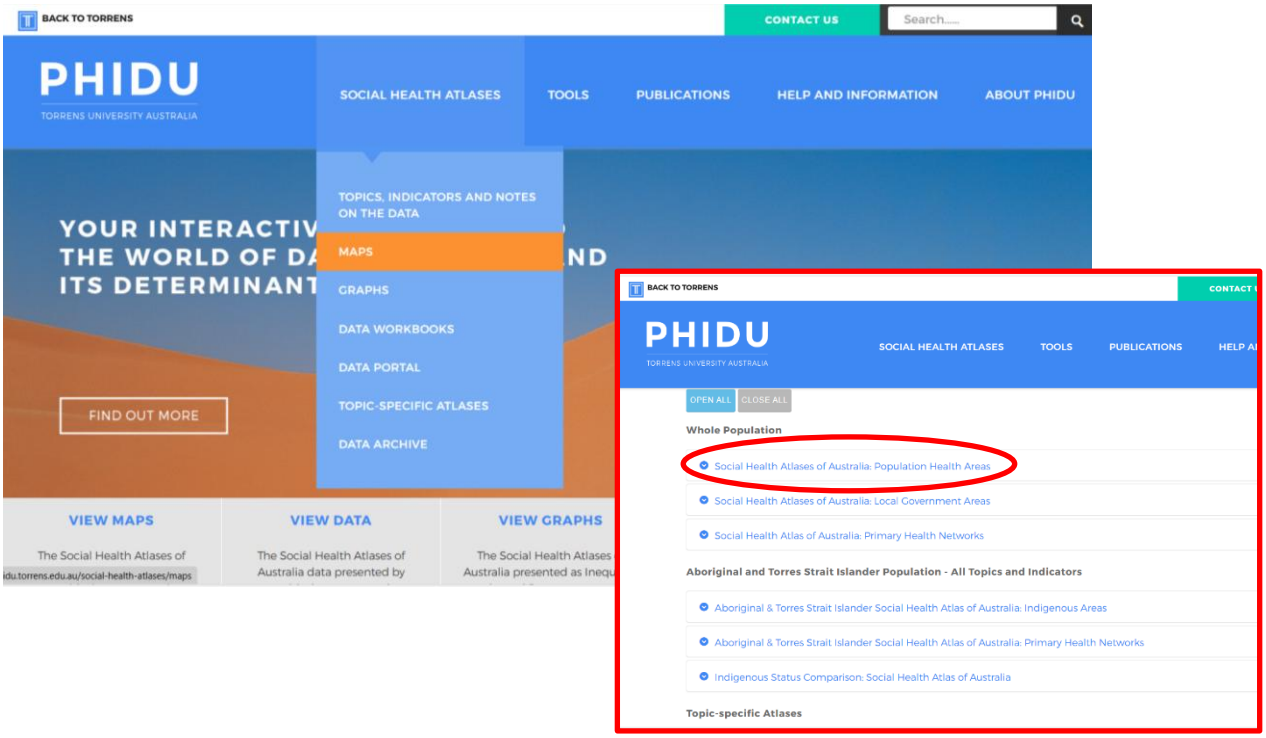
How to: Use the Double Map

Video tutorial transcript

Hello and welcome to the Public Health Information Development Unit, or PHIDU for short, tutorial series.

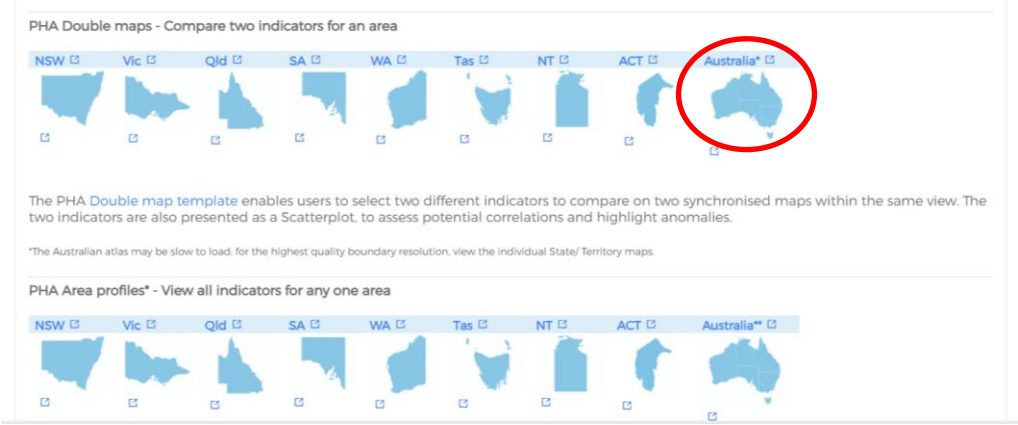
Today we will be explaining how to use the Double map template. The Double map template allows us to explore and compare the geographic trends between different types of published indicators with comparisons both geographically and statistically.

