User Guide

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Bibliographic information

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Summary

This user guide gives an overview of how to use the PsyMaptic software provided on www.psymaptic.org. It does not contain details about the methodology involved in developing the prediction tool i.e. the statistical development of the tool. Interested readers in the statistical development of the tool should read our academic paper when published (currently under peer review), or visit www.psymaptic.org/about for a summary of the methodology underpinning the prediction tool.

We believe that the model which underpins our prediction tool will provide useful prediction estimates of the expected incidence of psychotic disorder in the UK, based on population characteristics, at both the national and local authority levels. As such, the prediction tool (known as PsyMaptic), will arm healthcare commissioners and other interested stakeholders with information about the likely burden of new psychotic disorders, per year, within different groups and regions, based on each region's unique sociodemographic and socioenvironmental profile. Use of our tool comes with a disclaimer, which you are recommended to read. Having acknowledged the caveats therein, we believe that *Version 1+* of our tool provides sufficient precision and validation to be released in England and Wales. Our tool has undergone full academic peer review and has been accepted for publication in *BMJ Open* (read it here http://bmjopen.bmj.com/content/3/2/e001998.full?rss=1).

We have made predictions freely available at www.psymaptic.org. The tool has already attracted interest from various stakeholder groups, including Rethink's Lost Generation recommendation for Commissioners, the Joint Commissioning Panel for Mental Health (2012) in their "Guidance for the commissioning of public mental health services", Public Health England, and the IRIS Early Intervention in Psychosis Network adopted by the NHS Confederation. Full details of our tool's impact can be found at http://www.psymaptic.org/about/impact/

Funding

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Contents

1. Disclaimer

PsyMaptic (psymaptic.org, psymaptic.com, psymaptic.co.uk) provides open-use epidemiological prediction models which provide forecasts for the expected count and incidence of psychiatric disorders.

Models for all psychiatric disorders will have undergone academic peer review prior publication on this website. Users are advised to read the accompanying peer-reviewed publication for each model prior to using the data provided on this website. Users are also recommended to read the methodology documentation provided on our website prior to using our prediction models.

By accepting the Terms of Use, you agree to have understood the risks and limitations involved in using the predictions provided by our methodology. These risks and limitations include, but are not limited to, the nature of statistical prediction models which provide an inherent degree of uncertainty around any forecast of future events. Prediction estimates should always be used in conjunction with the range of uncertainty around that estimate, measured as prediction error and reported via 95% prediction intervals. Our models are based on a number of assumptions, which by accepting these Terms of Use, you agree to. We accept no responsibility for any instances where the observed count or rate of disorder is different from that forecast by our models, for any region or regions, or for any given sociodemographic group or groups.

By accepting are Terms of Use, you agree that we shall not be held liable in the event that the observed count of cases in any given region or sociodemographic group, however broad or specific, differs from that forecast by our models.

We reserve the right to update prediction models to improve forecasting at any point. All updates will be documented on this website, indicated via version numbers. Prior to use, you hereby agree that you have read and understood the methodology used in generating the forecasts presented here. Major changes to the forecast methodology will have undergone additional academic peer-review. Other updates to the models, including the addition of new empirical data, will not necessarily have undergone peer review, but will have adhered to the methodology described in our peer-reviewed publications.

You, the end user, may use the data provided here for any legal and ethically-approved purpose, including, but not limited to healthcare planning, health

economics, health service commissioning, health services research, epidemiology, aetiological research and public health.

By using the predictions provided here you accept the assumptions, risks and limitations inherent in forecasting, as set forth, but not limited to those issues described in the accompanying documentation and peer-reviewed publications which describe this work. You agree that we, the developers of PsyMaptic models, will not be held liable or otherwise accountable for any adverse outcome which emanates from the use of the models and forecasts provided here.

You will be asked to agree to these terms and conditions before viewing our prediction data.

2. The Basics

- All prediction data refers to the number or rate of new cases of psychotic disorder *per year* in a given region/sociodemographic group.

- Data describing the **number** of new cases in a given region/sociodemographic group refers to the expected *count* of new cases.

