

GIS Assignment

by Wanzi Su

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Figures

Figure 1 3

Figure 2.....4

Figure 3.....5

Figure 4.....6

Figure 5.....7

Figure 6.....8

Figure 7.....9

Figure 8.....10

Figure 9.....10

Figure 10.....10

Figure 11.....10

Figure 12.....11

Figure 13.....11

Figure 14.....11

Figure 15.....11

Figure 16.....11

Figure 17.....11

Figure 18.....13

Figure 19.....14

Figure 20.....15

Figure 21.....16

Figure 22.....17

Figure 23.....18

Introduction

About mumps:

Mumps is a contagious viral infection that used to be common in children before the introduction of the MMR vaccine.

It's most recognisable by the painful swellings at the side of the face under the ears (the parotid glands), giving a person with mumps a distinctive "hamster face" appearance.

Other symptoms of mumps include headaches, joint pain and a high temperature, which may develop a few days before the swelling of the parotid glands.

Mumps is spread in the same way as colds and flu – through infected droplets of saliva that can be inhaled or picked up from surfaces and transferred into the mouth or nose.

A person is most contagious a few days before the symptoms develop and for a few days afterwards.

During this time, it's important to prevent the infection spreading to others, particularly teenagers and young adults who haven't been vaccinated.

If you have mumps, you can help prevent it spreading by:

- *regularly washing your hands with soap*
- *using and disposing of tissues when you sneeze*
- *avoiding school or work for at least 5 days after your symptoms first develop*

You can protect your child against mumps by making sure they're given the combined [MMR vaccine](#) (for mumps, measles and rubella).

The MMR vaccine is part of the routine NHS [childhood immunisation schedule](#). Your child should be given 1 dose when they are around 12-13 months and a second booster dose at 3 years and 4 months. If you or your child have missed the offer you can simply catch up by requesting this free vaccination. Once both doses are given, the vaccine provides good protection against mumps.[1]

According to someone with experience, he used to have mumps when he was in primary school. At that time, he had to drop the class for a couple of days and stayed at home with some chopped cactus covering his face. It is believed to cure mumps in China. This disease did not make him feel bad but the parotid glands did swell. He used to wonder why he could not go to school because he didn't look so awful.

It is known that people who live a poor life can sometimes hardly pay for the cost of immunisation. So it is reasonable to assume that deprivation areas hold low immunisation rates.

Nationwide, poverty and ethnicity are determinants of immunization status at the individual level. For example, in urban areas, children whose parents are poor, minority, and have lower educational level are less likely to be immunized on time.[2]

Townsend Index

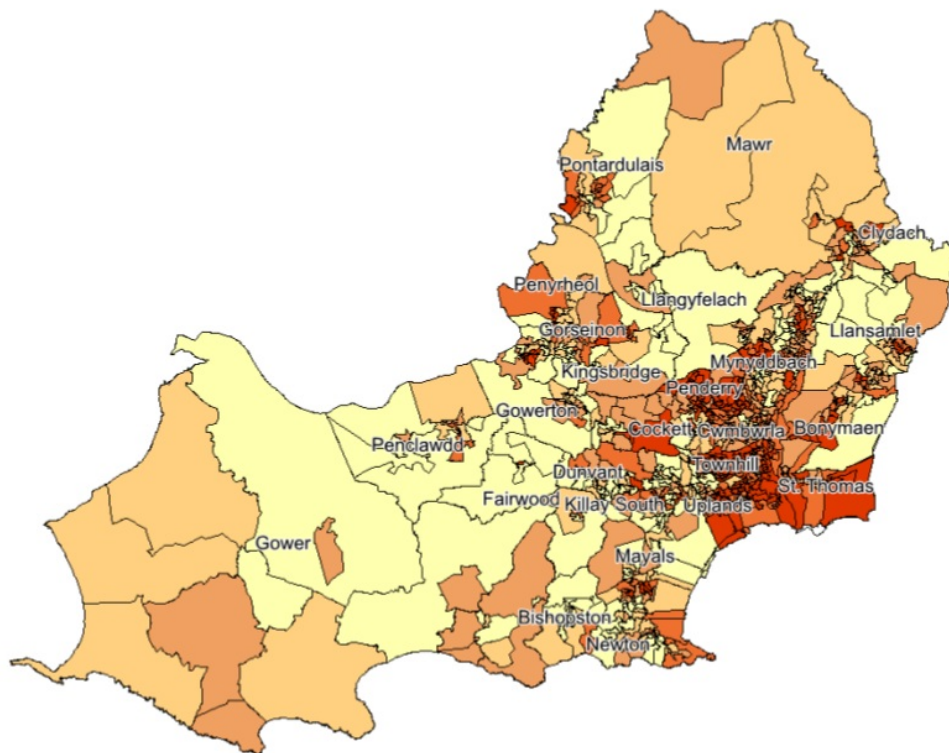


Figure 1

Figure 1 is the picture of the Townsend Index in 2001. The darker colour means the higher Townsend Index which also means this area suffered from more serious deprivation in 2001. It is clear from the picture that areas like Townhill, Castle, St. Thomas, Uplands, Bonymaen, Cwmbwria, Cockett, Penderry, Mynyddbach, Gorseinon, and Penyrheol are poor areas.

Townhill, Castle, St.Thomas, and Uplands are located in the city centre area. In China, the city centre area is normally not a place for people who are poor so it is a little bit confusing at first. Then the article about Townsend Index is found on the Internet, which says Townsend Index is influenced by four variables:

Unemployment (as a percentage of those aged 16 and over who are economically active);

Non-car ownership (as a percentage of all households);

Non-home ownership (as a percentage of all households); and

Household overcrowding[3]

Now, everything seems to be reasonable.

First, students are unemployed and they need to live close to the school so they live in the city centre area.

Second, people who have cars do not need to live around the city centre compared to people who don't have cars because they can drive to work or school.

Third, it is safer and more convenient for homeless people to live in the city centre area if they want to find a place to stay overnight or buy stuff.

Forth, people who live in the city centre area and share a small house are facing more overcrowding problems because of high rent. Besides, more apartment might be one of the reasons.