To access the double map template go to the home page (https://phidu.torrens.edu.au/), click on the ‘Social health atlases’ drop-down menu and select ‘Maps’. The maps page will give you a listing of what populations you can explore; in this case I have selected from the titles ‘Social Health Atlases of Australia: Population Health Areas’.



The Population Health Area, or PHA, is the main geographic area that we publish and is based on the Statistical Area Level 2 geography developed by the Australian Bureau of Statistics.

Scroll down to the ‘PHA Double Maps – Compare two indicators for an area’ title. Select the area of interest, by clicking on either the State, Territory or national map icons; in this case I have selected the Australia map icon.

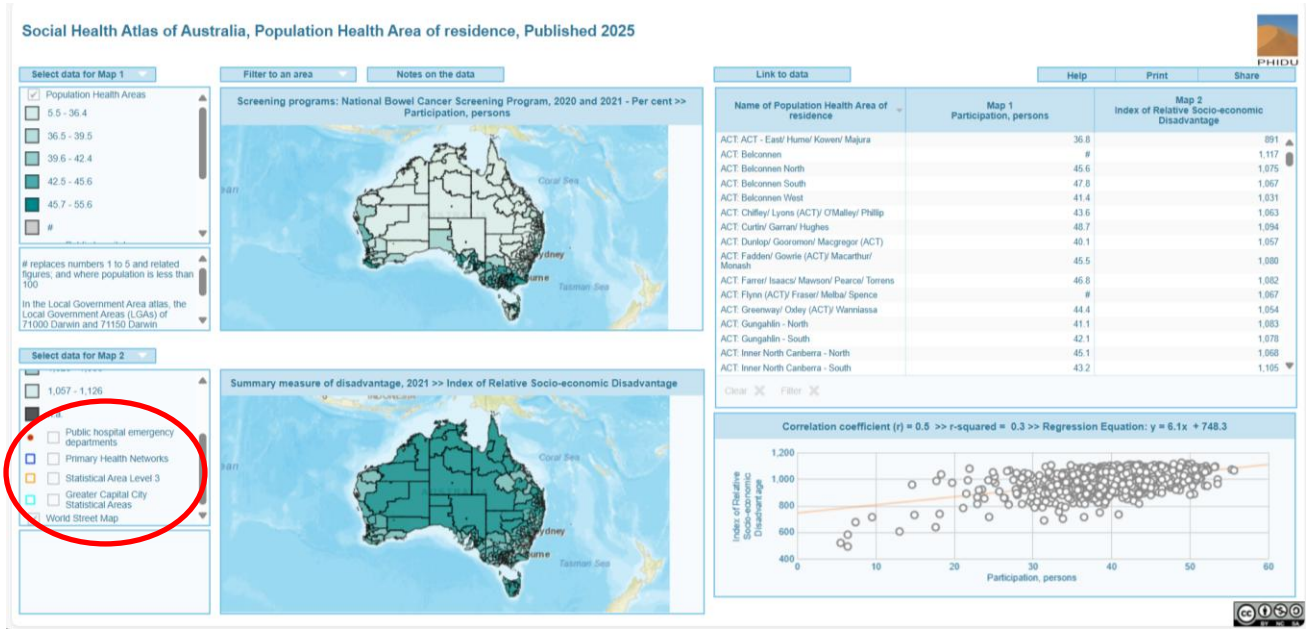


The Double map template should now load. Just a bit of information on this template. The Double map template shows two single map templates in one dynamic template. It combines two maps, Map 1, the top map on the screen and Map 2, the bottom map on the screen. These maps will represent two different indicators selected from the map-specific drop-down menus. To explain the functionality of the template, let’s select two indicators.

Go to the ‘Select data for Map1’ drop-down menu and, amongst the long list of indicators, scroll down to ‘Screening programs: National Bowel Cancer Screening Program (NBCSP) , 2020 and 2021’ and choose ‘Participation, persons’. As a side note, if you click on the page icon, this opens a PDF comprising the notes on all indicators in this atlas. A search of the PDF shows that the indicator for participation in the NBCSP is reported as a percentage of the population 50 to 74 years who participated in the program in the years 2020 and 2021.

