



Public Health  
England

# **Orthodontic Needs Assessment NHS England - North (Cumbria and the North East) April 2018**

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April 2018

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## **Introduction**

The NHS England local office for the North East and Cumbria are undertaking the re-procurement of primary care orthodontic services. All the current personal dental service (PDS) contracts will be re-procured across the North East and Cumbria. In order to help inform the recommissioning of these services, a needs assessment was requested by the local office to be undertaken by Public Health England to advise the process.

## **Needs Assessment Model**

The model for this needs assessment has been derived from the commissioning guide for orthodontics published by NHS England in September 2015<sup>1</sup>. The commissioning guide identifies a number of different resources and studies which can be used to inform a health needs assessment, for the commissioning of orthodontic services. The consensus view within the report is that approximately one third of children in any given population will need and demand orthodontic treatment. Children with a need (clinical) will meet the current NHS threshold for receiving orthodontic treatment. Children who demand care will recognise their need (clinical) and request care.

The commissioning guide also highlights the fact that demand for orthodontic care is rising, and earlier assessments on needs and demands in areas which have previously identified lower levels of demand are likely to have become outdated. Orthodontic treatment has developed and is now more widely provided and more generally accepted within society.

The model used in this needs assessment is based upon a third of all children within the population of the North East and North Cumbria aged 12 years old requiring and demanding orthodontic treatment. These assumptions are used to model the maximum level of need and demand within the population.

Orthodontic treatment provided within the NHS is funded in a currency called units of orthodontic activity (UOA). A full course of fixed orthodontic treatment will require 21 UOA. It is assumed that some patients will require a separate orthodontic assessment. To allow for this and slight variations in the way patients are managed, it is assumed that each completed course of orthodontic treatment for a patient will require 22.5 UOA. This figure has been endorsed in previous publications<sup>2</sup>.

## **Data**

Population data was obtained from the Office of National Statistics which provided estimates by single year age bands for local authorities in the United Kingdom for the mid 2014 period<sup>3</sup>.

## **Methodology**

The methodology used in this needs assessment was constructed in the following way. Population need for each year was based on an estimate of a third of the 12 year old population for each local authority in the North East and North Cumbria reported by the Office of National Statistics. The number of 12 year olds is expected to vary over the period for which the contracts will run. Population projections from the Office of National Statistics were used for the 13 year period from 2014-2027. An average of these was taken and this gave a higher number of 12 year olds than the single point population in 2014.

For each 12 year old child, 22.5 units of orthodontic treatment are awarded in order to meet their clinical needs. The available capacity to meet population needs was based upon the local authorities and districts which made up the five economies of orthodontic service provision in the North East and Cumbria. The five economies were:

- 1) The county of Cumbria as a single economy (The districts of Barrow and South Lakeland were subsequently removed due an NHS reorganisation).
- 2) North of Tyne and Wear, which is made up of Northumberland, Newcastle and North Tyneside local authorities;
- 3) South of Tyne and Wear economy composed of Gateshead, South Tyneside and Sunderland local authorities;
- 4) County Durham and Darlington economy
- 5) Teesside economy for the areas covered by the four local authorities of, Hartlepool, Stockton, Middlesbrough, and Redcar and Cleveland.

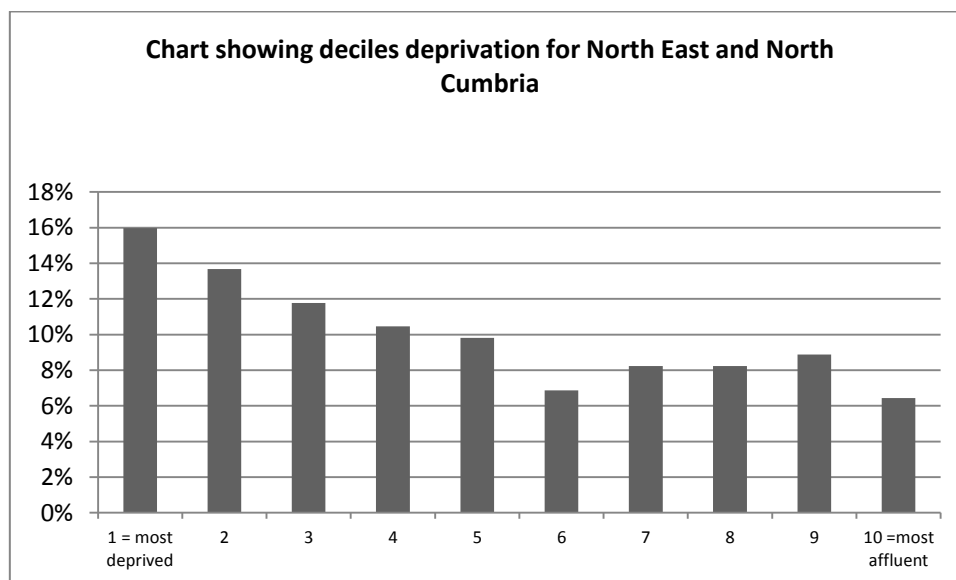
Calculations throughout this paper are rounded into whole numbers

## North East and Cumbria Historical patient flows of access to NHS Dental service and socio-demographic information

The North East and Cumbria has high levels of deprivation compared to England as a whole. Socio- economically disadvantaged communities have fewer resources than affluent areas and paying for public transport can act as a barrier to accessing orthodontic services.

Deprivation is most commonly measured in England using the Index of Multiple Deprivation (IMD). This provides a measure of relative affluence or deprivation in areas according to a range of indicators. People living in the most deprived areas will tend to have lower incomes and hence find travel costs more of a barrier than people living in more affluent areas.<sup>4</sup> The following table demonstrates the increased deprivation levels across the North East and North Cumbria(NE& N.C) compared to England as a whole (if NE & N.C was similar to England the area would have an equal proportion in each decile).

**Chart 1**



Access to services and transport links is a key issue for many rural communities in the North East and Cumbria. The following table is adapted from ONS data from the 2011 census on car and van ownership across the North East and Cumbria<sup>5</sup>

**Table 1**

Adapted from 2011 census showing proportion of households with no car or van access.

Area	Number Households	Percentage <b>No</b> cars or vans in household
County Durham UA	223,803	27.2
Darlington UA	46,670	28.0
Hartlepool UA	40,434	35.3
Middlesbrough UA	57,203	37.6
Northumberland UA	138,534	22.0
Redcar and Cleveland UA	59,605	28.4
Stockton-on-Tees UA	79,159	25.9
Tyne and Wear (Met County)	484,527	36.8
Gateshead	89,154	36.5
Newcastle upon Tyne	117,153	41.7
North Tyneside	91,295	31.6
South Tyneside	67,167	38.5
Sunderland	119,758	35.1
Cumbria	222,042	21.4
Allerdale	42,345	20.8
Barrow-in-Furness	31,224	29.9
Carlisle	48,342	24.7
Copeland	30,536	23.4
Eden	23,043	13.9
South Lakeland	46,552	15.3

Previous work has identified orthodontic patient flows across the five economies which looked at the equity of access to orthodontic services for patients across the North East and Cumbria it is reproduced in the table below<sup>6</sup>.

**Table 2**

Area Residence of Patients	Activity of providers by location of where patients live				
	Cumbria	North of Tyne	South of Tyne	County Durham	Teeside
	3509 (100%)	5348 (100%)	5667 (100%)	4688 (100%)	6693 (100%)
Cumbria	3503 (99.9%)	7(0%)	0	1(0%)	0
North of Tyne	5(0%)	5018(94%)	96(2%)	4(0%)	9(0.1%)
South of Tyne	0	274(5%)	5005(88%)	202(4%)	6(0.1%)
County Durham & Darlington	1(0%)	48(0.9%)	566(10%)	4441(94.7%)	315(5%)
Teeside	0	1(0%)	0	39(1%)	6362 (95%)

It should be noted that these flows represent historical locations at which orthodontic services have been delivered in the past. The data set covers the time period from 2006 to 2014. It will not necessarily represent the locations where patients and carers, would find it most convenient to receive orthodontic care.

It is relatively straight forward to identify locations for service delivery which would meet patients' and carers' needs within the Tyne and Wear conurbation. In the more dispersed populations of Northumberland, County Durham and Cumbria this is usually based upon the identification of population service centres, where communities already seek key amenities such as financial services, post offices, major food stores and existing specialist NHS services.

The need and demand for orthodontic treatment will be moderated by access to General Dental Services (GDS); if a child does not regularly access GDS services then they are unlikely to enter an orthodontic referral pathway. Moderation for variable access is explored in the table below with a factor introduced for child access to GDS dental services.

**Table 3**  
**Need demand and capacity across North East and Cumbria**

Geography	12-year-old Population 2014	Estimated Number children access NHS care	Proportion access dental care estimated	Estimated Need and Demand	Estimated Need and Demand Numbers	UOA @22.5 per case	UOA Commissioned	Proportion commissioned capacity to meet need
Cumbria	4,981	4291	86%	33%	1416	31861	25,312	79%
NOTW	8,191	6903	84%	33%	2278	51256	55,872	109%
SOTW	6,159	5467	89%	33%	1804	40597	58293	144%
County Durham & Darlington	6,069	5445	90%	33%	1797	40432	36834	91%
Teesside	5895	5467	93%	33%	1804	40594	53355	131%

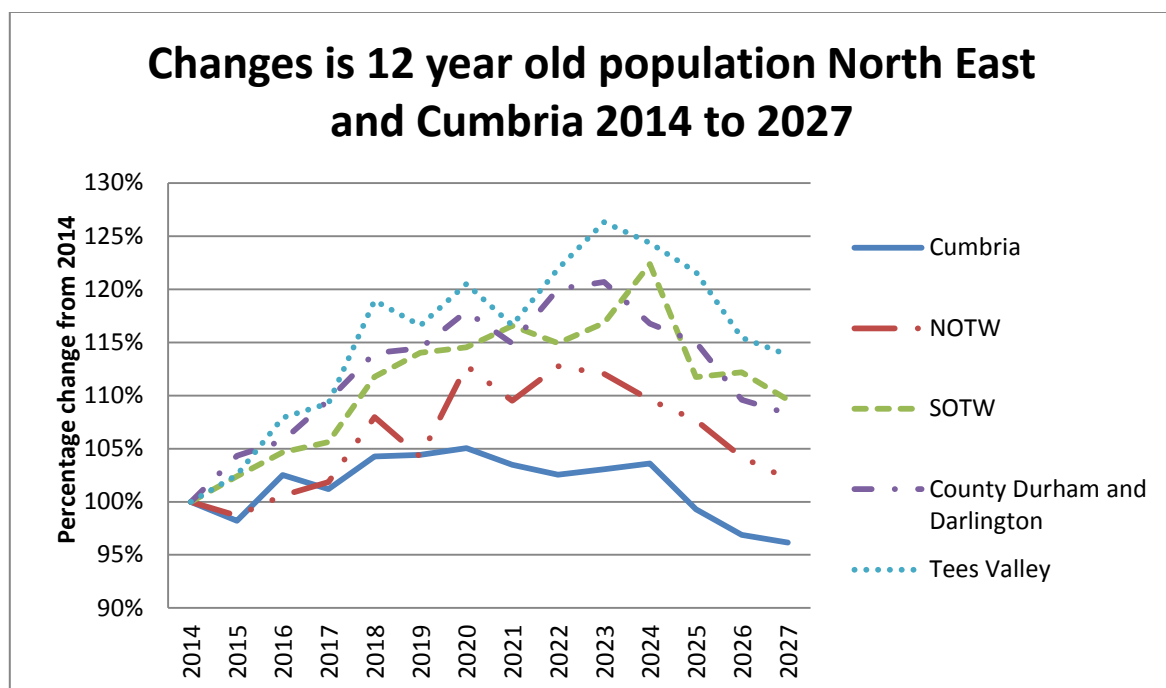
*Currently work is taking place to address issues of general access to routine NHS care across the North East and North Cumbria and it was thus decided for the purposes of the needs assessment, not to have a moderating factor for child access to dental services and undertake the needs assessment based upon a full 33% of 12 year old children will have a need for orthodontic treatment and request care. The total number of 12 year olds in each area was used regardless of access rates; even though not all 12 year olds who have a clinical need will present to a general dental practice and request orthodontic care.*

## Results

Using the model it is possible to produce a prediction for the future orthodontic needs of the North East and Cumbria. The model assumes that, there will not be significant inward or outward migration of children to 2027.

The calculations were then projected to 2027 to provide a description of how the current levels of commissioned service need to change in relation to need/demand as a result of changes in the numbers of 12 year olds within the population. The estimated numbers of 12 year olds in future years were derived from the Office of National Statistics mid 2014 population estimates for the single year age bands for each of the local authorities and the ONS birth data for 2015<sup>7</sup>.

Chart 2

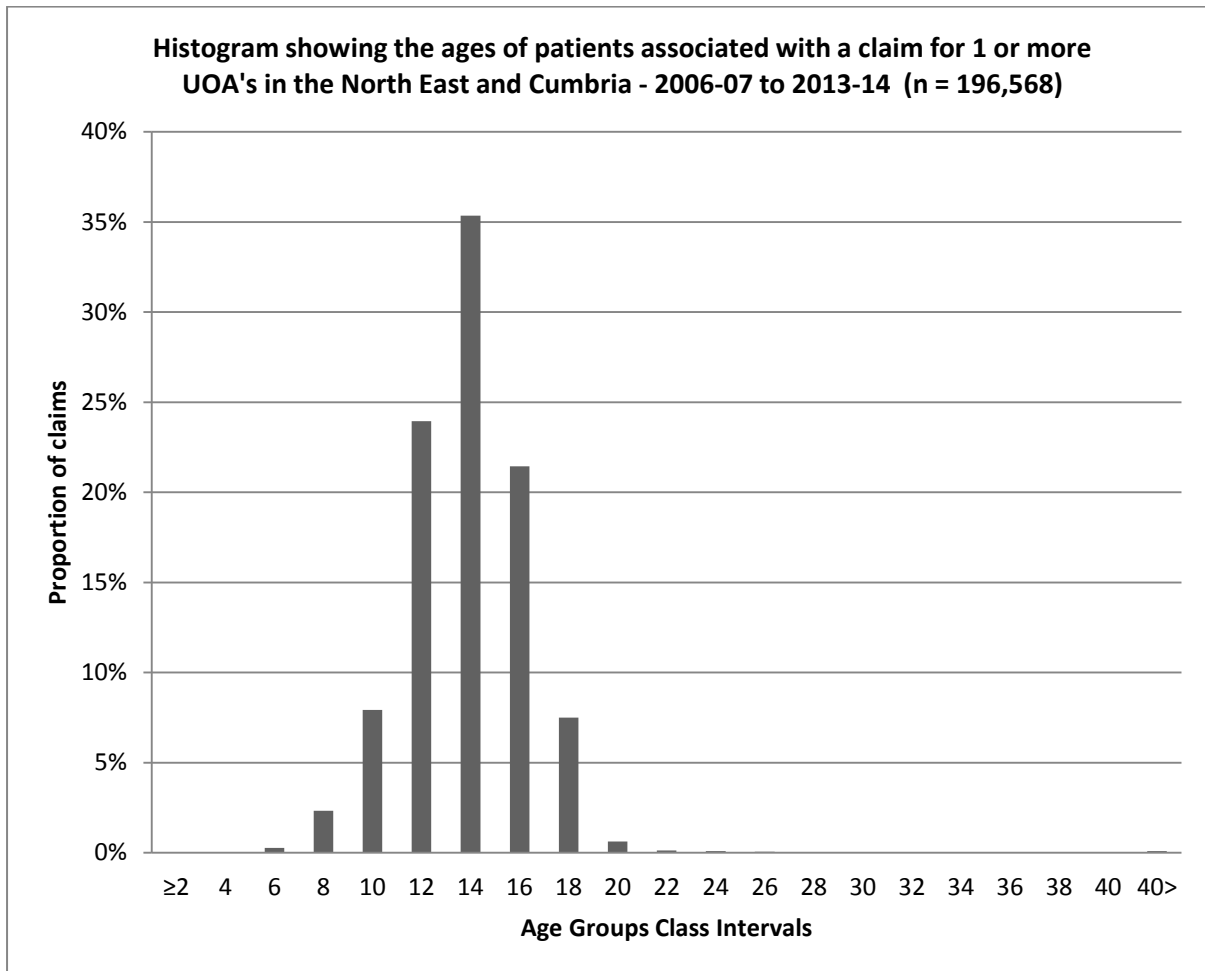


The above population projections demonstrate significant changes over time in the size of the 12 year old populations with both increases and decreases taking place in different areas. It is recognised that children may not all access orthodontic care precisely when 12 years old; patients may enter treatment at different ages for a range of clinical and social factors. The cut-off date for acceptance for treatment is usually 18 years old.

