

# Linking and mapping geographically referenced data

David Martin

NCRM Autumn School, 13 November 2008

# Overview of session

- Some practicalities
- The Geo-Refer projects
- Geographical referencing concepts
- Georeferencing methods: linking data
- Georeferencing methods: mapping data
- Getting more help: how to use the Geo-Refer online resources

# Purpose of session

- Challenge participants to consider whether there might be geographical aspects to their own work
- Overview issues involved in geographical referencing of social, economic and environmental datasets
- Some pointers to useful methods and techniques
- Key points in relation to a few essential datasets
- Information about online resources that will help you go further

# Some practicalities

- Presentation based on one more often used in association with a practical hands-on session
- Here, restricted to demonstration and discussion
- This is an informal session – it will work best if interactive
- There is no such thing as a silly question!
- Please interrupt

# Why would I want to know about georeferencing and mapping?

- Massive growth in geographical data – frequently embedded within existing and new data sources
- Adds analytical value
- Fundamentally, geographical referencing leads to either:
  - Data linkage, potentially for aspatial analysis
  - Mapping, and other forms of spatial analysis

Audience participation...

What data do (or might) you  
use that are (or could be)  
geographically referenced?

# The Geo-Refer Projects

- ESRC Researcher Development Initiative
- 2 Geo-Refer projects
- With colleagues Samantha Cockings and Samuel Leung
- Focus on training resources in geographical referencing issues
- Particularly aimed at users who are not geographers/geographical information specialists
- Training workshops and online resources

# Georeferencing examples

- Link survey results to census data
- Associate postcoded patient records to indices of deprivation
- Produce a map of local authorities showing response rates
- Allocate questionnaire responses to urban/rural neighbourhood types
- Identify which service delivery locations fall within different policy areas



# Geo-referencing concepts and methods

# Geographical referencing of social science phenomena: 1

- Characteristics of people or events, recorded at mail addresses
- Geographical location of mail address



# Geographical referencing of social science phenomena: 2

- Administration or policy related to defined areas, aggregations of individuals
- Geographical location of area boundaries



# Geographical referencing of social science phenomena: 3

- Phenomena that are linear, describing routes or flows
- e.g. bus route, telephone conversation, social network link



# Geographical referencing of social science phenomena: 4

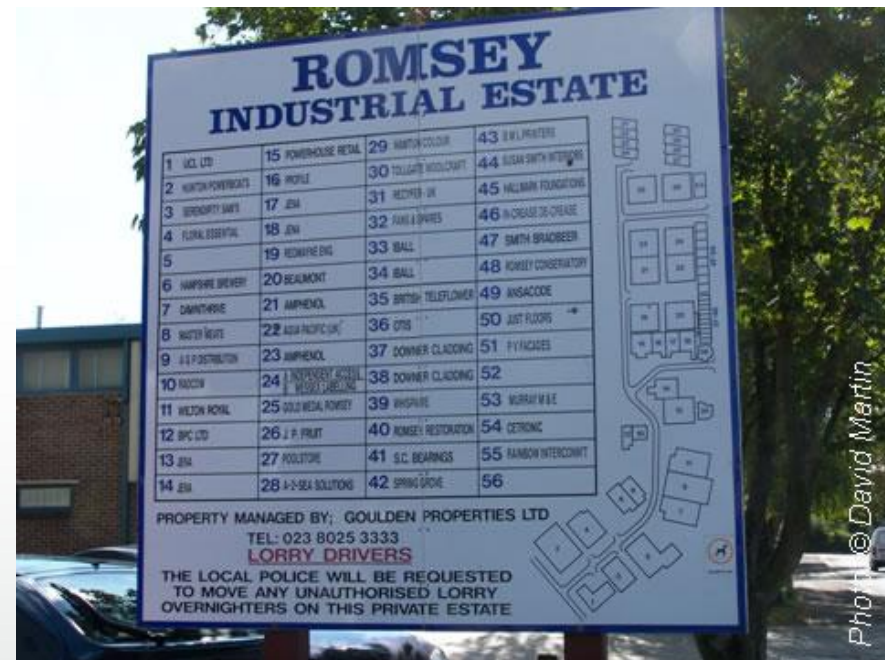
- Phenomena or events that have locations but do not fit standard descriptions
- e.g. road accident, environmental quality





# Geographical referencing of social science phenomena: 5

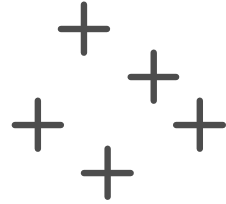
- Complex phenomena not captured by a simple location
- e.g. business locations, catchment populations



# Geographical object types

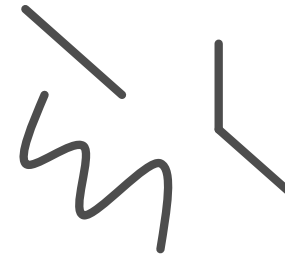
## POINTS

E.g.  
Health data  
Meteorological data  
Pollution sources  
Hospitals  
Landfill sites



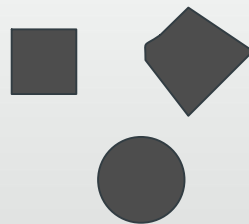
## LINES

E.g.  
Roads  
Powerlines  
Railways  
Rivers



## AREAS

E.g.  
Enumeration Districts  
Wards  
Health Authorities  
Grid squares  
Water supply zones



+ NETWORKS?  
+ SURFACES?

# Geographical object types

- **Points: a single pair of coordinates**
- Lines: an ordered sequence of coordinates
- **Areas: closed, ordered sequences of coordinates**
- Networks: complex line-based structures
- Surfaces: mathematically modelled representations of continuously varying phenomena



# Direct and indirect georeferencing

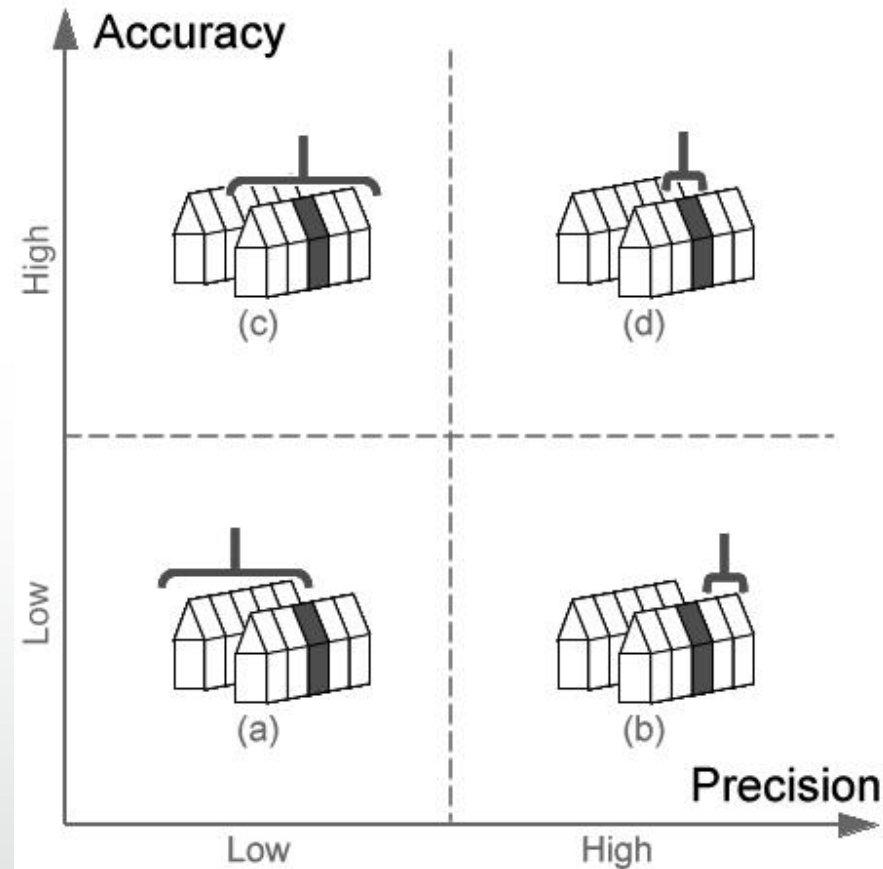
- Direct georeferencing: explicit coordinate system
  - Lat/Long, Ordnance Survey grid reference
- Indirect georeferencing: any type of area code or name relating to a known location
  - Postcode, Zip code, County, Census output area/enumeration district/tract; local government district; health authority, etc...

# Where do coordinates come from?

- Surveys for mapping
- Remote sensing
- Digitising paper source documents
- Direct capture using Global Positioning System (GPS) receiver
- **In the social sciences, geographical coordinates are generally secondary data, even when embedded within primary data!**

# Accuracy and precision

- Accurate location
  - free from locational bias
  - e.g. respondent lives in Southampton
- Precise location
  - provides detail (but not necessarily accurate)
  - e.g. respondent lives at 25b Highfield Lane
- Need to assess and adopt different strategies according to purpose

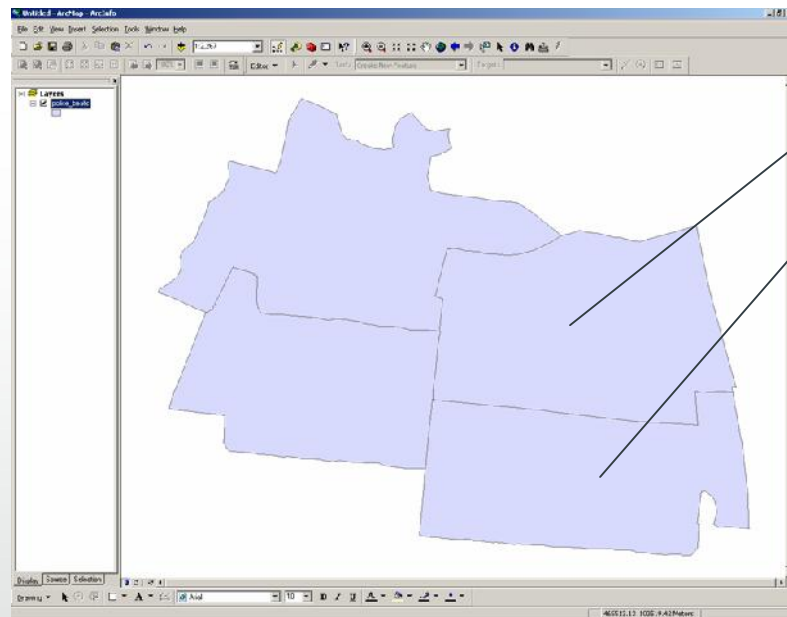


# Scale and projection

- Map scale
  - Explorer map: 1:25,000
  - Road atlas: typically 1:400,000
- Leads to inclusion/generalization of different features, boundary details, etc.
- Projection systems:
  - Very important when using lat/long datasets,
  - GB National Grid sidesteps the issues...

# Locations and attributes

- Locations: points, area boundaries



OID	BEATID	NAME	HOFFS	AUTH
0	1	Westend	30	Anywhere
1	2	Southend	20	Anywhere
2	3	Eastend	5	Nowhere
3	4	Northend	10	Nowhere

Record: 1 Show: All Selected Records (0 out of 4)

- Attributes: values, characteristics

# Geoprivacy issues

- Detailed location is potentially disclosive
- Postcode is generally considered to be sensitive information
- Explicit subject consent in data collection?
- Subject identification may be possible through linkage and mapping
- All usual rules apply, so give consideration when considering research ethics

# What about geographical information systems?

- Massive growth in use of GIS since early 1980s: complex software systems
- GIS growth promoting data standards, growth of geoinformation industry etc.
- GIS provide useful georeferencing tools and lots of other functions not needed here...
- ArcGIS and MapInfo (and others) widespread in UK universities
- This is not a GIS workshop!

# Georeferencing methods: linking data



# Tabular data linkage example

Research question: What is the relationship between asthma and deprivation?

Asthma rates	GP surgeries
--------------	--------------

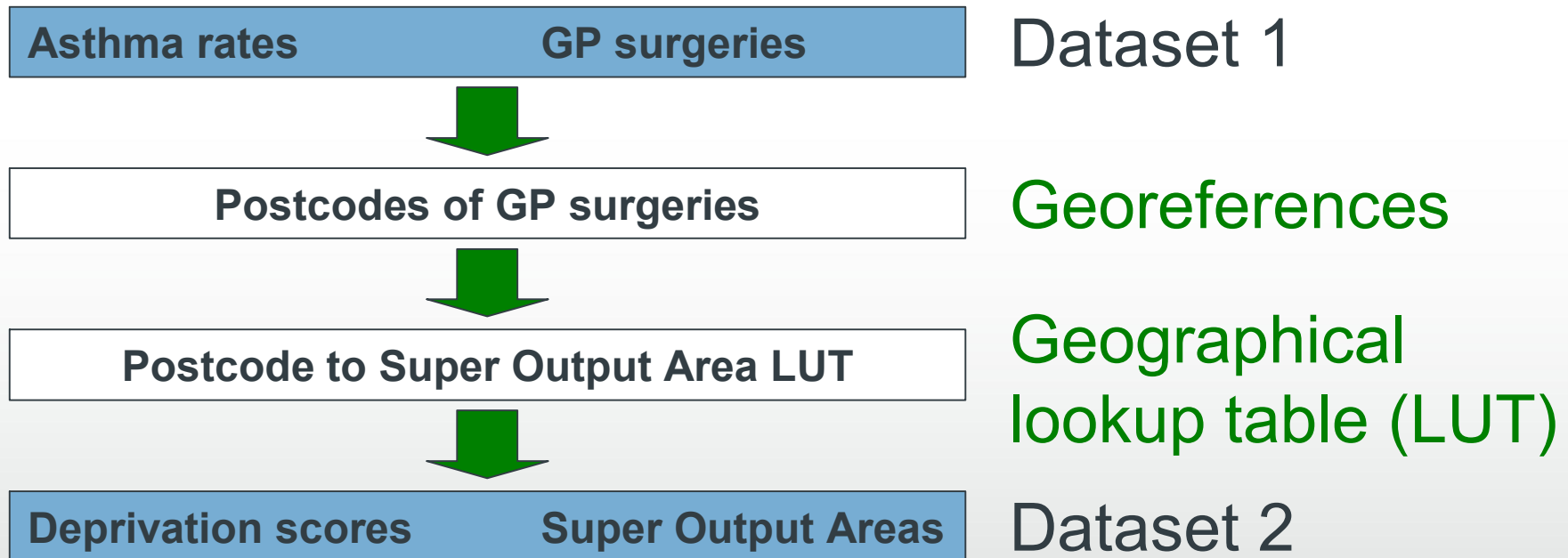
 Dataset 1

Deprivation scores	Super Output Areas
--------------------	--------------------

 Dataset 2

# Tabular data linkage example

Tabular linkage requires lookup(s) between georeferences on two or more datasets



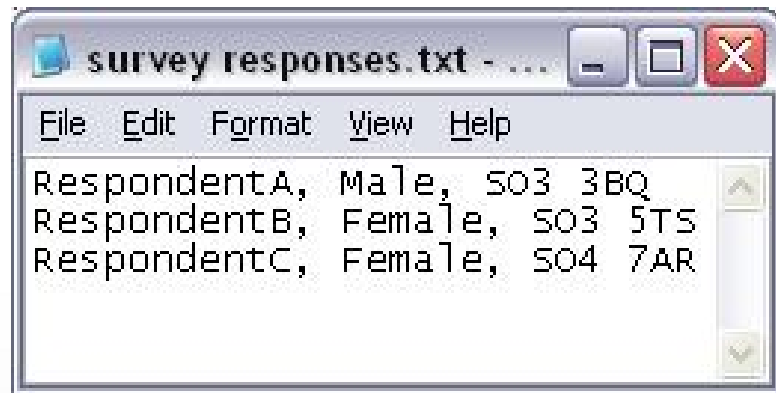
Assumes surgery is appropriate georeference for patient data!