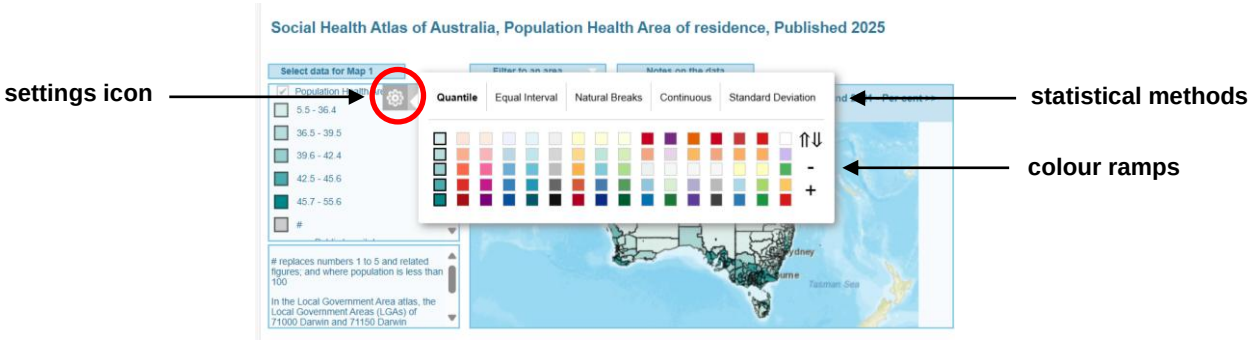
Go to the ‘Select data for Map 2’ drop-down menu and, amongst the long list of indicators, scroll down to choose the last of the Demographic and socioeconomic status indicators – the Summary measure of disadvantage, which is the Australian Bureau of Statistics Index of Relative Socio-economic disadvantage, or IRSD. Once again, clicking on the page icon opens a PDF with notes on tall of the indicators. The aim of the IRSD is to represent the socioeconomic status of Australian communities and identify areas of disadvantage and lack of disadvantage based on an average of socioeconomic indicators of the populations that live in those areas. A low score indicates relatively greater disadvantage. A high score indicates a relative lack of disadvantage.

So now we have two indicators selected, the National Bowel Screening Program in one map and the Index of Relative Socio-economic Disadvantage in the other. The legends associated with the maps are to the left of the maps. We can turn off the PHA boundaries to see the base map below and turn on other boundaries if need be.

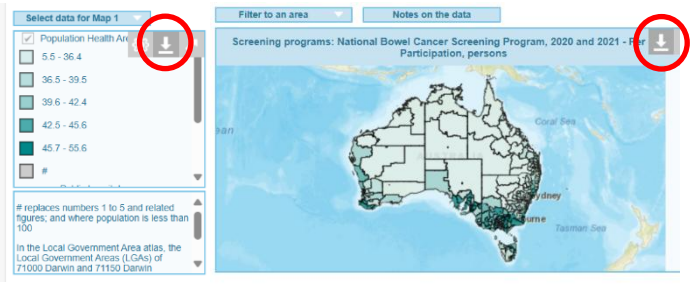


The legends show the default break up of datasets - in our case ,the percentage participation and IRSD scores.

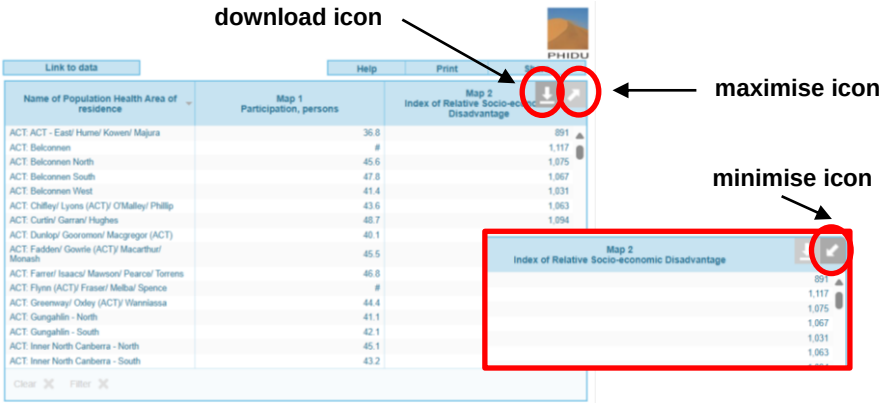
The legends can be changed by selecting the settings icon, where you can choose different colours through the colour ramps, or tchangehe way the values are broken up through the choice of different statistical methods.



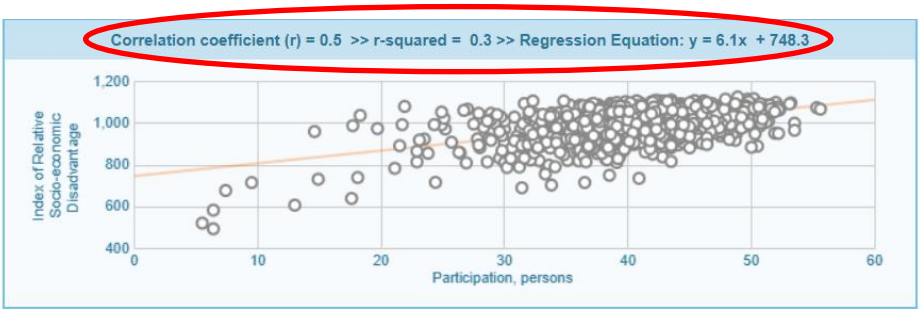
If you want to export the maps and the legend for reporting purposes, then you can use the download buttons on each element. This will download the legend or map to your download directory on your computer.



On the right of the screen is the data table which shows the values associated with the maps, with the names of the PHAs and indicator values for Map 1 and Map 2. We can search for specific PHAs through the list or sort by values for Map1 or Map 2 by clicking on these headings. The download icon opens the table up as plain text which can be copied and pasted into other software such as Excel. The maximise icon can maximise the data table to full screen;click the minimise to icon to get back to the double map template. These actions also apply to the maps and other elements on the page.