Previous work undertaken which reviewed all orthodontic claims in the North East and Cumbria<sup>5</sup> from 2006/07 to 2013/2014, demonstrated that the most common age was 14 years old, reported in claims made for NHS orthodontic treatment. This is shown in the following histogram.



### Histogram 1



To allow for this further modelling was undertaken to identify the average change in the size of 12 year old population over the 13 year period and the numbers of children involved. The table on the following page shows the mean number for each authority to enable a calculation to be made of the number of UOA required for all necessary orthodontic treatments at 22.5 UOA per case.

**Table 4**

Projections for numbers of 12 year old children in the North East and North Cumbria and required number of UOA to meet average need by Local Authority.

Local Authority	Mean No 12 year olds over 14year period	33% Need and Demand	UOA @ 22.5
Allerdale	977	322	7254
Carlisle	1186	391	8804
Copeland	731	241	5429
County Durham	5546	1830	41180
Darlington	1265	418	9395
Eden	493	163	3664
Gateshead	2232	737	16572
Hartlepool	1097	362	8143
Middlesbrough	1817	600	13492
Newcastle upon Tyne	3197	1055	23739
North Tyneside	2261	746	16791
Northumberland	3213	1060	23854
Redcar and Cleveland	1505	497	11174
South Tyneside	1613	532	11973
Stockton-on-Tees	2392	789	17757
Sunderland	3009	993	22339
<b>Totals</b>	<b>32533</b>	<b>10736</b>	<b>241560</b>

<sup>1</sup> Assuming all 12 year olds with clinical need for treatment are referred

## Discussion

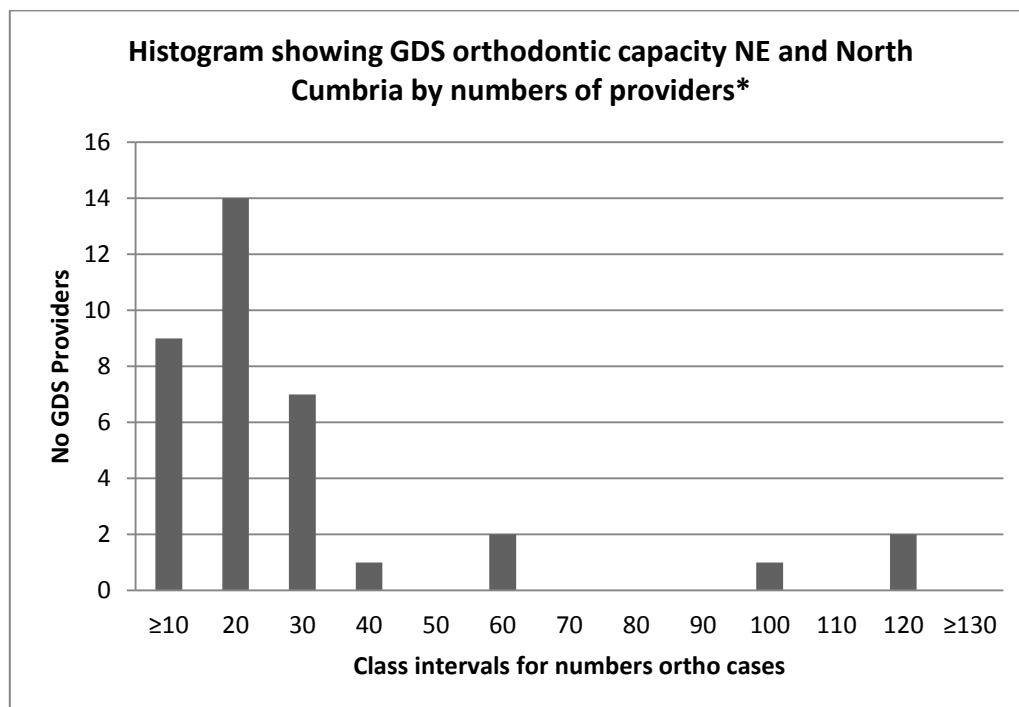
The model provides a useful guide with which to start the current discussions about the future commissioning of orthodontic services. It should be noted that in all areas excluding Cumbria there are going to be increases in the number of 12 year old children in the population up until 2027, especially in County Durham, Darlington and the Teeside areas. This is accurate data, and predicted changes are only going to alter significantly if there is either significant inward migration of family units into the area between now and 2027 to

increase the numbers of 12 years old's, or significant emigration of family units from the North East which would result in the numbers of 12 year children declining significantly. The UK government has reached an agreement with the European Union (EU) on citizens' rights in negotiations on the UK's withdrawal from the EU. EU citizens will be allowed to stay here after the UK leaves the EU on 29 March 2019<sup>8</sup>. Calculations based on ONS data suggests there will be an increasing, genuine, need and demand for orthodontic treatment within the North East, simply due to an increase in the number of 12 year old children.

This model is based upon the efficient use of orthodontic capacity which is currently commissioned. There are, however, areas where contracts pre-date the commissioning of activity according to population needs.

The hospital services do provide complementary services to specialists who are providing the majority of the treatment. They will, however, provide a significant number of specialist type (3a) cases for training purposes as they take an intake of specialist orthodontic trainees every 3 years and each one of these will require a couple of hundred cases each in order to complete training. Additionally they will provide care for individuals with complex orthodontic needs, often requiring a multi-disciplinary approach. These cases are particularly resource-intensive, but will form part of the third of the population who need and demand orthodontic treatment.

The current procurement exercise is for the large PDS contracts which are held by specialist practices. In parts of the North East and Cumbria there are GDS contracting holders who have orthodontic services in their contracts. A few of these in the North East have contract sizes for over 50 cases per year which is the likely recommended minimum for a level two provider (This recommendation is the subject of further consultation)<sup>9</sup>. There are currently 36 GDS contracts in the North East and North Cumbria which have, orthodontic components to their contracts, the distribution of the size of their contracts is shown in the following histogram.



\*Cases based upon 22.5 UOA per case

In order to understand the impact of service capacity across the area a heat map of orthodontic need/demand, additionally showing capacity from GDS type contract holders is provided in the appendices.

## **Conclusions**

This updated orthodontic health needs assessment for the North East and North Cumbria demonstrates the needs amongst the local population to 2027.

## **Acknowledgements**

I am very grateful to Mrs Zoe Freeman Clinical Fellow Newcastle University and Mr Jonathan Lewney, Academic Clinical Fellow in Dental Public Health for their invaluable comments on this paper.

## Appendices

### Appendix 1

To allow planning for small areas the following table is based upon an extract of ward level population data from the ONS which provides an average size of the 12 year old children age cohort from 2015 to 2019<sup>8</sup>. Additionally the table shows the level of deprivation in each ward measured by the index of multiple deprivation 2015, produced by Public Health England<sup>10</sup>. The higher the score for a ward the more deprived the population, this will affect the potential for patients to access services, as they are likely to have fewer material resources to enable travel to services compared with populations in more affluent areas. The range of scores is from 0, Ravenstonedale in Eden to 77, North Ormesby in Middlesbrough the second most deprived ward in England (The maps in appendix 4 describe the comparative levels of deprivation according to national deciles for England and legend shown below, can be used to contextualise the scores for wards in the North East and North Cumbria).

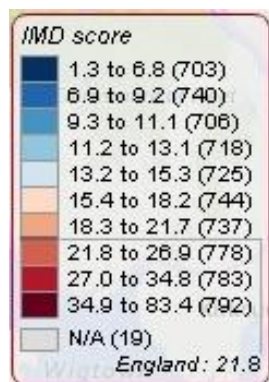


Table 1

Population of 0-12 year old children by wards North East and Cumbria 2016, average per year and 33% of average

Local Authority	Ward Name	0-12 Child population in each ward	Mean no per children per year 0-12 population/13	Orthodontic cases per year at 33% need and demand	Index of Multiple Deprivation (IMD) Score 2015
Gateshead	Birtley	1179	91	30	24.6
Gateshead	Blaydon	1571	121	40	25.6
Gateshead	Bridges	1128	87	29	33.7
Gateshead	Chowdene	1078	83	27	24
Gateshead	Crawcrook and Greenside	1195	92	30	13.4
Gateshead	Deckham	1642	126	42	39.2
Gateshead	Dunston and Teams	1320	102	34	33.6
Gateshead	Dunston Hill and Whickham East	1183	91	30	15.4
Gateshead	Felling	1504	116	38	48.8
Gateshead	High Fell	1693	130	43	44.2
Gateshead	Lamesley	1462	112	37	28.9
Gateshead	Lobley Hill and Bensham	1550	119	39	32.6
Gateshead	Low Fell	1157	89	29	8.6
Gateshead	Pelaw and Heworth	1285	99	33	24.3
Gateshead	Ryton, Crookhill and Stella	1222	94	31	14.4
Gateshead	Saltwell	1946	150	49	32
Gateshead	Wardley and Leam Lane	1183	91	30	20.5
Gateshead	Whickham North	1100	85	28	19.2
Gateshead	Whickham South and Sunnyside	1034	80	26	9.1
Gateshead	Windy Nook and Whitehills	1372	106	35	31.7

Local Authority	Ward Name	0-12 Child population in each ward	Mean no per children per year 0-12 population/13	Orthodontic cases per year at 33% need and demand	Index of Multiple Deprivation (IMD) Score 2015
Gateshead	Winlaton and High Spen	944	73	24	16.1
Newcastle upon Tyne	Benwell and Scotswood	2455	189	62	46.2
Newcastle upon Tyne	Blakelaw	2289	176	58	35.7
Newcastle upon Tyne	Byker	2142	165	54	58.8
Newcastle upon Tyne	Castle	2094	161	53	15.5
Newcastle upon Tyne	Dene	1445	111	37	6.6
Newcastle upon Tyne	Denton	1646	127	42	31.5
Newcastle upon Tyne	East Gosforth	1406	108	36	8.9
Newcastle upon Tyne	Elswick	3088	238	78	54.8
Newcastle upon Tyne	Fawdon	1677	129	43	36.7
Newcastle upon Tyne	Fenham	1904	146	48	30
Newcastle upon Tyne	Kenton	2363	182	60	35.9
Newcastle upon Tyne	Lemington	1579	121	40	28.7
Newcastle upon Tyne	Newburn	1436	110	36	24.3
Newcastle upon Tyne	North Heaton	1239	95	31	12.1
Newcastle upon Tyne	North Jesmond	367	28	9	5.5
Newcastle upon Tyne	Ouseburn	668	51	17	21.6
Newcastle upon Tyne	Parklands	1693	130	43	6.2
Newcastle upon Tyne	South Heaton	675	52	17	25.6
Newcastle upon Tyne	South Jesmond	397	31	10	10.5
Newcastle upon Tyne	Walker	2200	169	56	61.7
Newcastle upon Tyne	Walkergate	1252	96	32	29.9
Newcastle upon Tyne	Westerhope	1081	83	27	13.6
Newcastle upon Tyne	Westgate	961	74	24	37.7
Newcastle upon Tyne	West Gosforth	1509	116	38	9
Newcastle upon Tyne	Wingrove	2535	195	64	29.1
Newcastle upon Tyne	Woolsington	1933	149	49	36.8

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
North Tyneside	Battle Hill	1538	118	39	20.5
North Tyneside	Benton	1368	105	35	15.2
North Tyneside	Camperdown	1604	123	41	25.5
North Tyneside	Chirton	2207	170	56	40.2
North Tyneside	Collingwood	1603	123	41	22.6
North Tyneside	Cullercoats	1178	91	30	10.4
North Tyneside	Howdon	1740	134	44	33.9
North Tyneside	Killingworth	1415	109	36	15.1
North Tyneside	Longbenton	1600	123	41	24
North Tyneside	Monkseaton North	1397	107	35	5.8
North Tyneside	Monkseaton South	1410	108	36	14.5
North Tyneside	Northumberland	1010	78	26	17.5
North Tyneside	Preston	923	71	23	10
North Tyneside	Riverside	1911	147	49	44.7
North Tyneside	St Mary's	1040	80	26	4.6
North Tyneside	Tynemouth	1256	97	32	12.8
North Tyneside	Valley	2271	175	58	23
North Tyneside	WallSEND	1489	115	38	32.9
North Tyneside	Weetslade	1279	98	32	15.6
North Tyneside	Whitley Bay	1457	112	37	17.8
South Tyneside	Beacon and Bents	1297	100	33	39.3
South Tyneside	Bede	1250	96	32	44.7
South Tyneside	Biddick and All Saints	1645	127	42	45.6
South Tyneside	Boldon Colliery	1335	103	34	25.6
South Tyneside	Cleadon and East Boldon	1022	79	26	5.6
South Tyneside	Cleadon Park	1090	84	28	37.1
South Tyneside	Fellgate and Hedworth	1131	87	29	29.5
South Tyneside	Harton	1139	88	29	26.8



<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
South Tyneside	Hebburn North	1502	116	38	28.3
South Tyneside	Hebburn South	1053	81	27	29.2
South Tyneside	Horsley Hill	1456	112	37	26.7
South Tyneside	Monkton	1111	85	28	30.8
South Tyneside	Primrose	1262	97	32	37.3
South Tyneside	Simonside and Rekendyke	1204	93	31	47.3
South Tyneside	Westoe	863	66	22	20.5
South Tyneside	West Park	794	61	20	24.4
South Tyneside	Whitburn and Marsden	968	74	25	21.6
South Tyneside	Whiteleas	1142	88	29	35.4
Sunderland	Barnes	1542	119	39	17.9
Sunderland	Castle	1856	143	47	34.4
Sunderland	Copt Hill	1640	126	42	29.9
Sunderland	Doxford	1191	92	30	20.3
Sunderland	Fulwell	1261	97	32	9.2
Sunderland	Hendon	1708	131	43	54.6
Sunderland	Hetton	1679	129	43	36.3
Sunderland	Houghton	1698	131	43	26.9
Sunderland	Millfield	1646	127	42	29.7
Sunderland	Pallion	1649	127	42	39.8
Sunderland	Redhill	1845	142	47	46.5
Sunderland	Ryhope	1628	125	41	24.7
Sunderland	St Anne's	1813	139	46	39.4
Sunderland	St Chad's	1187	91	30	27.7
Sunderland	St Michael's	1161	89	29	19.3
Sunderland	St Peter's	1128	87	29	20.1
Sunderland	Sandhill	1637	126	42	38.8
Sunderland	Shiney Row	1985	153	50	26.2

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Sunderland	Silksworth	1457	112	37	29.3
Sunderland	Southwick	1661	128	42	48.4
Sunderland	Washington Central	1485	114	38	21.9
Sunderland	Washington East	1679	129	43	20.3
Sunderland	Washington North	1842	142	47	35.6
Sunderland	Washington South	1444	111	37	19.6
Sunderland	Washington West	1746	134	44	21.3
Redcar and Cleveland	Brotton	1144	88	29	31.1
Redcar and Cleveland	Coatham	813	63	21	46.7
Redcar and Cleveland	Dormanstown	1073	83	27	31.1
Redcar and Cleveland	Eston	1051	81	27	38.2
Redcar and Cleveland	Grangetown	1229	95	31	70.9
Redcar and Cleveland	Guisborough	982	76	25	30.3
Redcar and Cleveland	Hutton	1020	78	26	8.7
Redcar and Cleveland	Kirkleatham	1184	91	30	40.7
Redcar and Cleveland	Lockwood	225	17	6	37.1
Redcar and Cleveland	Loftus	959	74	24	38.8
Redcar and Cleveland	Longbeck	955	73	24	9.2
Redcar and Cleveland	Newcomen	657	51	17	29.9
Redcar and Cleveland	Normanby	955	73	24	21.3
Redcar and Cleveland	Ormesby	781	60	20	23.7
Redcar and Cleveland	St Germain's	695	53	18	16.6
Redcar and Cleveland	Saltburn	718	55	18	22.3
Redcar and Cleveland	Skelton	1183	91	30	25.4
Redcar and Cleveland	South Bank	1184	91	30	48.6
Redcar and Cleveland	Teesville	791	61	20	30.1
Redcar and Cleveland	West Dyke	972	75	25	8.9
Redcar and Cleveland	Westworth	663	51	17	14.6
Redcar and Cleveland	Zetland	676	52	17	19.8