- Data describing the **incidence** of new cases in a given region/sociodemographic group refers to the expected incidence rate of new cases per 100,000 people per year. In other words, it describes the count of new cases per year, per 100,000 people.

- Readers new to epidemiology should ensure they understand the difference between a count and an incidence rate of disease.

- 95% prediction intervals should be interpreted as the likely range of values in which the observed count or incidence rate is likely to fall on 95 out of 100 occasions. On average, we would expect the observed count/rate to fall outside of our prediction intervals on 5 times out of 100.

- Prediction intervals become wider when we look at more specific regions or sociodemographic groups.

- Currently, predictions are only available at national and Local Authority District levels. Prediction models at levels of smaller geographical dissemination are an ongoing area of research.

- Predictions are available for England and Wales only. Future versions of this tool will include predictions for other regions, including Scotland, Northern Ireland and even regions outside of the United Kingdom, but further research is needed to identify a valid PsyMaptic model for these areas. Initially PsyMaptic is released for the NHS in England and Wales.

- Predictions are available for most major sociodemographic groups. Users who require data for very specific groups may request a [bespoke commissioned report](#).

- Hovering over any indicator in the PsyMaptic tool usually provides a description about that indicator or further information about the data.

- The latest year of prediction data is based on the 2011 Office for National Statistics Census of Great Britain.

PsyMaptic data is disseminated in four ways:

- As visualized map data for different regions (Local Authority Districts & Counties)
- As tabular data at the national level (England and Wales)
- As freely available downloadable key datasets in Excel format (national, county & LAD levels)
- As bespoke commissioned datasets (for more complex data requests). See here.

Access to the PsyMaptic described above can be achieved by visiting www.psymaptic.org/prediction. Here, users can choose the flavor of data they require:

3. PsyMaptic mapping tool

PsyMaptic is underpinned by StatPlanet Plus software (version 3.0; www.statsilk.com) to provide visualization software of our data. StatPlanet Plus software is Flash-based software. **The initial Flash file (6mb+) may be slow to load on slow internet connections.**

First, choose either the prediction map at "local authority" or "county" level.

Once viewing PsyMaptic, the initial dataset will load as follows:
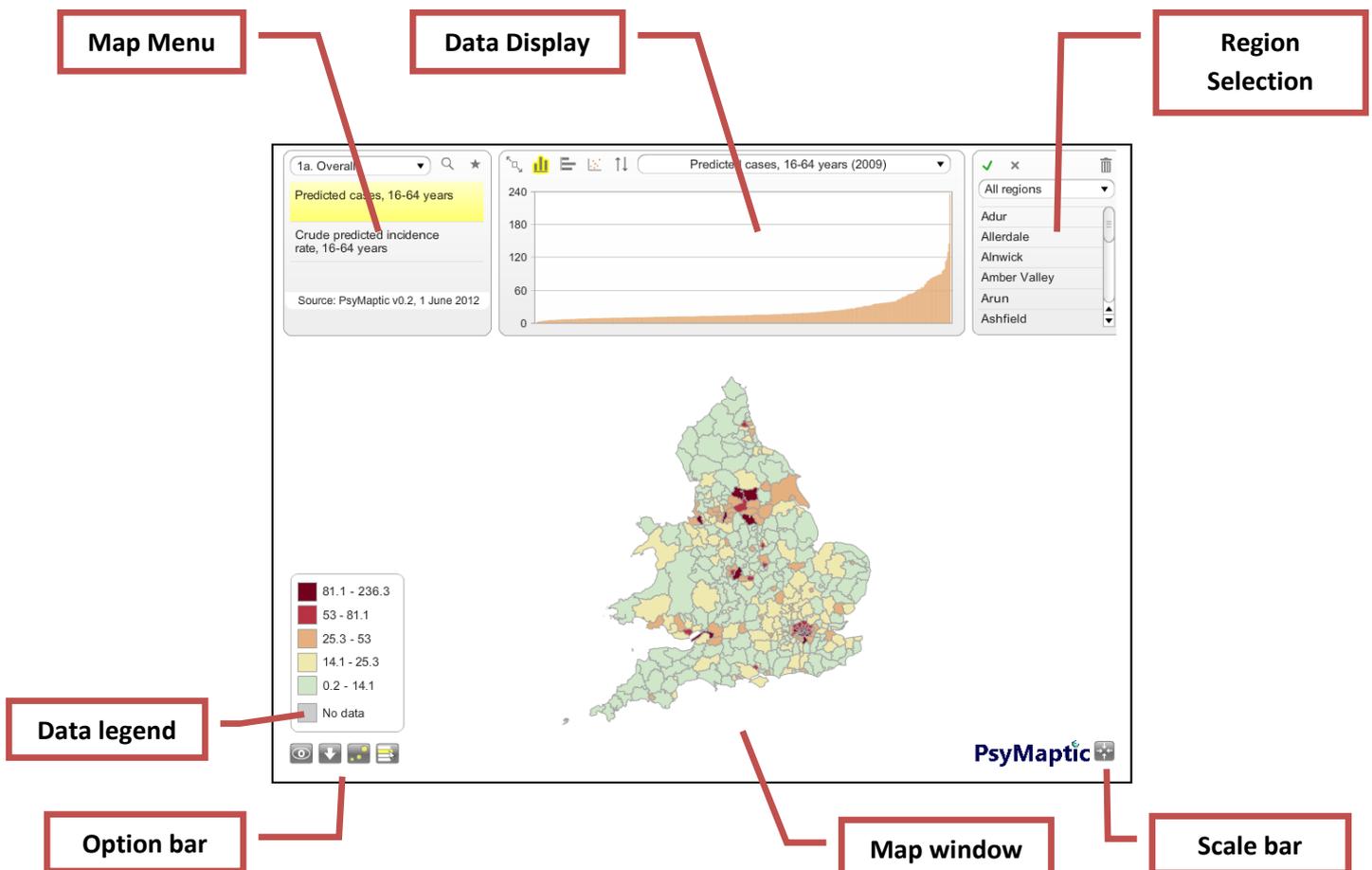
The main features of the PsyMaptic map window are as follows:

- **Map window:** displays data for selected interactive prediction map
- **Map menu:** Allows the user to select different maps

- **Graph window:** Allows the user to display additional information about the predictions, either as bar charts or scatterplots for selected variables.
- **Region selection:** Allows the user to select custom regions
- **Scale bar:** Allows the user to zoom into a selected region
- **Option bar:** provides further map customization (see below)
- **Data legend:** provides details of categorizations. We have provided defaults (see below), but categories and colour schema can be customized by end-user.

3.1   Map Window

The map window displays the prediction map. Hovering the mouse over any region will bring up a pop-up box showing the prediction data for the chosen map & region, with prediction intervals where available:
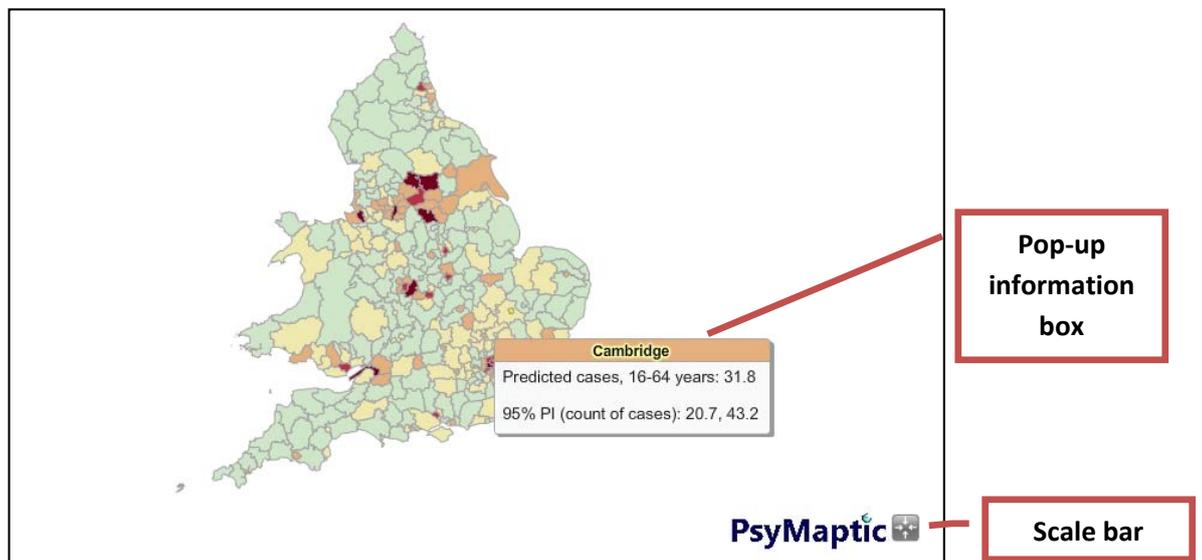
The map can also be zoomed in/out by rolling your mouse wheel (if available) over the map, or by using the scale bar in the bottom right hand corner. To move the map to a desired position in the map window, simply left click on the mouse (PCs) and drag the map to the desired position:
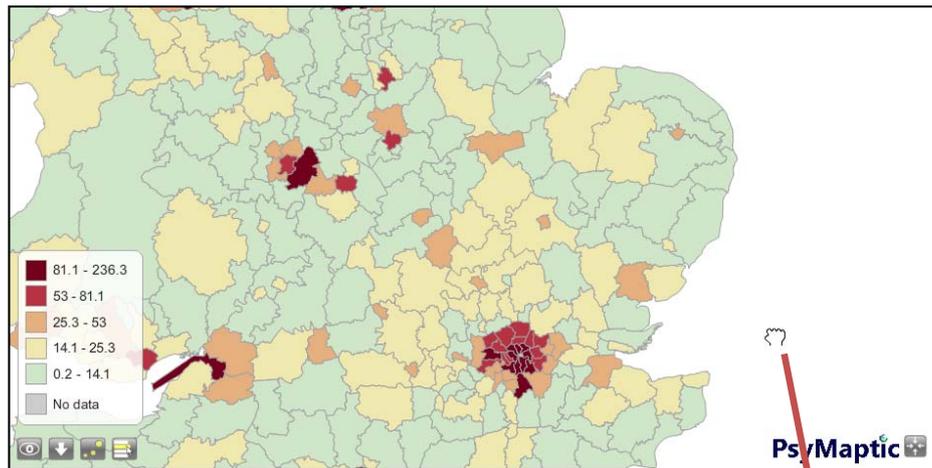
Click & drag map

3.2 Map menu

The *map menu* should be used to change to the desired prediction data required by the end user. Maps are organized into the following 5 categories:

1. 16-64 years old
2. 16-35 years old
3. 36-64 years old
4. Population data
5. Heat maps

For maps 1-3, PsyMaptic prediction maps are available for the following sociodemographic indicators:

a. Overall (total predicted counts/rates for people in age range)