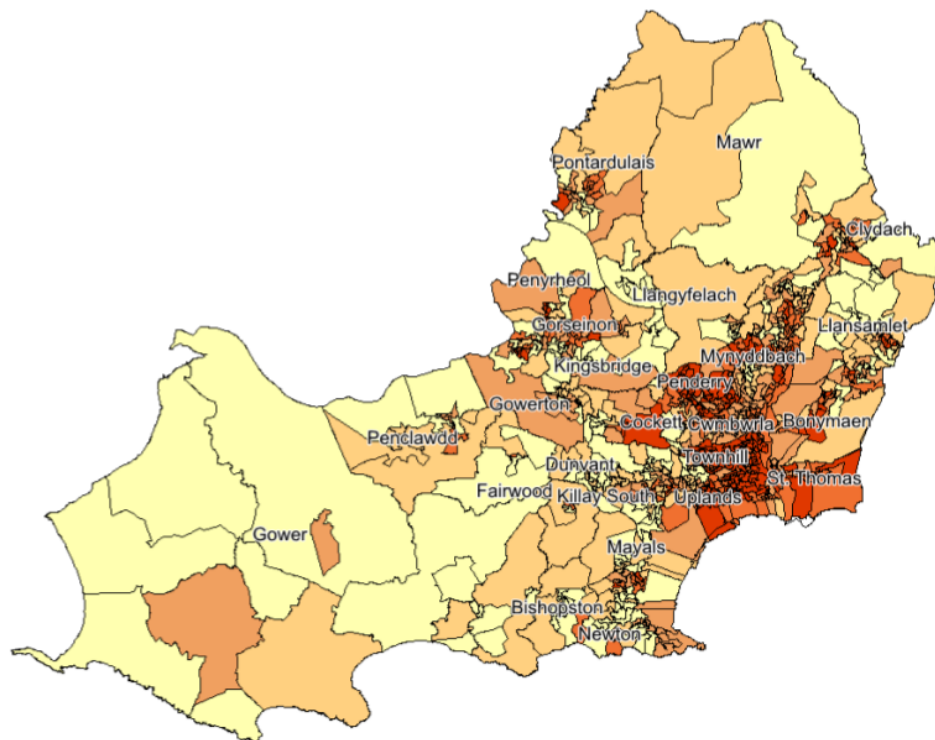


Figure 2

Figure 2 is the picture of the Townsend Index in 2011. We can see from the picture that areas like Townhill, Castle, St. Thomas, Uplands, Bonymaen, Cwmbwria, Cockett, Penderry, Mynyddbach, Gorseinon, Penyrheol, and Clydach are poor areas. Though they are mostly the same as in 2001, the Townsend Index has decreased numerically.

From 2001 to 2011, poor areas have not changed much and other areas have been partly different. For example, the west part of Gower has become brighter than 2001 and the east part of Mawr has not been the same dark as the west part anymore. The darker colour areas are widely spread around Swansea in 2001 but in 2011 the darker colour areas gather together and the brighter colour areas are widely spread instead.

In general, most of the darkest areas did not change and the darker areas drew near the darkest areas, which shows these areas might become poorer under the influence of the poorest areas. Of course, this does not rule out the fact that in some cases these areas just didn't become better as others.

The comparison of these two pictures indicates that people in Swansea have had a better life during the past 10 years since 2001 but people who suffer from deprivation still gather around the same areas. It is difficult for those people to make a difference in their lives due to some unknown reasons.

1st Dose MMR By Age 2



Figure 3

Figure 3 is the picture of 1st dose MMR immunisation rates from 2004 to 2007. The darker colour means the higher MMR immunisation rates from 2004 to 2007. It is clear from the picture that areas like Gorseinon, Penyrheol, Kingsbridge, Gowerton, Llangyfelach, and Penclawdd are high rates areas and areas like Mawr, Clydach, Mayals, Bishopston, Gower, Killay South, and Penderrey are low rates areas.

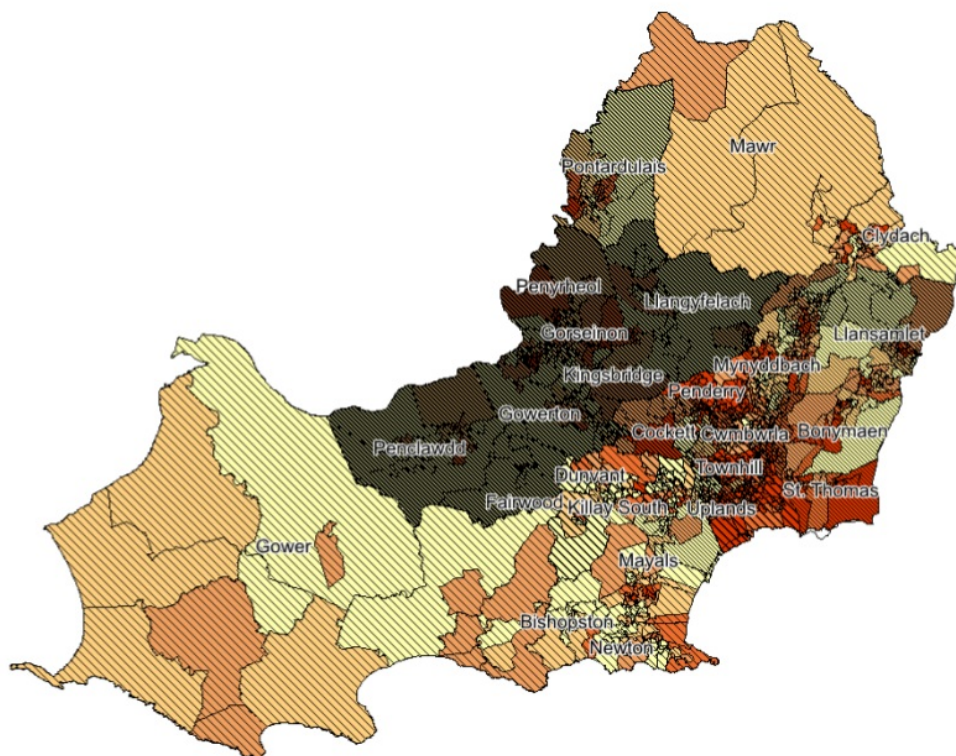


Figure 4

If we compare the immunisation rates picture from 2004 to 2007 and the Townsend Index picture in 2001, in another word, if we put figure 1 and figure 3 together like figure 4, we would find that some areas like Gorseinon and Penyrheol are poor areas but with high immunisation rates and some areas like Mayals, Gower, and Bishopston are rich areas with low immunisation rates. That is against the hypothesis at first.

City centre areas like Townhill, Castle, St. Thomas, and Uplands are poorest areas but the immunisation rates are higher than some rich areas like Gower, which means deprivation does not influence immunisation rates so much in Swansea from 2004 to 2007.

If we take a close look at the picture, it is interesting to find the fact that the highest immunisation rates areas are located in some places that are not too far from the city centre but also not too close to the poor areas. One of the reasons might be that medical service is not easy to access for people who live in these areas. Consequently, they are less likely to get some information about immunisation and are not as motivated as people who live in the city centre area.