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Stockton-on-Tees	Billingham Central	1337	103	34	31
Stockton-on-Tees	Billingham East	1468	113	37	41.3
Stockton-on-Tees	Billingham North	1183	91	30	10.9
Stockton-on-Tees	Billingham South	1213	93	31	29.9
Stockton-on-Tees	Billingham West	526	40	13	7.3
Stockton-on-Tees	Bishopsgarth and Elm Tree	833	64	21	20.5
Stockton-on-Tees	Eaglescliffe	1577	121	40	8
Stockton-on-Tees	Fairfield	658	51	17	12.2
Stockton-on-Tees	Grangefield	949	73	24	12.7
Stockton-on-Tees	Hardwick and Salters Lane	1551	119	39	49.6
Stockton-on-Tees	Hartburn	799	61	20	7.3
Stockton-on-Tees	Ingleby Barwick East	1928	148	49	7.2
Stockton-on-Tees	Ingleby Barwick West	2470	190	63	7
Stockton-on-Tees	Mandale and Victoria	2144	165	54	35.9
Stockton-on-Tees	Newtown	1503	116	38	53.7
Stockton-on-Tees	Northern Parishes	568	44	14	8.8
Stockton-on-Tees	Norton North	1062	82	27	34.4
Stockton-on-Tees	Norton South	1121	86	28	32.9
Stockton-on-Tees	Norton West	764	59	19	9.3
Stockton-on-Tees	Parkfield and Oxbridge	1579	121	40	42.9
Stockton-on-Tees	Roseworth	1441	111	37	39.9
Stockton-on-Tees	Stainsby Hill	1038	80	26	36.7
Stockton-on-Tees	Stockton Town Centre	1042	80	26	63.3
Stockton-on-Tees	Village	1197	92	30	26
Stockton-on-Tees	Western Parishes	445	34	11	12.9
Stockton-on-Tees	Yarm	1271	98	32	7.8

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Allerdale	All Saints	674	52	17	13.7
Allerdale	Aspatia	499	38	13	24.4
Allerdale	Boltons	168	13	4	15.4
Allerdale	Broughton St Bridget's	608	47	15	11
Allerdale	Christchurch	362	28	9	9.7
Allerdale	Clifton	265	20	7	26.8
Allerdale	Crummock	134	10	3	16.8
Allerdale	Dalton	239	18	6	11.8
Allerdale	Derwent Valley	154	12	4	11.3
Allerdale	Ellen	495	38	13	17.8
Allerdale	Ellenborough	516	40	13	28.8
Allerdale	Ewanrigg	578	44	15	43.2
Allerdale	Flimby	274	21	7	30.3
Allerdale	Harrington	408	31	10	13.1
Allerdale	Holme	215	17	5	22.4
Allerdale	Keswick	561	43	14	10.4
Allerdale	Marsh	194	15	5	21.1
Allerdale	Moorclose	880	68	22	37.9
Allerdale	Moss Bay	961	74	24	53.6
Allerdale	Netherhall	333	26	8	31.2
Allerdale	St John's	627	48	16	19.2
Allerdale	St Michael's	656	50	17	38.9
Allerdale	Seaton	720	55	18	11.5
Allerdale	Silloth	339	26	9	22.8
Allerdale	Solway	196	15	5	20.2
Allerdale	Stainburn	187	14	5	11.5
Allerdale	Wampool	222	17	6	15.4
Allerdale	Warnell	186	14	5	15.3
Allerdale	Waver	225	17	6	19.1

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Allerdale	Wharrels	173	13	4	14.4
Allerdale	Wigton	788	61	20	19.4
Carlisle	Belah	928	71	24	12.3
Carlisle	Belle Vue	1273	98	32	26.8
Carlisle	Botcherby	1154	89	29	37
Carlisle	Brampton	657	51	17	19
Carlisle	Burgh	257	20	7	12.2
Carlisle	Castle	655	50	17	33.8
Carlisle	Currock	1083	83	27	30.8
Carlisle	Dalston	820	63	21	13.8
Carlisle	Denton Holme	935	72	24	25.5
Carlisle	Great Corby and Geltsdale	261	20	7	13.7
Carlisle	Harraby	1162	89	29	22.9
Carlisle	Hayton	238	18	6	10
Carlisle	Irthing	225	17	6	18
Carlisle	Longtown & Rockcliffe	514	40	13	28.1
Carlisle	Lyne	212	16	5	25.7
Carlisle	Morton	722	56	18	33.1
Carlisle	St Aidans	752	58	19	24.1
Carlisle	Stanwix Rural	703	54	18	11.7
Carlisle	Stanwix Urban	763	59	19	6.1
Carlisle	Upperby	999	77	25	44
Carlisle	Wetheral	628	48	16	5.7
Carlisle	Yewdale	736	57	19	14.3
Copeland	Arlecdon	164	13	4	16
Copeland	Beckermet	377	29	10	18.8
Copeland	Bootle	158	12	4	20.2
Copeland	Bransty	720	55	18	12.4

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Copeland	Cleator Moor North	540	42	14	32
Copeland	Cleator Moor South	367	28	9	37.6
Copeland	Distington	584	45	15	31.4
Copeland	Egremont North	728	56	18	26.6
Copeland	Egremont South	431	33	11	20.4
Copeland	Ennerdale	86	7	2	22.6
Copeland	Frizington	379	29	10	34.6
Copeland	Gosforth	139	11	4	11.6
Copeland	Harbour	354	27	9	34.8
Copeland	Haverigg	150	12	4	22.1
Copeland	Hensingham	584	45	15	30.3
Copeland	Hillcrest	385	30	10	5.9
Copeland	Holborn Hill	396	30	10	27.8
Copeland	Kells	401	31	10	23.9
Copeland	Millom Without	129	10	3	26.2
Copeland	Mirehouse	845	65	21	39.2
Copeland	Moresby	141	11	4	15.9
Copeland	Newtown	454	35	12	29.4
Copeland	St Bees	241	19	6	6.5
Copeland	Sandwith	493	38	13	54.8
Copeland	Seascale	314	24	8	11.5
Eden	Alston Moor	241	19	6	18.2
Eden	Appleby (Appleby)	135	10	3	15.8
Eden	Appleby (Bongate)	212	16	5	8.6
Eden	Askham	189	15	5	15.8
Eden	Brough	153	12	4	21.2
Eden	Crosby Ravensworth	162	12	4	18.3
Eden	Dacre	149	11	4	11.7
Eden	Eamont	157	12	4	9.6

Local Authority	Ward Name	0-12 Child population in each ward	Mean no per children per year 0-12 population/13	Orthodontic cases per year at 33% need and demand	Index of Multiple Deprivation (IMD) Score 2015
Eden	Greystoke	133	10	3	19
Eden	Hartside	166	13	4	19.3
Eden	Hesket	366	28	9	14.8
Eden	Kirkby Stephen	343	26	9	17.8
Eden	Kirkby Thore	222	17	6	16
Eden	Kirkoswald	169	13	4	15.7
Eden	Langwathby	193	15	5	15.2
Eden	Lazonby	174	13	4	10.5
Eden	Long Marton	134	10	3	15.9
Eden	Morland	177	14	4	16
Eden	Orton with Tebay	170	13	4	20
Eden	Penrith Carleton	171	13	4	7.7
Eden	Penrith East	404	31	10	14.1
Eden	Penrith North	507	39	13	11.7
Eden	Penrith Pategill	179	14	5	24.2
Eden	Penrith South	355	27	9	16
Eden	Penrith West	464	36	12	14.6
Eden	Ravenstonedale	109	8	3	0
Eden	Shap	176	14	4	11
Eden	Skelton	143	11	4	16.7
Eden	Ullswater	152	12	4	16
Eden	Warcop	168	13	4	21.5
Hartlepool	Burn Valley	1264	97	32	38.1
Hartlepool	De Bruce	1412	109	36	42.2
Hartlepool	Fens and Rossmere	1001	77	25	18.2
Hartlepool	Foggy Furze	1269	98	32	31.8
Hartlepool	Hart	1554	120	39	10.5
Hartlepool	Headland and Harbour	1014	78	26	49.5
Hartlepool	Jesmond	1417	109	36	45.7

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Hartlepool	Manor House	2014	155	51	49
Hartlepool	Rural West	792	61	20	11
Hartlepool	Seaton	1319	101	33	21.8
Hartlepool	Victoria	1352	104	34	39.5
County Durham	Annfield Plain	1281	99	33	35.3
County Durham	Aycliffe East	1219	94	31	24.8
County Durham	Aycliffe North and Middridge	1541	119	39	20.8
County Durham	Aycliffe West	1365	105	35	36
County Durham	Barnard Castle East	997	77	25	16
County Durham	Barnard Castle West	847	65	22	13.8
County Durham	Belmont	1771	136	45	20.2
County Durham	Benfieldside	1165	90	30	17.9
County Durham	Bishop Auckland Town	989	76	25	23.7
County Durham	Bishop Middleham and Cornforth	501	39	13	30.2
County Durham	Blackhalls	1012	78	26	34.6
County Durham	Brandon	1425	110	36	22.7
County Durham	Burnopfield and Dipton	1154	89	29	15.3
County Durham	Chester-le-Street East	435	33	11	10.3
County Durham	Chester-le-Street North	587	45	15	19.3
County Durham	Chester-le-Street South	1007	77	26	13.1
County Durham	Chester-le-Street West Central	1135	87	29	35.1
County Durham	Chilton	612	47	16	30.1
County Durham	Consett North	1049	81	27	19.6
County Durham	Consett South	862	66	22	30.1
County Durham	Coundon	670	52	17	45.1
County Durham	Coxhoe	1807	139	46	21.9



Local Authority	Ward Name	0-12 Child population in each ward	Mean no per children per year 0-12 population/13	Orthodontic cases per year at 33% need and demand	Index of Multiple Deprivation (IMD) Score 2015
County Durham	Craghead and South Moor	1361	105	35	35.3
County Durham	Crook	1808	139	46	29.7
County Durham	Dawdon	1416	109	36	31.9
County Durham	Deerness	1897	146	48	26.7
County Durham	Delves Lane	1434	110	36	21.7
County Durham	Deneside	999	77	25	39.7
County Durham	Durham South	269	21	7	9.1
County Durham	Easington	1094	84	28	33.7
County Durham	Elvet and Gilesgate	230	18	6	13.1
County Durham	Esh and Witton Gilbert	1077	83	27	18.3
County Durham	Evenwood	1011	78	26	22.9
County Durham	Ferryhill	1526	117	39	32.4
County Durham	Framwellgate and Newton Hall	1734	133	44	10.4
County Durham	Horden	1041	80	26	49.5
County Durham	Lanchester	981	75	25	14.3
County Durham	Leadgate and Medomsley	1176	90	30	21.6
County Durham	Lumley	1014	78	26	18.7
County Durham	Murton	1262	97	32	28.4
County Durham	Neville's Cross	1159	89	29	5.8
County Durham	North Lodge	363	28	9	8.1
County Durham	Passfield	530	41	13	24.7
County Durham	Pelton	1761	135	45	21.1
County Durham	Peterlee East	1160	89	29	53.2
County Durham	Peterlee West	1400	108	36	33.7
County Durham	Sacriston	1058	81	27	24.4
County Durham	Seaham	1019	78	26	13.5

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
County Durham	Sedgefield	1141	88	29	12.9
County Durham	Sherburn	1206	93	31	21.1
County Durham	Sildon and Dene Valley	1992	153	51	42.9
County Durham	Shotton and South Hetton	1455	112	37	35.7
County Durham	Spennymoor	1618	124	41	24.1
County Durham	Stanley	1430	110	36	36.6
County Durham	Tanfield	1235	95	31	24
County Durham	Tow Law	775	60	20	32.4
County Durham	Trimdon and Thornley	2034	156	52	34.5
County Durham	Tudhoe	1249	96	32	29.7
County Durham	Weardale	851	65	22	17
County Durham	West Auckland	1332	102	34	26.7
County Durham	Willington and Hunwick	1424	110	36	30
County Durham	Wingate	703	54	18	27.8
County Durham	Woodhouse Close	1473	113	37	44.2
Northumberland	Alnwick	1125	87	29	15.9
Northumberland	Amble	682	52	17	28
Northumberland	Amble West with Warkworth	352	27	9	10.9
Northumberland	Ashington Central	834	64	21	43.6
Northumberland	Bamburgh	414	32	11	19.7
Northumberland	Bedlington Central	590	45	15	15.8
Northumberland	Bedlington East	756	58	19	32.5
Northumberland	Bedlington West	652	50	17	13.2
Northumberland	Bellingham	470	36	12	17.6
Northumberland	Berwick East	739	57	19	22
Northumberland	Berwick North	548	42	14	17

Local Authority	Ward Name	0-12 Child population in each ward	Mean no per children per year 0-12 population/13	Orthodontic cases per year at 33% need and demand	Index of Multiple Deprivation (IMD) Score 2015
Northumberland	Berwick West with Ord	607	47	15	17.8
Northumberland	Bothal	534	41	14	18.5
Northumberland	Bywell	594	46	15	9.3
Northumberland	Choppington	837	64	21	32.2
Northumberland	College	723	56	18	35.6
Northumberland	Corbridge	452	35	11	8
Northumberland	Cowpen	815	63	21	38.5
Northumberland	Cramlington East	662	51	17	30.1
Northumberland	Cramlington Eastfield	881	68	22	19.7
Northumberland	Cramlington North	771	59	20	3.5
Northumberland	Cramlington South East	410	32	10	15.2
Northumberland	Cramlington Village	557	43	14	17.9
Northumberland	Cramlington West	879	68	22	28.4
Northumberland	Croft	666	51	17	50.8
Northumberland	Druridge Bay	748	58	19	25.1
Northumberland	Haltwhistle	605	47	15	20.1
Northumberland	Hartley	618	48	16	12.4
Northumberland	Haydon	529	41	13	16.3
Northumberland	Haydon and Hadrian	505	39	13	15.9
Northumberland	Hexham Central with Acomb	574	44	15	14
Northumberland	Hexham East	514	40	13	19.6
Northumberland	Hexham West	510	39	13	5.1
Northumberland	Hirst	938	72	24	49.4
Northumberland	Holywell	523	40	13	17.5
Northumberland	Humshaugh	514	40	13	15.8
Northumberland	Isabella	857	66	22	38.5
Northumberland	Kitty Brewster	1058	81	27	31.3
Northumberland	Longhorsley	440	34	11	14.6

