i2 CASE STUDY

"FOR THE FIRST TIME WE NOW HAVE AN ANALYSIS TOOL THAT CAN CROSS TRADITIONAL BOUNDARIES OF DATA INTELLIGENCE AND BY DOING SO PROVIDES GRAPHICAL AND GEOGRAPHICAL EVIDENCE OF WHETHER CURRENT SERVICES OR NEWLY CHANGED SERVICES ARE WORKING".

Cancer registry leads the way in cancer treatment analysis

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The Eastern Cancer Registration and Information Centre (ECRIC) is one of eight cancer registries in England with Northern Ireland, Scotland and Wales having their own, and together we form the United Kingdom Association of Cancer Registries (UKACR). ECRIC serves a population of 5.5 million in the East of England; we provide a free service to the NHS and one of our core functions is to provide information for genetic enquire requests.

We collect and collate information from over twenty different data sources ranging from hospital pathology and patient information systems through to local cancer information systems, and other nationally collected audits on cancer data.

We register all malignant tumours as well and benign, in-situ and uncertain behaviour malignancies and CIN II & III. We also follow the patient journey from diagnosis through the patient pathway, capturing all treatments and hospitals of treatment for their lifetime.

We hold information on the patient including demographics (ethnicity, address, GP details and date of birth), their diagnosis (date of diagnosis, consultant and hospital of diagnosis), the tumour (site, behaviour, morphology and stage of tumour), hospital where treated (NHS and Private) and cause of death (this provides us with our survival and mortality figures).

Having the ability to analyse data has for a long time been the essential ingredient for hospitals to monitor and improve service within their organisations. This has its limitations however as although you can look at numbers and treatments locally you cannot see where all your patients are going for treatment and more importantly what treatments they are receiving.

In today's age of specialist tertiary centres becoming more and more important in healthcare, secondary healthcare providers are finding that their patients have to travel sometimes across long distances in order to get the treatment they need for the cancer they have been diagnosed with.

This leaves a DGH (1) with a problem; until now, they have not been able to visualise where their patients are going. However that has now changed with the i2 programme. For the first time i2 provides Consultants and Hospital Managers a visual and geographical picture of where their patients are going for treatment and more importantly what treatments they are having at each location.

By programming in all GP (2) practices, Private Hospitals and NHS Trusts you can see where patients are being diagnosed and treated and this is vital to understand if services are to be improved and understood. It also has excellent use when looking at IOG (3) or major service reconfiguration led by Cancer Networks or PCTs (4) as commissioners.

By using just three entities you can use the i2 programme to do this (see graph 1 below). You need the patient themselves (cross referencing all data to ensure only unique values are used) at one end, the event (Diagnosis, Surgery, Chemotherapy, Radiotherapy etc) in the middle using multiple links as the connecting line and the hospital of treatment at the other end.

Graph 1

Although I am going to concentrate our case study on using i2 to map the treatment delivery for cancer in Children and Young People, i2 has a much larger role to play in analysing data across many areas of today's complex NHS. To demonstrate this further I have put together three examples of how i2 can be used to maximise understanding and help shape the future care and service provision provided by an individual DGH or when looking at a broader picture capturing visually the patient pathway. These are:

1. Coping with large volumes of data
2. Measuring changes to service provision
3. Children and Young People's IOG

When we looked at breast cancer across the East of England region using *i2 Analyst's Notebook* 7, we could clearly see where patients were going for their diagnosis, primary and ongoing treatments regardless of the location of the healthcare provider responsible for each part of the patient's pathway, and found that the system could manage numbers of up to 15,000 plus.

Analyst's Notebook can also be used to see if a new reconfiguration of services has been effective or not. One such case was after it had been decided that Penile Cancer being such a rare cancer should be centralised into one NHS Hospital Trust so that all the specialists could be based there and as a direct result better care and improved outcomes would result from the change.

By going back to year one before the reconfiguration of Penile Cancer and the three years post we were able to demonstrate geographically whether or not the reconfiguration had been successful of not. By year four we could see clear movement of cases to one central specialist referral centre demonstrating that the desired outcome had been successful and by using i2 this has been shown in a graphical and geographical format that is easily presented to hospital Managers and Commissioners.

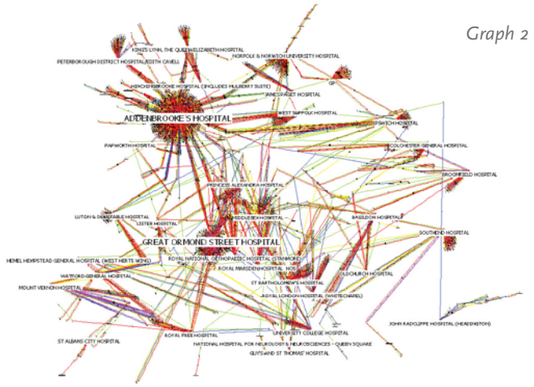
When we looked at Children and Young People data we were already aware that there were specialist paediatric centres around the country for children aged between 0-15 years old but once a patient turned 16 it was more unclear where their treatment care was now taking place. It was thought that this maybe being cared for outside of these specialists centres and on mainstream wards with patients up-to 75 years old.

