

# Developing a better understanding of suicide through Geovisualisation

Project Team

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# Aim

To describe how we are beginning to use geovisualisation as a means of knowledge construction for the geography of suicide

# What is geovisualisation and what does it do?

- It focuses on the use of “**dynamic visual displays as prompts for scientific insight** and on the methods through which dynamic visual displays might leverage perceptual cognitive processes to facilitate scientific thinking”  
(MacEachren 2004)
- It emphasises knowledge construction over information sharing or data storage

# Where did it all start?

- Visualisation was first mentioned in a paper by **Allen K. Philbrick** (1953) Toward a unity of cartographical forms and geographical content, *Professional Geographer*, v. 5, no. 5, p. 11-15.
- Based on the work of **Jacques Bertin** (1967) *Sémiologie Graphique* (*Semiology of Graphics*)
- Re-defined in 1987 by **US National Science Foundation** which emphasised knowledge creation and hypothesis generation



# Why is it important for suicide research?

- **Suicide is a complex phenomenon**
- **Suicides vary across space and time**
- **The relationship between suicidal individuals and the environment in which they live is necessarily complex**
- **The people interested in and/or who are responsible for suicide research and those that care for individuals at risk of suicide come from varied disciplines and agencies**
- **The methods of analysis can be difficult to understand (how they work and the outputs they produce)**
- **Analytical methods cannot always take into account all the factors**

# The way we are working

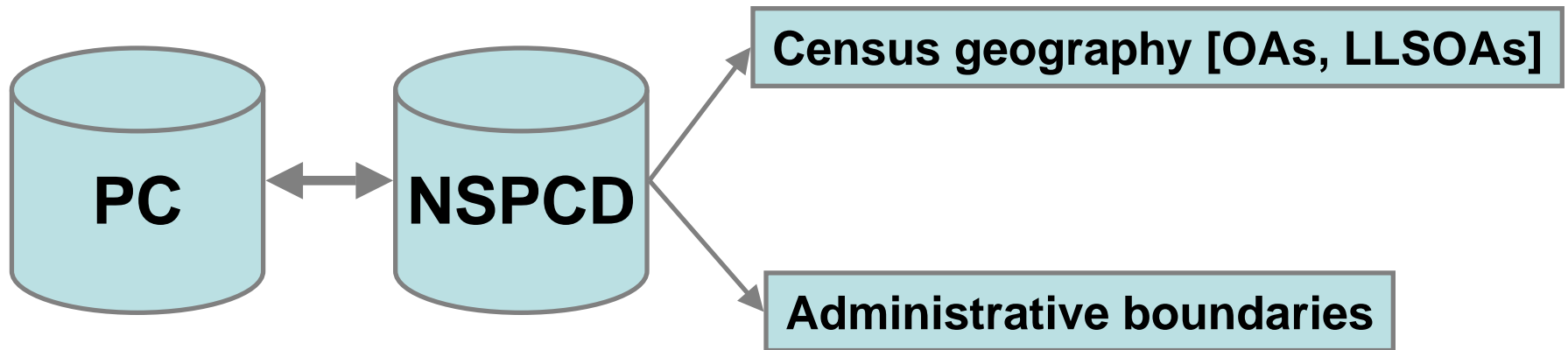
- Data Mining & Geomatics:
  - Geographic Information Systems (GIS)
  - Spatial cluster detection
  - Classification trees
  - Self Organizing Maps (SOM)

# Data – Cases

- Data provided by ONS and included 2 causes of death: Intentional Self-Harm (ICD10 X60 – X84); Event of Undetermined Intent (ICD10 Y10 – Y34)
- Key variables:
  - Time (month of death)
  - Demographics
  - Grid reference for where
    - The person lived
    - Where they committed suicide
  - Postcode of residence