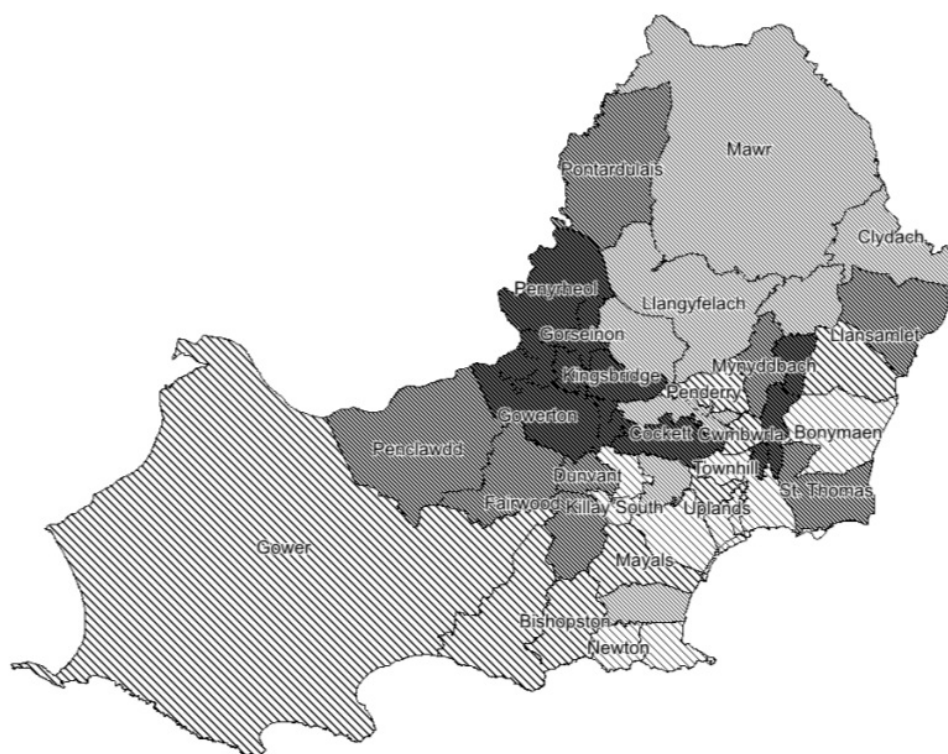


Figure 5

Figure 5 is the picture of 1st dose MMR immunisation rates from 2007 to 2010. The picture has shown that areas like Gorseinon, Penyrheol, Kingsbridge, Gowerton, Cockett, and Mynyddbach are high rates areas and areas like Townhill, Castle, Uplands, Bonymaen, Killay South, and Newton are low rates areas.

If we compare the immunisation rates picture from 2004 to 2007 and the immunisation rates picture from 2007 to 2010, we can see that some areas like Gorseinon, Penyrheol, Kingsbridge, and Gowerton are still the highest immunisation rates areas and Killay South is still one of the lowest immunisation rates areas. Some areas like Cockett, Mynyddbach, Mawr, Clydach, Mayals, Bishopston, Gower, and Penderry have improved the situation of immunisation but other areas like Townhill, Castle, Uplands, Bonymaen, Llangyfelach, and Penclawdd did not do a good job as those areas.

From 2007 to 2010, the areas which are quite far from the city centre like Mawr, Clydach, Bishopston, and Gower performed better than before and some new areas near the city centre like Cockett, Mynyddbach, Mayals, and Penderry joined the highest immunisation rates team replacing some old members like Llangyfelach and Penclawdd. On the other side, city centre areas Townhill, Castle, Uplands, and Bonymaen, which are also the poorest areas, finally dropped to the lowest immunisation rates team.

I think deprivation started to play an important role in the immunisation rates from 2007 to 2010. For example, rich areas like Bishopston and Gower are not the lowest immunisation rates areas anymore and poor areas like Townhill, Castle, Uplands, and Bonymaen are the lowest immunisation rates areas instead.

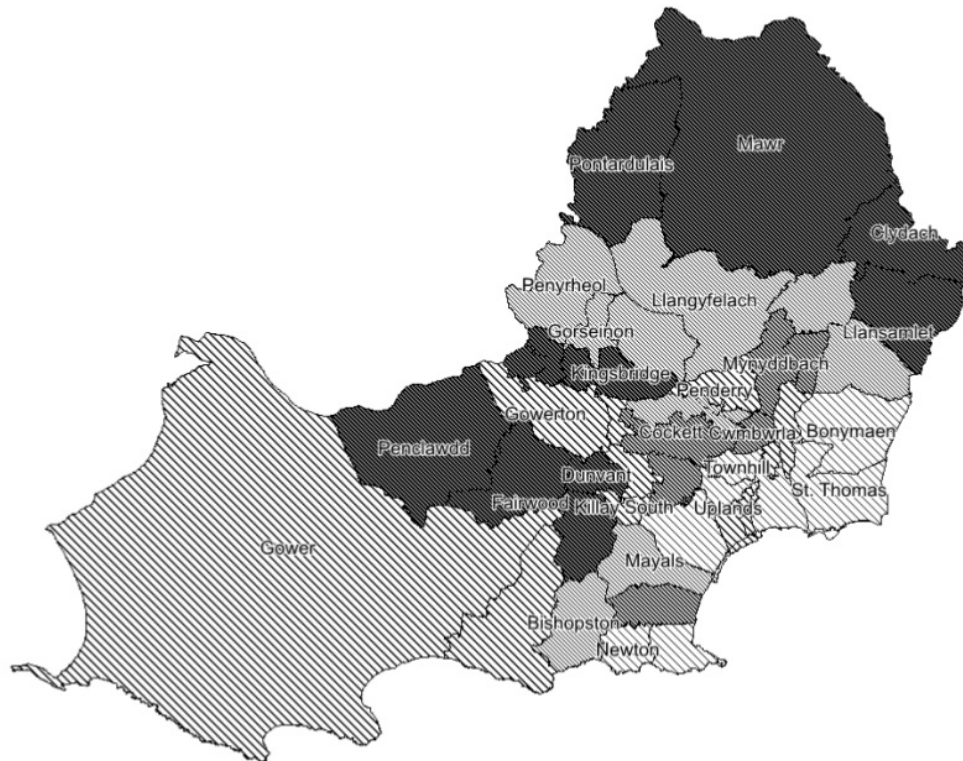


Figure 6

Figure 6 is the picture of 1st dose MMR immunisation rates from 2010 to 2013. What we can see from the picture is the fact that areas like Penclawdd, Fairwood, Kingsbridge, Pontardulais, Mawr, and Clydach are high rates areas and areas like Townhill, Castle, Uplands, Bonymaen, St. Thomas, and Newton are low rates areas.

Compared to figure 5, the immunisation rates picture from 2007 to 2010, figure 6 shows that Kingsbridge is still one of the highest immunisation rates areas and Townhill, Castle, Uplands, Bonymaen, Newton are still the lowest immunisation rates areas. Things started to work out in areas like Killay South, Penclawdd, Fairwood, Pontardulais, Mawr, and Clydach but other areas like St. Thomas, Gorseion, Penyrheol, Gowerton, Cockett, and Mynyddbach became worse.

From 2010 to 2013, the areas which are quite far from the city centre like Pontardulais, Mawr, Clydach joined the highest immunisation rates team while some new areas near the city centre like Penclawdd, Fairwood also joined the highest immunisation rates team

replacing some old members like Gorseinon, Penyrheol, Gowerton, Cockett, and Mynyddbach. On the other side, one of the city centre areas St. Thomas, which is also among the poorest areas, eventually turns into one of the lowest immunisation rates area. Killay South as one of the areas near the city centre is not a member of the lowest immunisation rates team anymore.

The analysis above is based on the Townsend Index picture in 2001 and it may not be very accurate because the Townsend Index would change year by year. As we have the Townsend Index in 2011, it is better to compare the immunisation rates picture from 2010 to 2013 and the Townsend Index picture in 2011 before discussing the relationship between the deprivation and the immunisation rates.