Local Authority	Ward Name	0-12 Child population in each ward	Mean no per children per year 0-12 population/13	Orthodontic cases per year at 33% need and demand	Index of Multiple Deprivation (IMD) Score 2015
Northumberland	Longhoughton	484	37	12	11.8
Northumberland	Lynemouth	545	42	14	27.2
Northumberland	Morpeth Kirkhill	662	51	17	10.8
Northumberland	Morpeth North	479	37	12	11
Northumberland	Morpeth Stobhill	636	49	16	18.7
Northumberland	Newbiggin Central and East	668	51	17	38.9
Northumberland	Newsham	824	63	21	36
Northumberland	Norham and Islandshires	424	33	11	23.5
Northumberland	Pegswood	747	57	19	19.3
Northumberland	Plessey	534	41	14	28
Northumberland	Ponteland East and Stannington	494	38	13	8.2
Northumberland	Ponteland North	630	48	16	9.2
Northumberland	Ponteland South with Heddon	442	34	11	5.8
Northumberland	Ponteland West	556	43	14	9.3
Northumberland	Prudhoe North	751	58	19	9.6
Northumberland	Prudhoe South	901	69	23	18.2
Northumberland	Rothbury	554	43	14	14.7
Northumberland	Seaton with Newbiggin West	830	64	21	29.8
Northumberland	Seghill with Seaton Delaval	755	58	19	20.6
Northumberland	Shilbottle	588	45	15	14.2
Northumberland	Sleekburn	651	50	17	34.3
Northumberland	South Blyth	700	54	18	8
Northumberland	South Tynedale	585	45	15	17.5

<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Northumberland	Stakeford	484	37	12	12.4
Northumberland	Stocksfield and Broomhaugh	606	47	15	5.7
Northumberland	Wensleydale	575	44	15	20.3
Northumberland	Wooler	439	34	11	17.1
Gateshead	Chopwell and Rowlands Gill	1319	101	33	24.8
Middlesbrough	Acklam	820	63	21	10.9
Middlesbrough	Ayresome	1212	93	31	33.7
Middlesbrough	Berwick Hills & Pallister	2078	160	53	62.3
Middlesbrough	Brambles & Thorntree	2065	159	52	68.7
Middlesbrough	Central	1954	150	50	58.7
Middlesbrough	Coulby Newham	1325	102	34	27.5
Middlesbrough	Hemlington	1303	100	33	49.4
Middlesbrough	Kader	531	41	13	12.6
Middlesbrough	Ladgate	974	75	25	31.1
Middlesbrough	Linthorpe	1112	86	28	20.5
Middlesbrough	Longlands & Beechwood	2037	157	52	57.2
Middlesbrough	Marton East	731	56	19	10.4
Middlesbrough	Marton West	654	50	17	8.3
Middlesbrough	Newport	2084	160	53	59.9
Middlesbrough	North Ormesby	467	36	12	77.7
Middlesbrough	Nunthorpe	594	46	15	6.1
Middlesbrough	Park	1747	134	44	30.7
Middlesbrough	Park End & Beckfield	1384	106	35	53.1
Middlesbrough	Stainton & Thornton	279	21	7	25.6
Middlesbrough	Trimdon	567	44	14	12.4

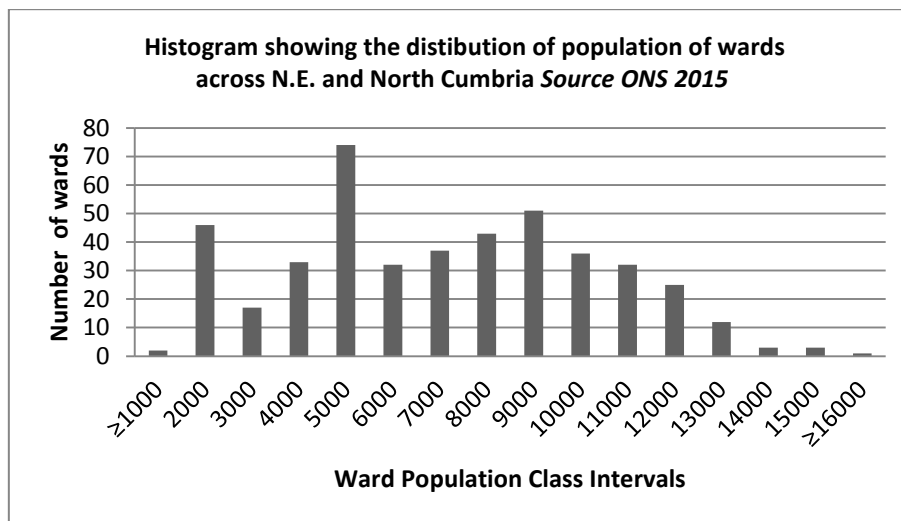
<b>Local Authority</b>	<b>Ward Name</b>	<b>0-12 Child population in each ward</b>	<b>Mean no per children per year 0-12 population/13</b>	<b>Orthodontic cases per year at 33% need and demand</b>	<b>Index of Multiple Deprivation (IMD) Score 2015</b>
Darlington	Bank Top & Lascelles	1216	94	31	38.1
Darlington	Brinkburn & Faverdale	1136	87	29	12
Darlington	Cockerton	1078	83	27	33
Darlington	College	598	46	15	6.8
Darlington	Eastbourne	1326	102	34	28.6
Darlington	Harrowgate Hill	1093	84	28	12.6
Darlington	Haughton & Springfield	825	63	21	26.3
Darlington	Heighington & Coniscliffe	677	52	17	10.6
Darlington	Hummersknott	373	29	9	5.2
Darlington	Hurworth	389	30	10	12.1
Darlington	Mowden	468	36	12	4.7
Darlington	North Road	997	77	25	37
Darlington	Northgate	837	64	21	39.4
Darlington	Park East	1409	108	36	47.6
Darlington	Park West	555	43	14	13.4
Darlington	Pierremont	949	73	24	21.8
Darlington	Red Hall & Lingfield	670	52	17	37.1
Darlington	Sadberge & Middleton				
Darlington	St George	873	67	22	11.5
Darlington	Stephenson	617	47	16	32.5
Darlington	Whinfield	491	38	12	17.5

### Appendix 3

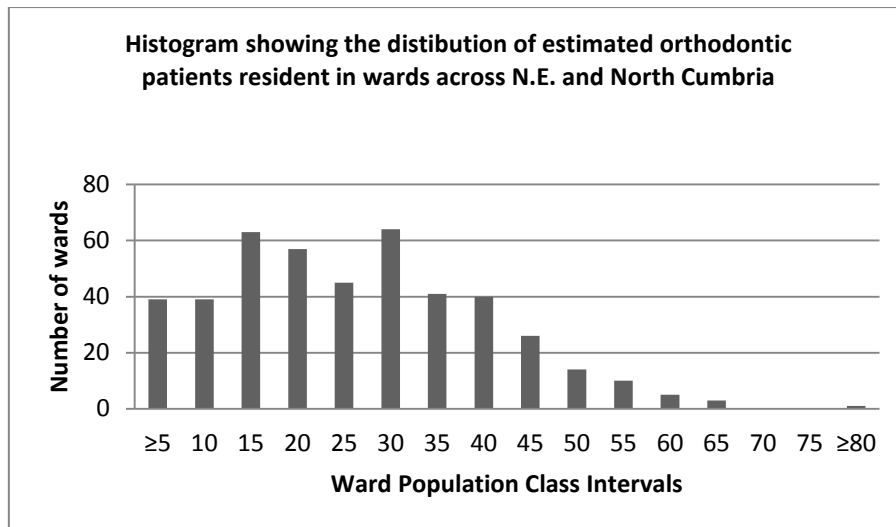
#### Heat maps of orthodontic need and demand in the North East & North Cumbria and location of all orthodontic providers 2018.

To generate the heat maps the data from the table in appendix two was utilised. The orthodontic need and demand estimated for each ward was ranked from highest to lowest and then divided into deciles. The deciles were not even due to the fact that multiple wards had exactly the same estimated numbers of children who would need and demand orthodontic treatment across the North East and North Cumbria. The deciles are used in the following maps to help understand where geographically current need and demand is for orthodontic care by ward and additionally identify the location of GDS orthodontic providers.

In interpreting this data in the maps it should be noted that geographic size does not relate to population density and the size of the population of each ward can vary significantly across the North East and North Cumbria from under a 1000 in a ward to over 15,000. To demonstrate this, a histogram has been produced which shows the distribution of the size of ward populations across the North East and North Cumbria, this is shown below.



The heat maps show an estimate of the children in each ward modelled using population data to provide an indication of numbers demanding/need care. These numbers could be influenced by emigration and migration to wards and other factors so should be seen as a general indication of potential patients and not actual definitive patient numbers, to help understand the distribution of children by wards across NE and North Cumbria who would need/demand care, the following histogram was produced.



The distribution of the deciles used in the maps is shown in the table below to demonstrate the range of numbers of children modelled for each ward decile.

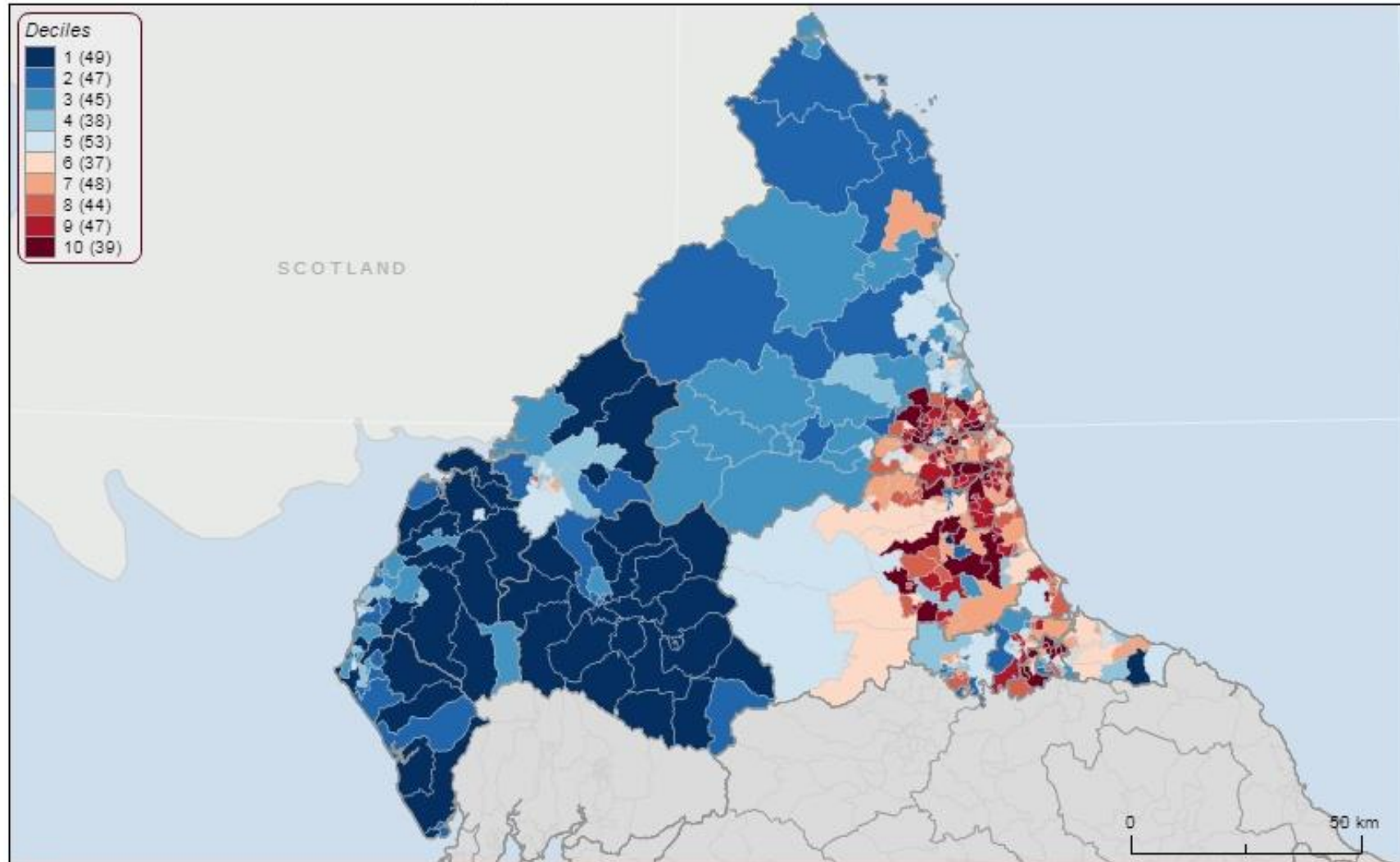
**Table showing range number of children in wards described in deciles across the North East and North Cumbria**

Decile	Minimum	Maximum
1	2	6
2	7	12
3	13	15
4	16	18
5	19	24
6	25	27
7	28	31
8	32	36
9	37	43
10	44	78



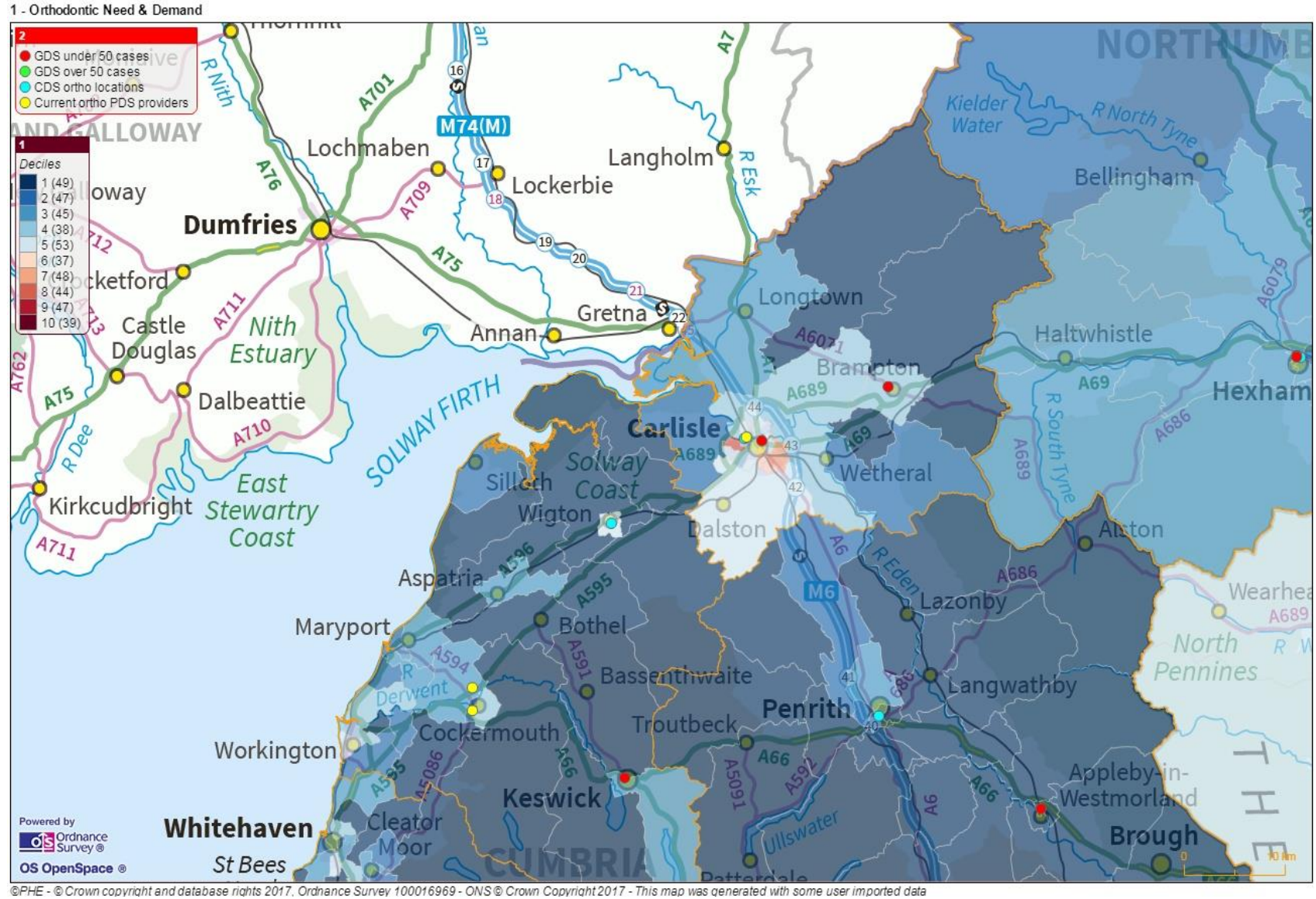
Map 1 North East and North Cumbria  
(Decile 1 = lowest numbers children)