Part of the IOG was to think about creating specialist centres for young adults between the ages of 16-24 but there was a school of thought that did not think that people would want to travel large distances for specialist care. Using i2 we have managed to graphically and geographically show where treatment was being delivered for these patients.

When we started to analyse the data with i2 we looked at all patients diagnosed with cancer for all cancers within the age range of 0-24. This provided us with a huge amount of patients and because the treatment patterns for each tumour type are different the starting graph (graph 2) is a very busy one.

(1) District General Hospital
(2) General Practitioner - Doctors Practice
(3) Improving Outcome Guidance
(4) Primary Care Trusts - Commissioners for all Acute Services within the National Health Service

Graph 2



Due to the amount of data and the many different tumour sites this diagram becomes difficult to understand.

The movement of patients can be seen between hospitals; however individual referral pathways are obscured by the number of tumour groups.

By doing this work by individual tumour groups will clearly show where patients go for their different treatments.

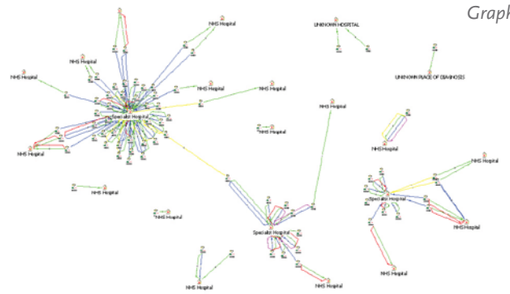
When looking at an i2 chart you can clearly see the patients as clusters of dots around each healthcare provider, the events will run off these to show where each specific event took place (the hospital), thus completing a unique dimension into healthcare analysis.

As a result we decided to separate the data by age group and also by specific tumour groupings as well as follows:

Age:	0-15	Tumour group:	Brain
	16-18		CIN3
	19-24		Leukaemia
			Lymphoma
			Other (all other tumours)
			Testicular

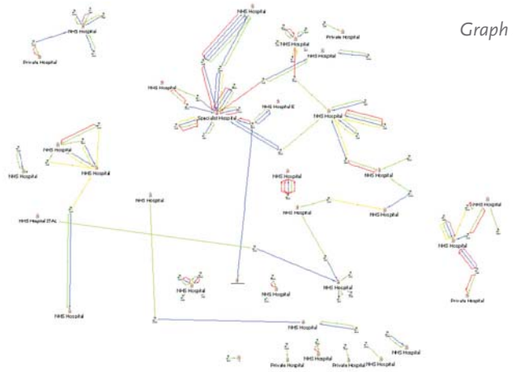
If we look at Lymphoma as a sub set we can see dramatically where treatment care is provided.

Graph 3



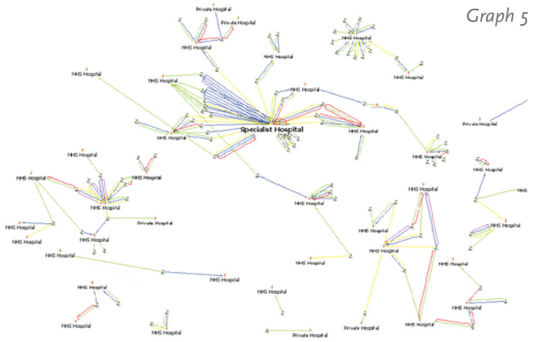
In graph 3, which only looks at children aged between 0-15 years old, we can see that the established specialist centres are working well and all children are indeed being cared for by the main paediatric centres for the region.

Graph 4



Compare this picture to that of graph 4, which looks at teenagers aged 16-19 years old and you can see a completely different picture. Now the healthcare is being provided in the main by the local DGH rather than a specialist centre.

Graph 5



When we look at graph 5 young adults aged between 20-24 years old, again the same pattern shows that there is no defined specialist care pathway but instead patients are being care for within their own local DGH.

Interestingly though it does show that there is a need to travel for specialist care when radiotherapy is required however this is being carried out within regional centres.

Conclusion

I am very excited about i2 and its long-term analytical benefits to cancer analysis. The benefits and power of i2 when used within a medical analysis environment are very powerful.

Commissioners can see if patients are going to the right hospitals they are commissioning care/services from and if not we can drill down to patient/consultant level to investigate why.

Consultants can see where their patients go once they leave their care and if a change to service provision has been implanted then they and hospital managers can see if this has been successful.

For the first time we now have an analysis tool that can cross traditional boundaries of data intelligence and by doing so provides graphical and geographical evidence of whether current services or newly changed services are working.

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Fighting cancer with information