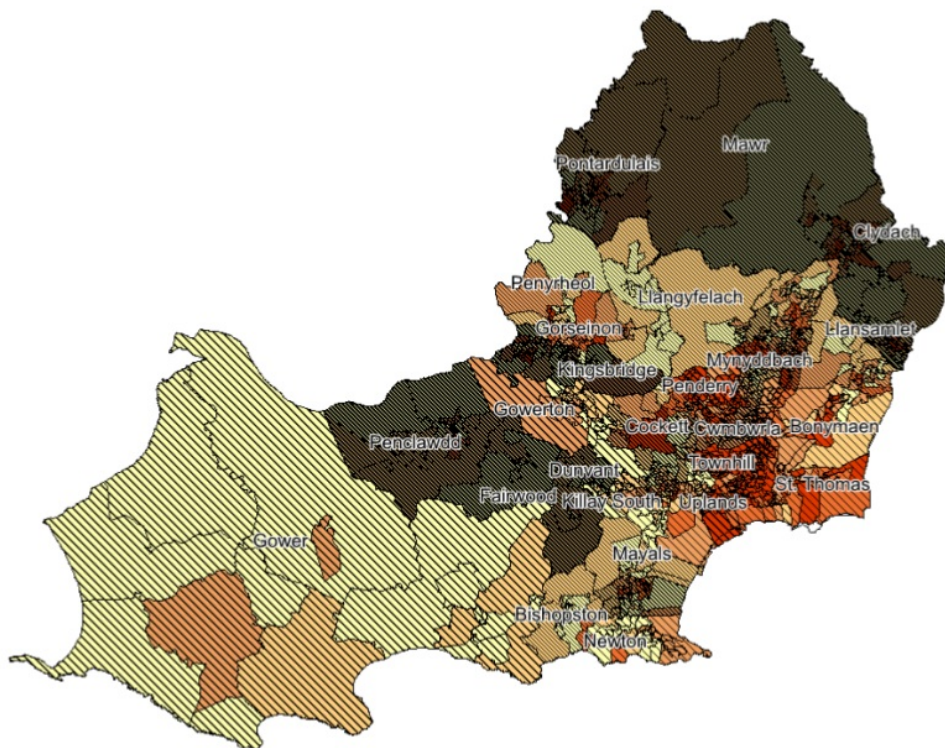


Figure 7

As we can see in figure 7, some areas like Clydach are poor areas but with high immunisation rates and some areas like Newton are rich areas with low immunisation rates. But we can easily find that these areas are controversial areas, which means they have both a part of high Townsend Index area and a part of low Townsend Index area. It is hard to define whether these areas are poor or rich. Since the immunisation rates are describing the immunisation status of the whole area, we cannot draw any conclusion with the result.

City centre areas like Townhill, Castle, St.Thomas and Uplands are poorest areas and also the lowest immunisation rates areas, which means deprivation really causes a drop in immunisation rates in Swansea from 2010 to 2013.

From the picture, it is shown that some areas that are not too far from the city centre but not too close to the poor areas can be the highest immunisation rates areas and some areas far from the city centre can also be the highest immunisation rates areas.

It seems that some areas far from the city centre have made a great step from 2010 to 2013. On the other side, poor areas' immunisation rates become lower and lower compared to those areas. The problem of immunisation caused by deprivation has become the most important issue.

To summarize, the trend of immunisation rates is more and more affected by deprivation. Areas far enough from the city centre but not too far stay high immunisation rates while city centre areas stay low immunisation rates. Other areas far from the city centre are getting better.