Below the data table is the scatterplot graph of the two selected indicators. The participation rate is graphed on the X-axis while the IRSD is graphed on the Y-axis. For the scatterplot, a regression equation is calculated with an R square as well as the correlation coefficient. Each dot on the scatterplot graph represents a PHA. The scatterplot graph shows that there is a relationship between these selected indicators described by the R value, where a value of 0 means no correlation and a value of 1 is complete correlation. As we move between 0 and 1 the strength of the relationship becomes stronger as we head to 1. This represents a positive correlation because we have a positive number. We can also have a negative relationship indicated by a negative sign and highlighting that as one indicator increases the other decreases.



Additionally, you can access notes on the data through the ‘Notes on the data’ button as well as links to the data on the ‘Link to data’ button.

So that was the structure of the template, now for the fun bit. Let’s now explore what can be done with these indicators.

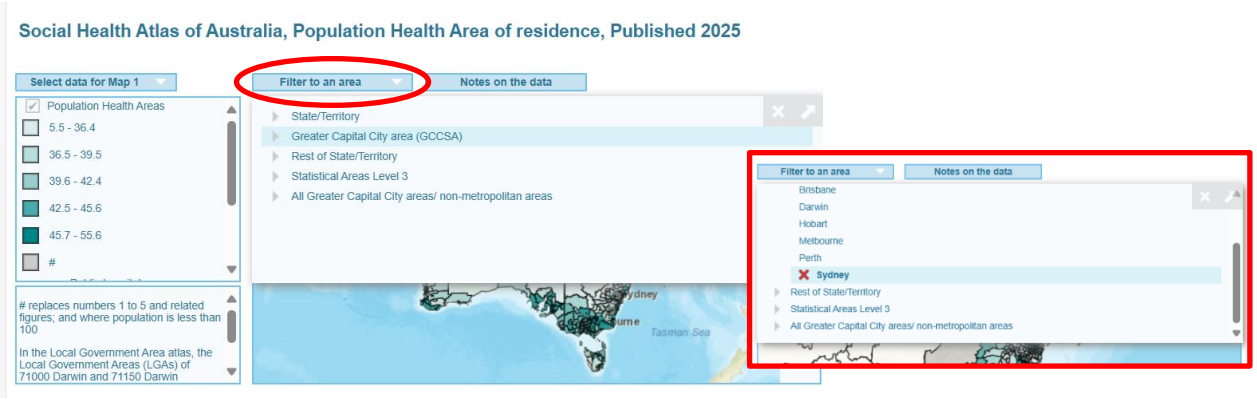
This current visualization shows the program participation, as a whole, at the Australian community level. Participation rates range from 5.5% to 55.6% across Australia. Lower participation rates are shown in lighter green and higher participation rates are shown in darker green. The IRSD score also varies from 496 to 1126. A low score indicates relatively greater disadvantage; a high score indicates a relative lack of disadvantage. On the map it is important to understand that areas of relatively greater disadvantage are shown in darker green while lighter green colours represent areas of relative lack of disadvantage.

Looking at the scatterplot we can see a positive correlation or positive relationship between participation and disadvantage, i.e., in general, less participation in greater disadvantaged areas and more participation in areas with a relative lack of disadvantage. The correlation coefficient has a value of 0.5, which is deemed by some statisticians as a moderate relationship between the indicators.

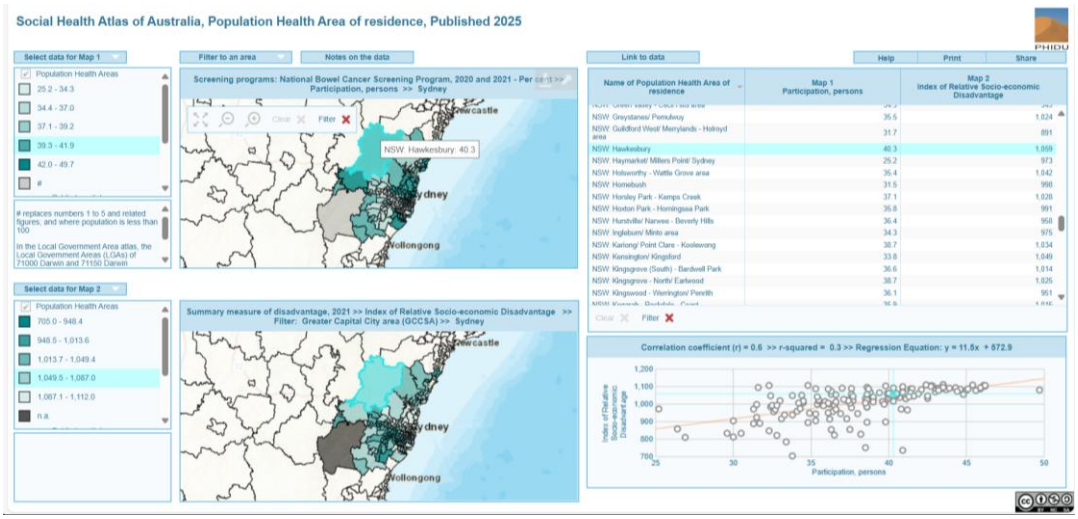
Hovering a pointer over a dot in the scatterplot brings up a box showing the name of the PHA (including its state or territory) and the results for each indicator.

