

The Trent

PUBLIC HEALTH GIS UNIT

It's all about maps, maps and medicine – or more accurately maps, illness and disease. The use of geographical methodology and the application of spatial models is one important and longstanding area of interdisciplinary health research, providing skills for the identification and interpretation of patterns and trends from spatially presented data. The widespread use of affordable powerful desktop computers and the availability of georeferenced socio-economic and health data has ensured that Geographical Information Systems (GIS) are becoming widely recognised as powerful tools in health care research and epidemiology.

The explosion in the use and interest of GIS and desktop mapping for health applications has resulted in the development of specialist health GIS and spatial analysis units (such as SASHU in London and the West Midlands Health GIS Service in Birmingham). Here in Trent the Public Health Geographical Information Sciences Unit at the University of Sheffield was established in 1999. The Unit's core activities are funded by a grant from the Public Health Development Fund. The unit has three main aims:

- To conduct high quality grant funded and commissioned research
- To promote awareness and use of GIS in health
- To provide support for GIS and spatial analysis in health

My focus here is on the latter two of those three core activities. I wish to discuss some of the issues that have arisen from our units experience in providing GIS support to the eleven health authorities in Trent. I should point out that this should not in anyway be construed as a criticism of anyone working in, or the practices of, those districts.

So a little bit about public health just to set the discussion in context. Simply put the importance and prominence of public health is changing – we have a Minister for Public Health and the government's white paper *Saving Lives Our Healthier Nation* has stipulated the creation of specific public health bodies. But what is public health? Where are its traditions? The importance of understanding the link between the environment and our health can be traced back to Hippocrates ('Of airs, waters and places...'), however it is only since the emergence of interest in public health during the nineteenth century that methods have been developed to measure differences in the distribution of disease (Beaglehole *et al*, 1997). The use of maps in epidemiological investigation is far from new (Gilbert, 1958) with perhaps the work of John Snow and his now famous study on the distribution of cholera around the Broad street water pump in the Golden Square area of Soho, central London, the best-known example¹.

150 years on from Chadwick's pioneering 1848 Public Health Act, the issues of concern then, the relative inequalities in health, are the same as they are today

¹ For a good history of medical geography see Curtis & Taket (1996)



(Calman, 1998). These issues together with the shift in medical emphasis towards primary and proactive health care services have ensured that the role of public health has increased in significance. The goal now is 'preventative health care' rather than the traditional 'reactive health treatment'. Both the previous Conservative administration and the present Labour government have, through their respective White papers (Health of the Nation, and Our Healthier Nation) stipulated specific targets for health improvement in a selection of key areas. Both initiatives have placed considerable emphasis on the prominent role that information technology (of which GIS are part), has to play in reaching these targets. The central role attached to GIS and spatial analysis units, such as ours in Trent, is core to the functioning of the recently established public health observatories.

One of the principle functions of the observatories will be in health surveillance – a broad term that involves the 'tracking' and monitoring of health. This complex and far from straightforward task will involve the assimilation and analysis of many diverse data ranging from poverty, housing, pollution, crime, educational standards, to pay employment, and not to mention directly related health data. These are all data relating to a place, a common theme binding them together and one that explicitly places them in the domain of GIS. The combination of all these disparate data from a wide variety of sources is in direct line with the 'joined up thinking' ethos of the present government, a role GIS is uniquely qualified to fulfil.

The changing role of public health together with the increasing role that GIS can play in public health has introduced a new set of challenges facing public health departments in health authorities up and down the country. One the one hand:

- Public Health departments are increasingly aware of the value of GIS, but either tend not to be aware of its full value (creating output other than descriptive choropleth maps), or how to use it to its fullest potential (though that's not to say some are accomplished users).

One the other hand

- Governmental initiatives are increasingly multi-agency and focus on small areas.

The first problem runs into the second. Health authorities as larger administrative units are increasingly coordinating multi agency projects such Health Action Zones, Sure Start etc. These projects all have one thing in common: the integration of diverse datasets from different agencies. This is where the first problem occurs.

In the first instance it is attribute data issues that tend to dominate the debate. Issues surrounding data quality, level of aggregation, confidentiality and data ownership for example. Indeed these issues are not trivial and should not be underestimated, increasingly so as web sites are being used as one (or the only) means of information dissemination. Nonetheless attribute data are but only one part of the data requirement for GIS. Without spatial data you simply don't have a GIS or mapping capability. While this must be self evident to the majority of 'trained' GIS users, it is not necessarily the case for specialists from other disciplines or backgrounds who wish to use GIS as a tool in their work. This is often the case with Health Authorities. I'll explain the significance by way of a question.

What is GIS?, Is it a computing tool – as with a word processor or spreadsheet, or is it a more comprehensive computer system more akin to a central database? Well of course it is, or can be, both. However the distinction is blurred (if indeed a distinction be needed). This fuzziness of definition together with differences in health authority structure has ensured that the location of GIS and mapping within health authorities is far from uniform. In some instances GIS is within public health, in others in information services. Of course GIS has a far wider role to play within a health authority other than public health – for instance asset/resource management and planning. The point is, for health authorities GIS is seen as a tool and is used by specialists in areas other than those traditionally associated with GIS (such as geography for instance). Again the intention here is not to criticise health authorities, but merely identify the disparity that can exist between the range of skills and expertise that users of GIS have in health authorities.