# Data – Places

- Cases linked to various geographies

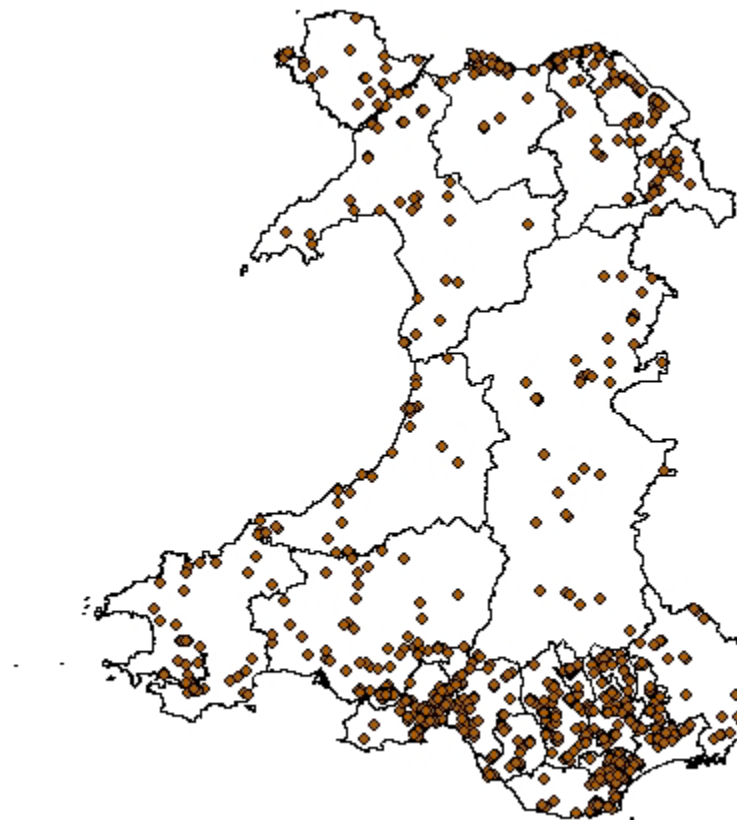
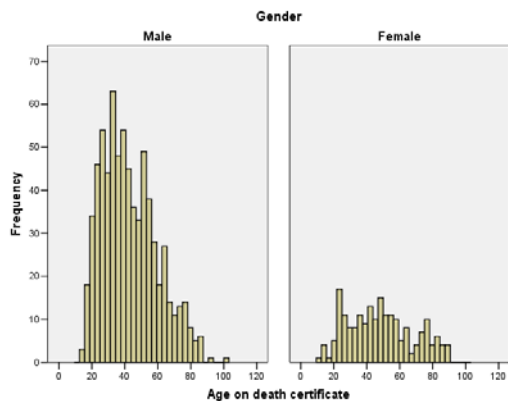


# Methods

- Analysis is divided into three areas:
  - 1. Investigate spatio-temporal clustering of suicide**
  2. Classify suicides to create a typology (Classification trees)
  3. Classify place using Self-organising Maps (SOM)