b. By sex (total predicted counts/rates for men/women separately)

Please note, due to low external validity, predicted rates are not currently made available for all ethnic groups at LAD level.

Category 4 (population data) contains maps displaying population level indicators, including population density, Extent of Deprivation (from the 2010 English Indices of Deprivation), and the total denominator population by major age group as estimated by the Office for National Statistics 2011 Census.

Finally, Category 5 ("Heat Maps") contains three maps which show (for the 16-35 year old age group only) the difference between the counts of cases predicted from our PsyMaptic model and those predicted by the Department of Health's original figure of 51

new cases per 100,000 people per year, which was used in their Policy Implementation Guide as the basis upon which Early Intervention in Psychosis Services [EIS] were first commissioned in 2002. The four heat maps are:

- *Excess or shortfall in cases (N), 16-35 years, predicted by PsyMaptic vs. DoH uniform rate:* Difference in expected cases between PsyMaptic and the DH rate. Positive numbers indicate predicted unmet need based on the Department of Health commissioned rate (in number of cases). Negative numbers indicate predicted unused supply (in numbers of cases).

- *Ratio of excess or shortfall in cases, 16-35 years, predicted by PsyMaptic vs. DoH uniform rate:* Values greater than 1 indicate excess caseloads predicted by PsyMaptic (i.e. unmet need), values less than 1 indicate deficit in caseloads predicted by PsyMaptic (surplus supply).