Orthodontic Need & Demand - source: ONS population data



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Map 2 North Cumbria (North) and environs plus orthodontic providers

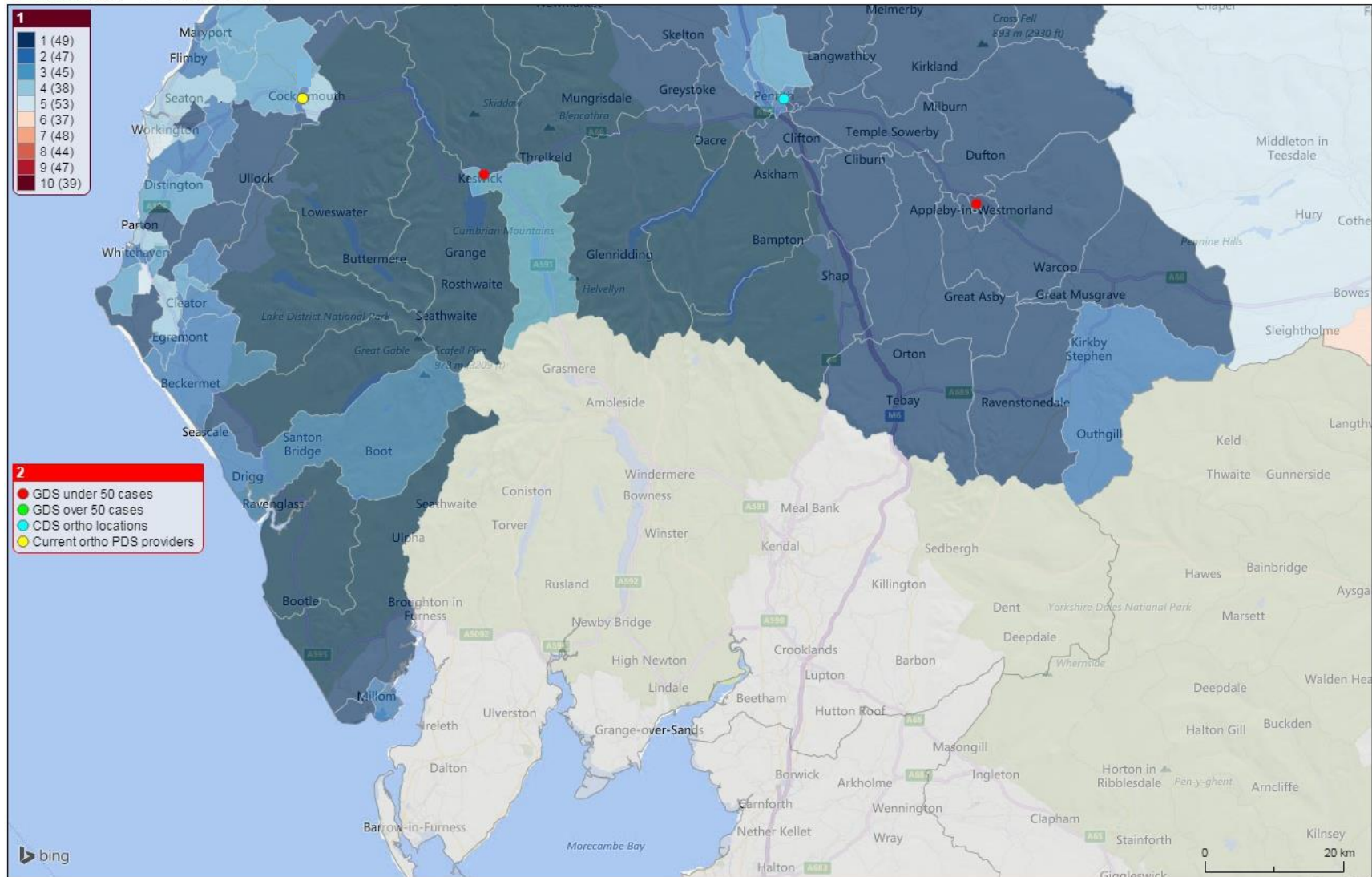




Map 3 North Cumbria (South) and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data

2 - Ortho providers - source: NHS England



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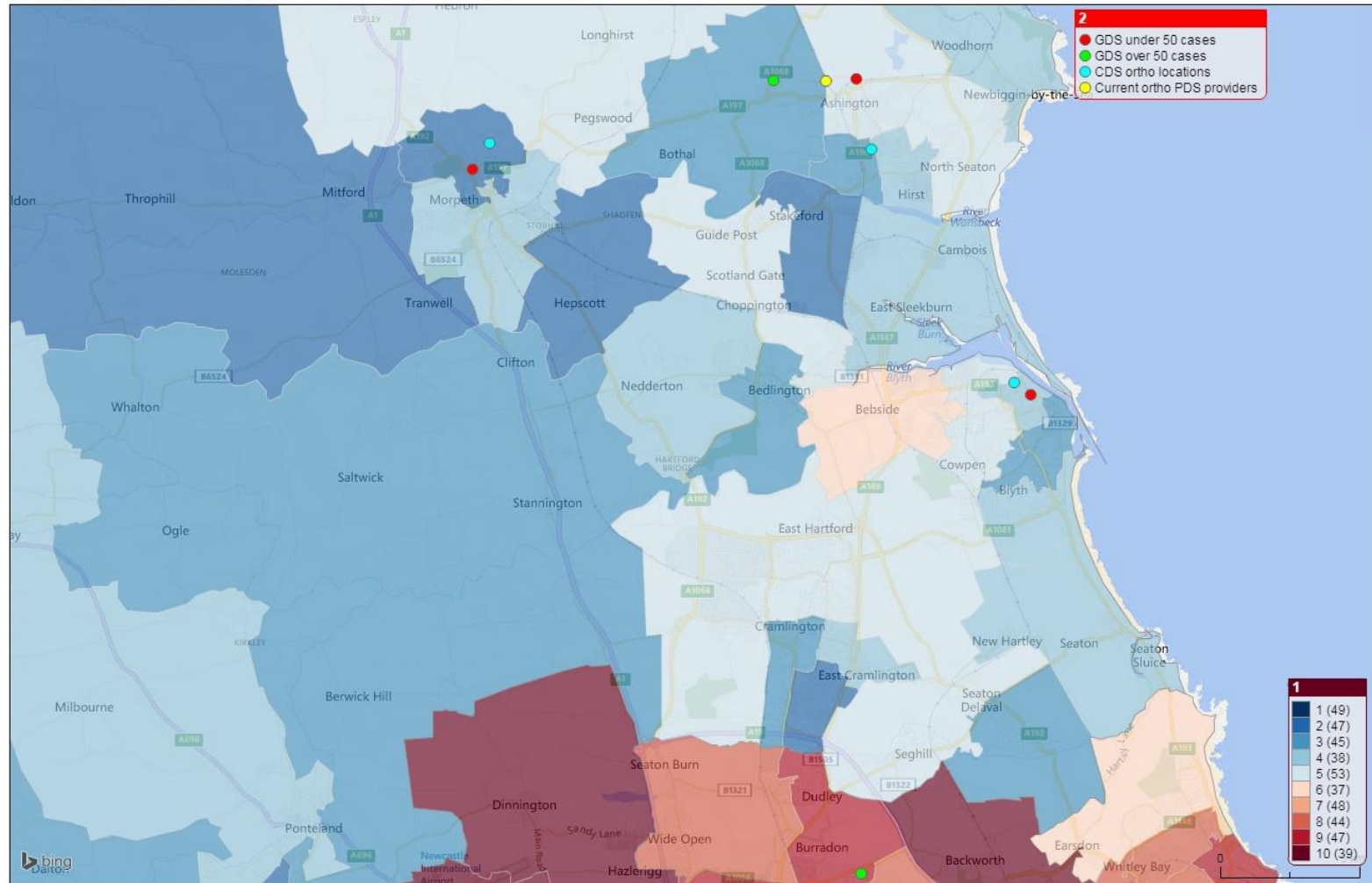
Map 4 Northumberland (North) and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data  
 2 - Ortho providers - source: NHS England



## Map 5 Northumberland (South East) and environs plus orthodontic providers

- 1 - Orthodontic Need & Demand - source: ONS population data
- 2 - Ortho providers - source: NHS England

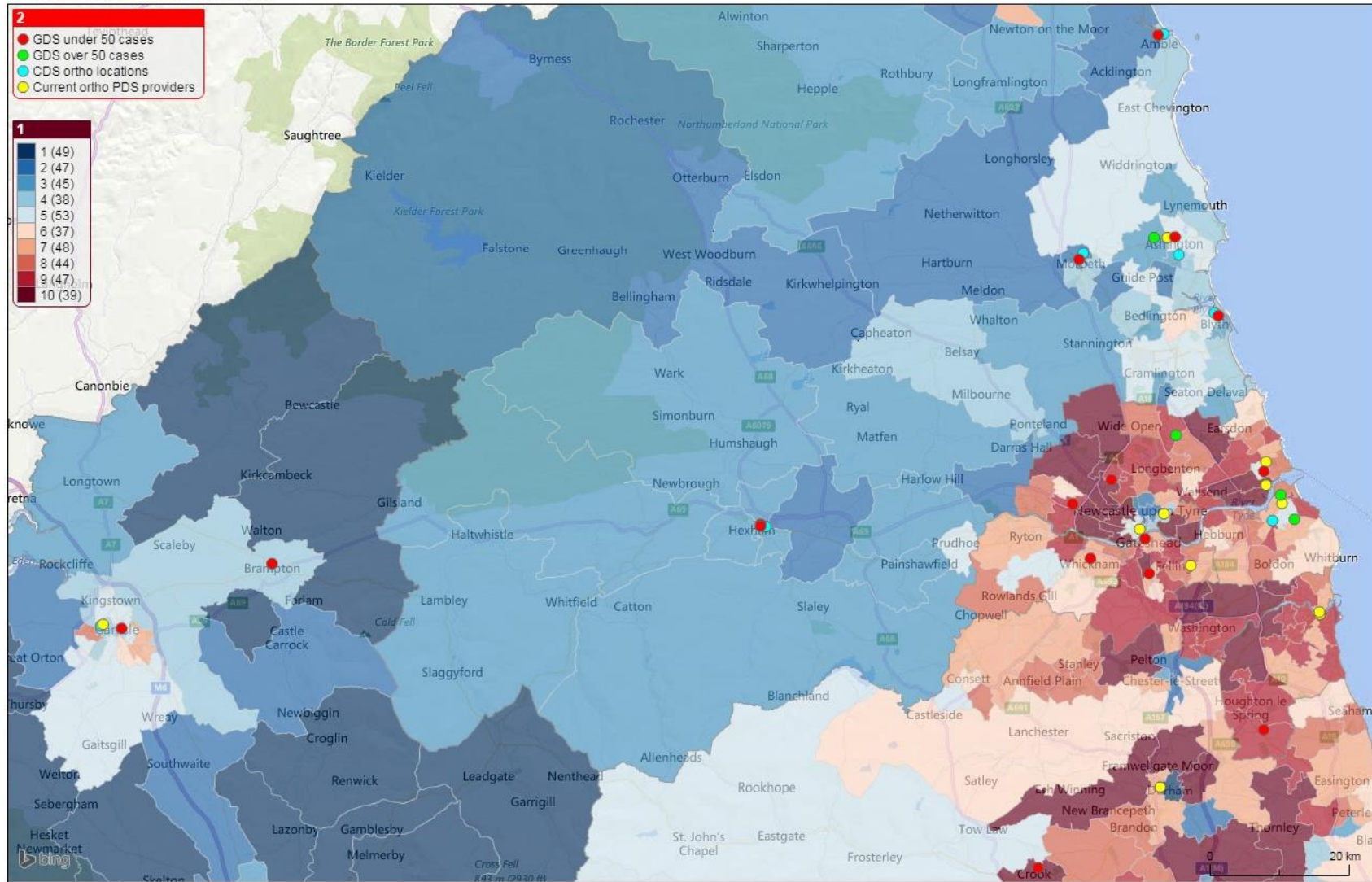




Map 6 Northumberland (South West) and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data

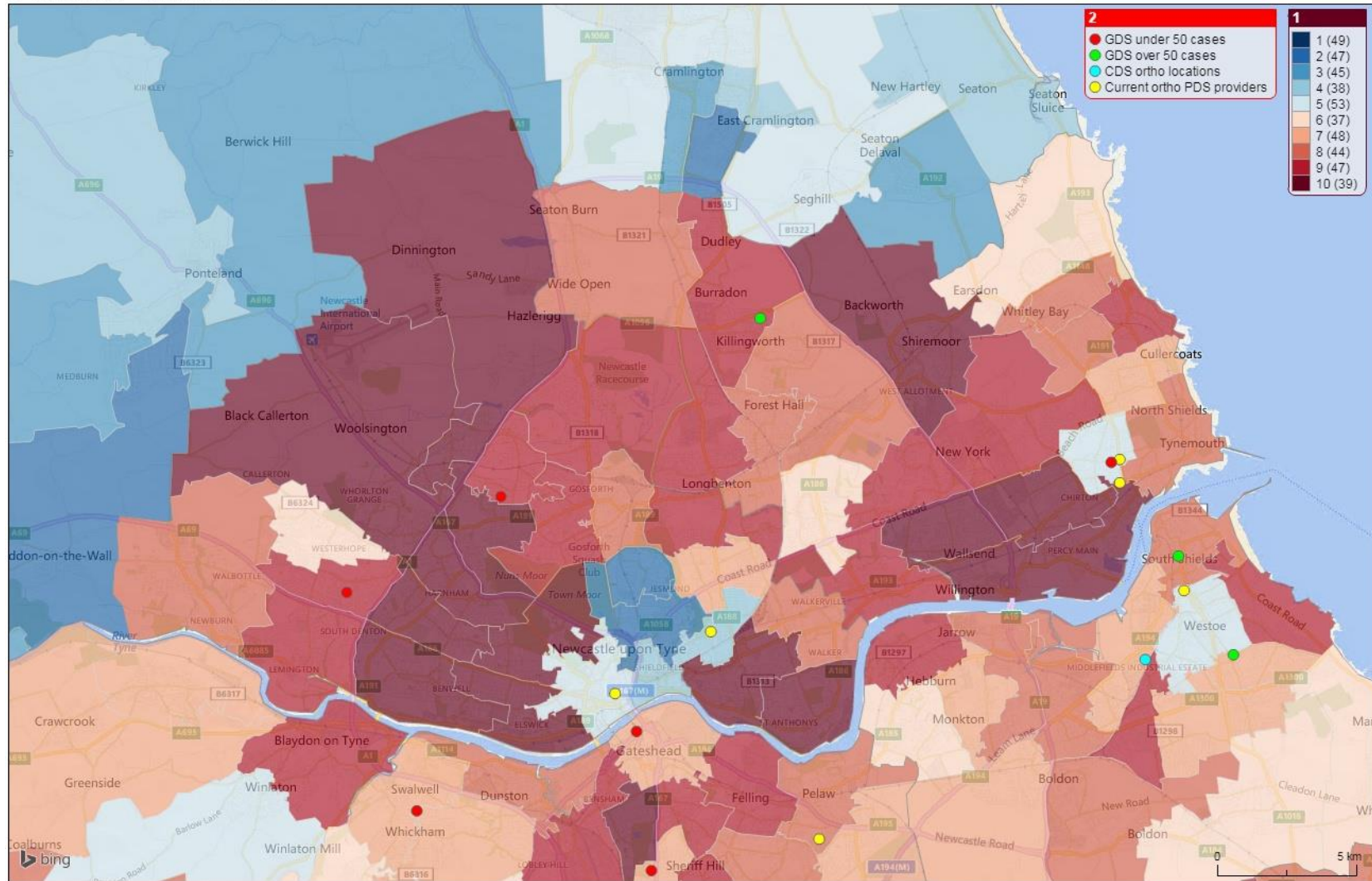
2 - Ortho providers - source: NHS England



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# Map 7 North of Tyne and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data  
2 - Ortho providers - source: NHS England