This is not necessarily a problem given that we cannot all be experts in everything. Indeed it is identification of such gaps that has undoubtedly fostered the growth of units such as that in Birmingham and ours here in Trent. While I said this is not *necessarily* a problem it is an area that we here in Trent have identified as an important issue. In essence Health Authorities have purchased (or been sold!) mapping and GIS. Regardless of the cost, the purchase nevertheless came from a limited budget, one for which there are equally competing demands. When subsequently our unit came along to assist the public health departments and spread the word of GIS it became apparent that the majority did not have much in the way of spatial data – other than basic boundary data. The exception to this has been those health authorities involved in specific projects such as health action zones – even then the spatial data has been limited.

A GIS without good spatial data is a GIS not being fully utilised. Once we had spoken to the various GIS users within public health the necessity of purchasing spatial data in addition to the boundary data they had was an argument easily won – funds permitting.

The purchasing arrangements that governmental bodies have for spatial data are poor and inconsistent. On the one hand there is a service level agreement (SLA) for local government allowing unitary/local authorities access to high quality spatial data. On the other hand health authorities have hitherto, and are still currently, left to fend for themselves. Aside from all the historical arguments as to how this situation came about, those arguments are surly not valid now. It's over ten years since Lord Chorley embraced and endorsed GIS in both the public and private sector. At the very least the present situation prevents health authorities and other health organisations from using GIS to anywhere near its full potential - this just has to be a bad situation.

Often in research the question is lack of attribute data. However the Health Service as a whole is often quoted as being the largest repository of locked up geographic information in the country with the term 'data rich and information poor' frequently used (Mason, 1994). The situation here tends to be the opposite, not the lack of attribute data, rather the lack of spatial data.



It is the case that currently the Ordinance Survey is in consultation with regard to establishing an SLA for health users through NHS supplies. I'm given to understand that this long overdue, not to mention much needed SLA should be in place sometime in 2001. Until that time Health Authorities are left to their own devices. The end result is the high price that health authorities are asked to pay for the same data that their Local Authority neighbours get at a substantially reduced rate. Given that so much of present government thinking is for combined multi-agency or 'joined up' health projects (New Deal, Sure Start, Health Action Zones) the situation is far from ideal.

Our unit has fulfilled two roles in this respect. On the hand we have spoken with the user districts and identified their requirement for spatial data. Often this has been done by way of demonstration, showing them what can be done with GIS if you have the right data. Secondly we have negotiated a discounted price on behalf of the districts. In effect acting as a central 'hub', or middleman brokering the deal.

This situation is, as I understand it, fairly unique, and will hopefully serve to be mutually beneficial for all concerned. From our Unit's point of view we will be far better placed to assist the individual districts in their use of GIS because we will know they have accurate and good quality spatial data. From the Health Authorities point of view they have been impartially advised on the choice and selection of spatial data required (without them worrying about technical detail and so on), together with the best negotiated price possible. As a result they will be better placed to use GIS in ways perhaps hitherto they have not been able. Finally from the data vendors point of view they have secured a sale to a large number of users. Sales that if considered individually would in the main not have occurred. Indeed on an individual level the price at which the health authorities could afford is outside the price that makes it commercially viable for data vendors. However with the Unit acting as a central broker a deal has been struck, such that the price that each health authority pays is relatively small and more importantly affordable. Yet the whole is in many ways greater than the sum of the parts as the combined total is sufficient to make the overall deal commercially viable for the vendor.

The importance of the GIS unit acting as the middleman brokering the deal can be explained from both health authorities and the vendors point of view. Aside from the actual cost of the data the health authorities did not know necessarily what they wanted. We were able to objectively advise, starting from the desirable and ending with the practical. The end result is a uniform set of base data that covers the entire health region – each district can be sure that on this level at least they will all have the same data – allowing to some extent cross border analysis to be considered (though not where a district has a boundary to a non-Trent district). This should ensure that where cross district projects are in place, or local government agencies are involved, everyone will be 'singing from the same hymn sheet' – or in this particular case 'reading from the same map!'

The second aspect stems from the data vendor. We are able to give impartial and objective advice to the health authorities in way they never can, or could. Our aim is not to sell data rather insure the health authorities get the best possible deal (highest quality data for the lowest possible price). Consequently our aim has been to establish a level of trust between a vendor and ourselves. If they provide high quality data at a



reasonable price we are more likely to recommend them to the individual districts. This is the situation we are presently in.

For anybody working in Public Health who uses GIS access to good high quality spatial data is an absolute basic requirement. The need for such data is increasing as both the number of people in this area grows together with the sophistication of GIS based analysis. This increase has lead directly to the need for impartial health related expertise and guidance. Units such as ours in Trent have been created to full fill this need. Our remit is varied, but at a basic level we are able to fill a vacuum that exists between cash strapped public bodies such as the health authorities on the one hand and commercial vendors on the other. The role of honest broker between commercial data/system vendors and the health authorities is not one that was originally envisaged for the unit. Nonetheless it is one born out of practicality. Given the increase in GIS use by Public Health departments, not just in Trent but across the country it is role that is likely to increase.

References

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