- *Significant excess or shortfall in cases (ratio), 16-35 years, predicted by PsyMaptic vs. DoH univform rate, per annum:* As above, except only those regions where the difference (ratio) between the PsyMaptic predicted rate and DH predicted rate reach (a conservatively-estimated) statistical significance are plotted.

- *Ratio of predictions from Version 1+ compared with Version 0.5, aged 16-35 years old*: Ratio of the number of cases aged 16-35 predicted in Version 1+ compared with Version 0.5. Ratios above 1 indicate more cases are predicted in Version 1+ than Version 0.5, ratios under 1 indicate fewer cases predicted by Version 1+. Version 1+ updates previous versions by using 2011 denominator and changing the prediction algorithm (to include deprivation).

We urge caution in interpreting these maps. Areas where our PsyMaptic tool suggests fewer cases would be seen than predicted under the DoH uniform rate may have to deal with a proportion of cases who require psychiatric triage for mental health problems which do not later meet criteria for entry into EIS. Nevertheless, these people may have other significant mental health problems requiring attention, and are likely to consume a degree of EIS resources on top of those required for people with FEP, as predicted by PsyMaptic.

To select a map category (1-5) use the drop down menu in the *map menu* and click on the sub-category required:
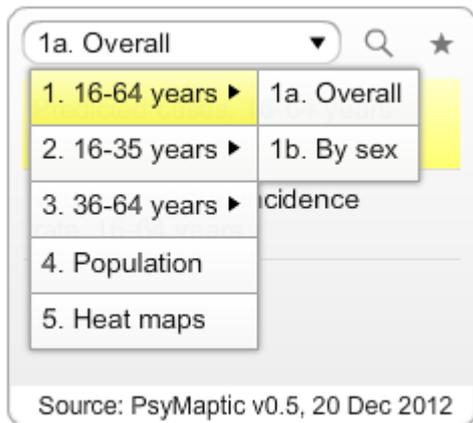
Once selected, a display of available maps within that sub-category will appear, with the default map displayed in the *map window*, and highlighted in

Search for a particular map

**Click to select a different map**

Bookmark a particular map
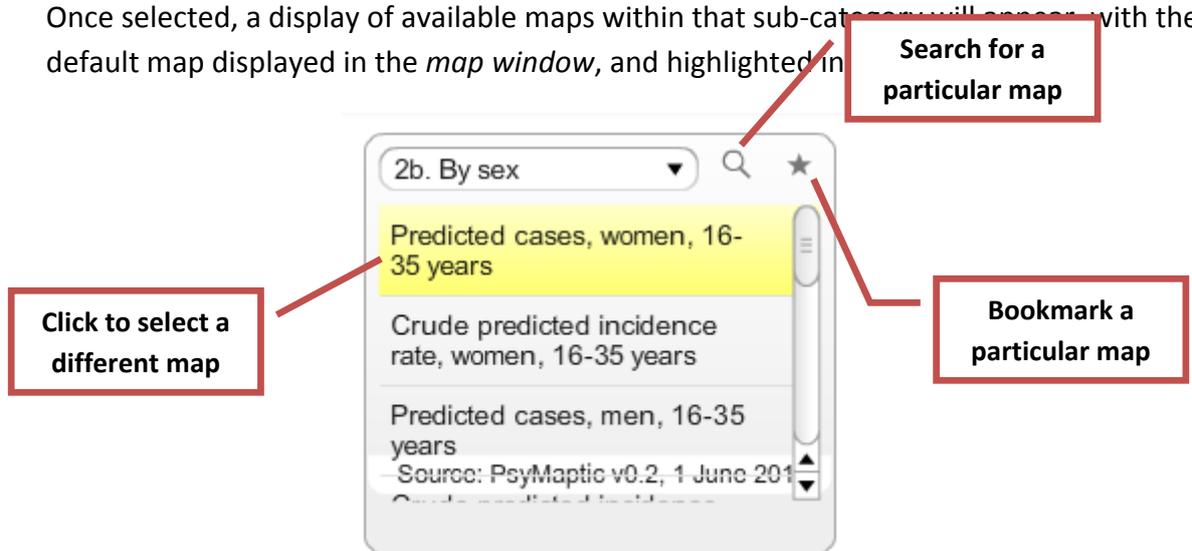
In the example above, the map displayed the predicted count of cases in women, aged 16-35 years has been selected. Here, one could also select this predicted count to be displayed as a predicted incidence rate (Crude predicted incidence rate, women, 16-35 years old), or the equivalent two maps for men can also be selected.

