

CSC3031 Applied Data Science Coursework

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Introduction

Poor mental health in children have often been described as an escalating crisis. Despite the advancements in global mental health awareness in recent years, child mental health have largely remained confined in the shadows. A recent survey across England found that in children aged 7-16, the rates of probable mental health disorder rose from 1 in 9 in 2017 to 1 in 6 in 2020 (1). In addition, reports suggest that there is an undeniable disparity in the risk of poor mental health outcomes between wealthier and more deprived areas (2), suggesting there may be regional differences in rates of child mental health issues.

This report therefore aims to explore how children's mental health in England have changed throughout the years between 2015-2020 and how they vary across different regions/districts within the country.

Objective & methodology

To answer our research question, we aim to produce a spatial map of child mental health scores across different England lower-tier local authority districts (LTLAs) between 2015-2020. We then conduct a one way ANOVA to assess the significance of differences in mental health scores between the years, making sure parametric test assumptions are met using the Levene's test for homogeneity of variance and plotting a quantile-quantile (QQ) plot to assess normality. We also conduct a post-hoc pairwise comparison t-test to determine between which years were the differences most significant. To further illustrate regional differences in child mental health scores, we plot a line graph of mental health scores between years across the 9 England regions. We plotted average regional mental health scores rather than LTLAs as there are over 300 individual LTLAs, which would not be feasible to plot in a single graph.

The data

Our data was obtained from the England 2015-2020 Health Index Scores published by the Office for National Statistics. The Health Index data is made available as an Excel spreadsheet containing Health Index Scores for a variety of health indicators/outcomes such as life expectancy, physical activity, mental health disorders, diseases, etc. For our analysis, we are only interested in the children's social, emotional and mental health index score. The mental health scores are scaled to a base of 100, which represents the whole-England average score for each health indicator in 2015. Scores higher than 100 indicate better health index than the 2015 England average and scores below 100 indicate worse health. Scores 10 points above/below 100 indicate a mental health score one standard deviation above/below the England average, while scores 20 points above/below indicate a score two standard deviations above/below the average, and so on. The shapefiles/geometries required to plot our spatial map was obtained from the Office for National Statistics Open Geography Portal.

We read only the Excel sheets that contained the health data scores and filtered out the index scores for the non-required health indicators, leaving only the children's mental health index scores. As each year is separated into separate sheets in the original Excel file, we merged all of them together and rearranged it into one tidy data-frame in R. Next we merged the health score data frame with the spatial shapefile data-frame based on LTLA area codes. Not all the LTLA area codes in the health score data-frame had corresponding

LTLA codes in the shapefile data-frame, so we excluded those data from our analysis. On the other hand, LTLA codes in the shapefile that do not have a corresponding mental health score were assigned NAs.

Results & discussion

For the full data table, see Table 1 in Appendix.

From Figure 1, we can see that in 2015, a higher proportion of England LTLAs had a mental health score higher than 100 compared to later years, with a higher proportion of lower mental health scores between 60-100 in 2020 compared to 2015. This indicates that children's mental health have generally decreased between 2015-2020 as can also be seen in Figure 2, which corroborates findings from recent surveys(1).