# Suicide incidence 2001-2003

	Male	Female
Gender	709	202
Suicide	571	138
Open	141	61

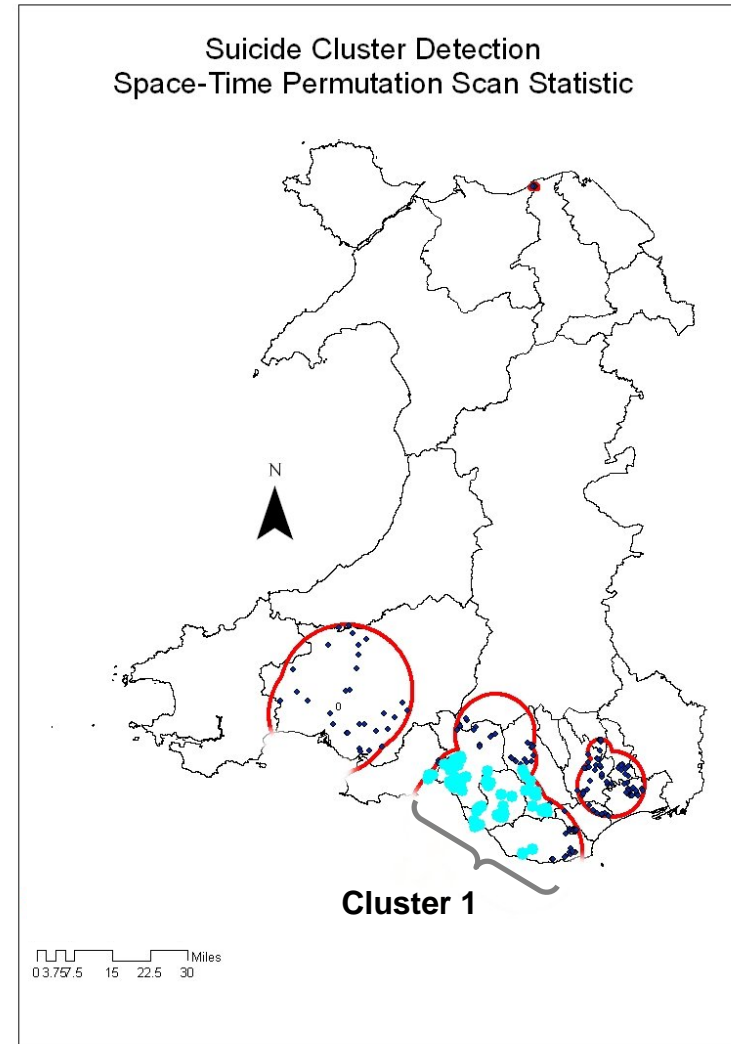


n = 911

# Cluster Detection Using SaTScan Space-Time Permutation Scan Statistic

CLUSTER	START DATE	END DATE
1*	2002/3/1	2002/3/31
2	2001/4/1	2001/5/31
3	2002/3/1	2002/3/31
4	2002/3/1	2002/3/31
5	2002/12/1	2003/2/28
6	2002/12/1	2003/2/28
7	2003/7/1	2003/7/31
8	2003/9/1	2003/11/30
9	2002/1/1	2002/1/31
10	2003/7/1	2003/7/31
.....		