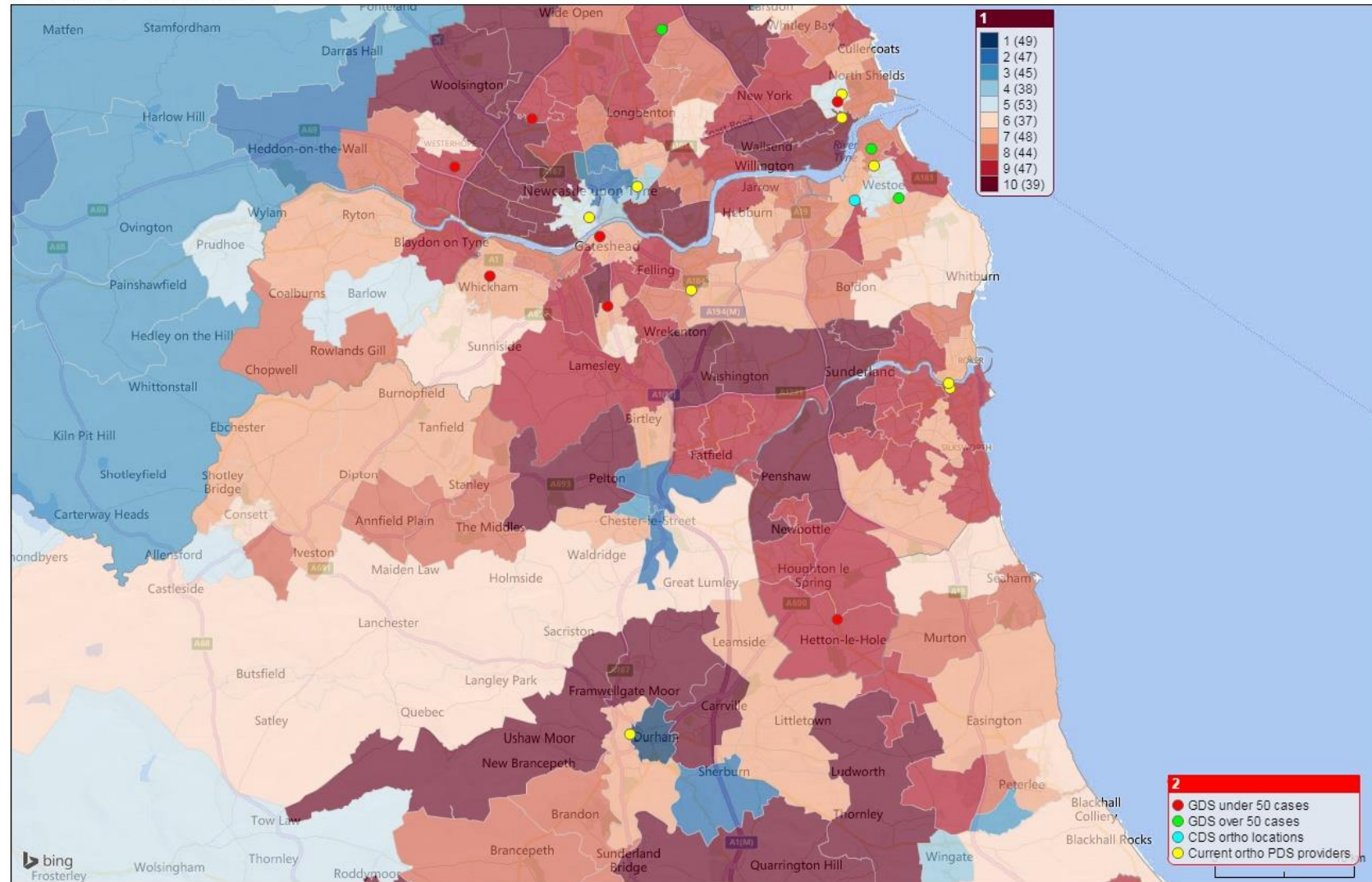




# Map 8 South of Tyne and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data

2 - Ortho providers - source: NHS England



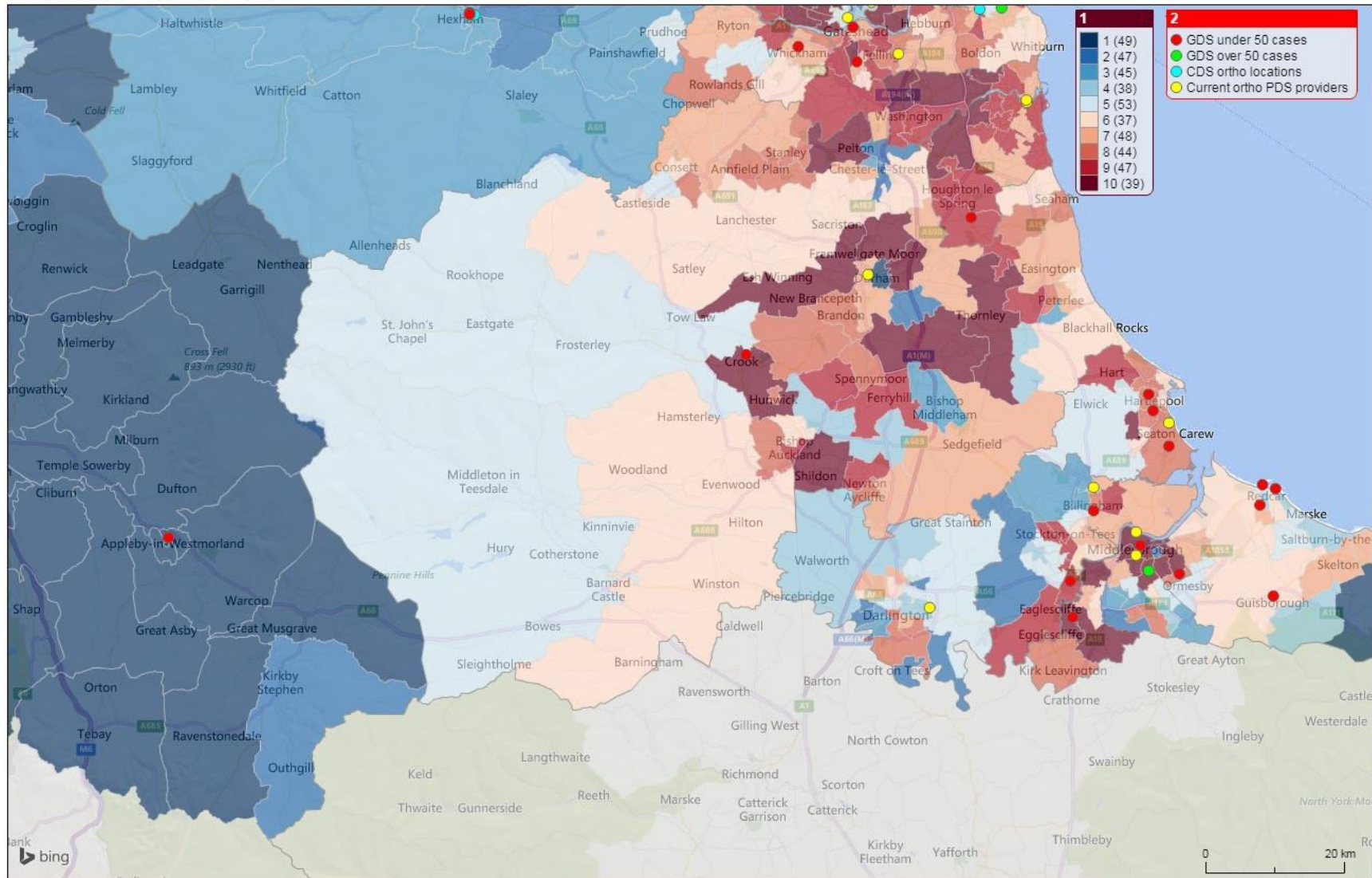
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# Map 9 County Durham and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data

2 - Ortho providers - source: NHS England

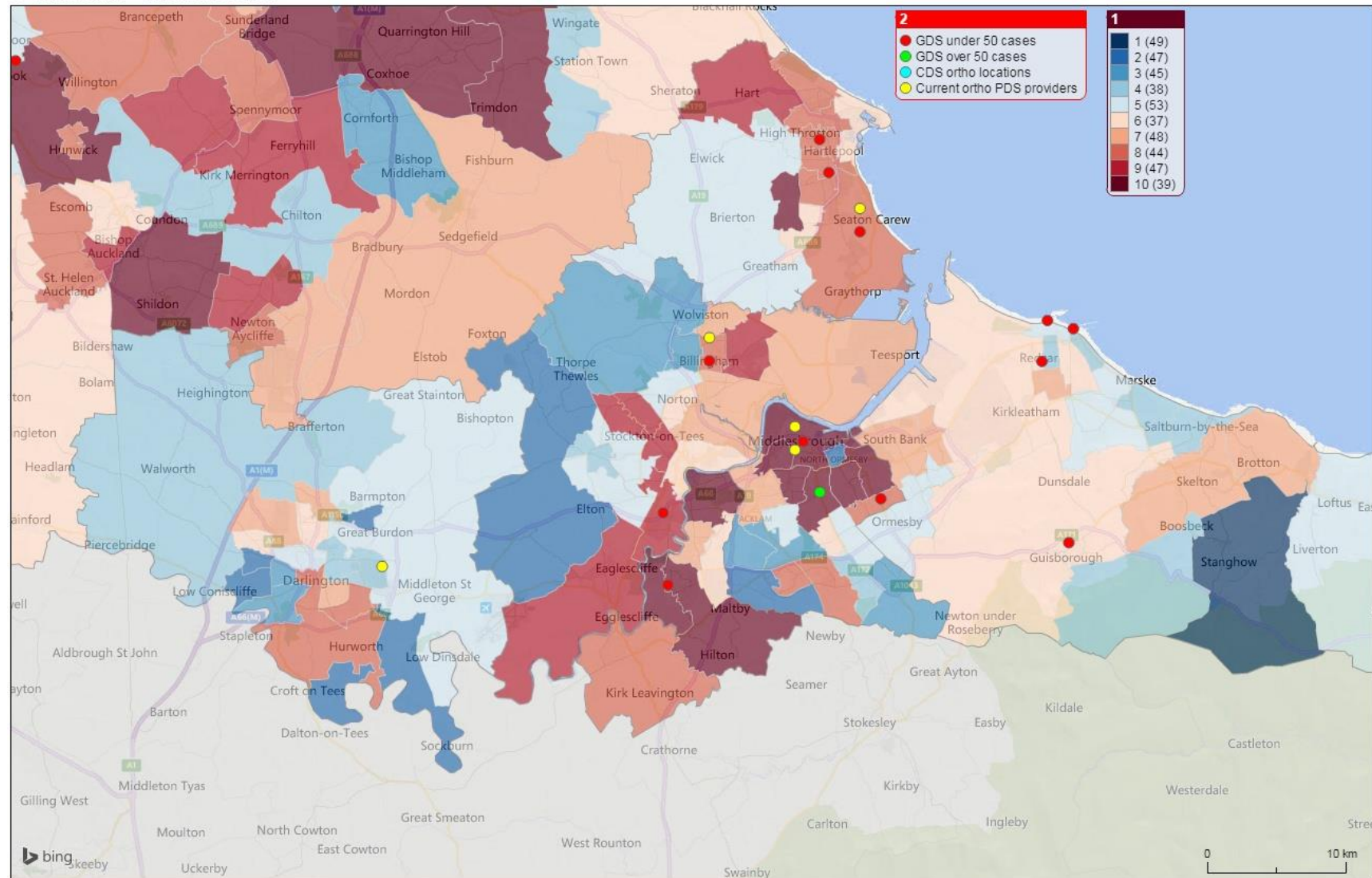


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# Map 10 Tees Valle and environs plus orthodontic providers

1 - Orthodontic Need & Demand - source: ONS population data

2 - Ortho providers - source: NHS England



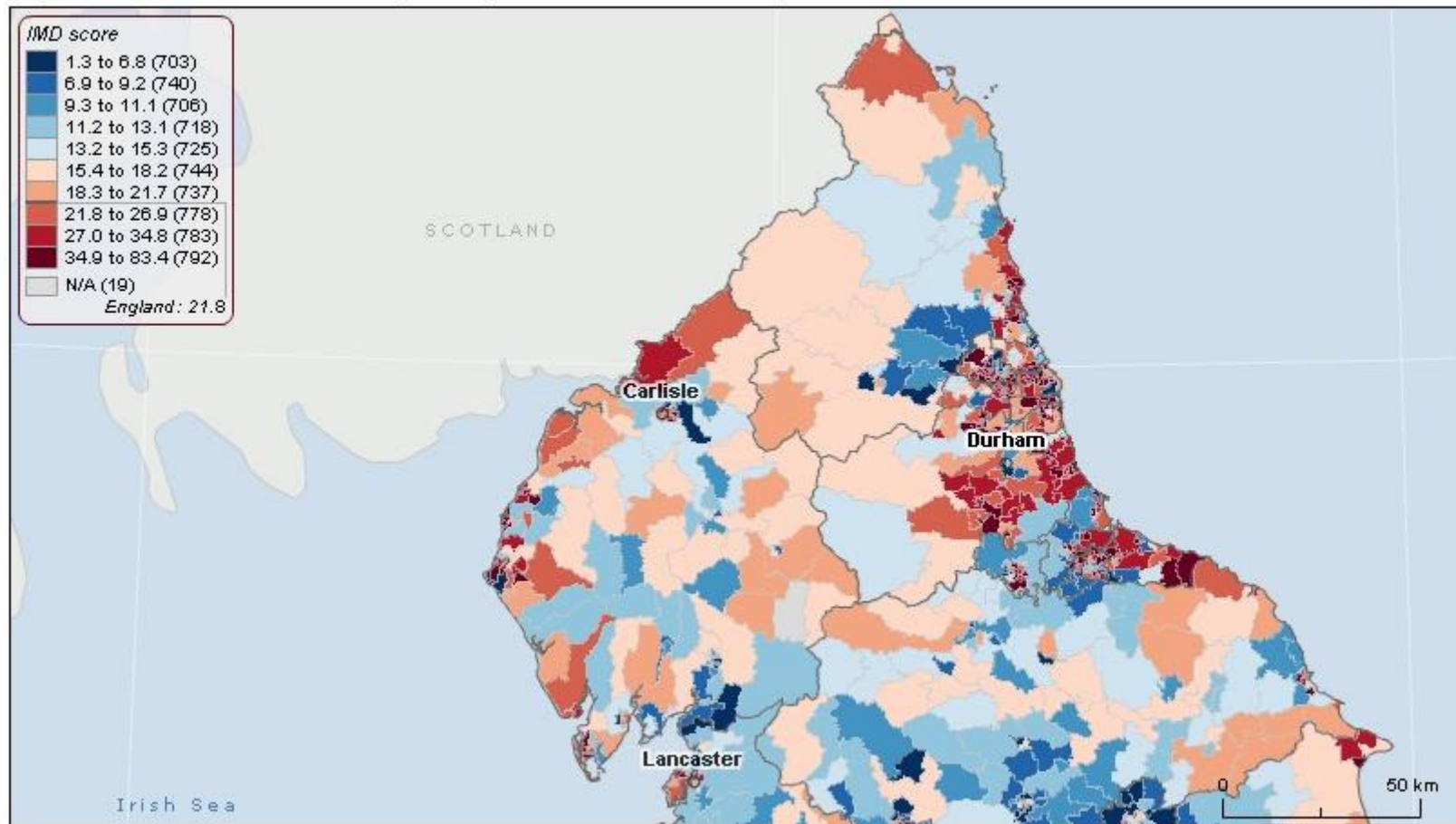
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Appendix 4 Maps showing Deprivation across area using *Index of Multiple Deprivation 2015*<sup>10</sup> (Low is advantaged High is deprived)