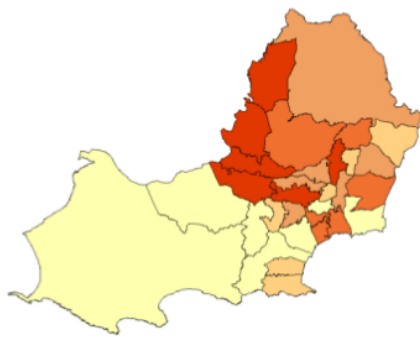


Figure 8

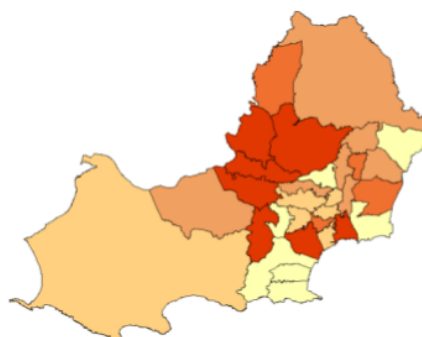


Figure 9

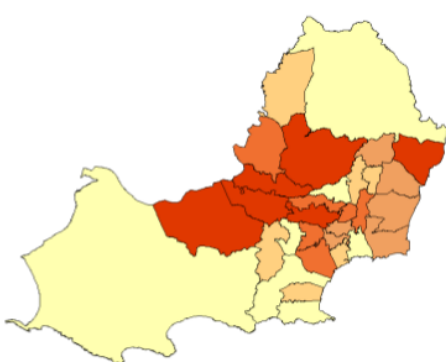


Figure 10

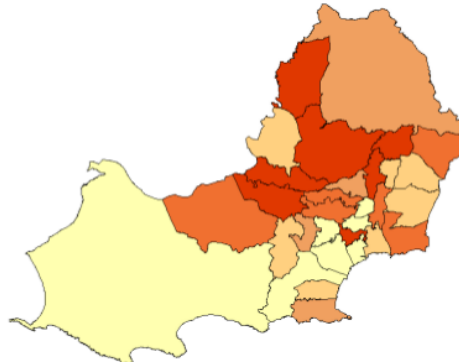


Figure 11

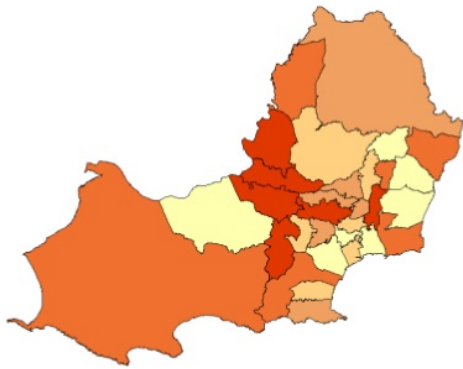


Figure 12

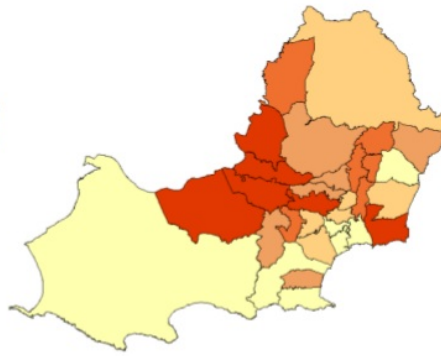


Figure 13

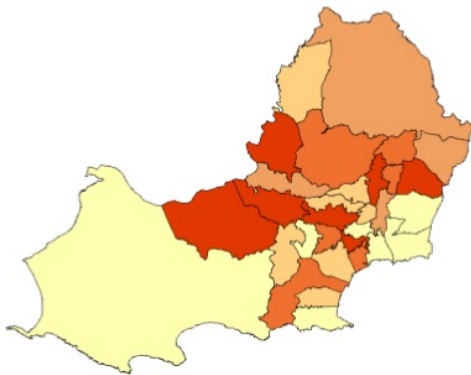


Figure 14

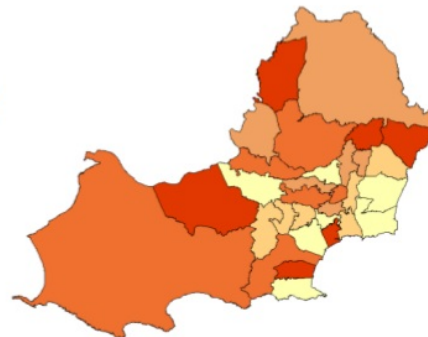


Figure 15

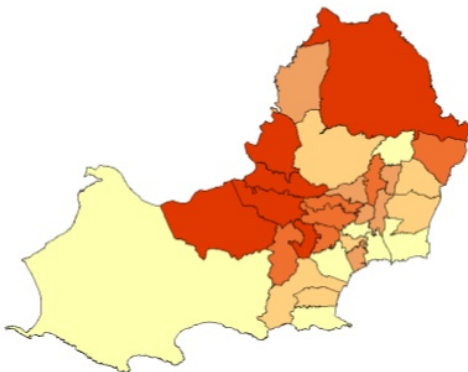


Figure 16

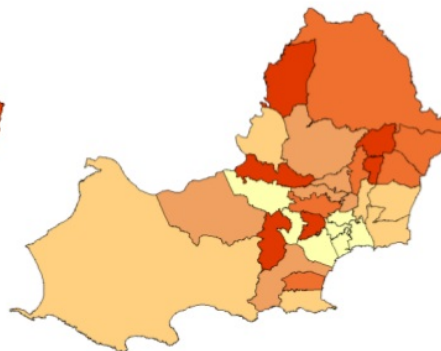


Figure 17

Figure 8 to figure 17 are the pictures of each year's MMR immunisation rates from 2003 to 2013. It is not necessary to discuss the trends of immunisation rates change from 2003 to 2013 year by year because we already got the conclusion above. Here we can draw a general conclusion about the immunisation rates in the past 10 years since 2003.

On the one side, if an area is among the darkest colour areas, which means the highest immunisation rates areas, this area is followed by a “1”. On the other side, if an area is among the brightest colour areas, which means the lowest immunisation rates areas, this area is followed by a “0”.

Then we can highlight those areas that are followed by more than four “1” s and change the colour of those areas that are followed by more than four “0” s into red. Below is what we would get from those 10 figures:

Gowerton 1 1 1 1 1 1 1 0 1 0

Kingsbridge 1 1 1 1 1 1 1 1

Lower loughor 1 1 1 1 1 1 1 1

Upper loughor 1 1 1 1 1 1 1 1

Penclawdd 0 1 0 1 1 1 1

Fairwood 0 1 1 1 0 1 1 1 1 1

Penyrheol 1 1 1 1 1 1

Gorseinon 1 1 1 1 1 1

Duvant 0 1 1 1

Pontardulais 1 1 1 1

Cockett 1 1 1 1

Morriston 1 0 1 0 1

Landore 1

Llangyfelach 1 1 1

Penllergaer 1 1 1

Mawr 0 1

Clydach 0 1

Mynyddbach 1 1 1

Sketty 0 1 0 0 0 0 1 0

Castle 1 0 1 0 0 0 0 0

Newton 0 0 0 0 0 0

Oystermouth 0 0 0 0 0 0

Pennard 0 0 0 0 0 0

Gower 0 0 0 0 0 0

Townhill 0 0 0 0 0

Uplands 1 0 0 0 1 1 0 0

Bishopston 0 0 0 0 0 0

St. Thomas 0 0 1 0 0 0

Mayals 0 0 0 0 0 0

Llansamlet 0 1 0 0 1 1

Penderry 0 0 0

Bonymaen 0 0 0

Killay south 0 0 0 1 0

Killay north 0 0 0 1 0

West cross 0 1

Cwmbwrla 0

If an area is followed by more than four “1”s, it means this area is listed as one of the highest immunisation rates areas for more than four times. So in general, it is reasonable to conclude that those highlighted areas are the highest immunisation rates areas from 2003 to 2013. Similarly, we can conclude that those red areas are the lowest immunisation rates areas from 2003 to 2013. This is the general conclusion.

We can also see it on the map:



Figure 18

As shown in figure 18, the darkest colour areas are the highest immunisation rates areas from 2003 to 2013 and the brightest colour areas are the lowest immunisation rates areas from 2003 to 2013.

The general conclusion also accords with our earlier observations, which showed that the city centre holds the lowest immunisation rates and areas near the city centre hold the highest immunisation rates. One thing to mention is that the southern part of Swansea also holds the lowest immunisation rates.

2nd Dose MMR By Age 5

The factors that influence the 2nd dose MMR immunisation rates are different from the 1st dose and are quite complex. For example, some people might think it unnecessary to be vaccinated again or they just simply forget. Autism, which has been proved not related to the MMR vaccination, is still one of the parents' concern.

Most received no information on the rationale, benefits, and risks of MMR vaccination before the second dose vaccination and could not recall being given information before the first dose. National Health Service leaflets were perceived as dull and uninformative compared with the photographs and case histories of autism presented in the mass media.[4]

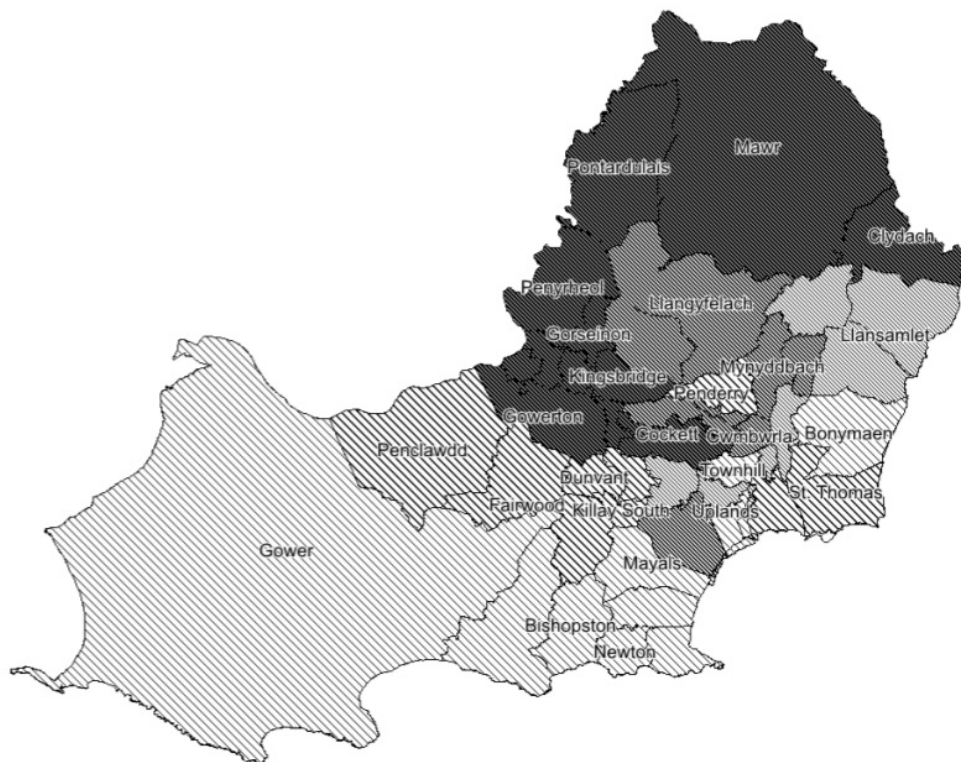


Figure 19

Figure 19 is the picture of 2nd MMR immunisation rates from 2004 to 2007. It is clear from the picture that areas like Gorseinon, Penyrheol, Kingsbridge, Gowerton, Cockett, Pontardulais, Mawr, and Clydach are high rates areas and areas like Pennard, Mayals, Bishopston, Gower, Newton, Uplands, Townhill, and Bonymaen are low rates areas.