The PHAs represented by the dots show a clustering of values at the right-hand side of the graph, indicating higher participation rates with higher IRSD scores while there is a more random, less tighter distribution of participation rates at lower IRSD scores.

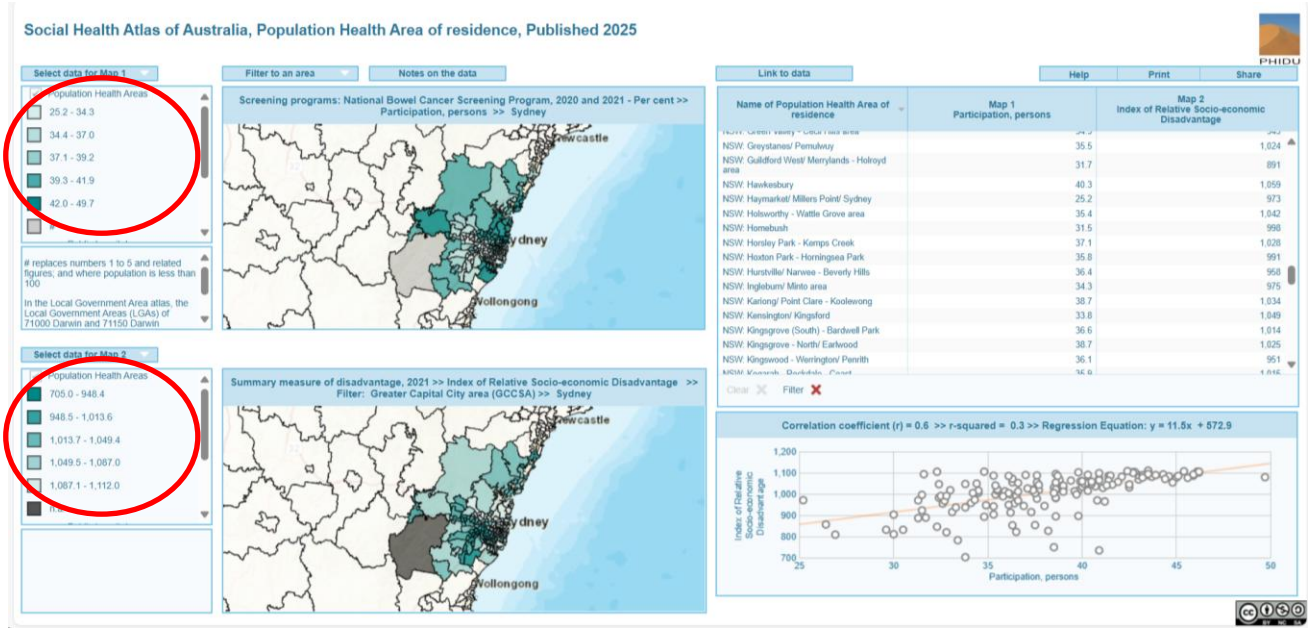
That was the participation rate and IRSD relationship at the Australian population level; lets now filter to an area, to investigate the local area based geographic variation in participation rates and IRSD scores. So now let's select the 'Filter to an area' drop-down menu, where you have a number of choices, from the State/Territory, Greater Capital City area, Rest of State/Territory, Statistical Areas Level 3 and All Greater Capital City areas/ non-metropolitan areas. For this example, we will pick Capital Cities/ Sydney. Sydney is a good choice as it fits nicely on a screen and, despite the relatively large population in many areas, we can frequently see distinct spatial patterns.



When we move the cursor over Map1 we see that a PHA is highlighted. If we look at Map 2 the same PHA is highlighted. These two different indicators are geographically synchronized. We can also see that the same records come up in the Data table and scatterplot graph.