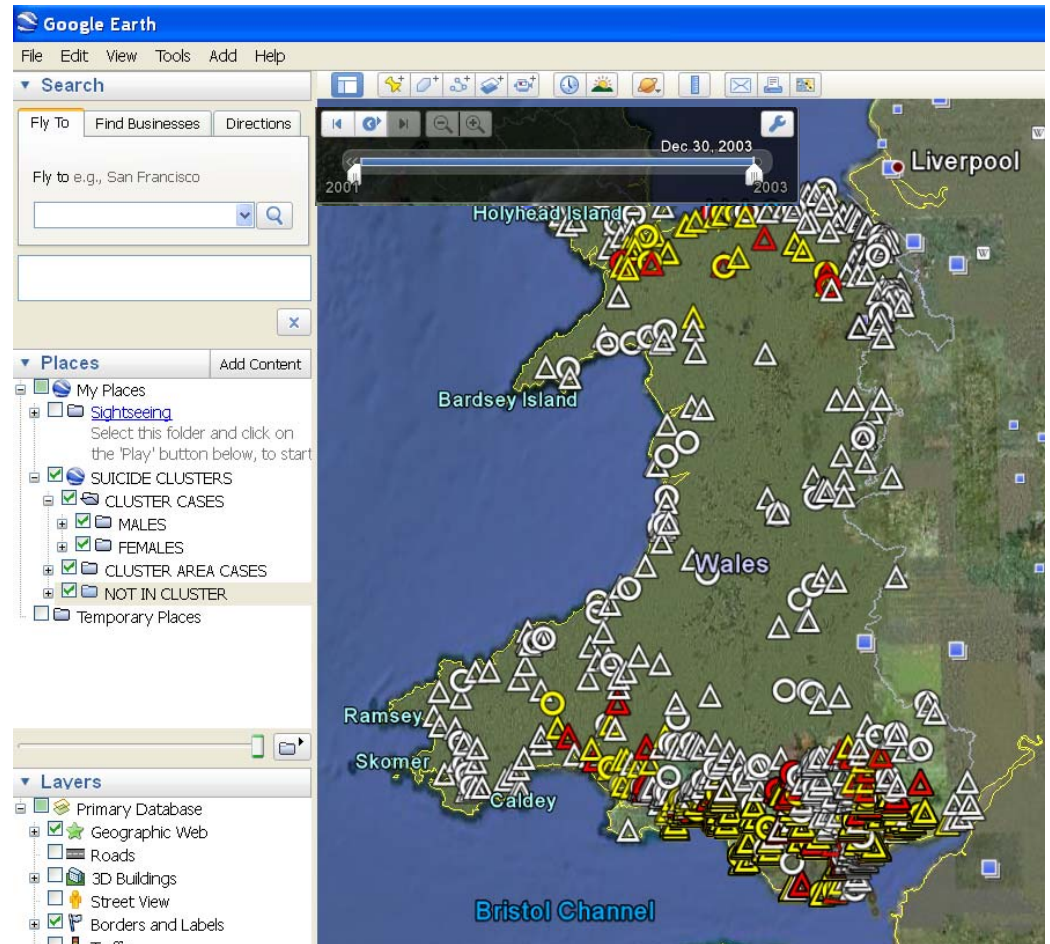
\* Not significant at 0.05



# Geovisualisation of suicide in Wales

Using KML and Google Earth it is possible to dynamically interact with the data

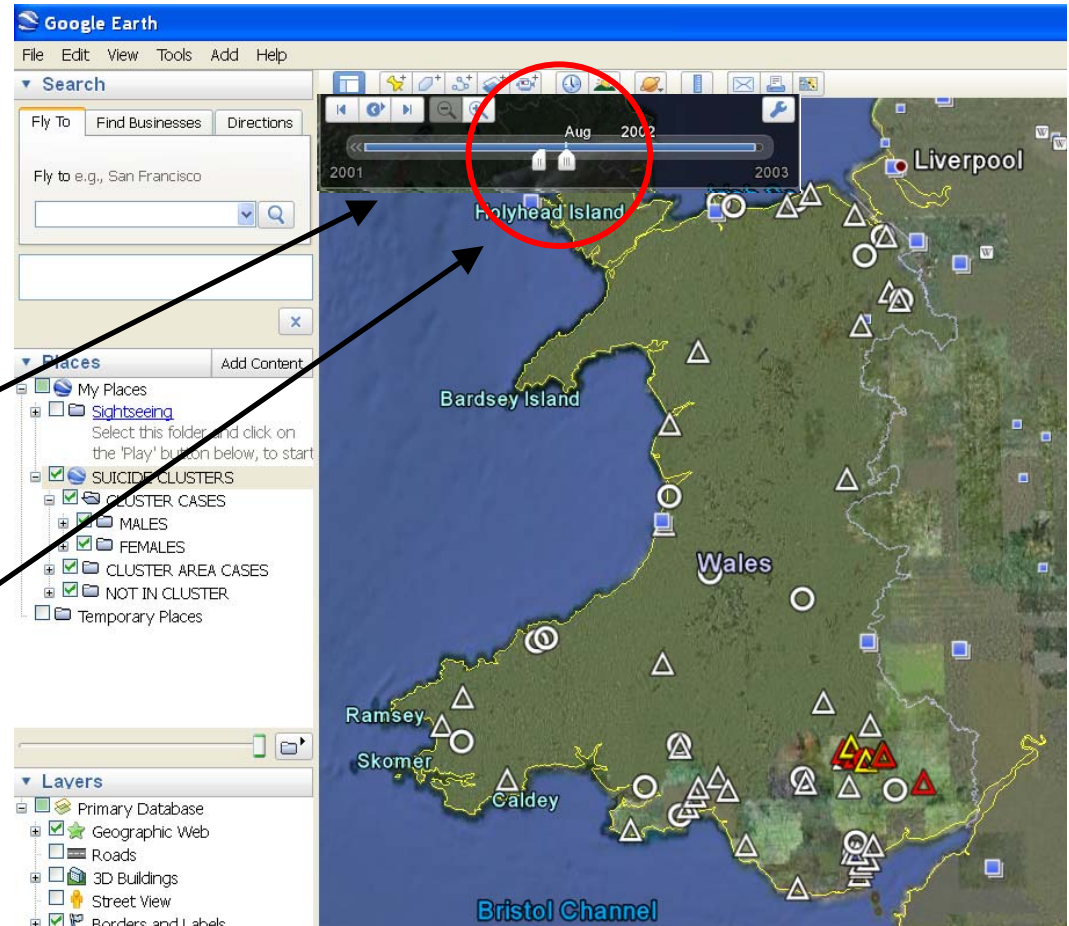
All Cases are displayed by gender and cluster membership (in a cluster, overlap with a cluster spatially but not temporarily, and not in a cluster).