Within the *map menu* it is also possible to perform a search for a given map using the search button (see diagram above), which brings up a new search dialog box. It is also possible to bookmark a particular map of interest by clicking on the star button in the *map menu* when the desired map is selected. This will display a "sticky" box on the *map window* which will remain visible until the map is removed as a bookmarked map. This facility is useful for users who require to quickly switch between two (or more) different maps. Those indicators which have also been bookmarked will also appear on the pop-up box when hovering over a different map (see section 3.1).

3.3 Graph window

The *graph window* menu allows the user to see a snapshot of the distribution of any data indicators available. The default display is a column chart showing the distribution of the selected indicator by Local Authority District (see below).
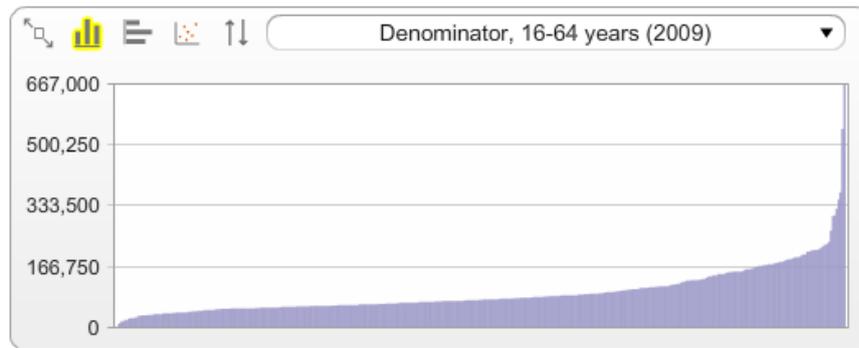
The top left of the *graph window* provide further options. Users may expand the *graph window* to make it larger on the screen, choose a bar chart instead of a column chart, choose a scatter plot or reverse the order of the data. The drop-down menu at the top of the *graph window* allows the end user to select their indicator of choice in the *graph window*. Please note that this will also change the map displayed in the *map window*.

Hovering over a specific column in the column chart will illuminate the statistics for that region for the chosen indicator, and highlight the region on the map.