# Tabular linkage tools

- Access, SPSS etc. – general purpose database or statistical packages for matching lists with common data items
  - Probably necessary for large or non-standard data linkage tasks
- GeoConvert – online tool specific to recent UK postcode-based lookup
  - Very useful for a wide range of small-medium standard UK data linkages

# Data linkage example: input tables

Coded survey responses



File	Edit	Format	View	Help
RespondentA,	Male,	SO3	3BQ	
RespondentB,	Female,	SO3	5TS	
RespondentC,	Female,	SO4	7AR	

Respondent ID

Gender

Postcode

Postcode directory

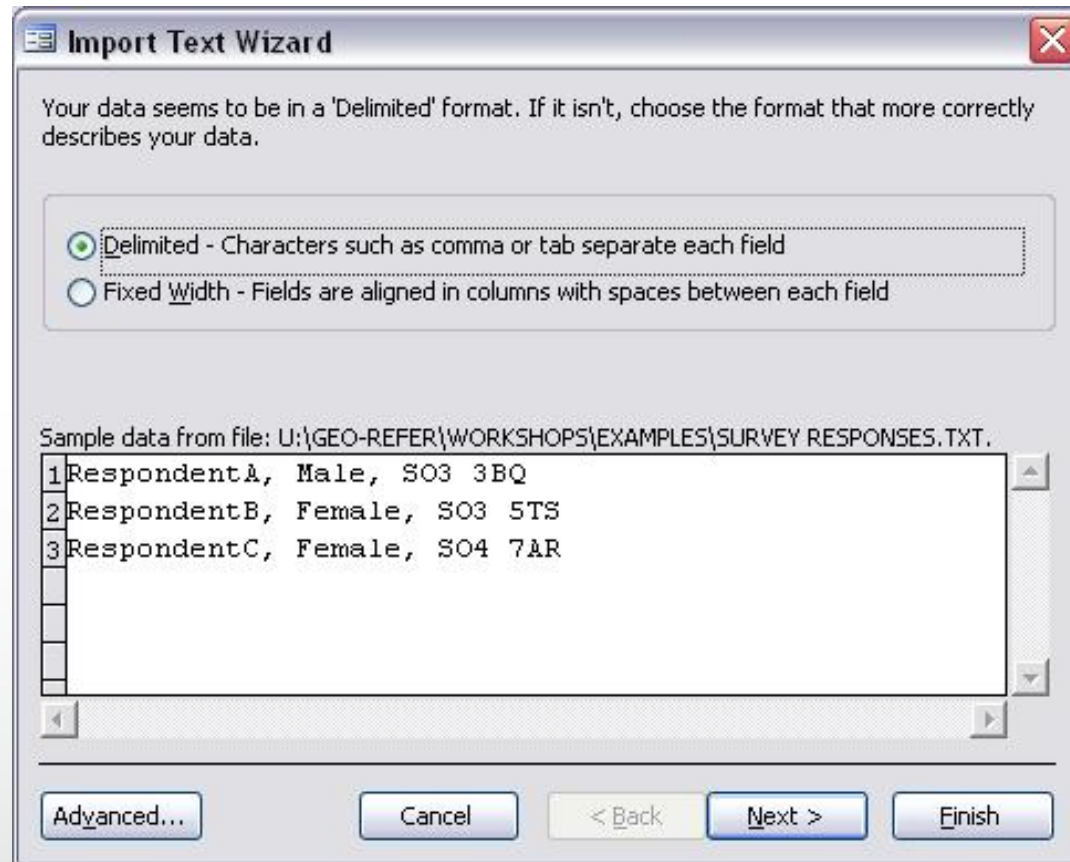


File	Edit	Format	View	Help
SO3	3BPWARD	53		
SO3	3BQWARD	54		
SO3	3BRWARD	54		
SO3	5TSWARD	61		

Postcode

Ward code

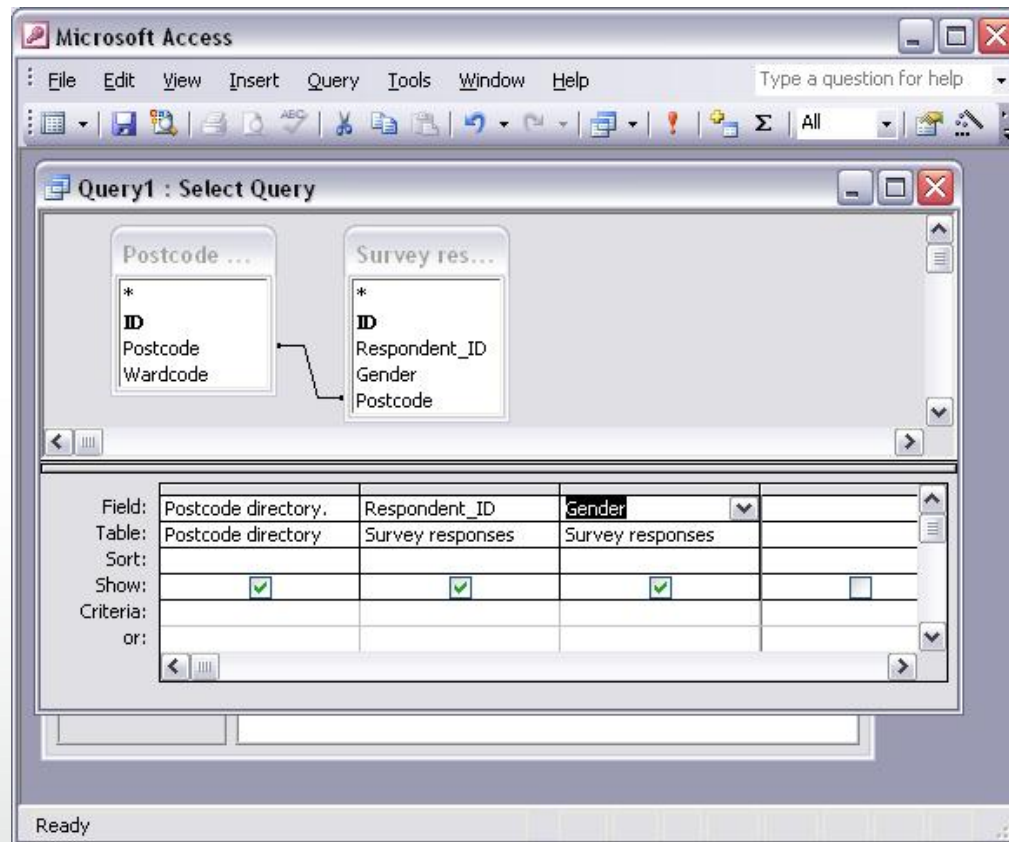
# Import external data files



Get external data >  
import

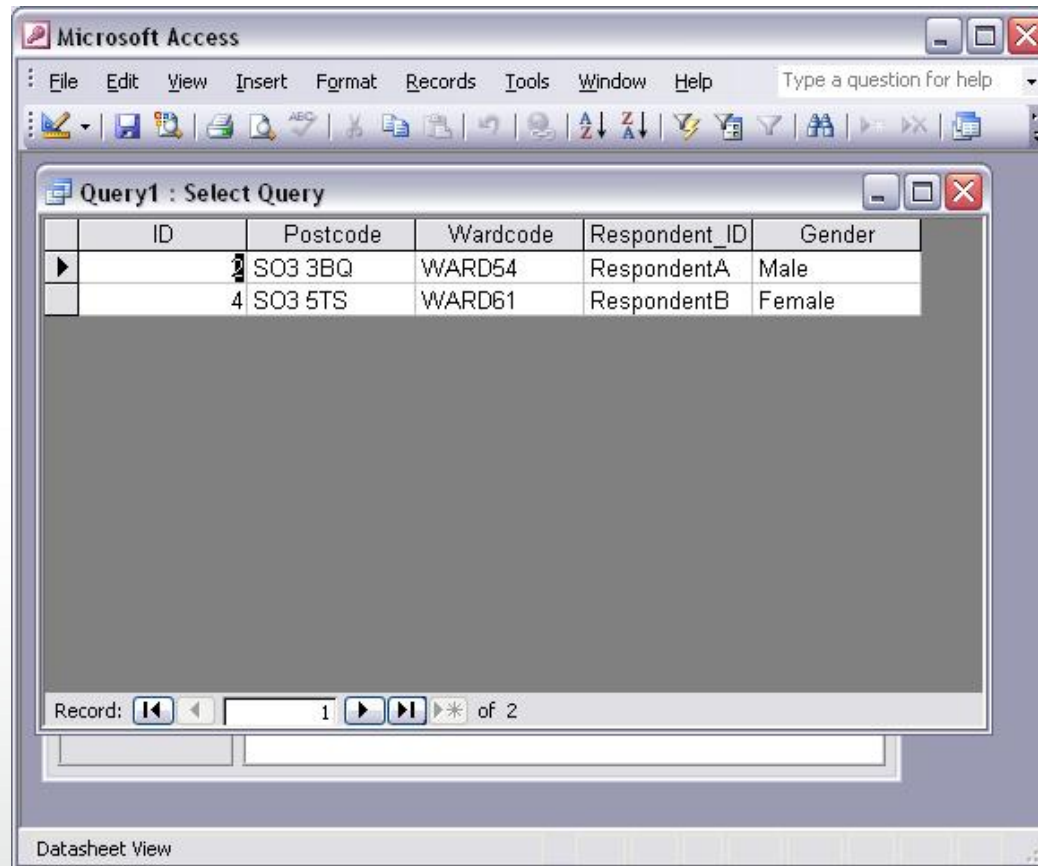
We need to describe  
the data structure  
(here comma  
separated)

# Build new Access query



We now add both tables to a new query, link them by the postcode field and select the items required in output

# Matched lists



The screenshot shows the Microsoft Access application window. The title bar reads 'Microsoft Access'. The menu bar includes File, Edit, View, Insert, Format, Records, Tools, Window, and Help. A search bar on the right says 'Type a question for help'. The toolbar contains various icons for file operations and data manipulation. The main window displays 'Query1 : Select Query' in Datasheet View. The table has five columns: ID, Postcode, Wardcode, Respondent\_ID, and Gender. It contains two rows of data. The status bar at the bottom indicates 'Record: 1 of 2' and 'Datasheet View'.

ID	Postcode	Wardcode	Respondent_ID	Gender
2	SO3 3BQ	WARD54	RespondentA	Male
4	SO3 5TS	WARD61	RespondentB	Female

The resulting query contains requested fields for all matching rows and can be exported

NB not all are matched!

# Watch the time!

- Extreme care needs to be taken when matching between datasets relating to different dates
- Postcodes, boundaries, area names all subject to change
- All changes on different timescales
- Assume another time = another geography!

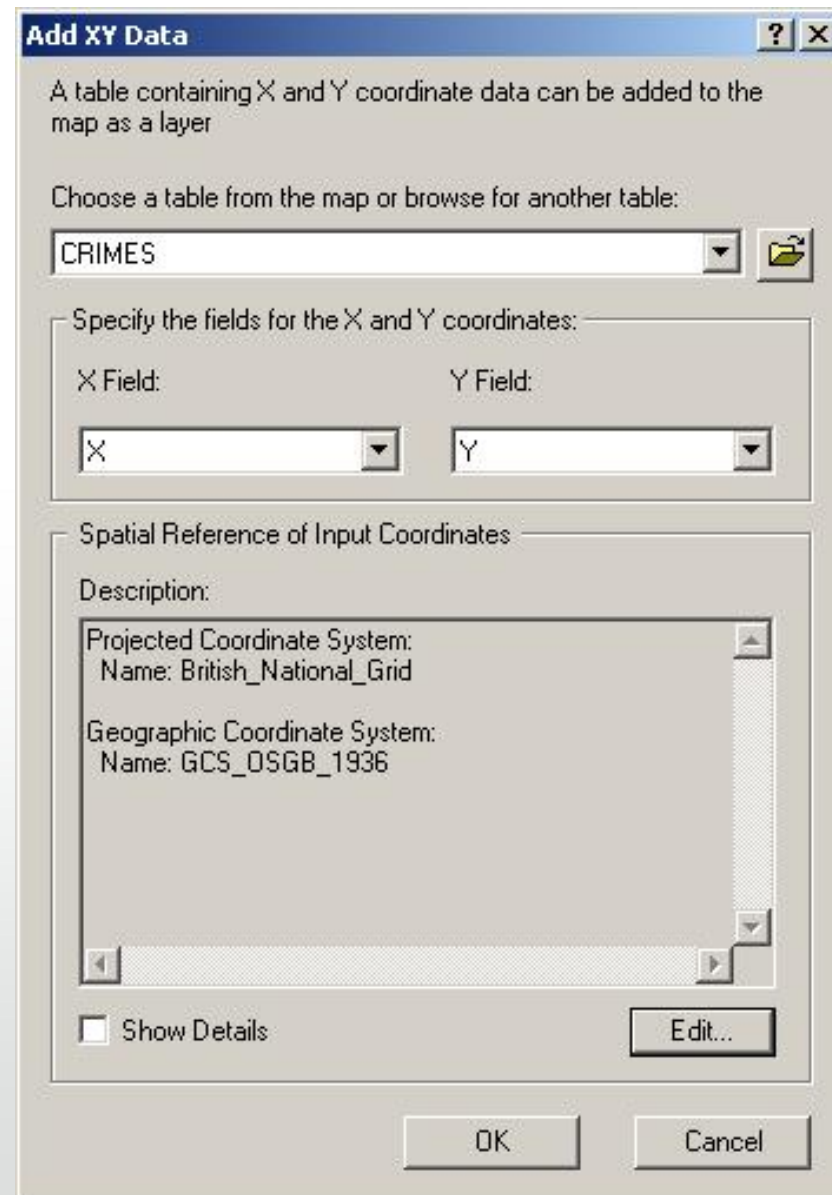


# Georeferencing methods: mapping data

# Mapping

- Map locations of points and/or areas
  - e.g. grid-refs of survey responses
  - e.g. boundaries of Lower Layer Super Output Areas (LSOAs)
- Map attributes of areas
  - e.g. Link survey responses on attitudes to recycling to wards, then map response rates by ward

# Mapping a set of grid-referenced points



**Add XY Data** [?] [X]

A table containing X and Y coordinate data can be added to the map as a layer

Choose a table from the map or browse for another table:

CRIMES [v] [Browse]

Specify the fields for the X and Y coordinates:

X Field: [X] [v]      Y Field: [Y] [v]

Spatial Reference of Input Coordinates

Description:

Projected Coordinate System:  
Name: British\_National\_Grid

Geographic Coordinate System:  
Name: GCS\_OSGB\_1936

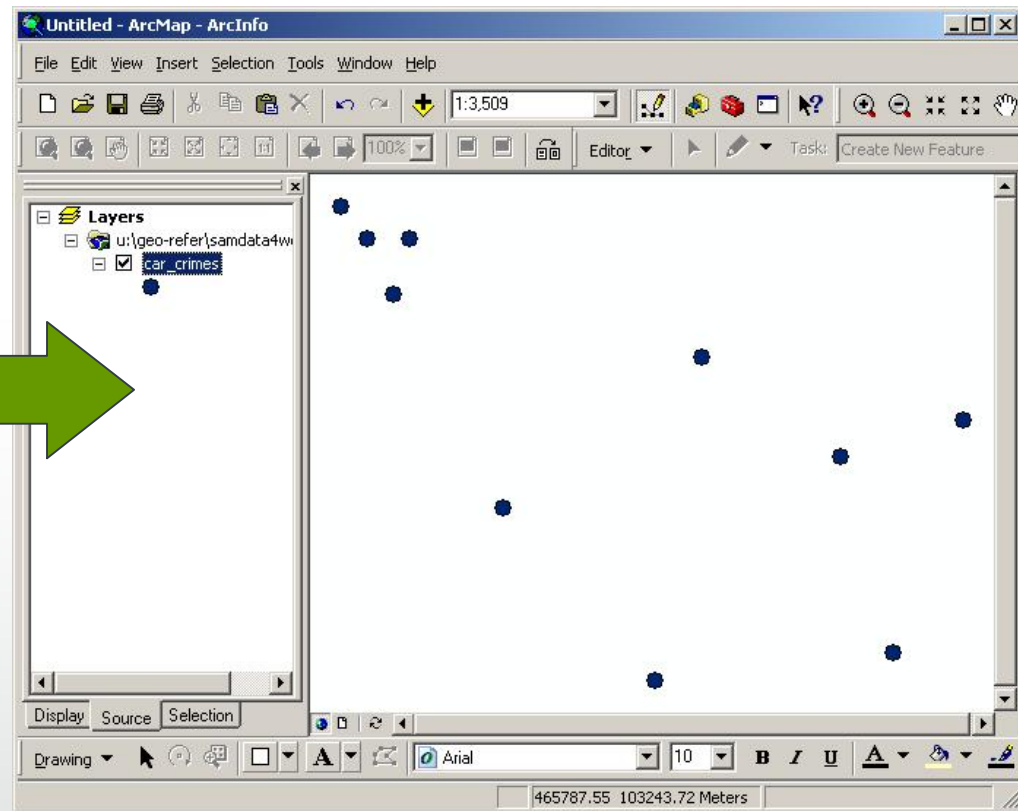
☐ Show Details      [Edit...]

[OK] [Cancel]

# Mapping grid-referenced points

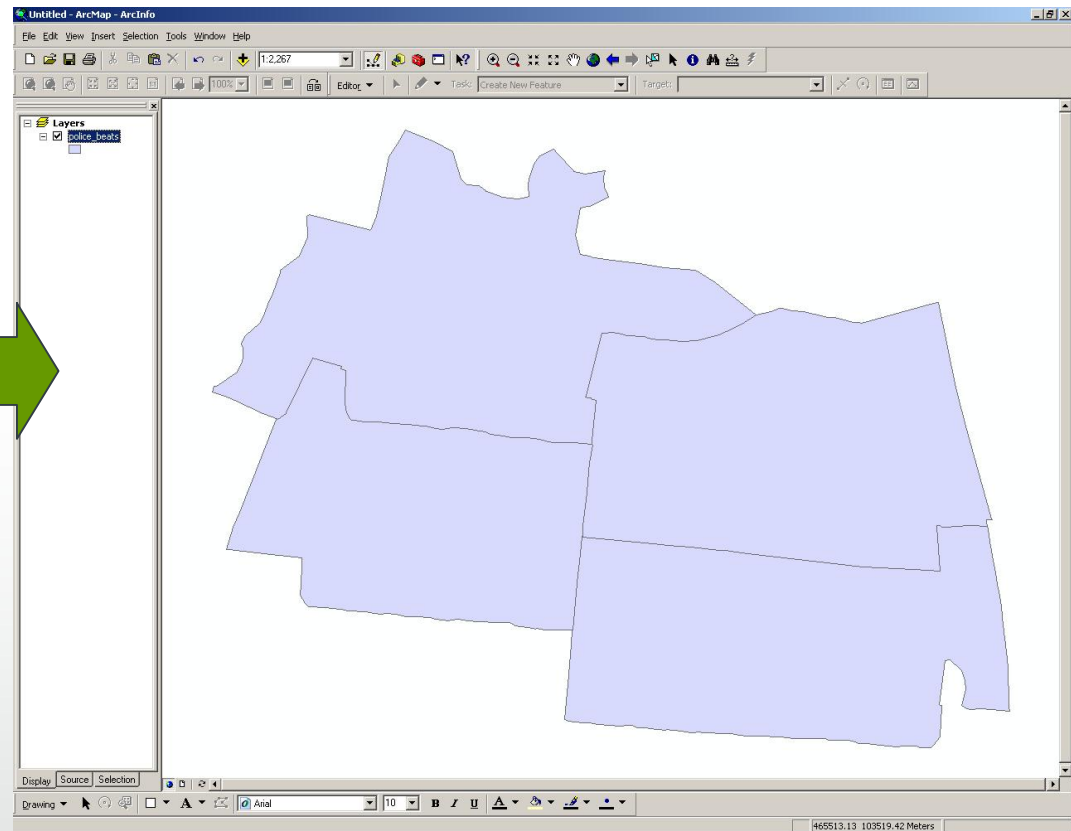
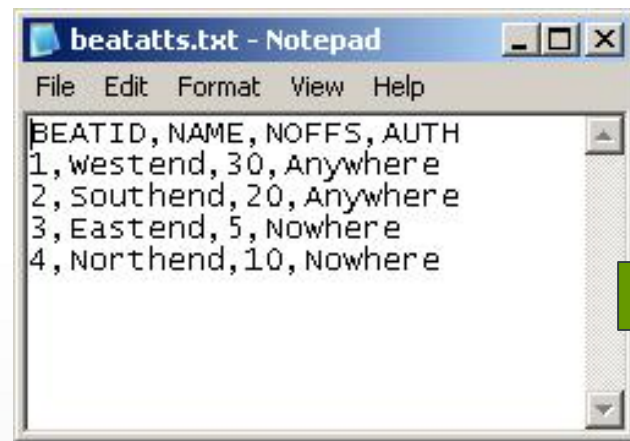
## Grid-refs of car crimes

465474,103429  
465490,103409  
465517,103409  
465507,103374  
465703,103334  
465791,103271  
465869,103294  
465577,103238  
465825,103146  
465673,103129



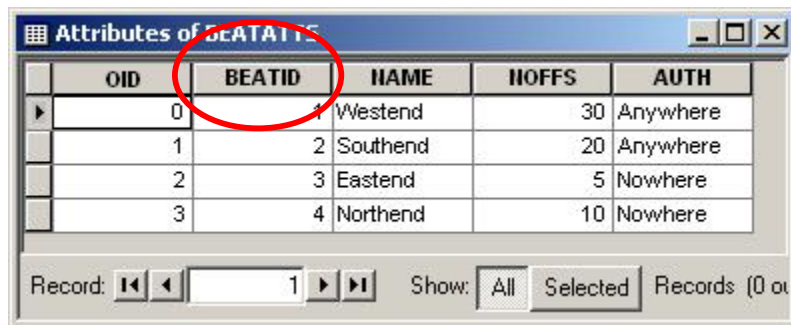
# Linking attribute data to boundary data

## Area-based attribute data



# Linking attribute data to boundary data

Define common field in attribute table and in shapefile



Attributes of BEAT115

	OID	BEATID	NAME	HOFFS	AUTH
▶	0	1	Westend	30	Anywhere
	1	2	Southend	20	Anywhere
	2	3	Eastend	5	Nowhere
	3	4	Northend	10	Nowhere

Record: 1 Show: All Selected Records (0 out of 4 Selected.)