# Geovisualisation of suicide in Wales

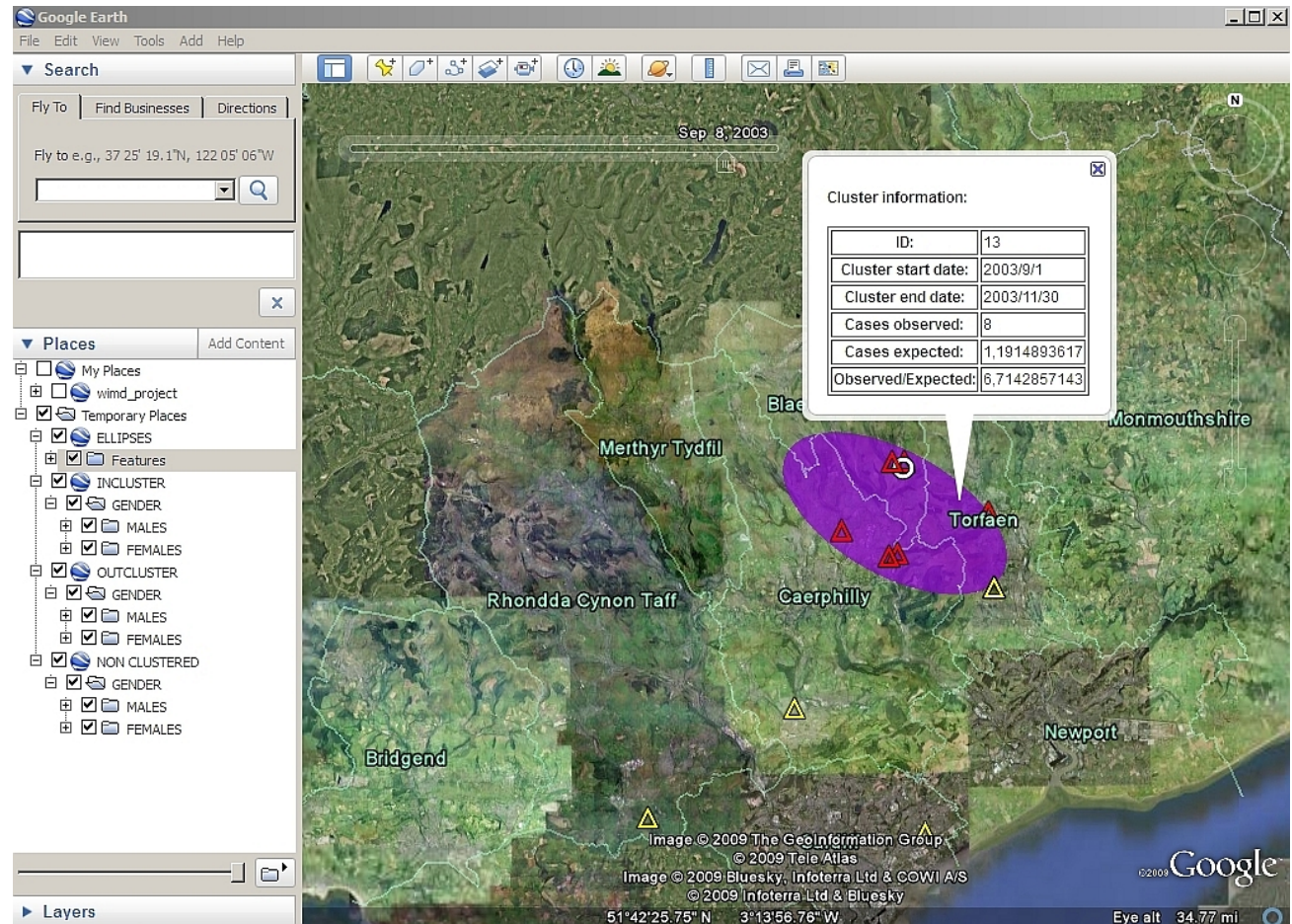
**Using the time slider it is possible to explore groups of cases.**