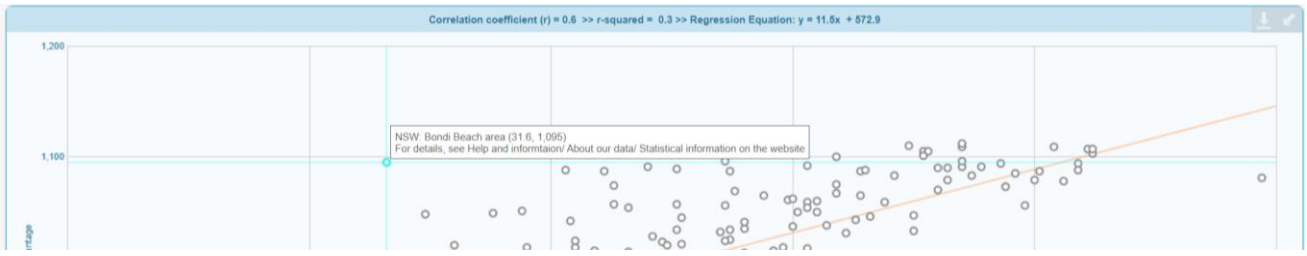


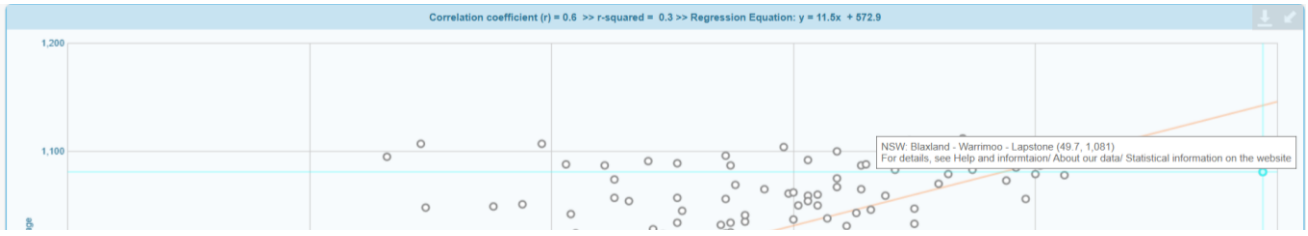
From the legends we see that participation rates in Sydney vary from 25.2% to 49.7% and the IRSD scores vary from 705 to 1112.



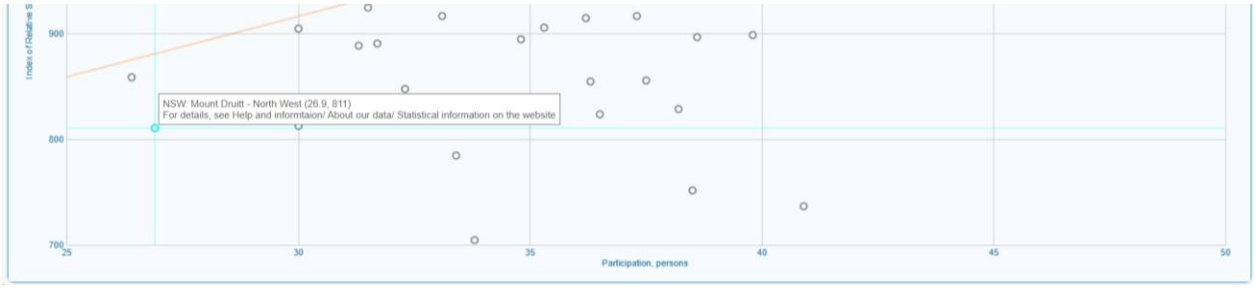
Let's look at the scatterplot graph in the bottom right-hand corner. Firstly, the correlation coefficient shows a strong correlation at the PHA level between these two variables, with a coefficient of 0.6 showing that, in general, participation rates increase with relative lack of disadvantage. This relationship is shown in the plotting of the PHAs where a positive (left to right) distribution is shown. There is clustering of PHAs with similar indicator values, high participation rates and high IRSD scores, on the right-hand side of the graph and a more dispersed pattern on the left-hand side of the graph. This more dispersed pattern indicates a greater range of values in participation rates across these IRSD scores.

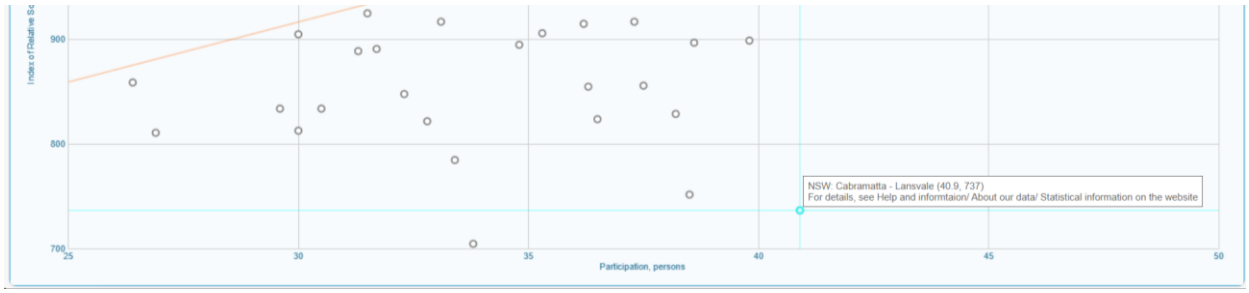
So, not all PHAs follow the general trend of participation rates increasing with relative lack of disadvantage. If we look at the PHAs with an IRSD score of around 1100 participation rates range from 32% participation in the Bondi Beach PHA to around 50% in the Blaxland PHA, that's a range difference of nearly 20 percentage points in participation rates with the same IRSD scores.