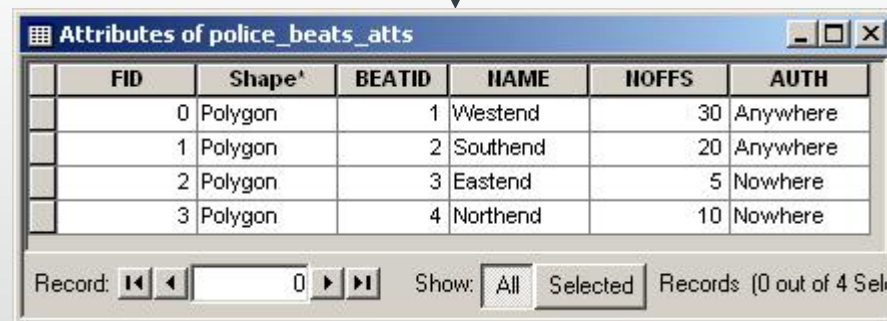


Attributes of police\_beats

	FID	Shape	BEATID
▶	0	Polygon	1
	1	Polygon	2
	2	Polygon	3
	3	Polygon	4

Record: 1 Show: All Selected Records (0 out of 4 Selected.)

JOIN attributes from a table (based on BEATID)



Attributes of police\_beats\_atts

	FID	Shape^	BEATID	NAME	HOFFS	AUTH
	0	Polygon	1	Westend	30	Anywhere
	1	Polygon	2	Southend	20	Anywhere
	2	Polygon	3	Eastend	5	Nowhere
	3	Polygon	4	Northend	10	Nowhere

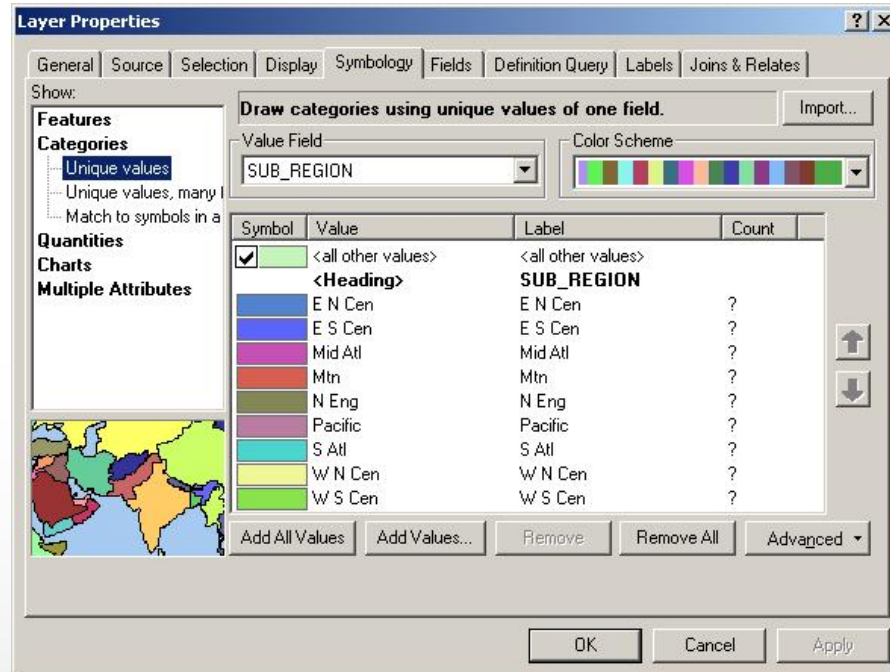
Record: 0 Show: All Selected Records (0 out of 4 Selected.)

Attributes  
linked to  
boundaries

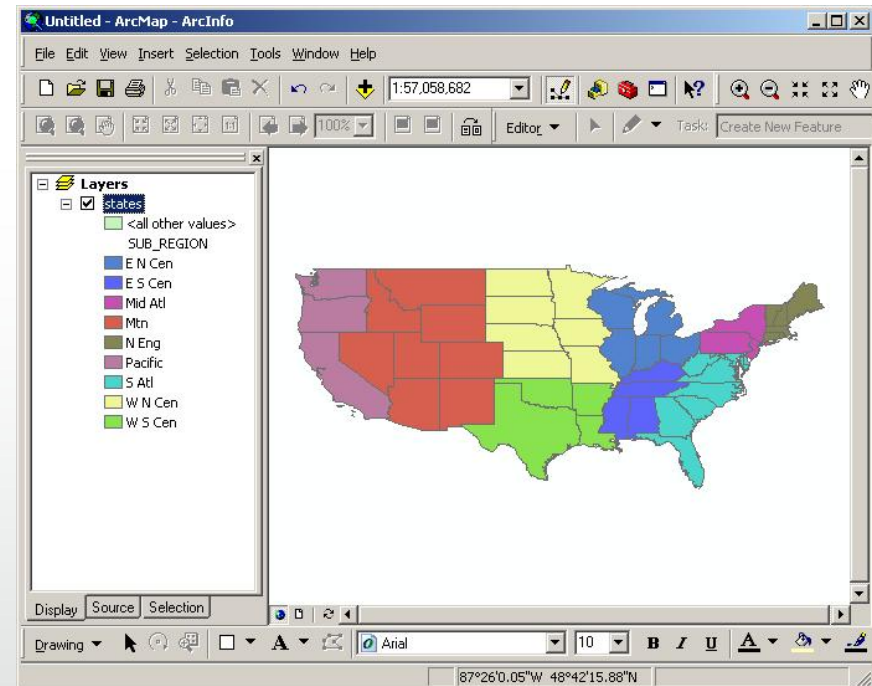
# Creating a choropleth/thematic map

- Add layer (shapefile)
- Select variable to map
- Select data type
- (Select classification scheme/class breaks)
- Select colour scheme

# Mapping area data: Categorical



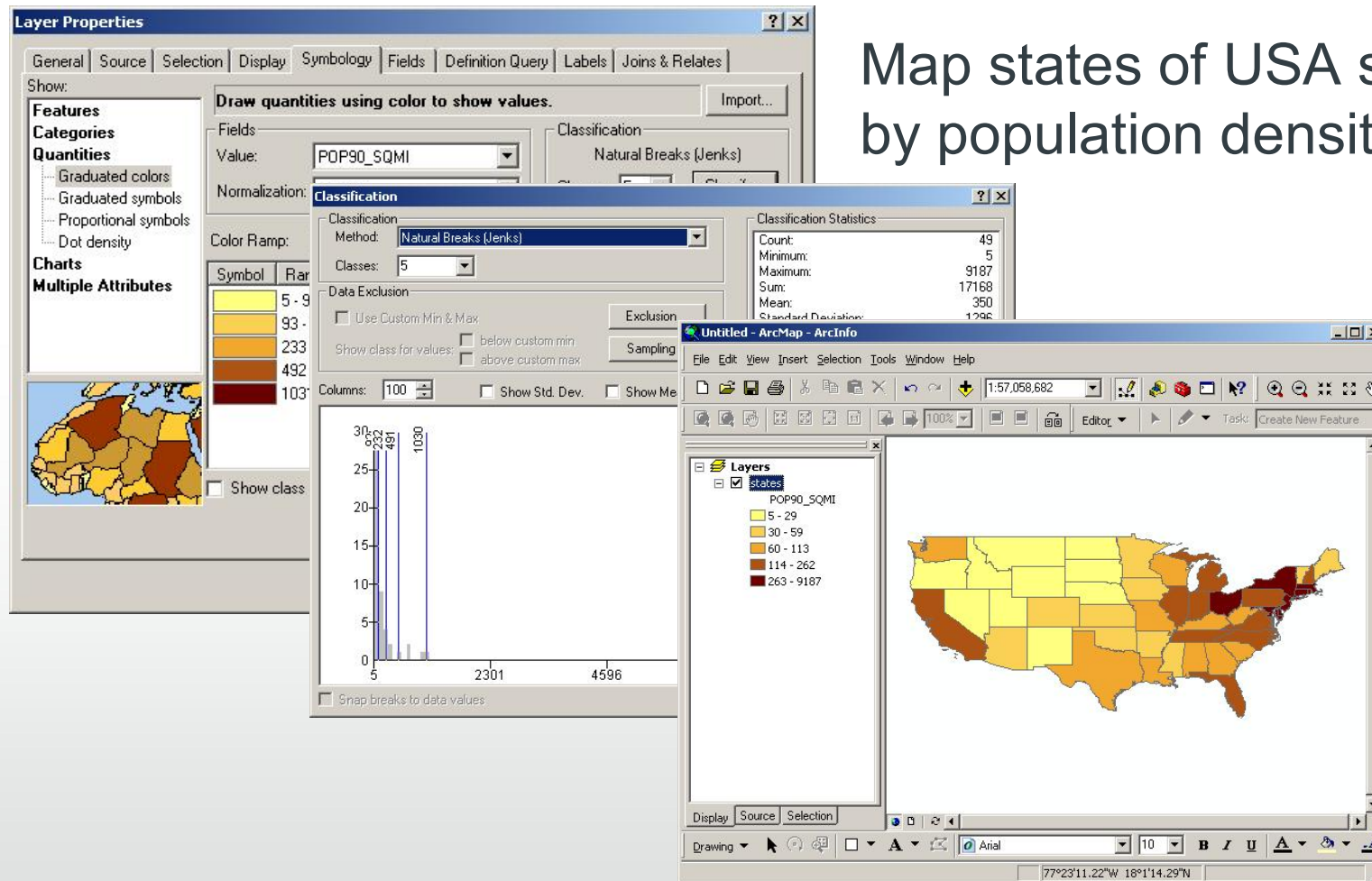
Map states of USA  
shaded by sub-region





# Mapping area data: Continuous

Map states of USA shaded by population density

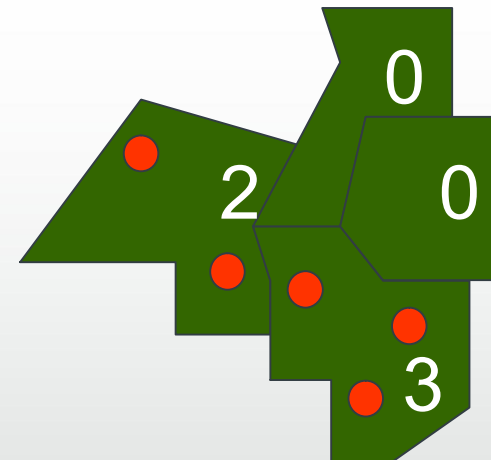
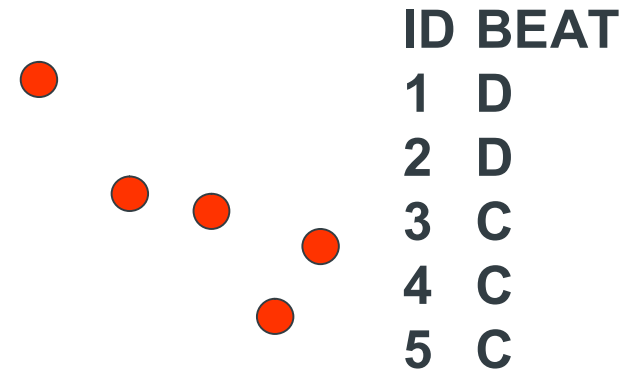


# Spatial data linkage

- Where no tabular linkage exists between data
- Can use GIS operations to match points to areas or areas to areas
  - e.g. grid referenced accidents matched to own neighbourhood boundaries
  - e.g. clinic catchment areas to new ward boundaries

# Allocation and aggregation

- Allocate
  - e.g. allocate attributes of police beats to car crime locations
- Aggregate
  - e.g. aggregate number of car crimes in each police beat
- Same spatial linkage operation, but different outputs



# Modifiable areal unit problem

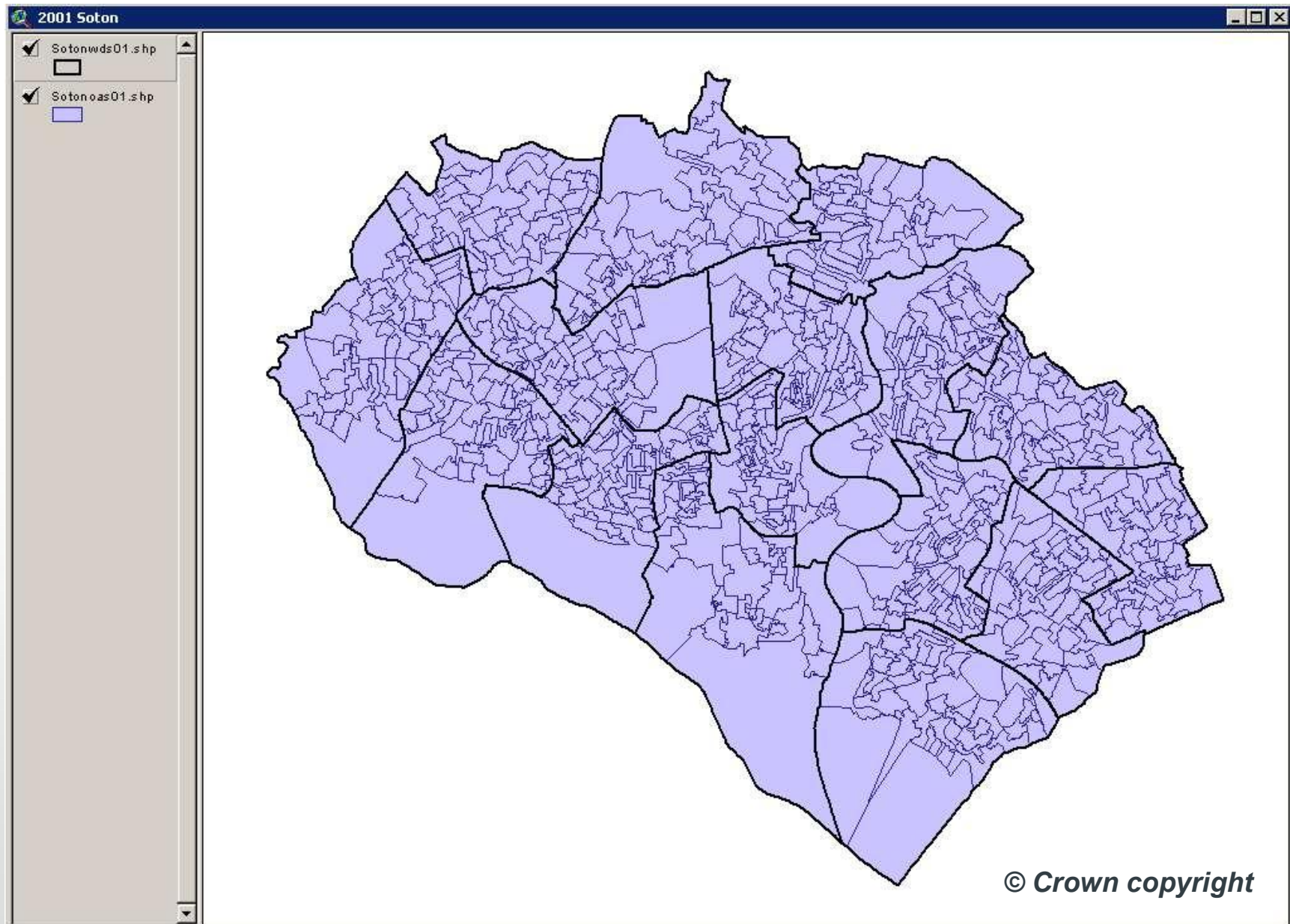
- Pattern observed in shaded area census maps are artifact of boundaries used
  - Different boundaries would produce different pattern, even with same population
  - Relationships at one level of aggregation need not hold at any other level (ecological fallacy)

# Implications for some commonly-used datasets

# Some very useful geographically referenced datasets

- Demographic data
  - Detailed populations: 2001 census (OA, ward, LAD)
  - Updated populations: mid-year estimates (LSOA)
  - Neighbourhood Statistics (OA/LSOA/MSOA)
- Indicators and classifications
  - Urban/rural codes, OA classifications (OA)
  - Indices of Deprivation 2007 (LSOA)
- Linkage datasets
  - National statistics postcode directory

# Southampton: 2001 output areas and wards



# Demographic data: census codes and boundaries

- Area hierarchy and codes
  - Output Areas (no names) 25JPUF0005
  - Ward UF
  - LADs (county/district 25JP or unitary authority 00JP)
- Digital boundaries
  - Available all levels from OA upwards
- OAs mostly built up from postcodes
- Census geography changes each decade (until 2011?)