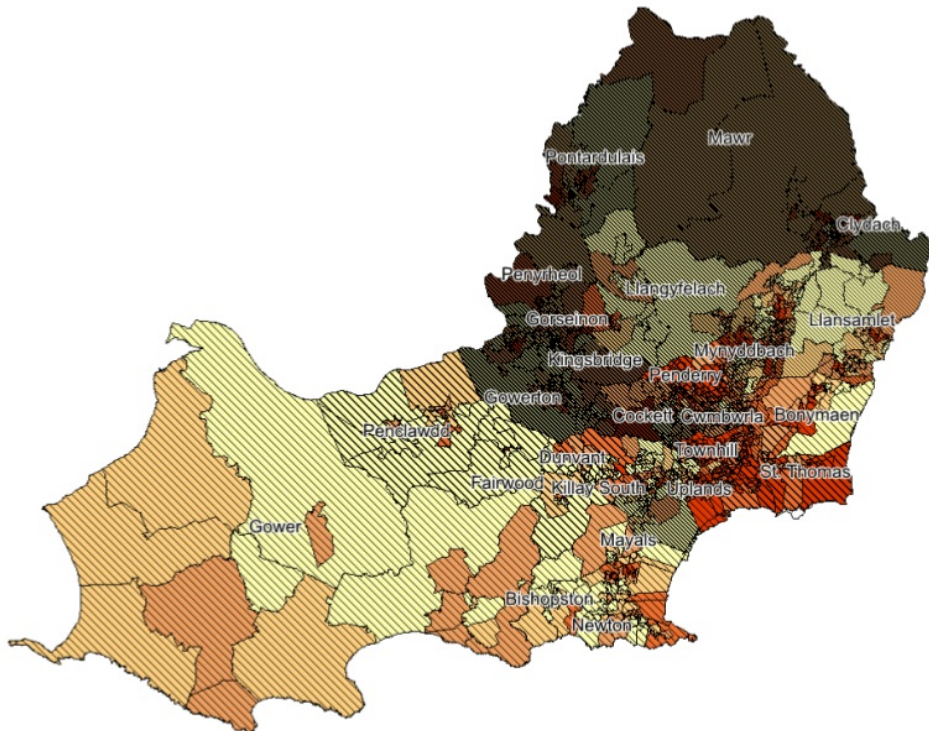


Figure 20

If we compare figure 19 and figure 1 like figure 20, we would find that some areas like Gorseinon, Cockett, and Penyrheol are poor areas but with high immunisation rates and some areas like Mayals, Gower, and Bishopston are rich areas with low immunisation rates. That is almost the same as the 1st dose so we don't need to analysis again.

The only thing different is that the northern part of Swansea starts to show better immunisation rates than the southern part from 2004 to 2007 earlier than the 1st dose. That is strange because the 2nd dose should be later than the 1st dose. The 2nd dose MMR immunisation rates from 2004 to 2007 should partly indicate the 1st dose MMR immunisation rates from 2001 to 2004. Probably people have different attitude between the 1st dose and the 2nd dose.

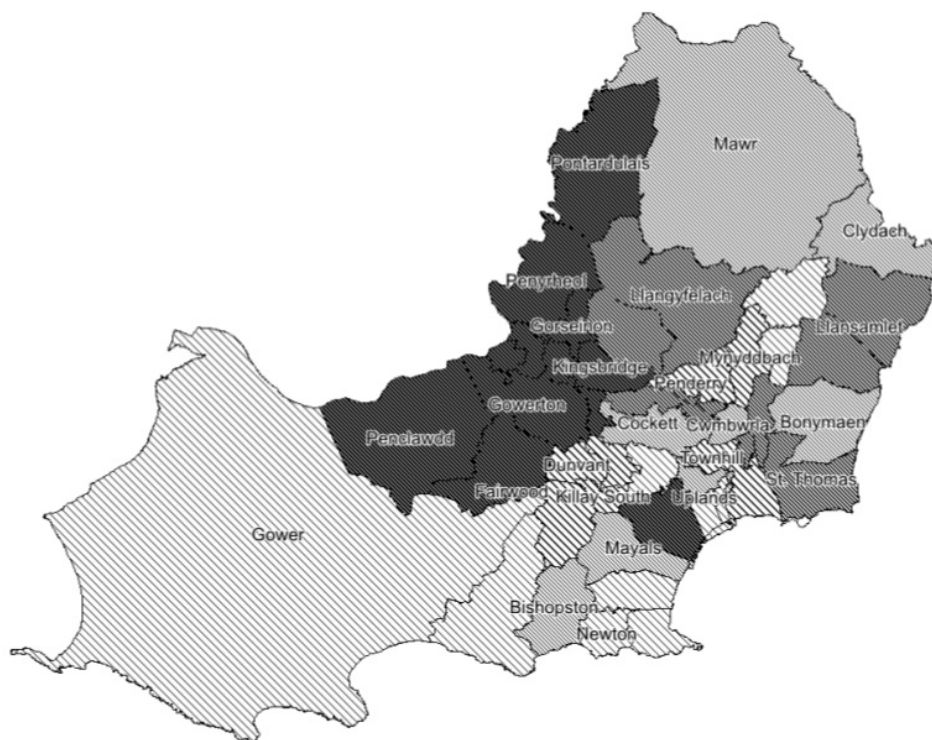


Figure 21

Figure 21 is the picture of 2nd dose MMR immunisation rates from 2007 to 2010. We can see that areas like Gorseinon, Penyrheol, Kingsbridge, Gowerton, Penclawdd, Fairwood, Sketty, and Pontardulais are high rates areas and areas like Gower, Pennard, Uplands, and Newton are low rates areas.

If we compare the immunisation rates picture from 2004 to 2007 and the immunisation rates picture from 2007 to 2010, we can see that some areas like Gorseinon, Penyrheol, Kingsbridge, Pontardulais, and Gowerton are still the highest immunisation rates areas and Pennard, Gower, Newton, and Uplands are still the lowest immunisation rates areas.

From 2007 to 2010, the areas near the city centre like Sketty, Mayals, Bishopston, Townhill, and Bonymaen had better performance than before. Some new areas near the city centre like Penclawdd and Fairwood joined the highest immunisation rates team replacing some old members like Mawr and Clydach. On the other side, areas far from the city centre like Cockett, Mawr, and Clydach dropped to the lowest immunisation rates team.