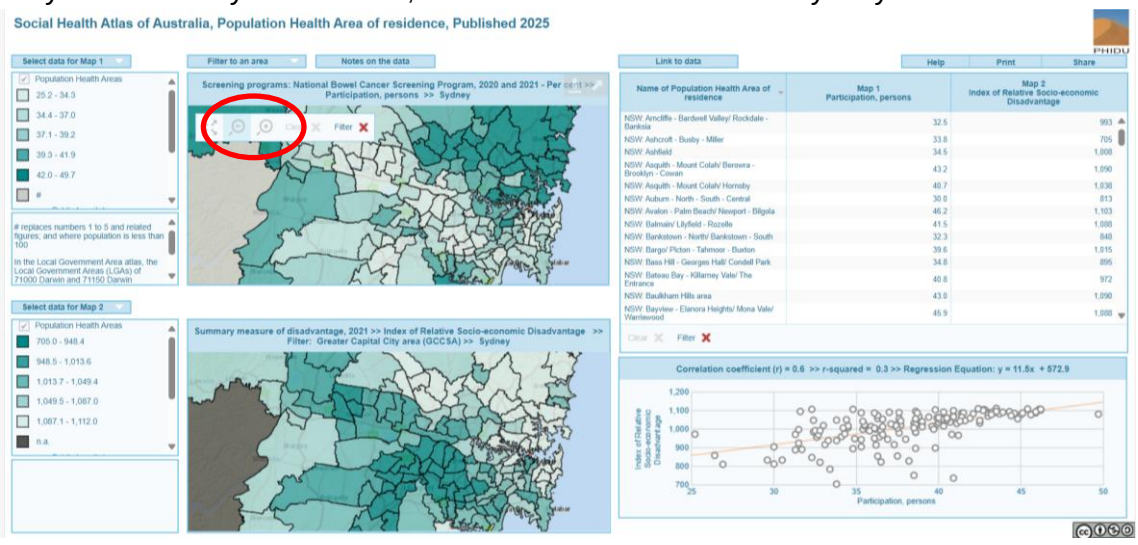
There are smaller differences in the range of participation rates in PHAs that have relatively greater disadvantage. The PHA of Mount Druitt – North West has a 27% participation rate, one of the lower levels of participation in the Sydney area, while the greater disadvantaged PHA (according to the ABS IRSD score) of Cabramatta- Lansvale had a participation rate of 41%. This participation rate is equivalent to those values reported in many areas with higher IRSD scores. That was the statistical view of the PHA relationships between participation rates and relative disadvantage.



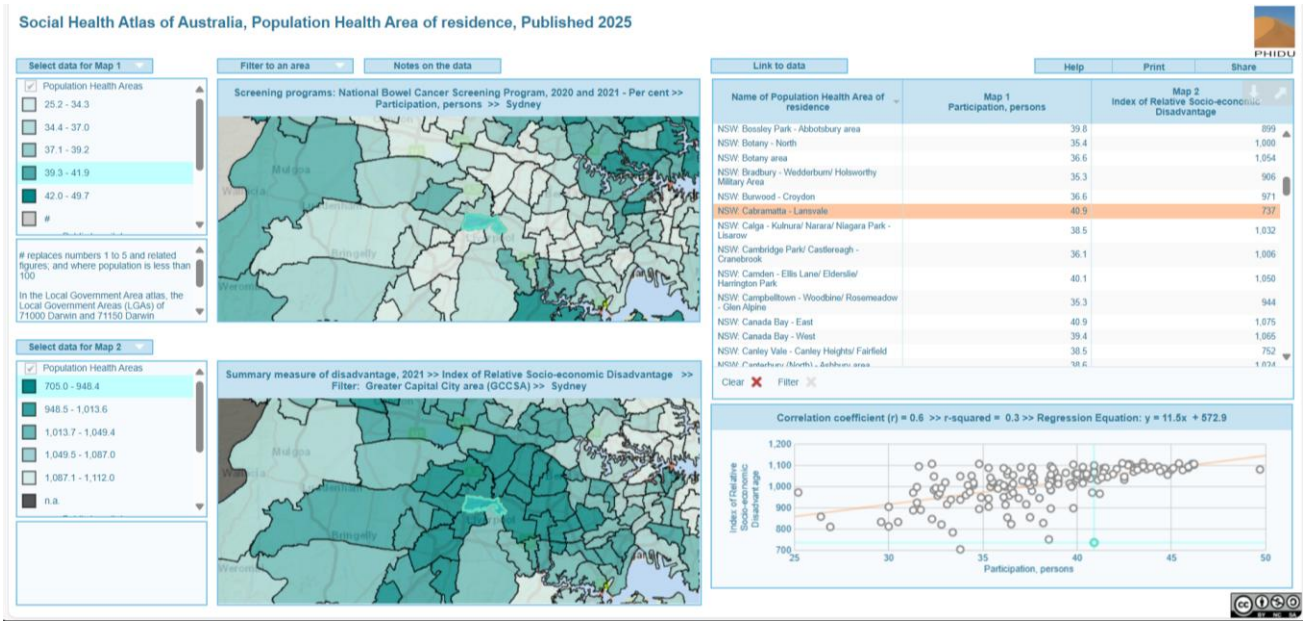


Now we can investigate if there is a geographical trend in these relationships, importantly looking for any clustering of these areas and where the clusters are located. We have established that there is a general trend, as we have seen in the scatterplot, either a combination of low-to-low values or high-to-high values when we looked at participation rates and rates of relative disadvantage. Alternatively, there are PHAs where one indicator is high and the other is low and vice versa.