Neighbourhood Statistics - Home Page - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back

Search

Favorites

Address <http://www.neighbourhood.statistics.gov.uk/dissemination/LeadHome.do;jessionid=ac1f930bce6fec3c419cc414be7939a86e64764f589?m=0&s=1220970848> Go Links

Office for National Statistics

UK Snapshot | Neighbourhood | Economy | Census | About Us | Jobs

Neighbourhood Statistics Sign in or Register >

FIND STATISTICS FOR AN AREA [>More about areas](#)

This search allows you to find **detailed statistics** within specific geographic areas, for example in **neighbourhood regeneration**.

1

**First enter the name of an area OR full postcode:**  
  
e.g. Clapham Park e.g. N51JP

2

**Then select the type of area you need statistics for:**  
☒ Local Authority  
☐ Ward  
☐ New Deal For Communities  
☐ Super Output Area  
[More areas](#) ▼

3

**Search**

NEIGHBOURHOOD SUMMARY

This search allows you to find a **summary report** for your **local neighbourhood**. If you want to know more about the neighbourhood you live or work in use this search.

**Enter a full postcode from your neighbourhood:**  
  
e.g. N51JP

**Search**

I WANT TO:

[view or download data by topic](#)  
[explore analysis, training and guidance](#)  
[create a custom table, chart or map](#)

LATEST NEWS

[4 September 2008 - Educational attainment](#)  
[1 September 2008 - Updated Indicator Catalogue](#)  
[More news stories...](#)

About Neighbourhood Statistics | News | User Guide | FAQ | Glossary | Accessibility

Internet

# Linkage datasets: National Statistics Postcode Directory

- Full list of UK postcodes , updated quarterly
- Dates of introduction and termination
- Ordnance Survey grid references
- Multiple area codes, including
  - Census, neighbourhood statistics, local government, health, electoral

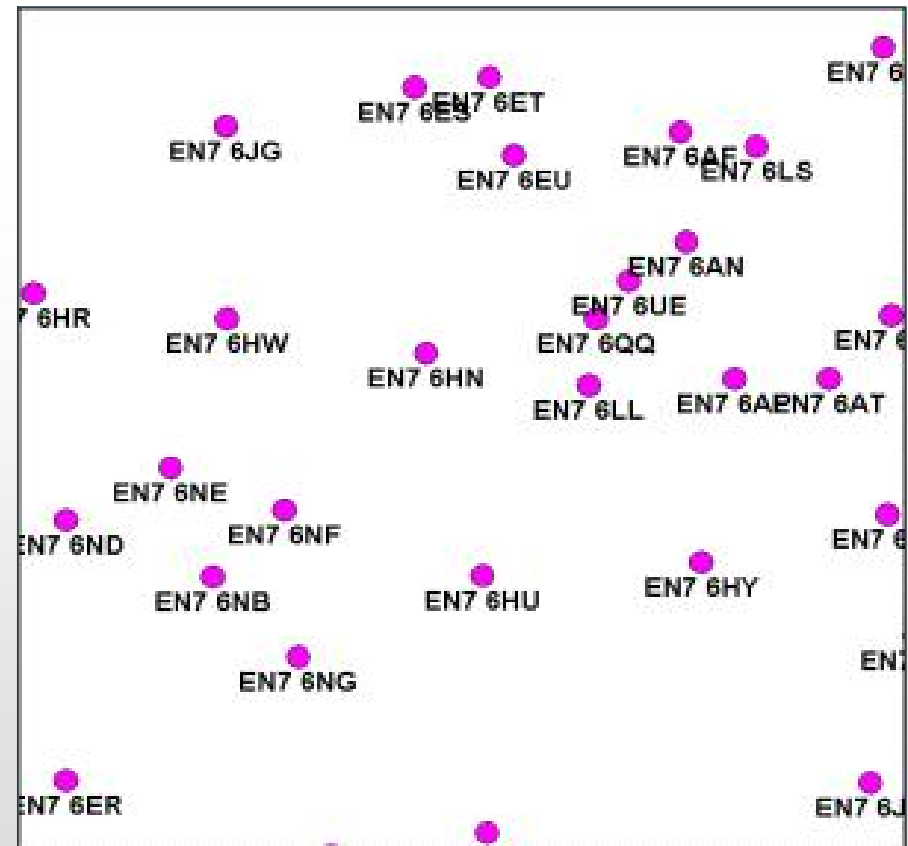
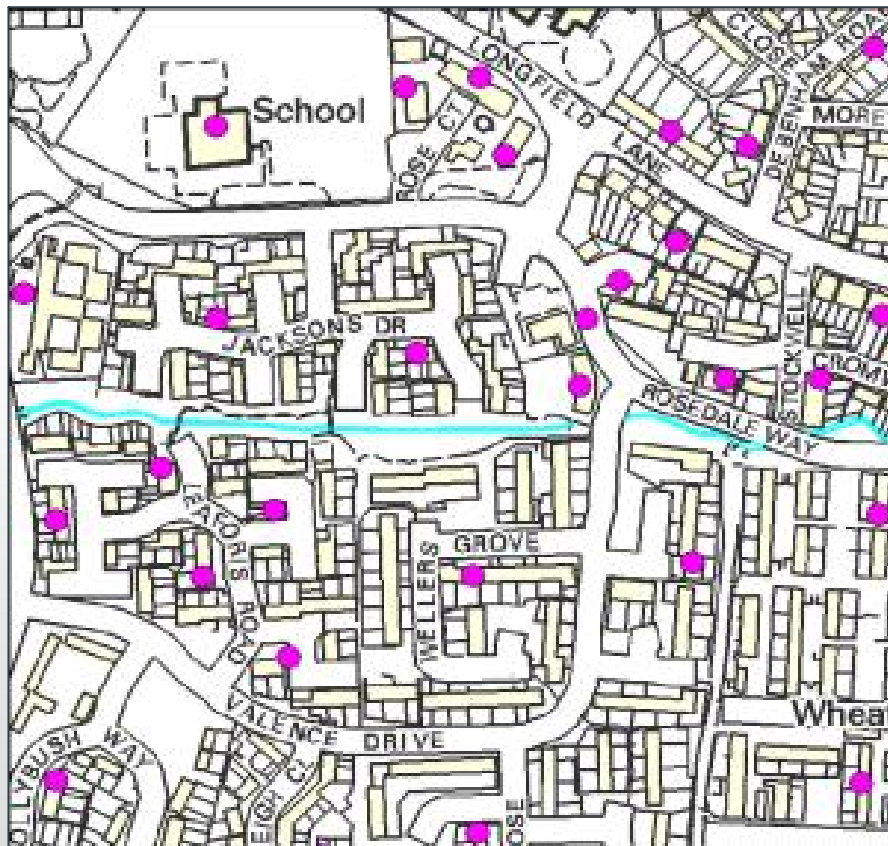
# Postcodes: coding structure

- Smallest standard geographical codes
- Integrated with addressing (listed in Royal Mail PAF)
- Area hierarchy and codes
  - Unit postcode (NOT areas) SO17 1BJ (~15 addresses)
  - Sector SO17 1
  - District SO17
  - Area SO
- Widespread recognition and use

# Postcodes: spatial referencing

e.g. Ordnance Survey Code-Point

<http://www.ordnancesurvey.co.uk/oswebsite/products/codepoint/>



Demonstration of online  
services: Census.ac.uk,  
UKBorders, Geoconvert

Census.ac.uk - home - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites RSS Feeds Print Mail Downloads

Address <http://census.ac.uk/> Go Links >>

# Census.ac.uk

Moving you closer to the data

[Home](#) [Census programme](#) [Available data](#) [News](#) [Contact us](#) [My Census](#)

## Data search

Enter search term

Go

- [Data search help](#)
- [Advanced data search](#)
- [Search web site](#)

## Registered users

- [Login](#)
- [Update me](#)
- [Login help](#)
- [Submit outputs](#)

## New users

- [Registration](#)
- [Quick guide](#)

## Data use

- [End User Licence](#)

Home



# Census.ac.uk

Census.ac.uk, home of the ESRC Census Programme, provides a one stop gateway to data and support services which allow users and researchers in UK Higher and Further Education to access the 1971, 1981, 1991 and 2001 UK censuses. It also provides access to other important census related resources.

Anyone is welcome to use the open resources of this web site and search metadata and publications, but to access most data registration and acceptance of licence terms relating to access and use of the data is required. The Quick Guide is a useful first step to using census data via Census.ac.uk.

Links to the data are provided in search results, metadata records and guides. Users can also go directly to the individual Programme units.

The census outputs are available in a number of forms and there is detailed information about these, their content and how to access the data in the Census.ac.uk guides.. especially those covering:

**Census Research Projects**

**Federated Access Management**

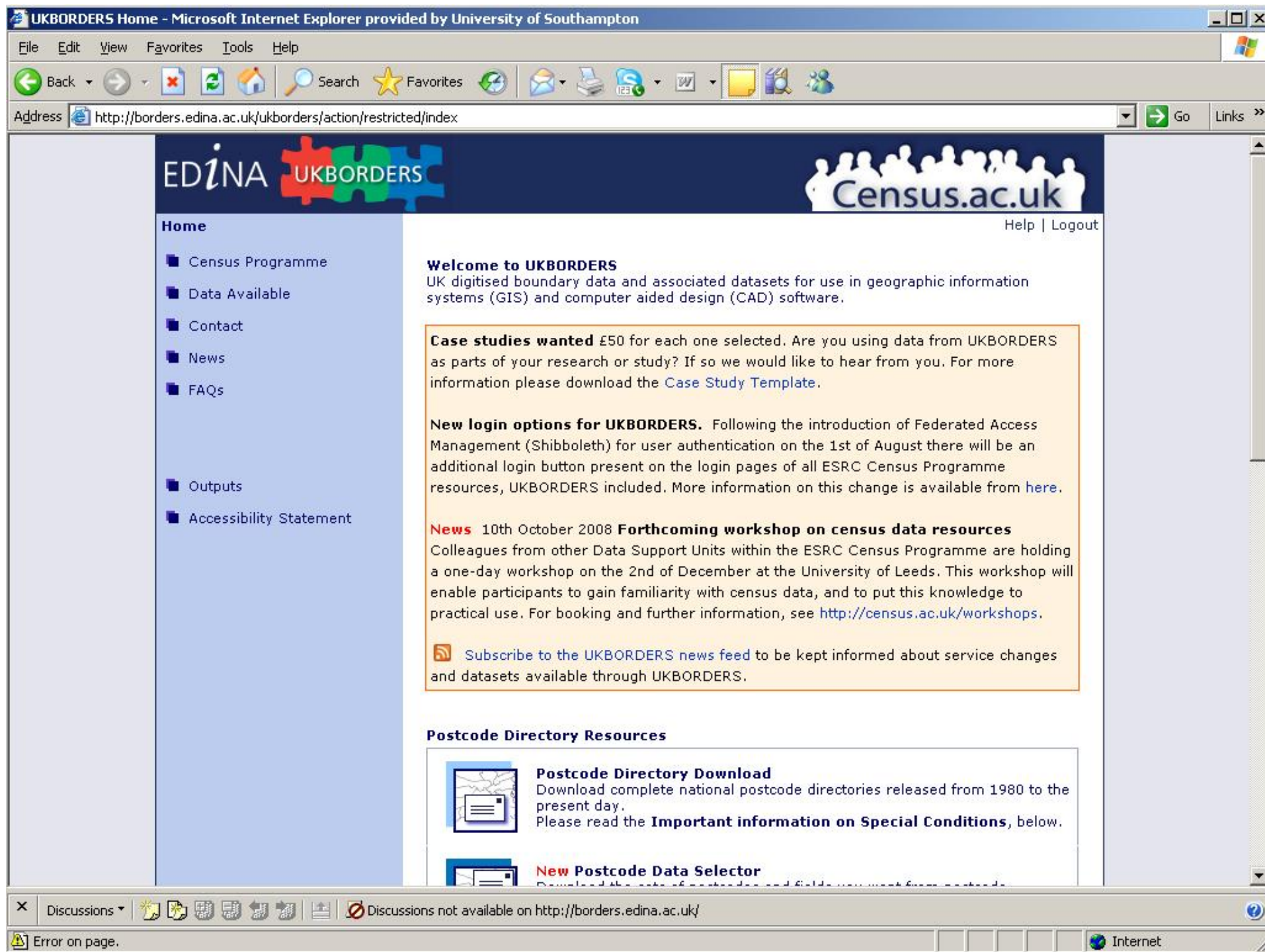
**Census Workshops**

**Experian Demographic data**

Discussions not available on <http://census.ac.uk/>

Internet





UKBORDERS - Data Selector > Where - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites RSS Print Mail I2345678910111213141516171819202122232425262728293031323334353637383940414243444546474849505152535455565758596061626364656667686970717273747576777879808182838485868788899091929394959697989910010110210310410510610710810911011111211311411511611711811912012112212312412512612712812913013113213313413513613713813914014114214314414514614714814915015115215315415515615715815916016116216316416516616716816917017117217317417517617717817918018118218318418518618718818919019119219319419519619719819920020120220320420520620720820921021121221321421521621721821922022122222322422522622722822923023123223323423523623723823924024124224324424524624724824925025125225325425525625725825926026126226326426526626726826927027127227327427527627727827928028128228328428528628728828929029129229329429529629729829930030130230330430530630730830931031131231331431531631731831932032132232332432532632732832933033133233333433533633733833934034134234334434534634734834935035135235335435535635735835936036136236336436536636736836937037137237337437537637737837938038138238338438538638738838939039139239339439539639739839940040140240340440540640740840941041141241341441541641741841942042142242342442542642742842943043143243343443543643743843944044144244344444544644744844945045145245345445545645745845946046146246346446546646746846947047147247347447547647747847948048148248348448548648748848949049149249349449549649749849950050150250350450550650750850951051151251351451551651751851952052152252352452552652752852953053153253353453553653753853954054154254354454554654754854955055155255355455555655755855956056156256356456556656756856957057157257357457557657757857958058158258358458558658758858959059159259359459559659759859960060160260360460560660760860961061161261361461561661761861962062162262362462562662762862963063163263363463563663763863964064164264364464564664764864965065165265365465565665765865966066166266366466566666766866967067167267367467567667767867968068168268368468568668768868969069169269369469569669769869970070170270370470570670770870971071171271371471571671771871972072172272372472572672772872973073173273373473573673773873974074174274374474574674774874975075175275375475575675775875976076176276376476576676776876977077177277377477577677777877978078178278378478578678778878979079179279379479579679779879980080180280380480580680780880981081181281381481581681781881982082182282382482582682782882983083183283383483583683783883984084184284384484584684784884985085185285385485585685785885986086186286386486586686786886987087187287387487587687787887988088188288388488588688788888989089189289389489589689789889990090190290390490590690790890991091191291391491591691791891992092192292392492592692792892993093193293393493593693793893994094194294394494594694794894995095195295395495595695795895996096196296396496596696796896997097197297397497597697797897998098198298398498598698798898999099199299399499599699799899910001001100210031004100510061007100810091010101110121013101410151016101710181019102010211022102310241025102610271028102910301031103210331034103510361037103810391040104110421043104410451046104710481049105010511052105310541055105610571058105910601061106210631064106510661067106810691070107110721073107410751076107710781079108010811082108310841085108610871088108910901091109210931094109510961097109810991100110111021103110411051106110711081109111011111112111311141115111611171118111911201121112211231124112511261127112811291130113111321133113411351136113711381139114011411142114311441145114611471148114911501151115211531154115511561157115811591160116111621163116411651166116711681169117011711172117311741175117611771178117911801181118211831184118511861187118811891190119111921193119411951196119711981199120012011202120312041205120612071208120912101211121212131214121512161217121812191220122112221223122412251226122712281229123012311232123312341235123612371238123912401241124212431244124512461247124812491250125112521253125412551256125712581259126012611262126312641265126612671268126912701271127212731274127512761277127812791280128112821283128412851286128712881289129012911292129312941295129612971298129913001301130213031304130513061307130813091310131113121313131413151316131713181319132013211322132313241325132613271328132913301331133213331334133513361337133813391340134113421343134413451346134713481349135013511352135313541355135613571358135913601361136213631364136513661367136813691370137113721373137413751376137713781379138013811382138313841385138613871388138913901391139213931394139513961397139813991400140114021403140414051406140714081409141014111412141314141415141614171418141914201421142214231424142514261427142814291430143114321433143414351436143714381439144014411442144314441445144614471448144914501451145214531454145514561457145814591460146114621463146414651466146714681469147014711472147314741475147614771478147914801481148214831484148514861487148814891490149114921493149414951496149714981499150015011502150315041505150615071508150915101511151215131514151515161517151815191520152115221523152415251526152715281529153015311532153315341535153615371538153915401541154215431544154515461547154815491550155115521553155415551556155715581559156015611562156315641565156615671568156915701571157215731574157515761577157815791580158115821583158415851586158715881589159015911592159315941595159615971598159916001601160216031604160516061607160816091610161116121613161416151616161716181619162016211622162316241625162616271628162916301631163216331634163516361637163816391640164116421643164416451646164716481649165016511652165316541655165616571658165916601661166216631664166516661667166816691670167116721673167416751676167716781679168016811682168316841685168616871688168916901691169216931694169516961697169816991700170117021703170417051706170717081709171017111712171317141715171617171718171917201721172217231724172517261727172817291730173117321733173417351736173717381739174017411742174317441745174617471748174917501751175217531754175517561757175817591760176117621763176417651766176717681769177017711772177317741775177617771778177917801781178217831784178517861787178817891790179117921793179417951796179717981799180018011802180318041805180618071808180918101811181218131814181518161817181818191820182118221823182418251826182718281829183018311832183318341835183618371838183918401841184218431844184518461847184818491850185118521853185418551856185718581859186018611862186318641865186618671868186918701871187218731874187518761877187818791880188118821883188418851886188718881889189018911892189318941895189618971898189919001901190219031904190519061907190819091910191119121913191419151916191719181919192019211922192319241925192619271928192919301931193219331934193519361937193819391940194119421943194419451946194719481949195019511952195319541955195619571958195919601961196219631964196519661967196819691970197119721973197419751976197719781979198019811982198319841985198619871988198919901991199219931994199519961997199819992000200120022003200420052006200720082009201020112012201320142015201620172018201920202021202220232024202520262027202820292030203120322033203420352036203720382039204020412042204320442045204620472048204920502051205220532054205520562057205820592060206120622063206420652066206720682069207020712072207320742075207620772078207920802081208220832084208520862087208820892090209120922093209420952096209720982099210021012102210321042105210621072108210921102111211221132114211521162117211821192120212121222123212421252126212721282129213021312132213321342135213621372138213921402141214221432144214521462147214821492150215121522153215421552156215721582159216021612162216321642165216621672168216921702171217221732174217521762177217821792180218121822183218421852186218721882189219021912192219321942195219621972198219922002201220222032204220522062207220822092210221122122213221422152216221722182219222022212222222322242225222622272228222922302231223222332234223522362237223822392240224122422243224422452246224722482249225022512252225322542255225622572258225922602261226222632264226522662267226822692270227122722273227422752276227722782279228022812282228322842285228622872288228922902291229222932294229522962297229822992300230123022303230423052306230723082309231023112312231323142315231623172318231923202321232223232324232523262327232823292330233123322333233423352336233723382339234023412342234323442345234623472348234923502351235223532354235523562357235823592360236123622363236423652366236723682369237023712372237323742375237623772378237923802381238223832384238523862387238823892390239123922393239423952396239723982399240024012402240324042405240624072408240924102411241224132414241524162417241824192420242124222423242424252426242724282429243024312432243324342435243624372438243924402441244224432444244524462447244824492450245124522453245424552456245724582459246024612462246324642465246624672468246924702471247224732474247524762477247824792480248124822483248424852486248724882489249024912492249324942495249624972498249925002501250225032504250525062507250825092510251125122513251425152516251725182519252025212522252325242525252625272528252925302531253225332534253525362537253825392540254125422543254425452546254725482549255025512552255325542555255625572558255925602561256225632564256525662567256825692570257125722573257425752576257725782579258025812582258325842585258625872588258925902591259225932594259525962597259825992600260126022603260426052606260726082609261026112612261326142615261626172618261926202621262226232624262526262627262826292630263126322633263426352636263726382639264026412642264326442645264626472648264926502651265226532654265526562657265826592660266126622663266426652666266726682669267026712672267326742675267626772678267926802681268226832684268526862687268826892690269126922693269426952696269726982699270027012702270327042705270627072708270927102711271227132714271527162717271827192720272127222723272427252726272727282729273027312732273327342735273627372738273927402741274227432744274527462747274827492750275127522753275427552756275727582759276027612762276327642765276627672768276927702771277227732774277527762777277827792780278127822783278427852786278727882789279027912792279327942795279627972798279928002801280228032804280528062807280828092810281128122813281428152816281728182819282028212822282328242825282628272828282928302831283228332834283528362837283828392840284128422843284428452846284728482849285028512852285328542855285628572858285928602861286228632864286528662867286828692870287128722873287428752876287728782879288028812882288328842885288628872888288928902891289228932894289528962897289828992900290129022903290429052906290729082909291029112912291329142915291629172918291929202921292229232924292529262927292829292930293129322933293429352936293729382939294029412942294329442945294629472948294929502951295229532954295529562957295829592960296129622963296429652966296729682969297029712972297329742975297629772978297929802981298229832984298529862987298829892990299129922993299429952996299729982999300030013002300330043005300630073008300930103011301230133014301530163017301830193020302130223023302430253026302730283029303030313032303330343035303630373038303930403041304230433044304530463047304830493050305130523053305430553056305730583059306030613062306330643065306630673068306930703071307230733074307530763077307830793080308130823083308430853086308730883089309030913092309330943095309630973098309931003101310231033104310531063107310831093110311131123113311431153116311731183119312031213122312331243125312631273128312931303131313231333134313531363137313831393140314131423143314431453146314731483149315031513152315331543155315631573158315931603161316231633164316531663167316831693170317131723173317431753176317731783179318031813182318331843185318631873188318931903191319231933194319531963197319831993200320132023203320432053206320732083209321032113212321332143215321632173218321932203221322232233223432253226322732283229323032313232323332343235323632373238323932403241324232433244324532463247324832493250325132523253325432553256325732583259326032613262326332643265326632673268326932703271327232733274327532763277327832793280328132823283328432853286328732883289329032913292329332943295329632973298329933003301330233033304330533063307330833093310331133123313331433153316331733183319332033213322332333243325332633273328332933303331333233333334333533363337333833393340334133423343334433453346334733483349335033513352335333543



UKBORDERS - Easy Download > Postcode Directory - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address http://borders.edina.ac.uk/html2/pcluts\_main.html Go Links

EDINA
UKBORDERS

Census.ac.uk

Home > Postcode Directries
Help | Logout

### Easy Download: Postcode Directories

*What are Postcode Directories?*

Postcode directories are files which provide details of current and historic postcodes along with details of other geographies in which that postcode is located. They provide a valuable means by which events or occurrences (such as disease, crimes, customer residence etc.) can be allocated from a postcode to another area such as an electoral ward or health area.

The links below are to postcode directory files for individual years (or quarterly releases where we have been supplied them) as indicated. The zip archive provides the raw data directory itself as well as any supporting information such as field specification. The versions for later years contain more information and come with more supporting information.

Notes: In most instances the files are provided as supplied to us by ONS. Where it has been necessary to amend the originals this will be explicitly indicated on the download page.

For general information about postcode directories, and the All Fields Postcode directory in particular, please see the [ONS site](#).

Quarterly Directories
Back to top ↑

Click on the relevant tick box to download...

Year/Quarter:	February	May	August	November
2008	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2007	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2006	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Discussions

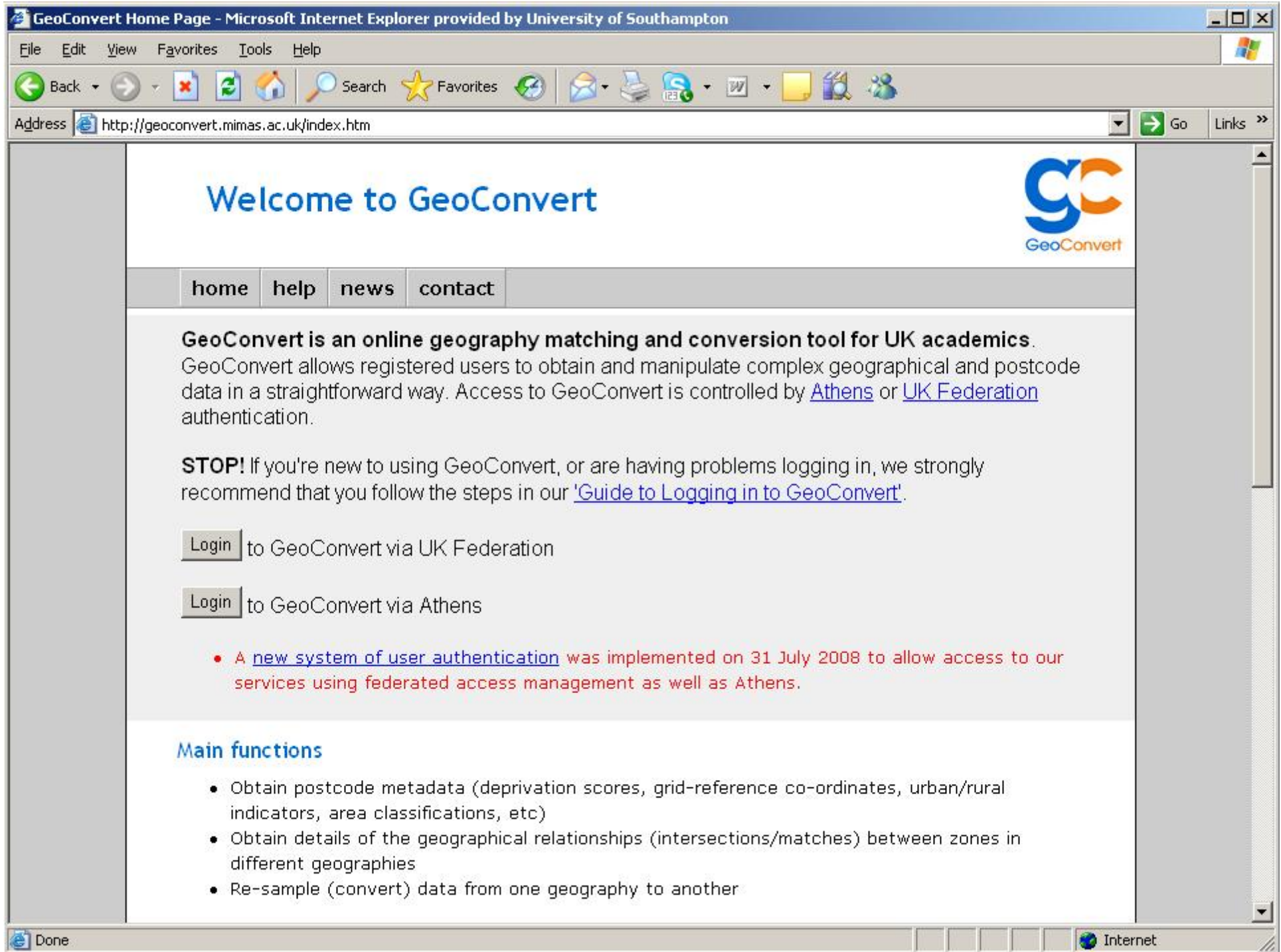
Discussions not available on http://borders.edina.ac.uk/

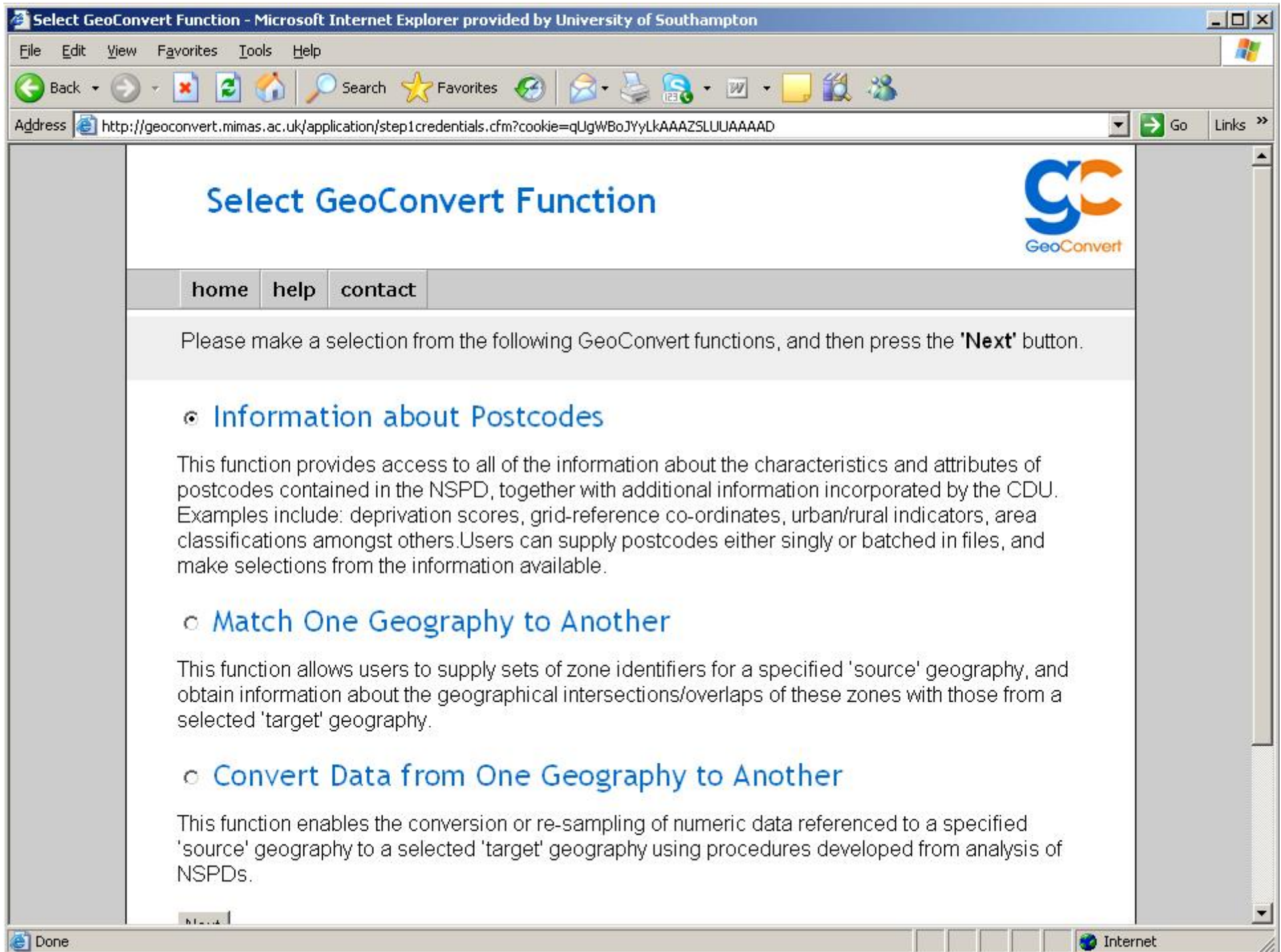
Done
Internet

davepostcodes.txt - Notepad

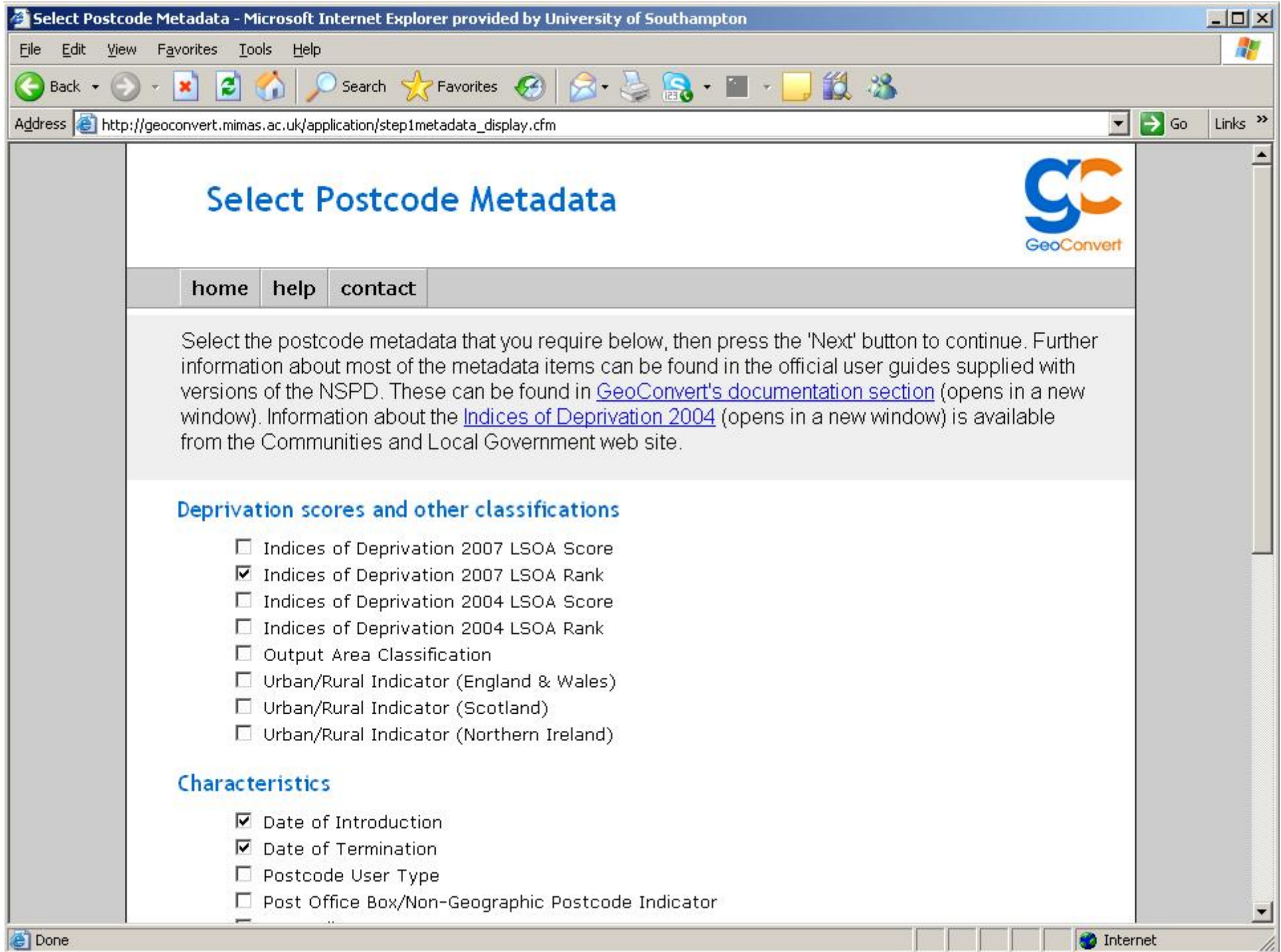
File Edit Format View Help

```
Postcode, Count, Age, Year
DA5 3BE, 1, 0, 1965
BS9 1JQ, 1, 18, 1983
BS6 6JR, 1, 20, 1985
CF5 1NX, 1, 21, 1986
CF1 8EA, 1, 24, 1989
CF11 6EA, 1, 24, 1989
SO16 7GF, 1, 26, 1992
SO16 8JE, 1, 27, 1992
SO16 0TG, 1, 32, 1997
SO51 6BN, 1, 40, 2005
```









Supply Postcode(s) - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites RSS Print Mail I23

Address [http://geoconvert.mimas.ac.uk/application/step1metadata\\_input.cfm](http://geoconvert.mimas.ac.uk/application/step1metadata_input.cfm) Go Links >>

# Supply Postcode(s)



home help contact

Supply either a single postcode, or a file of the postcodes for which you want to obtain metadata, and then press the 'Next' button to continue. If supplying a file of postcodes, please consult the [Guide to Input Files](#) to ensure that it has the correct structure and content, and make selections below to identify what kind of (if any) column delimiter characters it uses, and whether or not it contains a header row.