The scatter plot is a useful function. Two indicators can be plotted on the x and y axes, and a third indicator can be selected to denote the size of the points (i.e. transforming the scatter plot into a bubble plot).
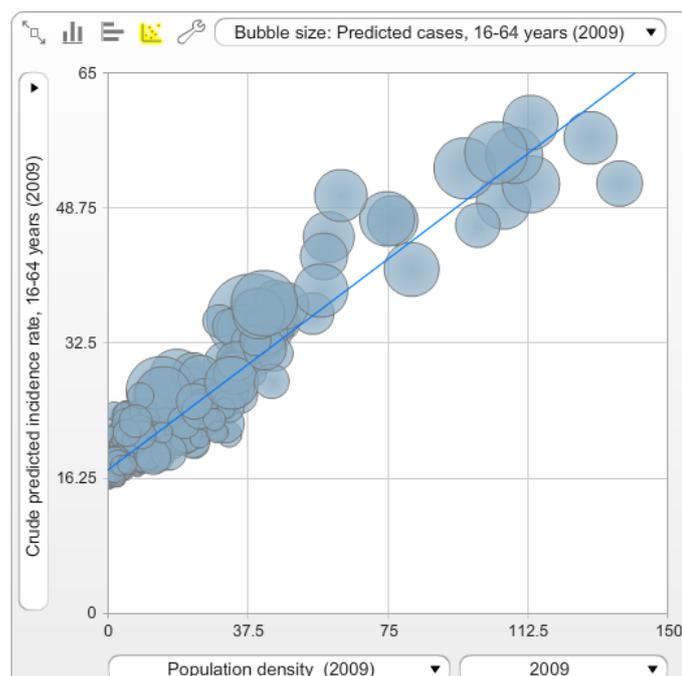
For example, in the above bubble plot, the crude predicted incidence *rate* (y axis) is plotted against population density (x-axis) with bubble size denoting total predicted *count* of cases (absolute numbers). Hovering over any bubble provides additional info.
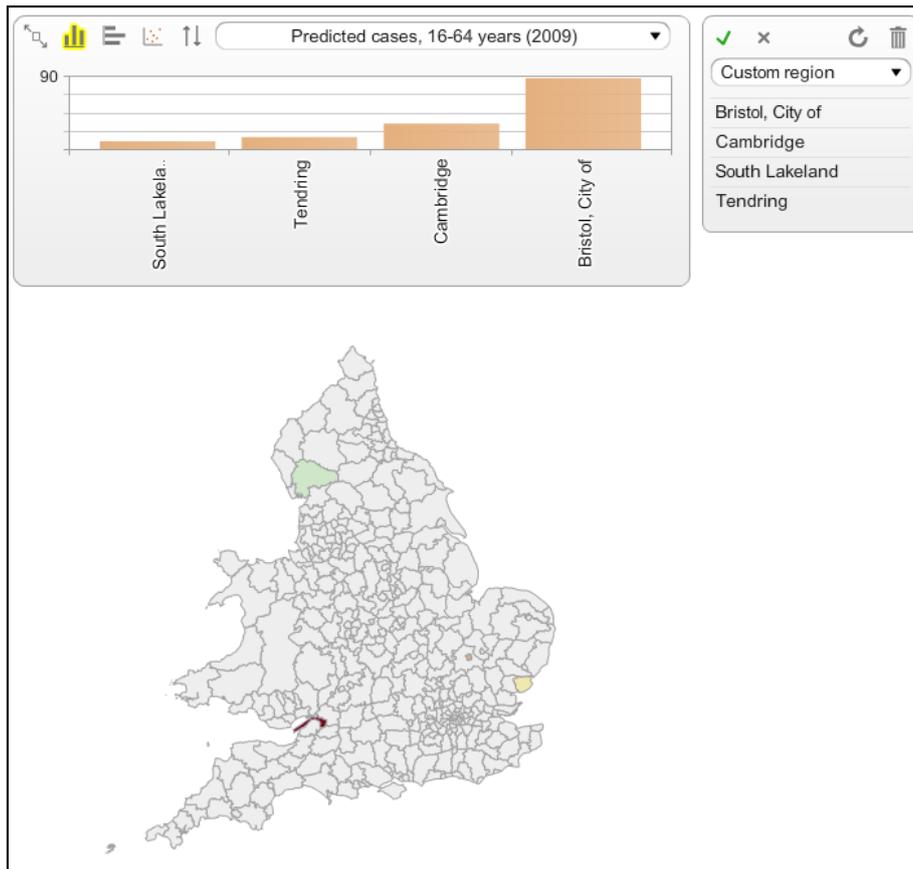
3.4 Region selection

The *region selector* allows the user to select multiple regions at once to compare data on the bar or column chart of the *graph window* and on the map itself.
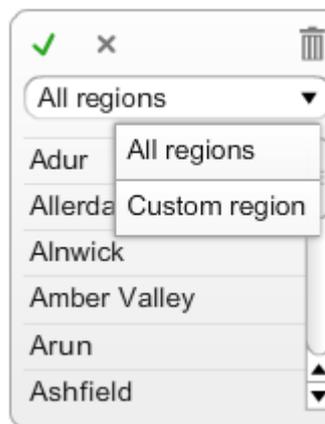
To make a custom selection follow these steps:

1. Ensure you have selected the map/indicator of interest from the *map menu*.
2. On the *region selection* menu select "custom region" from the drop down list.
3. Select the regions of interest you require. To do this, either click on them on the *region selection* menu, or on the map itself or on the *graph window*.
4. To remove any unwanted regions, find that region and click on it to deselect or click the "X" in the above menu to deselect all.
5. Once you are happy with your selection, click the green tick mark in the *region selection* menu as shown above. Only your selected regions will now appear in this menu, the *graph window*, and highlighted on the map. For example:

6. Click the trash can icon in the *region selection* menu to remove all regions from the selection or click the "refresh" button to refresh the list of selectable regions.