Map 11 North East and Cumbria and environs

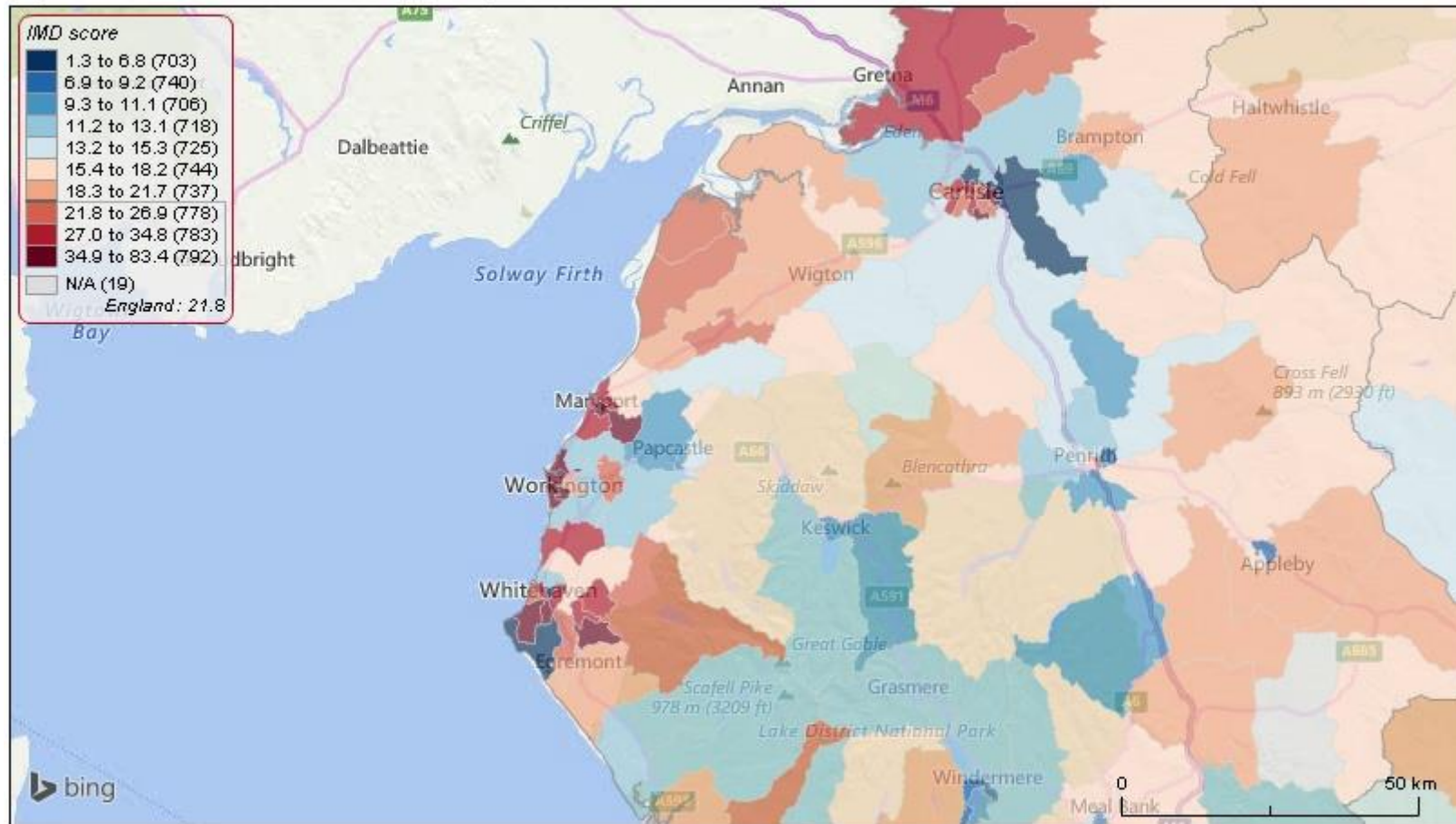
**Deprivation Score - Index of Multiple Deprivation 2015** - source: Department for Communities and Local Government



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Map 12 North Cumbria (North) and environs

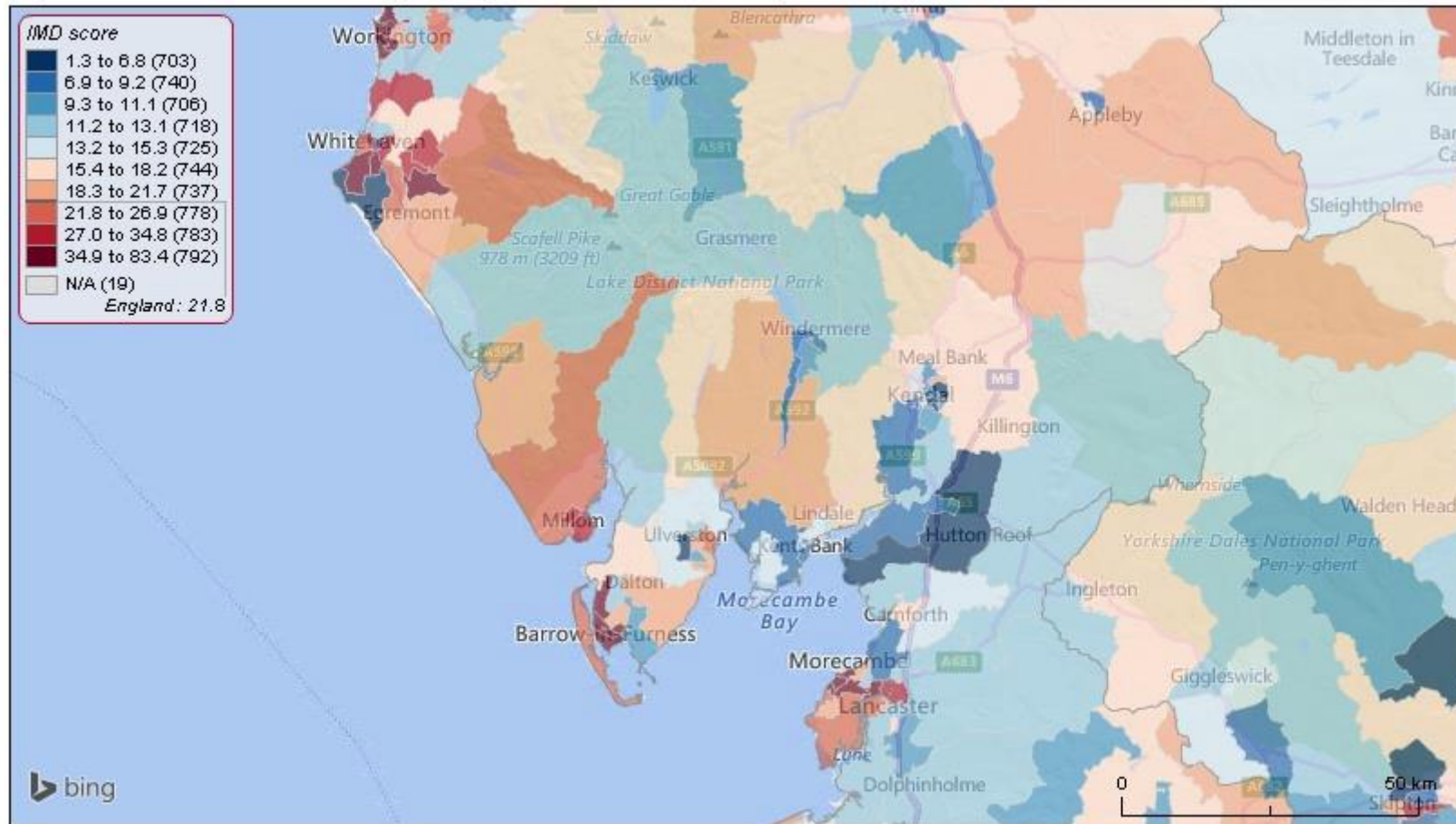
**Deprivation Score - Index of Multiple Deprivation 2015** - source: Department for Communities and Local Government



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Map 13 North Cumbria (South) and environs

Deprivation Score - Index of Multiple Deprivation 2015 - source: Department for Communities and Local Government



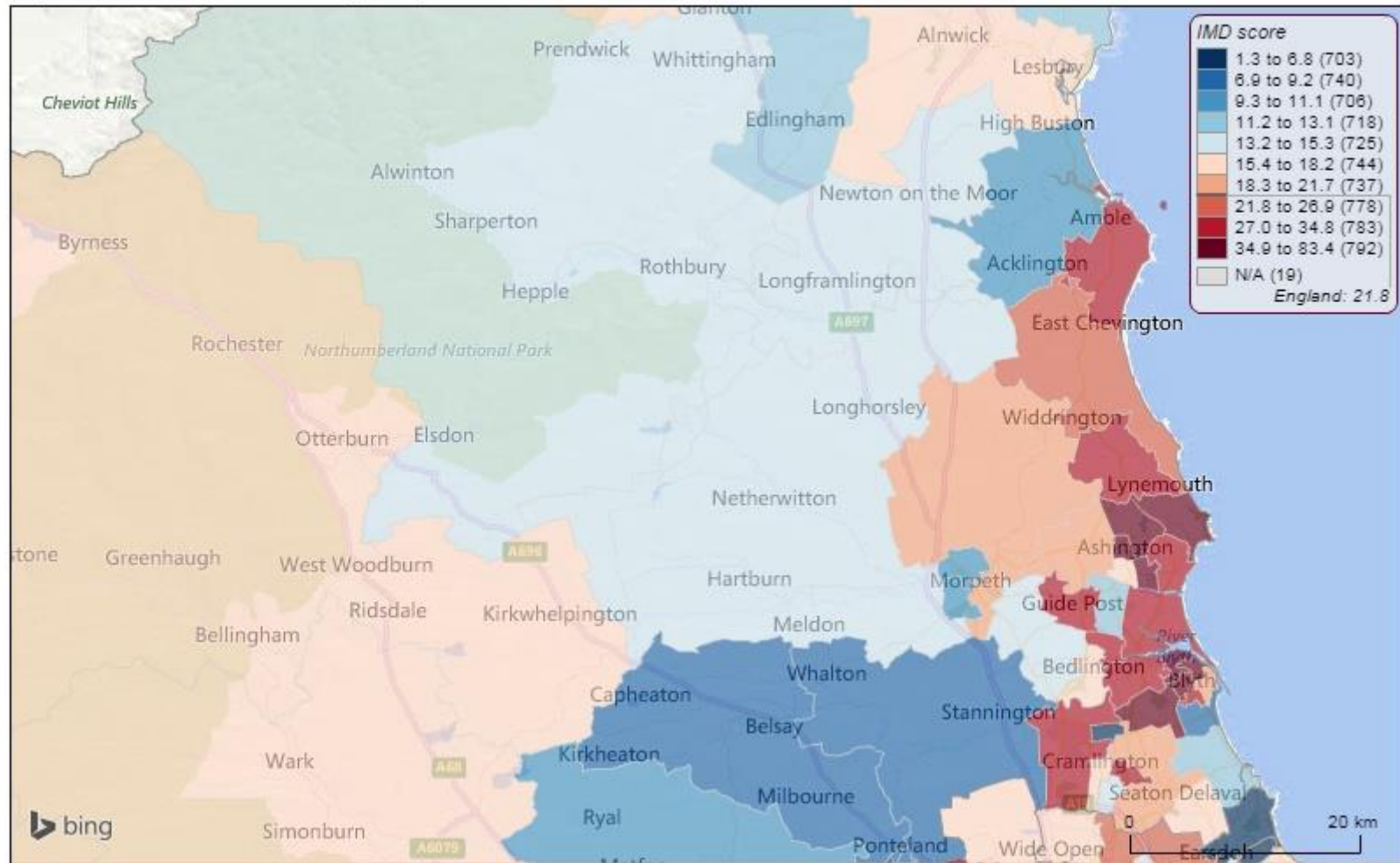
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Map 15 Northumberland (South East) and environs

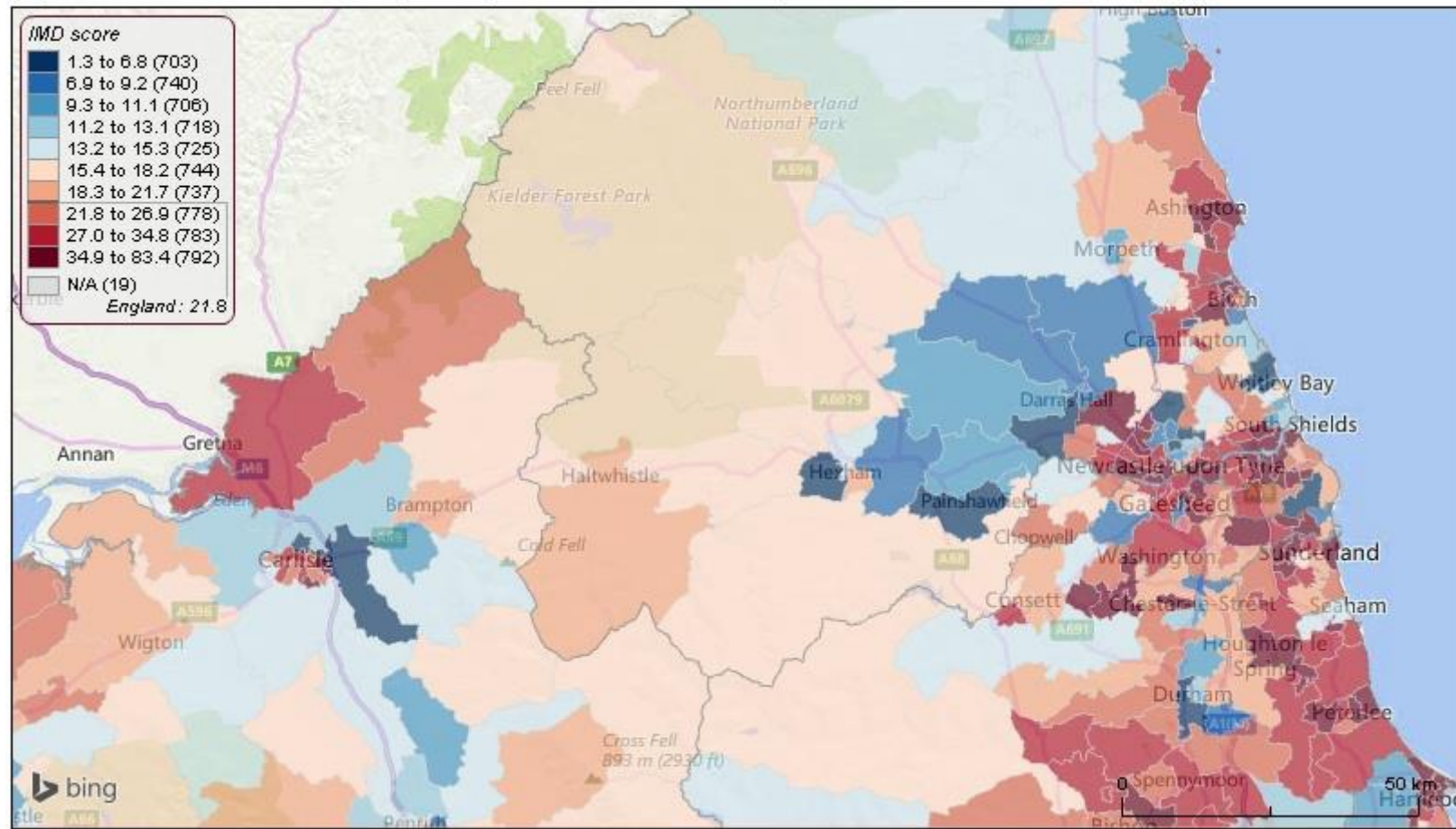
Deprivation Score - Index of Multiple Deprivation 2015 - source: Department for Communities and Local Government



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Map 16 Northumberland (South West) and environs