**It is possible to control the time span of the cases displayed**



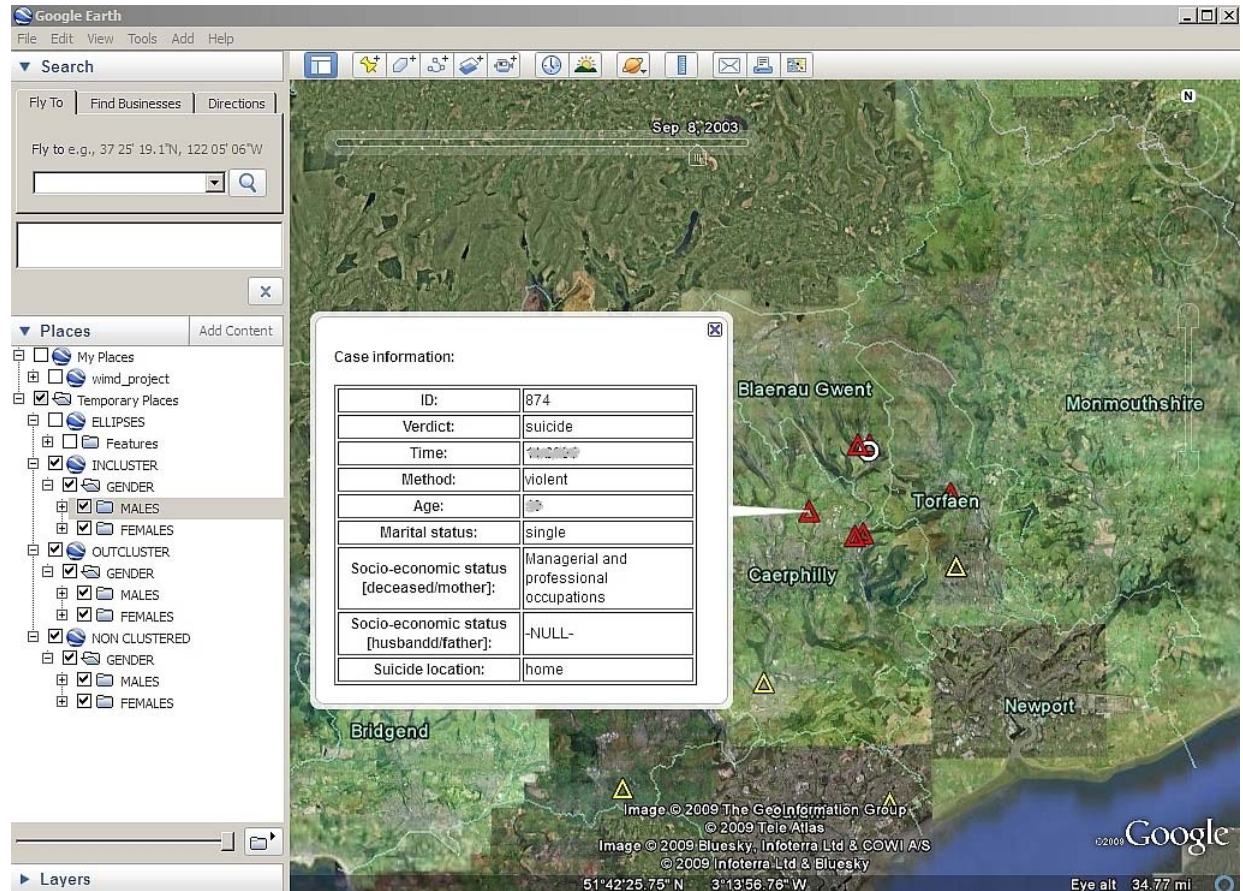
# Geovisualisation of suicide in Wales

All the functions of Google Earth are available and it is possible to zoom to a cluster and display the details