## Supply a Single Postcode

or

## Supply a File of Postcodes

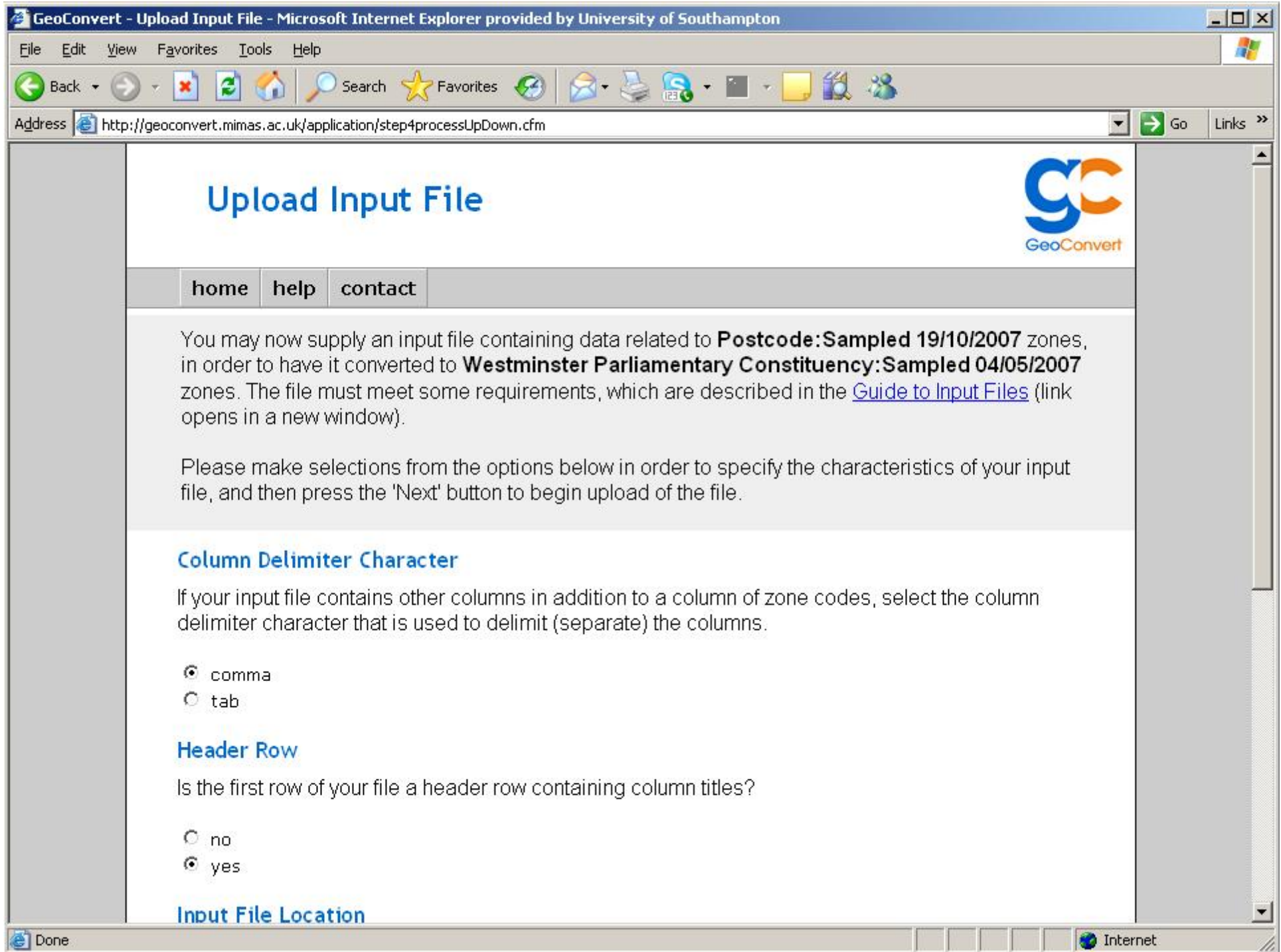
### Column Delimiter Character

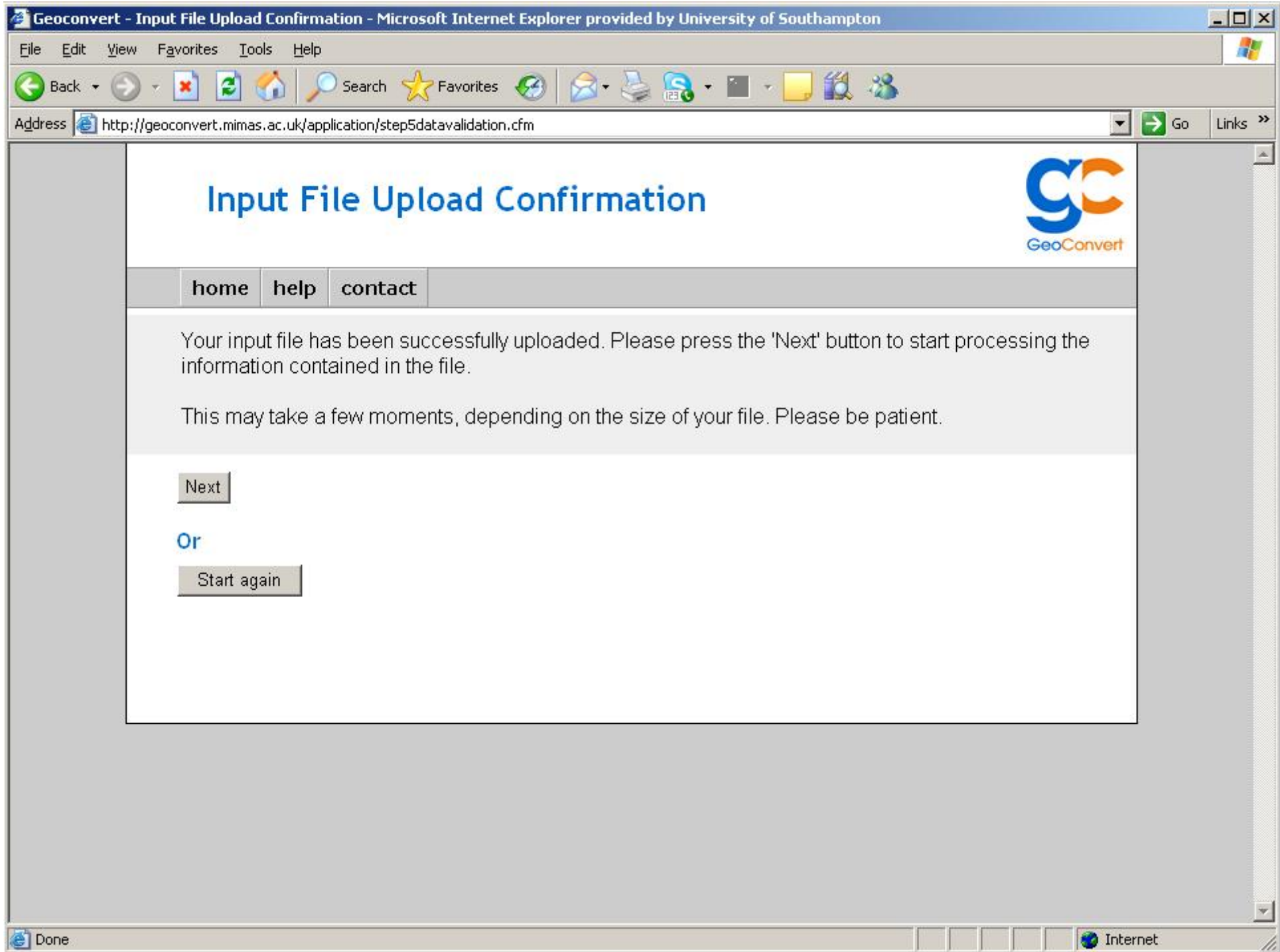
If your input file contains other columns in addition to a column of zone codes, select the column delimiter character that is used to delimit (separate) the columns.

☒ comma  
☐ tab

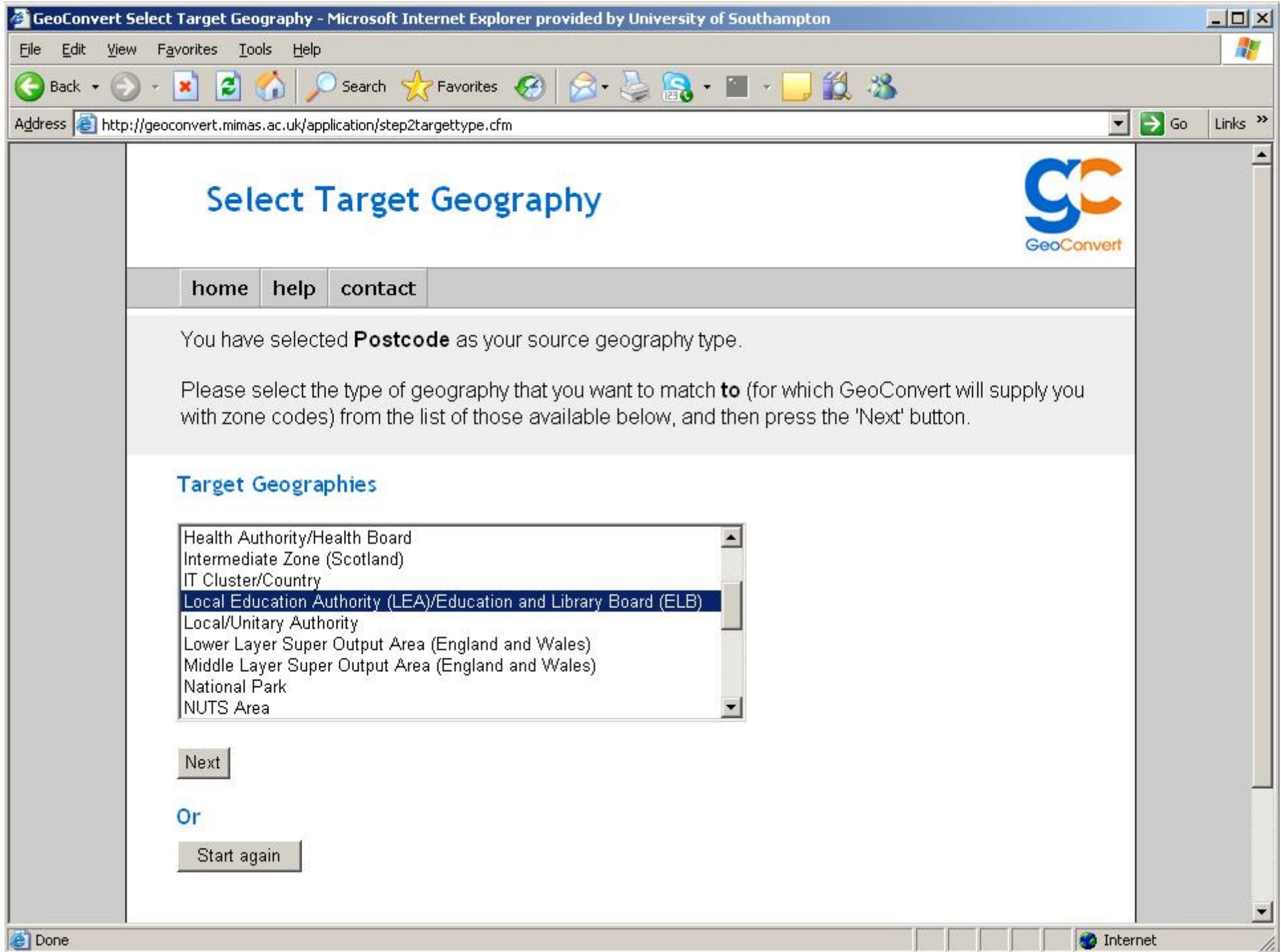
### Header Row

Done Internet










GeoConvert Postcode Metadata - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites RSS Print Mail ICS Calendar Address Book

Address [http://geoconvert.mimas.ac.uk/application/step1metadata\\_results.cfm](http://geoconvert.mimas.ac.uk/application/step1metadata_results.cfm) Go Links >>

## Postcode Metadata Results



[home](#) [help](#) [contact](#)

Your input file has been successfully uploaded.

Your input has been successfully processed to produce the output files described below. The links to the files can be used to open the output files in new browser windows or to download them to your location by clicking on them and following the 'open' or 'save' procedures presented by your browser. Further information about the different types of output files can be found in the [Guide to Output Files](#) (link opens in new browser window).

### Metadata Codebook

The codebook provides brief descriptions of the information contained in the columns of the postcode metadata output file.

[Metadata Codebook](#)

### Output Files

The remaining rows contained in your input file were successfully uploaded, and contained postcodes that were matched to postcodes contained in the version of the NSPD that you selected. The metadata items that you selected have been attached to the matched postcodes and are contained in the postcode metadata rows output file.

Internet

http://geoconvert.mimas.ac.uk/application/download/49780857\_matched.csv - Microsoft Internet Explorer provided by University of

File Edit View Insert Format Tools Data Go To Favorites Help

Back Forward Stop Home Search Favorites RSS Print Mail New Tab

Address http://geoconvert.mimas.ac.uk/application/download/49780857\_matched.csv Go Links

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	input_row	standard_p	IMD_2007	OAC07	nov	DOINTR07	DOTERM0	OSEAST1	OSNRTH1	ADDRCT0	input_postcode			
2	1	DA5 3BE	26553	6A2	Jan-80		547421	173448	42	DA5 3BE				
3	2	BS9 1JQ	30847	4D1	Jan-80		356471	175807		BS9 1JQ				
4	3	BS6 6JR	15868	2A1	Jan-80		357933	173941	0	BS6 6JR				
5	4	CF5 1NX		2B2	Jan-80		316599	176408	35	CF5 1NX				
6	5	CF1 8EA		7A1	Jan-80	Jun-99	316900	176200	22	CF1 8EA				
7	6	CF116EA		7A2	Jun-99		316952	176227	22	CF11 6EA				
8	7	SO167GF	22039	6D2	Dec-94		441805	117170	12	SO16 7GF				
9	8	SO168JE	30634	6D2	Dec-94		438556	116286	11	SO16 8JE				
10	9	SO160TG	24632	4A1	Dec-96		437429	116148	9	SO16 0TG				
11	10	SO516BN	27399	4B4	Jan-86		430667	118615	58	SO51 6BN				
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