3.5 Scale bar

The scale bar allows the user to zoom in to the appropriate scale they desire to view the data at. This can also be accomplished by using the mouse wheel (if you have one) when hovering over the map in the *map window*. Use the "+" and "-" bars to zoom in and out, respectively or drag on the triangle for precise control. The final button returns you to the default map view (currently England and Wales).

3.6 Option bar

The option bar provides four additional options to display the data


These are summarized briefly below:

1. ⊙ allows the user to customize the look and feel of their PsyMaptic experience. Further information can be added to the map, including map labels. The pop-up indicators can also be customized and the panels including the *graph window, map menu* (listed as "indicators") and the *region selection* menu.

2. ⬇ allows the user to export the data. **The use of this button is not recommended** as the exported data are in the format required for running the PsyMaptic software rather than designed for specific use by interested users. We encourage interested users who wish to download the data to do so by visiting [this page](), where downloaded data in easier to interpret Excel files is freely available (please note this data will not be available to download by the public until this tool has undergone peer review).

3. ⚇ Adds proportional symbols for the selected indicator to the map for each region.

4. ▱ Toggles the *region selection* menu on or off. Rarely used.

3.7 Legend

Each map is provided with a predefined map legend.

■	46.5 - 137.1
■	35.2 - 46.5
■	17.4 - 35.2
■	5.1 - 17.4
■	0.2 - 5.1
■	No data
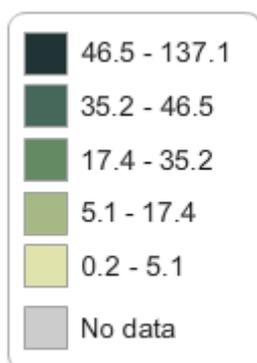
For every map, we have categorized the distribution of Local Authority Districts in the following way:

- Category 0: No data (rare)
- Category 1: 0-50th percentile (i.e. below the median) (lowest 50%)
- Category 2: 51st – 75th percentile
- Category 3: 76th – 90th percentile
- Category 4: 91st – 95th percentile
- Category 5: 96th – 100th percentile (top 5%)

Each map therefore shows the relative distribution (and severity) across England & Wales in terms of predicted counts and rates for the given sociodemographic indicator displayed. Maps do not show the relative severity of expected counts and rates between sociodemographic indicators, and the relative scales (displayed in the legends) should always be considered. For example, the top category for a given map will always show LADs in the top 5th percentile of the predicted count or rate of all LADs in England & Wales. However, the absolute values within this category will vary. To illustrate this, consider predicted count maps for men versus women aged 16-64 years old. For men, the count of predicted cases in the top 5th percentile lied between 50.0 and 145.4, but for women lied between 29.5 and 90.9. Serious users of this data should consider the absolute differences in predicted values between groups, as well as the relative geographical differences in predicted rates within groups.

Hovering over a particular category in the map legend will highlight all regions in that category on the map and on the *graph window*.

Users who wish to fully customize their PsyMaptic experience may also alter the values for the legend, number of legend categories and colour scheme. These preferences will not be preserved once the user leaves the page.

4. PsyMaptic national data

We have also provided national summaries of the predicted count of psychotic disorder, per annum, in England and Wales. These summaries come with prediction intervals and are available for England and Wales, separately and combined. Summary statistics are currently available for the following sociodemographic groups:

- Overall (i.e. total) counts
- By sex
- By major ethic group (as in Section 3.2)

These data are provided on a separate webpage in tabular form only:

Indicator ⇕	England			Wales			England & Wales		
	16-64	16-35	36-64	16-64	16-35	36-64	16-64	16-35	36-64
	Count (95% PI)	Count (95% PI)	Count (95% PI)	Count (95% PI)	Count (95% PI)	Count (95% PI)	Count (95% PI)	Count (95% PI)	Count (95% PI)
Total									
Women									
Men									
White British									
Non-British white									
Black Caribbean									

5.0 Downloadable data

Users who wish to download the PsyMaptic tool data may do so by visiting <u>this page</u>. End users will be asked to agree to our terms of use prior to downloading the data.