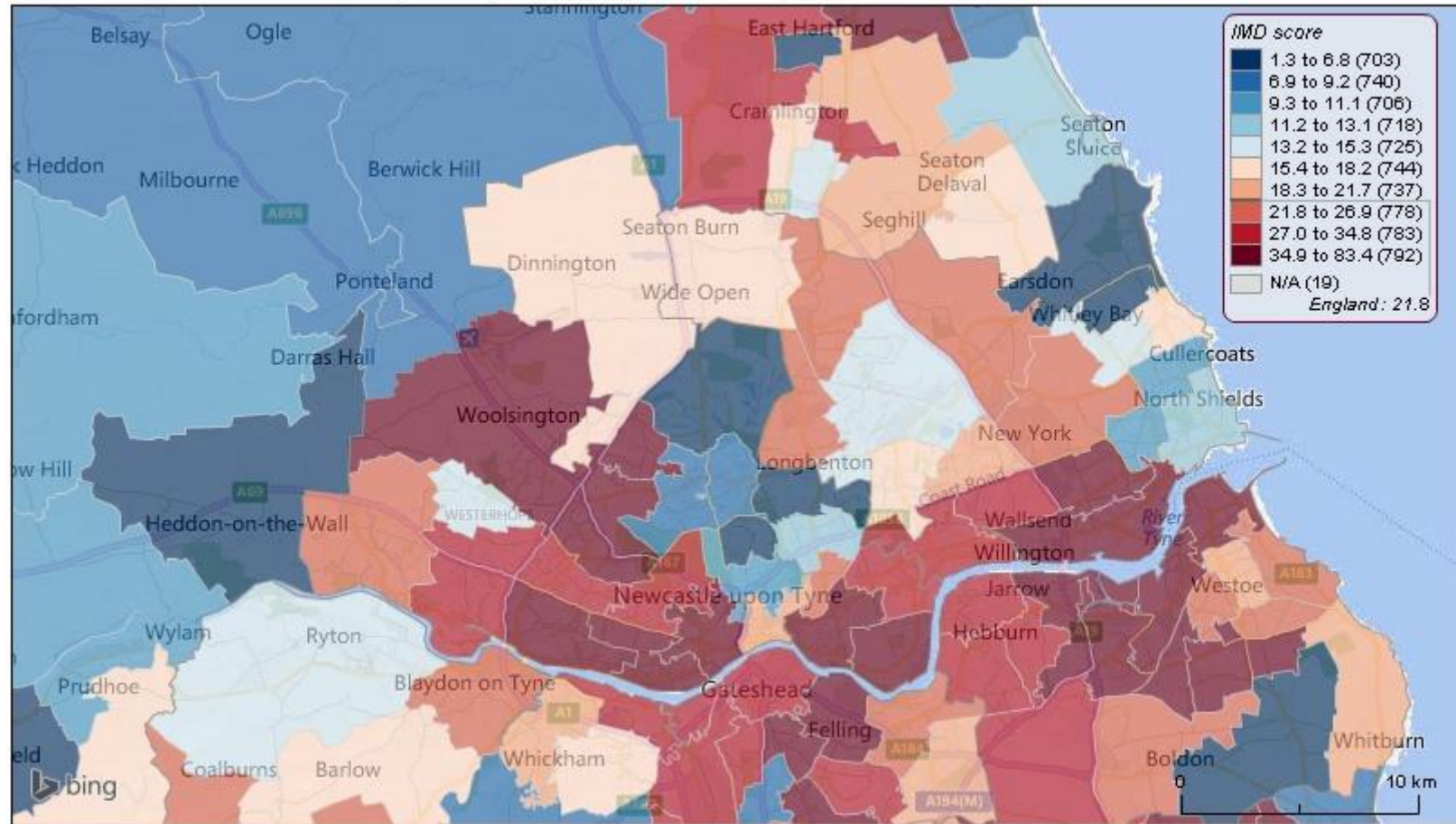
Deprivation Score - Index of Multiple Deprivation 2015 - source: Department for Communities and Local Government





Map 17 North of Tyne and environs

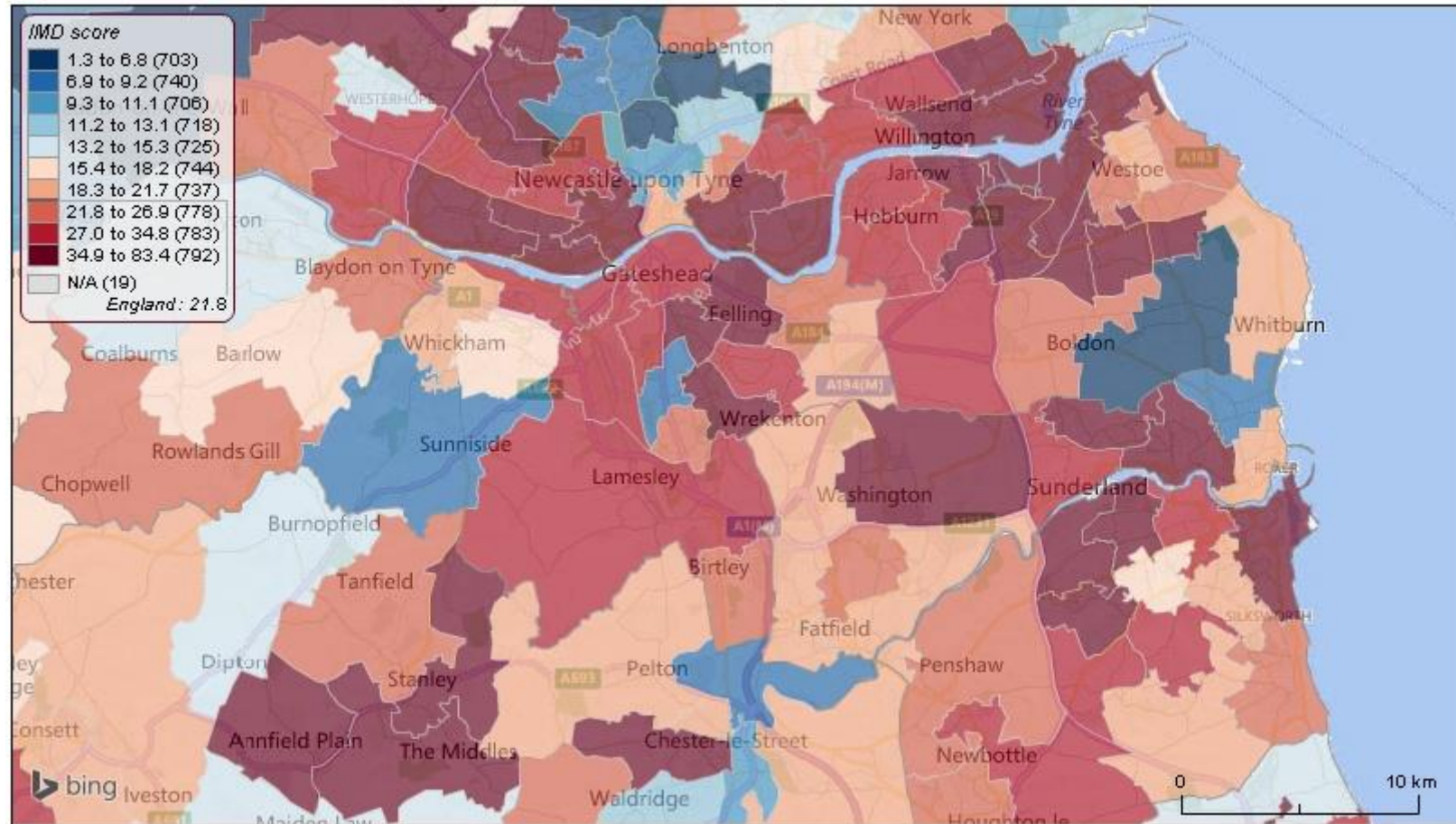
**Deprivation Score - Index of Multiple Deprivation 2015** - source: Department for Communities and Local Government



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Map 18 South of Tyne and environs

**Deprivation Score - Index of Multiple Deprivation 2015** - source: Department for Communities and Local Government

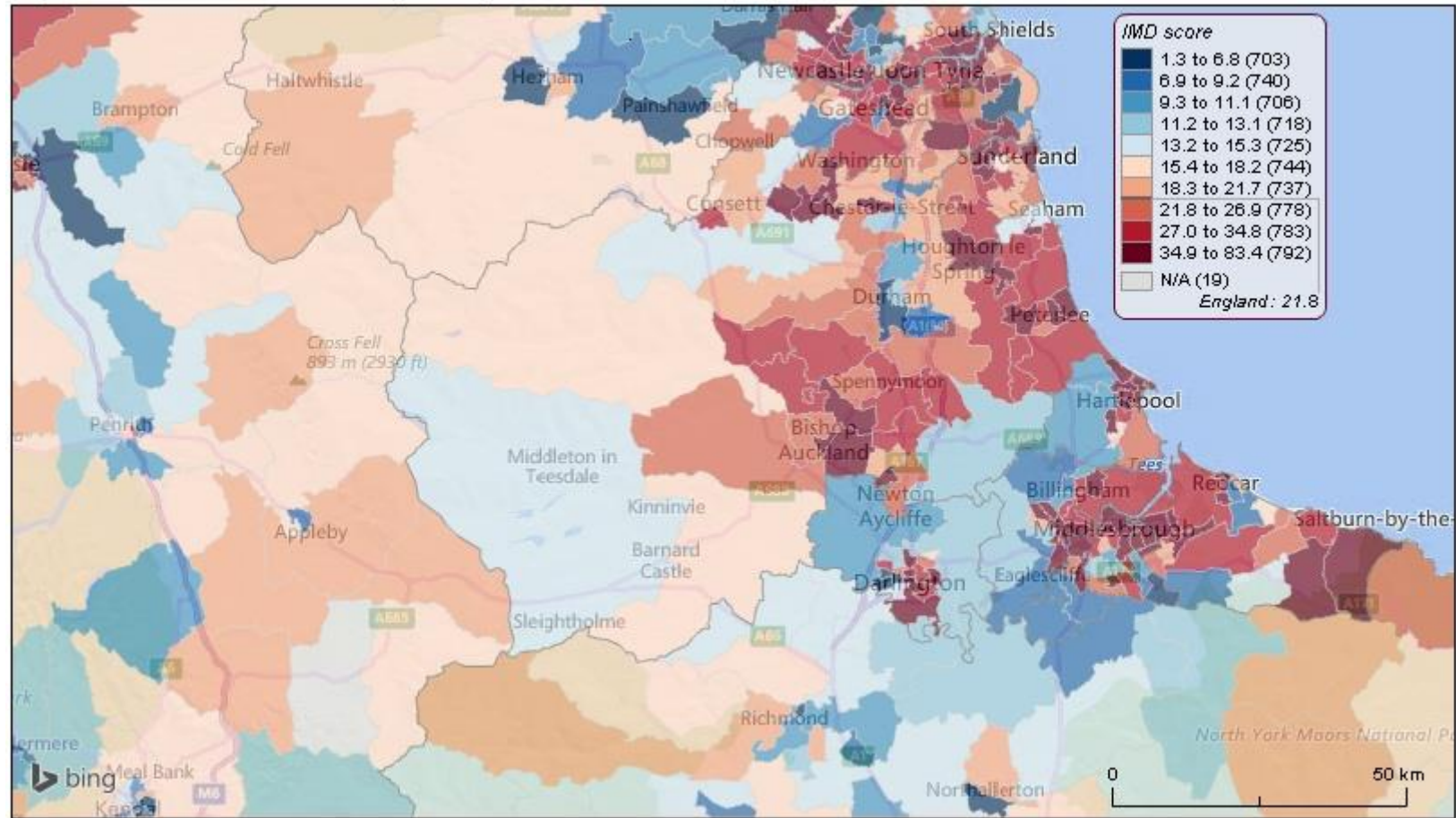


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Map 19 County Durham and environs

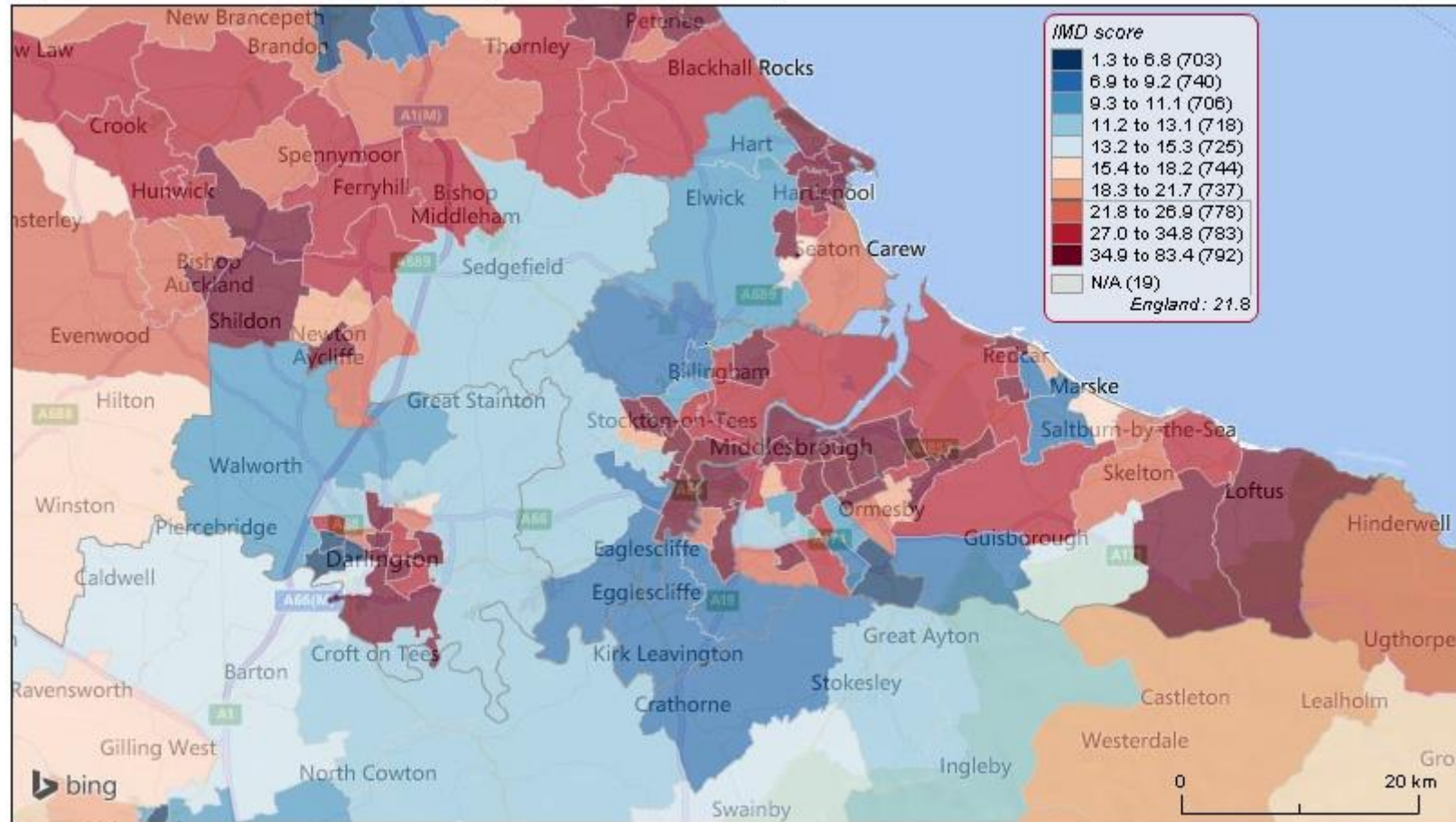
**Deprivation Score - Index of Multiple Deprivation 2015** - source: Department for Communities and Local Government



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Map 20 Tees Valley and environs

**Deprivation Score - Index of Multiple Deprivation 2015** - source: Department for Communities and Local Government



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<sup>4</sup> Department of Communities and Local Government, English Indices of Deprivation, London, 2015.

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<sup>8</sup> Foreign & Commonwealth Office, Home Office, UK Visas and Immigration, and Department for Exiting the European Union

Available on line at:

[www.gov.uk/guidance/status-of-eu-nationals-in-the-uk-what-you-need-to-know](http://www.gov.uk/guidance/status-of-eu-nationals-in-the-uk-what-you-need-to-know)

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Available on line at:

<https://www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2015/09/guid-comms-orthodontics.pdf>

<sup>10</sup>Public Health England

Available on line at:

<http://www.localhealth.org.uk/#l=en>