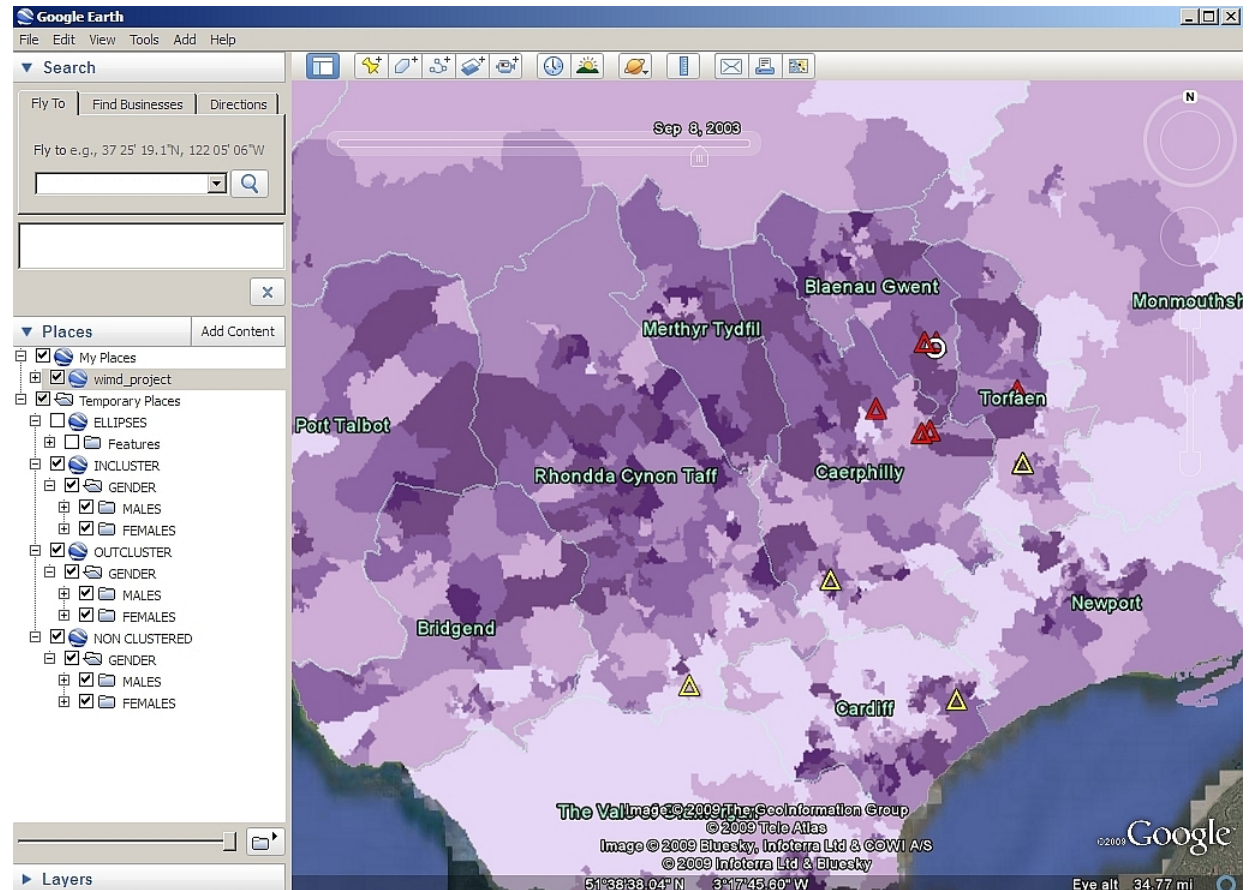
# Geovisualisation of suicide in Wales

All the functions of Google Earth are available and it is possible to zoom to a cluster and display the details of each case



# Geovisualisation of suicide in Wales

You can combine your data with other datasets such as the Welsh Index of Multiple Deprivation



# Discussion

- The advantages are:
  - Data can be queried by anyone with access to a PC with a browser
  - The user can view:
    - data at almost any scale
    - data as unprocessed cases
    - as analysis output
    - in combination with other locally held data
    - It is possible to develop an understanding of the geography of suicide without specialist training/knowledge of either suicide, geography or spatial analytical techniques

# Discussion

- Limitations
  - You need a high level of expertise to set up the system
  - Access to the data
    - The data are not freely available
    - The data need to be stored securely
    - The data are not available for some time after the event

# Refs

- Panczak, R., Jones, P., and Lloyd, K., (In Press) Geography of Personal Crisis - Geo-Referenced Data in Suicide Research, *International Journal of Health Geographics*
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- Kulldorff M, Heffernan R, Hartman J, Assunção RM, Mostashari F. A space-time permutation scan statistic for the early detection of disease outbreaks. *PLoS Medicine*, 2:216-224, 2005.
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