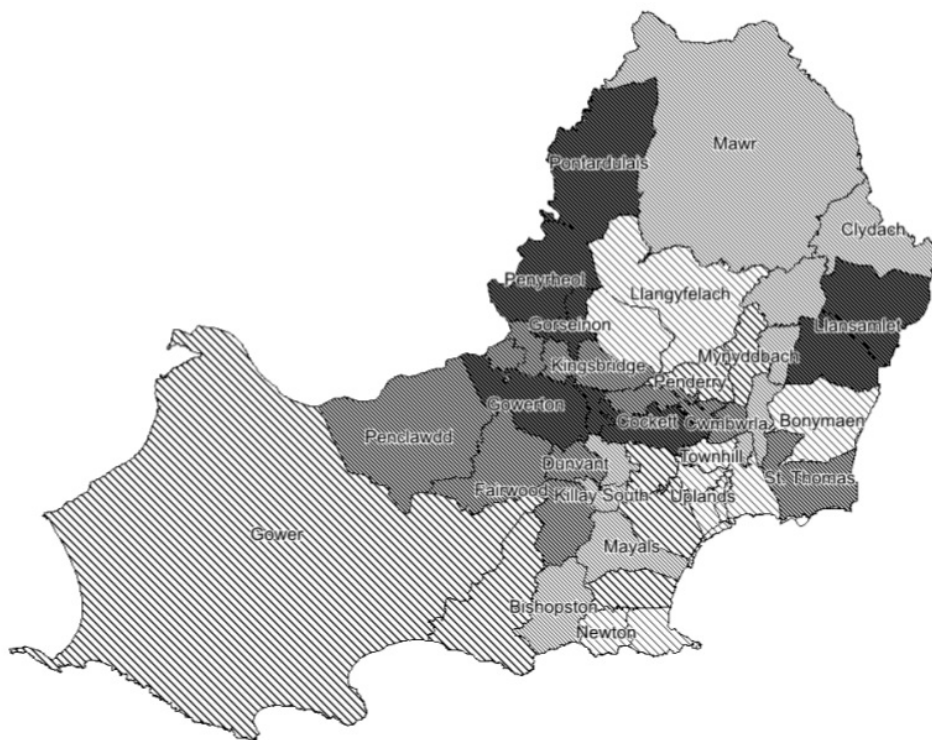


Figure 22

Figure 22 is the picture of 2nd dose MMR immunisation rates from 2010 to 2013. The picture provides the fact that areas like Gorseinon, Penyrheol, Gowerton, Cockett, Llansamlet, and Pontardulais are high rates areas and areas like Llangyfelach, Townhill, Uplands, Newton, and Bonymaen are low rates areas.

Compared to figure 21, figure 22 shows that Gorseinon, Penyrheol, Gowerton, and Pontardulais are still the highest immunisation rates areas and Uplands, Newton are still the lowest immunisation rates areas.

From 2010 to 2013, the areas near the city centre like Cockett and Llansamlet joined the highest immunisation rates team replacing some old members like Kingsbridge, Penclawdd, Fairwood, and Sketty. On the other side, areas far from the city centre like Gower and Pennard are not the lowest immunisation rates areas anymore while some areas near the city centre like Llangyfelach, Townhill, and Bonymaen become part of the lowest immunisation rates areas.

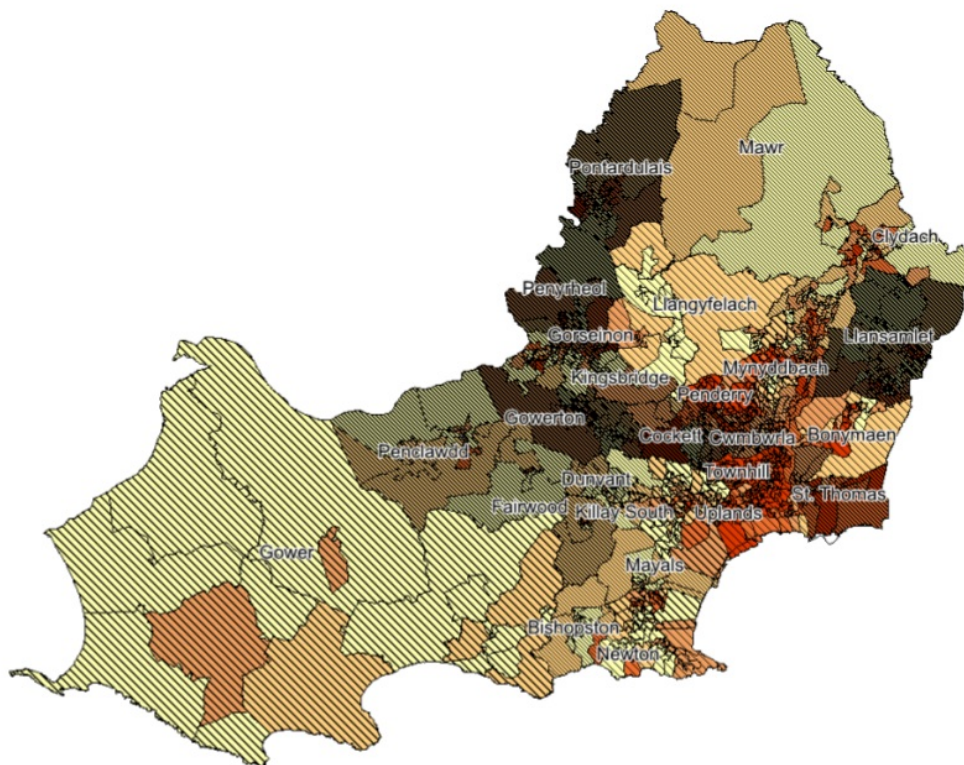


Figure 23

As we can see in figure 23, some areas like Cockett, Gorseinon, and Penyrheol are poor areas but with high immunisation rates and some areas like Newton are rich areas with low immunisation rates. It is interesting that this is against the conclusion from the 1st dose, which means deprivation have less influence on the 2nd dose immunisation rates.

From the picture, it is shown that the highest immunisation rates areas usually are those areas near the city centre. Areas far from the city centre have hardly been the highest immunisation rates areas since 2007. City centre areas always become the lowest immunisation rates areas.

To summarize, deprivation does not play an important role in the 2nd dose immunisation rates. Areas near the city centre hold higher immunisation rates than city centre areas and areas far from the city centre. The northern part of Swansea holds higher immunisation rates than the southern part.

Conclusion

The research has shown that the Welsh government should pay more attention to the city centre areas and the areas far from the city centre, especially city centre areas.

City centre areas hold the lowest immunisation rates both in the 1st dose and the 2nd dose. Though people in the city centre can access medical services easily, deprivation may cause some trouble.

The city centre has the most population and is also where people like to gather so the virus can easily spread. It is suggested that the Welsh government should hand out some free masks in public places like supermarkets or train/bus stations. Mumps is spread through infected droplets of saliva so masks can effectively prevent the virus from spreading as the virus carrier can stop the saliva and healthy people can block infected droplets of saliva by masks. It is also useful when a virus carrier comes to Swansea or leaves Swansea and puts on a free mask.

People in the areas far from the city centre have difficulty in accessing medical services and are less likely to get some information about immunisation.

The suggestion for these areas is increasing publicity and help the people there to find an easy way of accessing medical services. For example, public service announcements about mumps should be put on the television or the Internet and break the rumours about autism. For another example, the government can get some volunteers and arrange some "medical services delivery" for those who have difficulty just like food delivery.

Moreover, the southern part of Swansea has more serious immunisation situation than the northern part. The Welsh government can use the geographical information system to have a better understanding of the immunisation situation in whole Swansea. It is hard to know that the southern part has more trouble by just looking at the forms and the numbers. The geographical information system can also be used to cut down the spreading of the mumps because it is shown on the map which area has more infection cases. The government can find ways to prevent it from spreading to another area.