6A2

Settled households

4D1

Thriving suburbs

2A1

Transient communities

2B2

Settled in the city

7A1

Asian communities

7A2

Asian communities

6D2

Aspiring households

6D2

Aspiring households

4A1

Prospering younger families

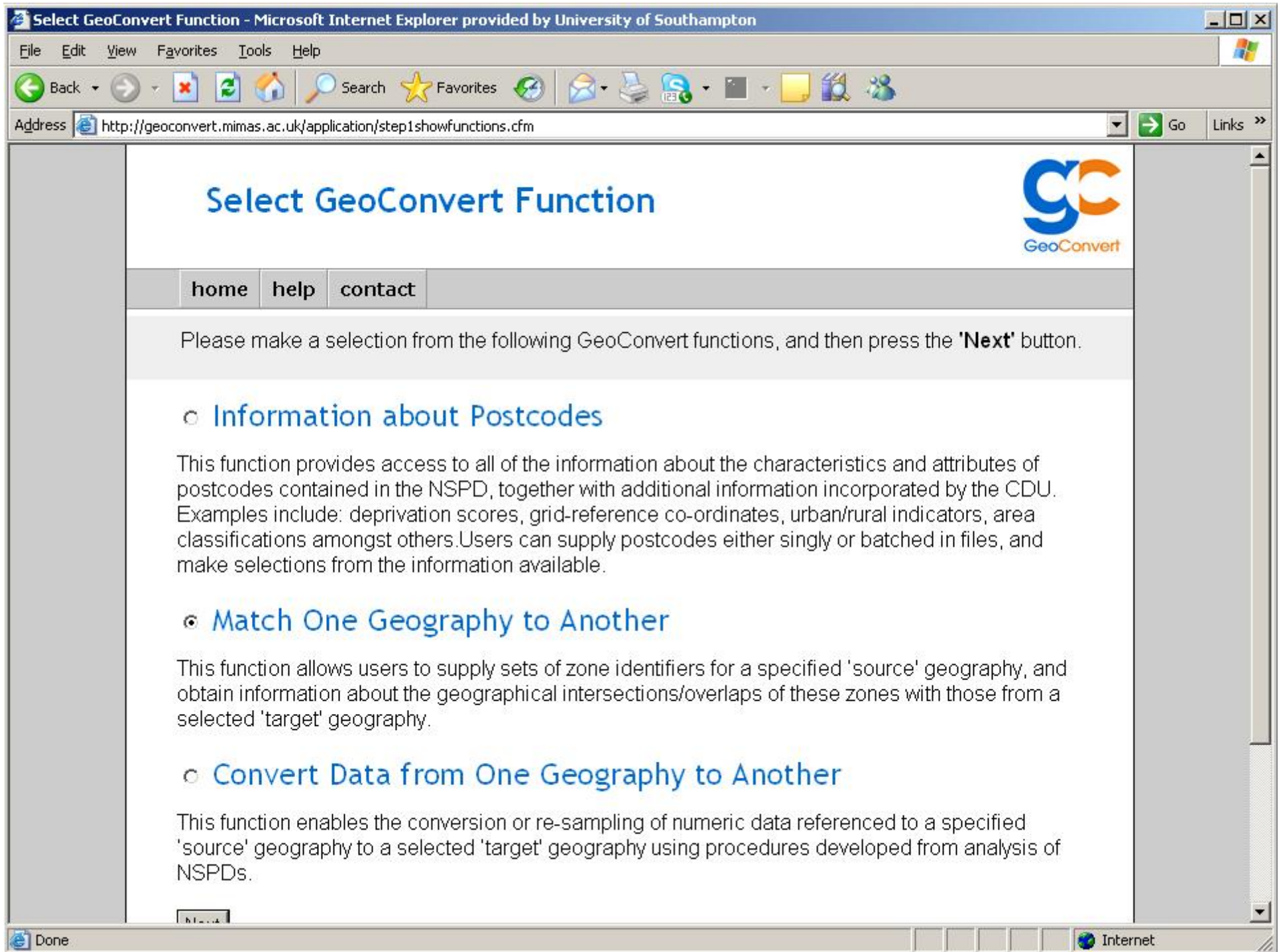
4B4

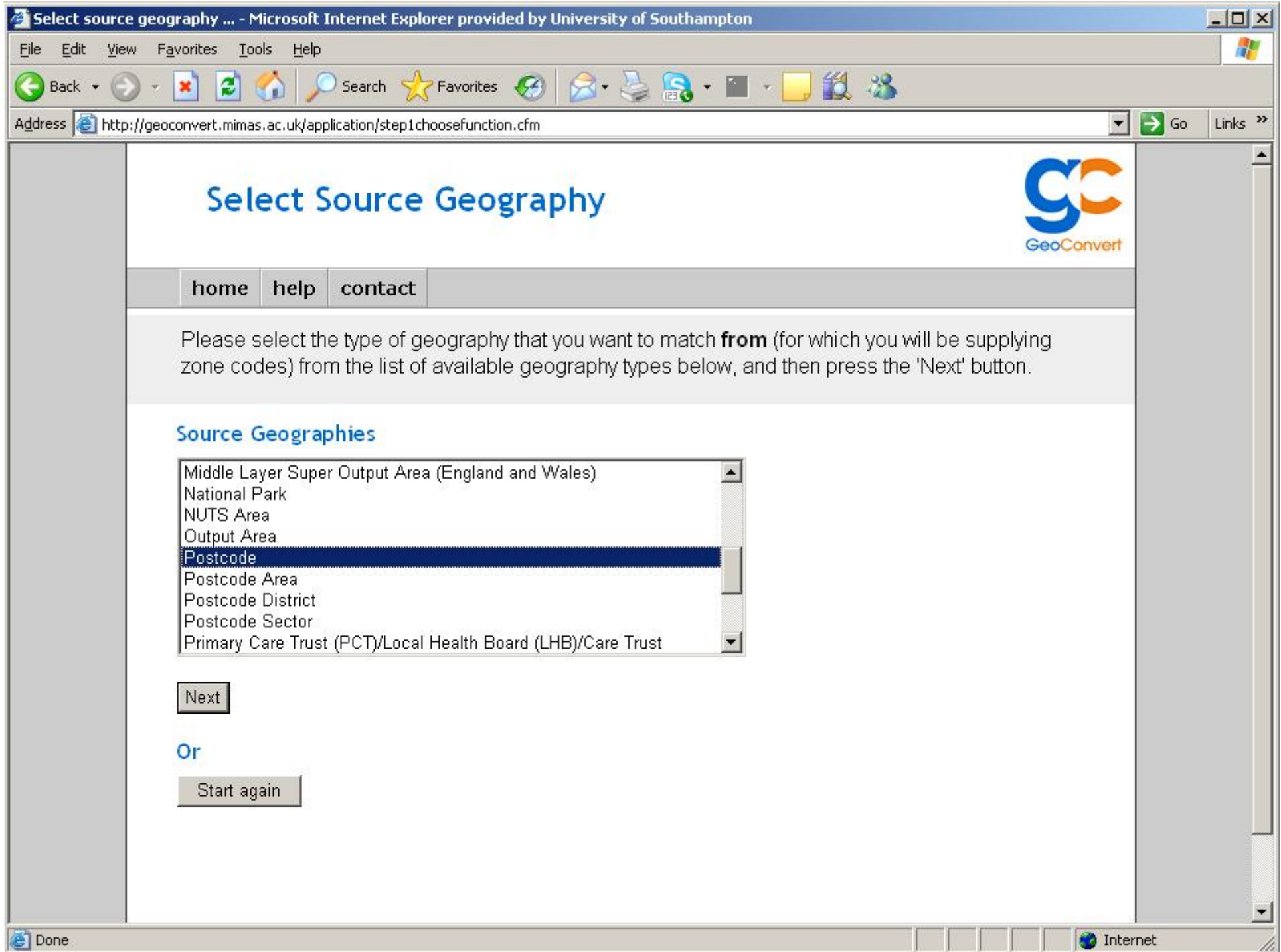
Prospering older families

49780857\_matched

Discussions not available on http://geoconvert.mimas.ac.uk/








GeoConvert - Download Results - Microsoft Internet Explorer provided by University of Southampton

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites RSS Print Mail I23

Address <http://geoconvert.mimas.ac.uk/application/step6convert.cfm> Go Links >>

# Results



[home](#) [help](#) [contact](#)

The results of the processing are contained in the output files described below. The links to the files can be used to open the output files in new browser windows or to download them to your location by clicking on them and following the 'open' or 'save' procedures presented by your browser. Further information about the different types of output files can be found in the [Guide to Output Files](#) (link opens in new browser window).

## Output Results

### Matched Rows

The remaining rows contained in your input file were successfully uploaded, and had zone codes which were matched to source codes in the relevant GeoConvert lookup. The matched source zones are involved in 10 intersections with zones of your selected target geography. Details of the intersections, together with re aggregation proportions, are contained in the matched rows output file.

[Matched Rows](#)

Or

[Start again](#)

[http://geoconvert.mimas.ac.uk/application/download/25993871\\_matched.csv](http://geoconvert.mimas.ac.uk/application/download/25993871_matched.csv) Internet



http://geoconvert.mimas.ac.uk/application/download/25993871\_matched.csv - Microsoft Internet Explorer provided by University of

File Edit View Insert Format Tools Data Go To Favorites Help

Back Forward Stop Home Search Favorites RSS Print Mail New Tab

Address http://geoconvert.mimas.ac.uk/application/download/25993871\_matched.csv Go Links

G23 fx

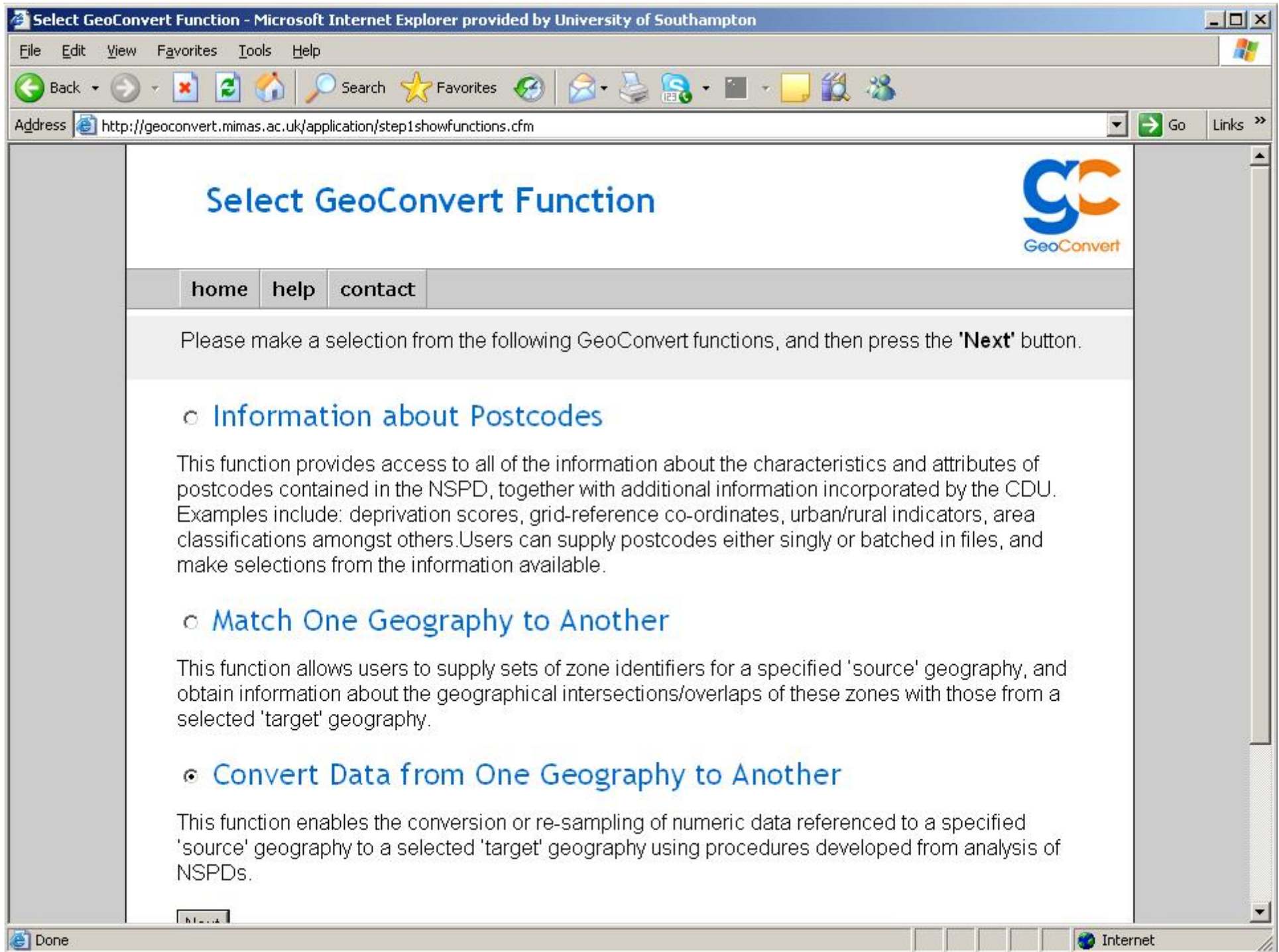
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	input_row	Postcode	proportion	Local	Educ	input_postcode								
2	1	DA5 3BE	1	303	DA5 3BE									
3	2	BS9 1JQ	1	801	BS9 1JQ									
4	3	BS6 6JR	1	801	BS6 6JR									
5	4	CF5 1NX	1	681	CF5 1NX									
6	5	CF1 8EA	1	681	CF1 8EA									
7	6	CF11 6EA	1	681	CF11 6EA									
8	7	SO16 7GF	1	852	SO16 7GF									
9	8	SO16 8JE	1	850	SO16 8JE									
10	9	SO16 0TG	1	850	SO16 0TG									
11	10	SO51 6BN	1	850	SO51 6BN									
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

303 Bexley  
801 Bristol  
681 Cardiff  
852 Southampton  
850 Hampshire

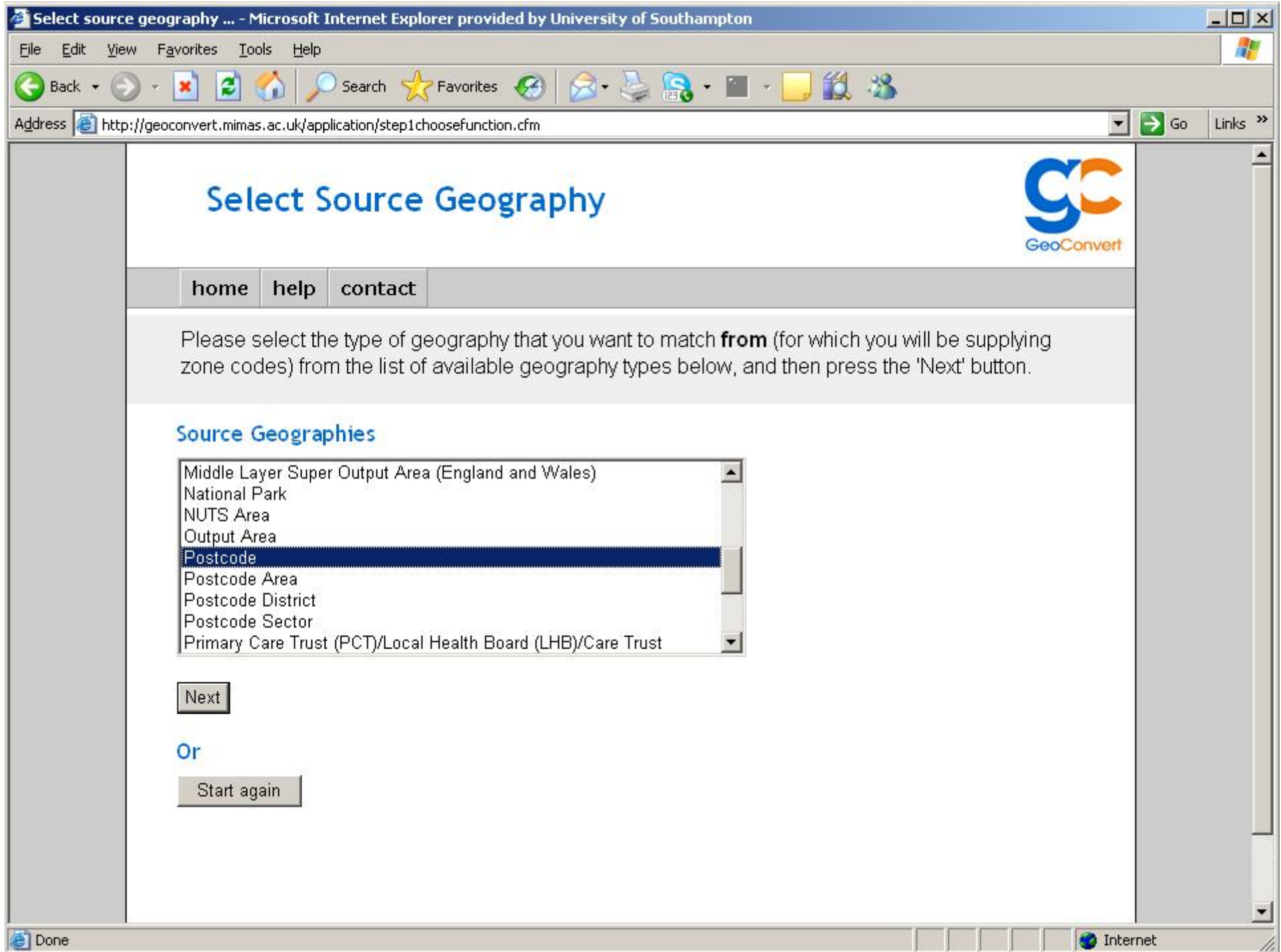
25993871\_matched

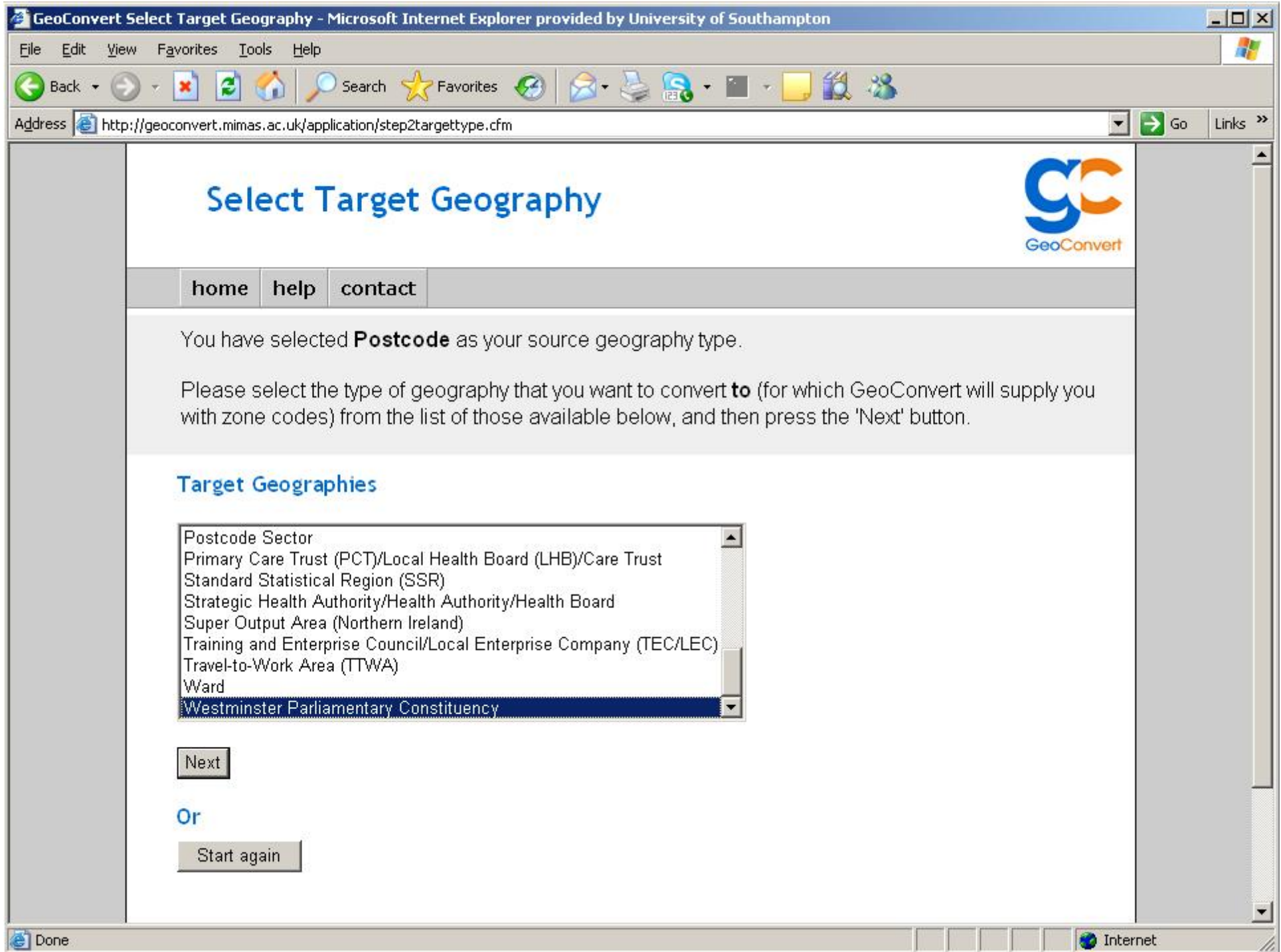
Discussions Discussions not available on http://geoconvert.mimas.ac.uk/

