of methods programmes working on getting this right:

1. Joint Strategic Needs Assessment (JSNA) — 'soft' insight methods
2. Intelligent Working Programme (IWP) — infrastructure and data underpinning all activities
3. Data Science Programme (DSP) — data science and associated 'hard' methods
4. Population Health Management (PHM) — application of methods towards behaviour change



If we are going to change system behaviour so that the system can help change population behaviour through a completely different way of working in an Integrated Care System, we have a lot of work to do.

There are a huge number of moving pieces.

People are beginning to come together.

It seems very slow at this point.

There is only action happening in parts of the system, but it is starting to happen.

Next Steps

Only one really. Build our Data Science capability. It's going to be a long road and another blog!

This futures blog

This blog series is about how we create 'healthy places' and what our possible 'futures' could be given current trends and momentum within society, the economic and political systems, and the environment. I use the plural 'futures' intentionally, because our future is not predetermined (I hope), we can and should work towards the future we want. This blog aims

to generate discussion (maybe even some debate) around ‘Healthy places futures’ in the hope that if we all put our minds to it, a collective vision may emerge to inform any strategy we might put in place to get us to our preferred future. We’ll be leaning heavily on futuring tools found on our Shaping Tomorrow hosted website: phd.shapingtomorrow.com.

The future is already here — it’s just not very evenly distributed (William Gibson 1993).re