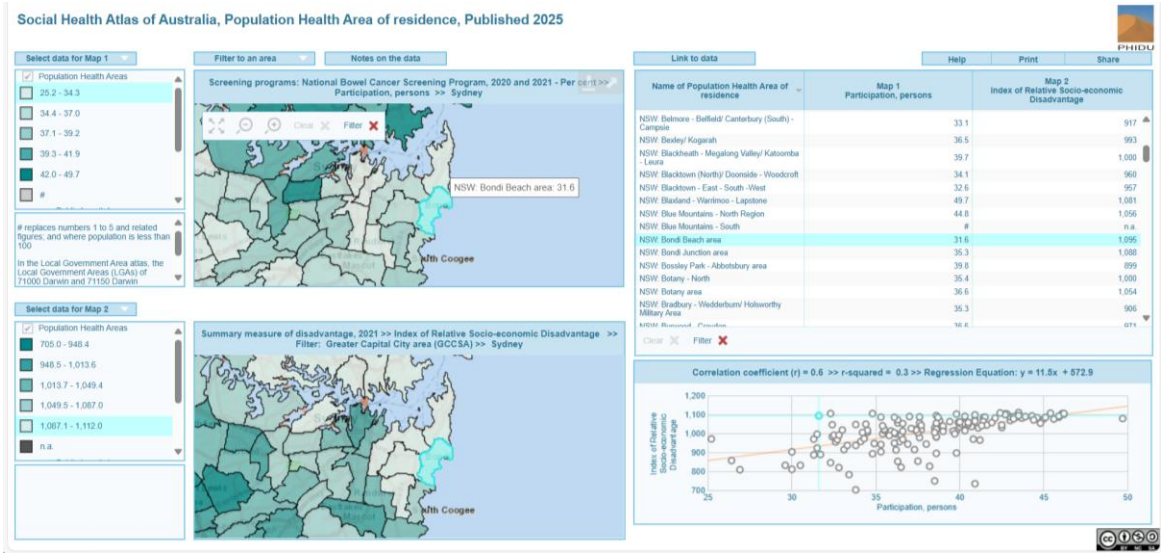
While looking at these geographic variations, high PHAs on the map, please make note of how the PHAs are highlighted in the aqua colour in Maps 1 and 2, the data able and on the scatterplot and how they interact. If we look at the maps, zooming in either through the zoom icon, or the mouse wheel on your mouse if you have one, we can zoom in to the inner Sydney area.



Now once again, the darker colours represent higher participation rates and lighter green colours lower participation rates. On the other map, we see darker green for greater relative disadvantage and lighter green for lack of relative disadvantage. The first thing we see is clusters of low values for participation rates and IRSD scores in the north west of the city and higher values for both indicators as we move towards the coast in the northern part of the Sydney region. On the scatterplot ,we highlighted that the Cabramatta- Lansvale PHA had a low IRSD score but a higher participation rate, so around the Cabramatta- Lansvale PHA there seems to be a cluster of fairly similar values, around the 37- 40% rate for participation in the PHAs with relatively greater disadvantage.



If we zoom in further to the Bondi Beach PHA there seems to be a cluster of fairly similar values, around the 30- 35% rate for participation in the PHAs with relatively lack of disadvantage. We can investigate this in the scatterplot diagram highlighting PHAs on the plot and looking at the maps to see where they are located. So by investigating the trends using the scatterplot and the maps we can tease out that there is also a geographic relationship in some of these trends which don't conform to the overall general trend of less participation in greater disadvantaged areas and more participation in areas with a relative lack of disadvantage.



I will let you explore the different strengths of correlation and geographic distributions that can be found in different cities, and other geographically defined areas. You could also investigate the relationship between the participation in the bowel cancer screening program and other indicators that you may deem more specifically related to the population that participates in the program. For example, the areas to the north, east and west of Cabramatta- Lansvale PHA that had relatively low IRSD scores (indicating proportionately more disadvantaged populations) have relatively high proportions of people born overseas in a non-English-speaking country, and relatively low proportions of Australian-born.

I hope this tutorial opens to you the possibilities in this template – of course not everything tracks spatially by socioeconomic status, but many things do, and it can be informative to think about what the drivers are for certain diseases, or preventive measures.

Thank you and please 'Contact us' if you have any questions about this video, the Social Health Atlas, or health data in general.