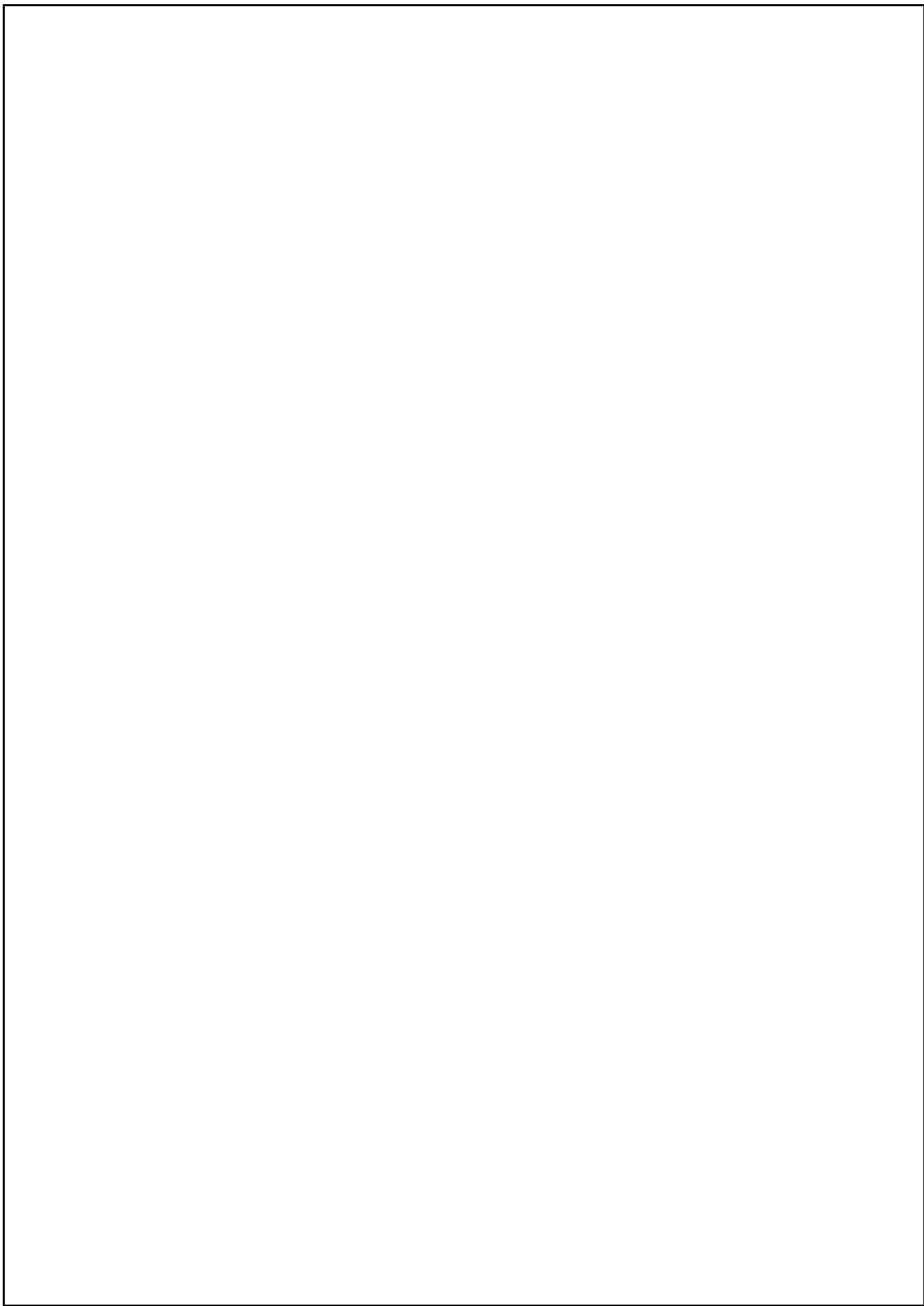
Reference

[1] : <https://www.nhsdirect.wales.nhs.uk/encyclopaedia/m/article/mumps>

[2] : Smith PJ, Chu SY, Barker LE. Children who have received no vaccines: who are they and where do they live? *Pediatrics*. 2004;114(1):187–195. doi:10.1542/peds.114.1.187.

[3] : https://en.wikipedia.org/wiki/Townsend_deprivation_index

[4] : McMurray R, Cheater FM, Weighall A, et al. Managing controversy through consultation: a qualitative study of communication and trust around MMR vaccination decisions. *Br J Gen Pract* 2004;54:520–5.



GIS Assignment

GRADEMARK REPORT

FINAL GRADE

67 / 100

GENERAL COMMENTS

Instructor

Generic Assessment Criteria Wanzi Su	Marks available	Marks awarded
1. Engagement with Literature Skills		
<i>Investigating the fundamentals of visual perception, cartographic visualisation and the map as a visual information system. Explore the origins of GIS and cartographic representation.</i> Although you have set the scene for your discussion your research in section is limited. You have referenced the NHS but what about software you should reflect on GIS as a concept and discuss, via relevant research and reflection how visualisation of data could help with your study.	25	14
2. Knowledge and Understanding Skills		

<i>Discuss the principles of thematic mapping and data visualisation within a software environment. Use the evidence that you have collected and exerts from the GIS system that you have developed to help with your discussion and analysis. You will be measured on good use of case study data.</i> You demonstrate a good level of understanding of the software environment and you use the MapInfo software well to look at the data and present well structure thematic maps. You do reflect on your data throughout your case study but you need to look at evidence from the literature to support your claims and this is somewhat limited. You need to reference far more research paper or journals relating to epidemiology and GIS. You have presented a good hypothesis and you do use this well as you discuss your results.	35	21
3. Cognitive and Intellectual Skills		

<i>Discuss the principles of thematic mapping and data visualisation within a software environment. Use the evidence that you have collected and exerts from the GIS system that you have developed to help with your discussion and analysis. You will be measured on good use of case study data.</i> This section has been completed to a suitable standard and you have used evidence form your thematic maps to help with your discussions. Maybe provide a map legend (key) as this will help the reader and provide better data visualisation.	15	12
4. Practical Application Skills		

<i>Identify types of data involved in Geo-information systems. Briefly describe the use of Excel to gather data. Use of GIS to analyse data that you have collected for the study.</i> Here you have looked at the data but maybe explain how you gathered your data provide an example i.e. screen shots from excel and maybe explore additional datasets.	15	14
5. Transferable Skills for Life and Professional Practice		

<i>All work suitably presented and referenced and concluded</i> You need to work on your report presentation. Provide sections with numbered section headings and this will help you build a table of content in addition to your table of figures. The main body of the report has been well written and you have reflected well on your data analysis. You demonstrate a good understanding of the result and you have looked at the data correlation. You have provided many visuals of maps as a conclusion but it is difficult to follow as you have to refer to the figure list at the top of the report. Try to include more referenced material next time. Total 67%	10	6
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PAGE 1
PAGE 2
PAGE 3
PAGE 4
PAGE 5
PAGE 6
PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12

PAGE 13

PAGE 14

PAGE 15

PAGE 16

PAGE 17

PAGE 18

PAGE 19

PAGE 20

PAGE 21