Done Unknown Zone









http://geoconvert.mimas.ac.uk/application/download/65554960\_converted.csv - Microsoft Internet Explorer provided by University

File Edit View Insert Format Tools Data Go To Favorites Help

Back Forward Stop Home Search Favorites Refresh Print Mail Stop

Address [http://geoconvert.mimas.ac.uk/application/download/65554960\\_converted.csv](http://geoconvert.mimas.ac.uk/application/download/65554960_converted.csv) Go Links

G31 fx

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Westminst	Count	Age	Year										
2	76	2	38	3968										
3	339	1	0	1965										
4	371	4	125	7986										
5	540	3	69	5964										
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

76 Bristol West  
339 Old Bexley and Sidcup  
371 Romsey  
540 Cardiff West

65554960\_converted

Discussions Discussions not available on <http://geoconvert.mimas.ac.uk/>

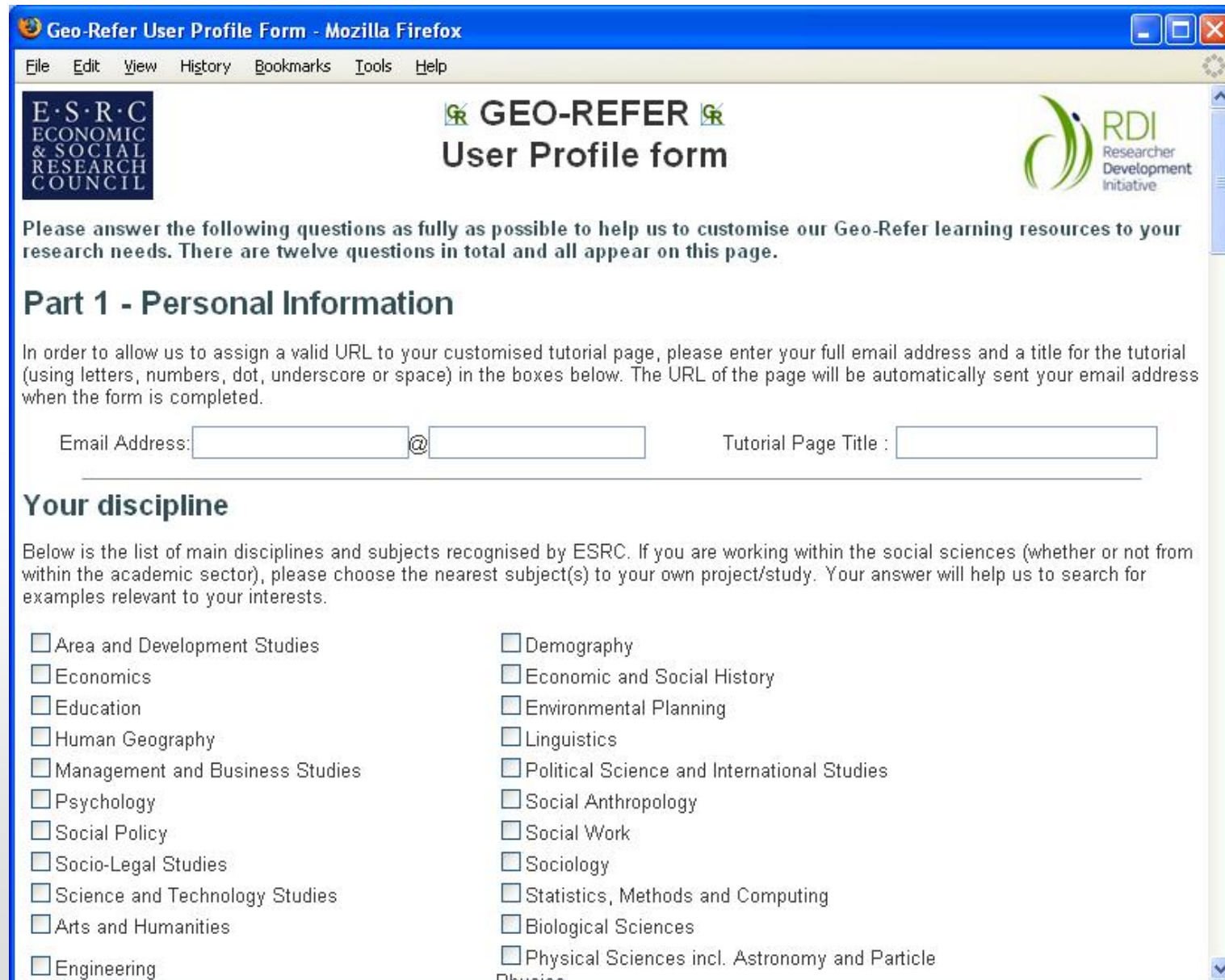
Done Unknown Zone

# Getting more help: how to use the Geo-Refer online resources

# Using the Geo-Refer resources

- URL - <http://www.geog.soton.ac.uk/geo-refer>
- Two options for using the site:
  - Complete the user profile form to specify own profile and Geo-Refer will best-match learning materials
  - Browse the resources, for an extensive list of concepts, methods, datasets and examples

# Geo-Refer user profile form



The screenshot shows a web browser window titled "Geo-Refer User Profile Form - Mozilla Firefox". The browser's menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The page header features three logos: the ESRC (Economic & Social Research Council) logo on the left, the GEO-REFER logo in the center, and the RDI (Researcher Development Initiative) logo on the right. Below the logos, a paragraph of text reads: "Please answer the following questions as fully as possible to help us to customise our Geo-Refer learning resources to your research needs. There are twelve questions in total and all appear on this page." The main heading of the form is "Part 1 - Personal Information". Below this, a paragraph explains: "In order to allow us to assign a valid URL to your customised tutorial page, please enter your full email address and a title for the tutorial (using letters, numbers, dot, underscore or space) in the boxes below. The URL of the page will be automatically sent your email address when the form is completed." There are two input fields: "Email Address:" followed by a text box and an "@" symbol, and "Tutorial Page Title :" followed by a text box. Below these fields is a section titled "Your discipline". A paragraph of text reads: "Below is the list of main disciplines and subjects recognised by ESRC. If you are working within the social sciences (whether or not from within the academic sector), please choose the nearest subject(s) to your own project/study. Your answer will help us to search for examples relevant to your interests." Below this text is a list of 20 disciplines and subjects, each preceded by an unchecked checkbox. The list is arranged in two columns. The first column includes: Area and Development Studies, Economics, Education, Human Geography, Management and Business Studies, Psychology, Social Policy, Socio-Legal Studies, Science and Technology Studies, Arts and Humanities, and Engineering. The second column includes: Demography, Economic and Social History, Environmental Planning, Linguistics, Political Science and International Studies, Social Anthropology, Social Work, Sociology, Statistics, Methods and Computing, Biological Sciences, and Physical Sciences incl. Astronomy and Particle Physics.

**Geo-Refer User Profile Form - Mozilla Firefox**

File Edit View History Bookmarks Tools Help

**ESRC**  
ECONOMIC  
& SOCIAL  
RESEARCH  
COUNCIL

**GEO-REFER**

**User Profile form**

**RDI**  
Researcher  
Development  
Initiative

Please answer the following questions as fully as possible to help us to customise our Geo-Refer learning resources to your research needs. There are twelve questions in total and all appear on this page.

**Part 1 - Personal Information**

In order to allow us to assign a valid URL to your customised tutorial page, please enter your full email address and a title for the tutorial (using letters, numbers, dot, underscore or space) in the boxes below. The URL of the page will be automatically sent your email address when the form is completed.

Email Address:  @  Tutorial Page Title :

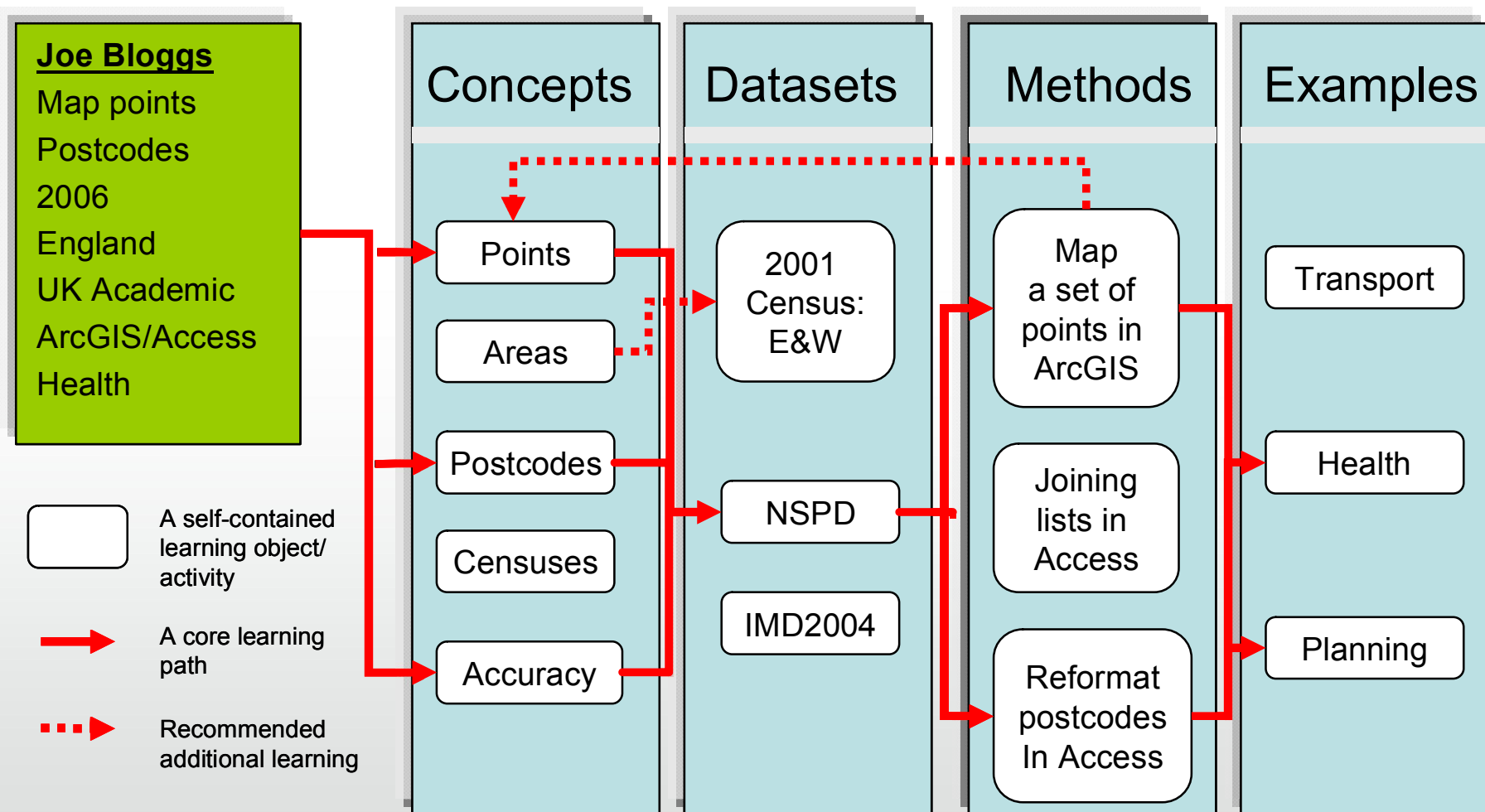
**Your discipline**

Below is the list of main disciplines and subjects recognised by ESRC. If you are working within the social sciences (whether or not from within the academic sector), please choose the nearest subject(s) to your own project/study. Your answer will help us to search for examples relevant to your interests.

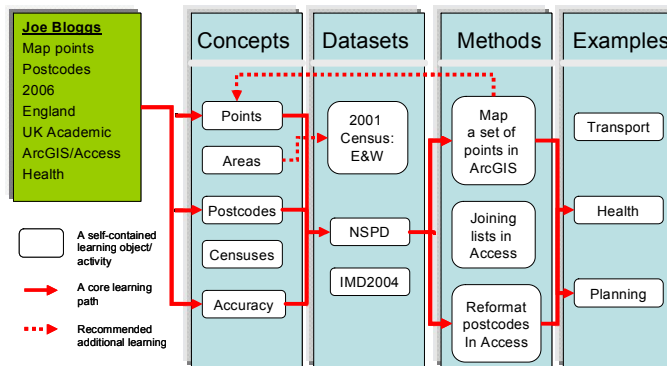
<input type="checkbox"/> Area and Development Studies	<input type="checkbox"/> Demography
<input type="checkbox"/> Economics	<input type="checkbox"/> Economic and Social History
<input type="checkbox"/> Education	<input type="checkbox"/> Environmental Planning
<input type="checkbox"/> Human Geography	<input type="checkbox"/> Linguistics
<input type="checkbox"/> Management and Business Studies	<input type="checkbox"/> Political Science and International Studies
<input type="checkbox"/> Psychology	<input type="checkbox"/> Social Anthropology
<input type="checkbox"/> Social Policy	<input type="checkbox"/> Social Work
<input type="checkbox"/> Socio-Legal Studies	<input type="checkbox"/> Sociology
<input type="checkbox"/> Science and Technology Studies	<input type="checkbox"/> Statistics, Methods and Computing
<input type="checkbox"/> Arts and Humanities	<input type="checkbox"/> Biological Sciences
<input type="checkbox"/> Engineering	<input type="checkbox"/> Physical Sciences incl. Astronomy and Particle Physics



# Customised set of learning resources



# Customised online tutorial



The screenshot shows the GEO-REFER Learning Resources Repository website in Microsoft Internet Explorer. The browser window title is "GEO-REFER Learning Resources Repository - Microsoft Internet Explorer". The address bar shows the URL "http://www.geog.soton.ac.uk/geo-refer/samplecollection.html". The website has a navigation bar with tabs for "Concepts", "Datasets", "Methods", and "Examples". The main heading is "Geographical Referencing Learning Resources". Below this, there is a search bar and a "Go" button. The content area displays a "Customised online geo-referencing tutorial for Joe Bloggs". The content is organized into sections: "Concepts" (Points, Postcodes, Accuracy and precision), "Datasets" (National Statistics Postcode Directory (NSPD)), "Methods" (Mapping a set of points in ESRI ArcGIS, Reformatting postcodes in Microsoft Access), and "Examples" (Health, Planning). There is also an "Additional Resources" section. The browser's status bar at the bottom shows "Done" and "Internet".



# Really useful tools/datasets



## ONS Beginners Guide to UK Geography

Online explanatory material  
about contemporary UK  
boundary systems

Includes census, postal,  
administrative, electoral,  
health and other geographies

Useful links to other resources

Very clear – written for  
general audience

Good reference for students!

Does not cover historical  
datasets: essentially  
describes the post-2001  
census situation

No downloadable data, just  
explanatory guidance

**Freely accessible from ONS  
website**

[http://www.statistics.gov.uk/geography/beginners\\_guide.asp](http://www.statistics.gov.uk/geography/beginners_guide.asp)

## National Statistics Postcode Directory

Postcode

Ordnance Survey Grid  
Reference

Dates of introduction and  
termination (if applicable)

Delivery point count

2001 Census geography  
codes

1991 Census geography  
codes

Numerous other codes, esp.  
changing health geographies

Numerous derived lookup  
tables

AKA All Fields Postcode  
Directory, Central Postcode  
Directory, Postzon file...

Used in GeoConvert

Downloadable from  
UKBORDERS; registration  
required

<http://ukborders.census.ac.uk>

## UKBORDERS Digital Boundary Data

Coordinates of area  
boundaries downloadable in  
various GIS and mapping  
formats

Primarily census-derived,  
covering whole UK

Census, administrative, health  
and electoral geographies

Includes some historical (pre-  
1971 boundary sets e.g. 1951  
local government

Need to understand which  
zones are needed

Need suitable software to load  
the boundaries

Large data volumes and  
further manipulation often  
required

No attribute data

Downloadable from  
UKBORDERS; registration  
required

<http://ukborders.census.ac.uk>

## Neighbourhood Statistics Services

Wide range of easily  
downloadable social data

Includes basic 2001 census  
datasets and administrative  
data derived from government  
departments

Searchable by many different  
georeferences

Some online mapping and  
analysis

Simple – general audience

Only covers most basic  
datasets

No lookup tables or boundary  
data downloadable, just  
statistics for areas

Data formatting can be  
frustrating for serious user

Freely accessible from ONS,  
GROS, NISRA websites;  
registration increases  
functionality

<http://www.neighbourhood.statistics.gov.uk>

## Other useful sites...

Royal Mail Postcode Finder and Address Finder

<http://www.royalmail.co.uk>

> Registration required and limited number of uses

CASWEB

<http://census.ac.uk/casweb>

> Downloadable census statistics (1971-2001) through an online interface. Boundary data only for 1991. Registration required.

Digimap – Ordnance Survey mapping, inc. historical

[www.edina.ac.uk/digimap](http://www.edina.ac.uk/digimap)

> JISC-funded subscription service at Edina

Google Earth and Microsoft Live Search Maps [www.earth.google.com](http://www.earth.google.com)  
[www.maps.live.com](http://www.maps.live.com)

> Street mapping and aerial photography (and many others)