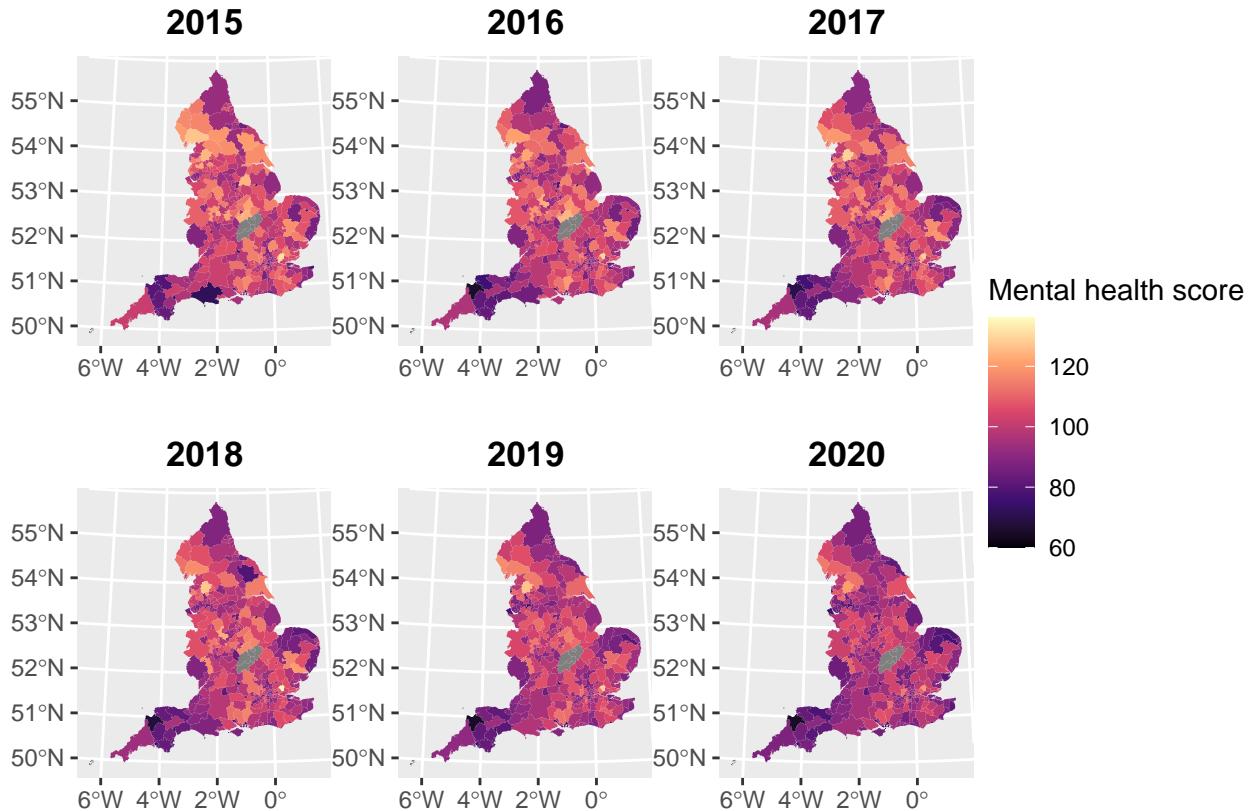


Figure 1: Child mental health score spatial plot

Distribution of mental health scores between 2015–2020

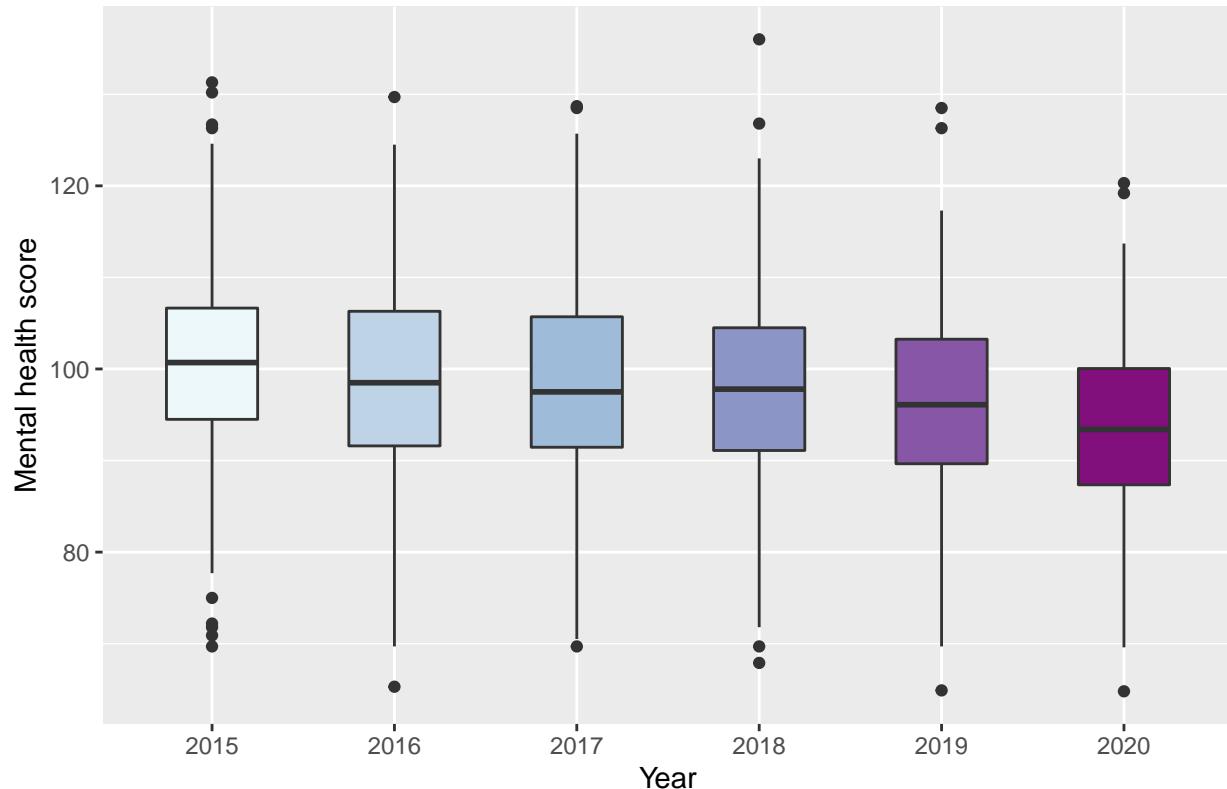


Figure 2: Child mental health score box plot

Statistical analysis using the one-way ANOVA confirm that the difference in mental health scores between 2015-2020 were significant. Pair-wise comparison t-test analysis indicate that the difference in scores between 2020 and other years were all significant, with the difference between 2020 and 2015 being the most significant at $p < 2e-16$.

The lack of significant differences in mental health scores between 2016-2017, 2017-2018 and 2018-2019 indicate that mental health scores remained relatively similar between 2016-2019, before dropping in 2020.

One-way ANOVA

```
##          Df Sum Sq Mean Sq F value Pr(>F)
## as.factor(year)   5   9292    1858   18.23 <2e-16 ***
## Residuals       1836 187214      102
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Pairwise t-test

```
##
##  Pairwise comparisons using t tests with pooled SD
##
## data: ltl_health$score and as.factor(ltl_health$year)
##
## 2015   2016   2017   2018   2019
##
```

```

## 2016 0.0456 - - - -
## 2017 0.0195 0.7203 - - - -
## 2018 0.0014 0.2098 0.3519 - - -
## 2019 4.7e-07 0.0028 0.0081 0.0818 - -
## 2020 < 2e-16 4.0e-10 2.7e-09 4.7e-07 0.0014
##
## P value adjustment method: BH

```

This can also be seen in Figure 3, where the England mental health score average (black) remained relatively steady between 2016-2018, before showing a fairly steep drop between 2018-2020. It is possible that the effect of COVID-19 quarantining measures impacted children's mental health scores around this time, which may explain the drop. This idea is supported by studies finding increased cases of childhood depression and PTSD in 2020 compared to immediately before the pandemic (3,4).

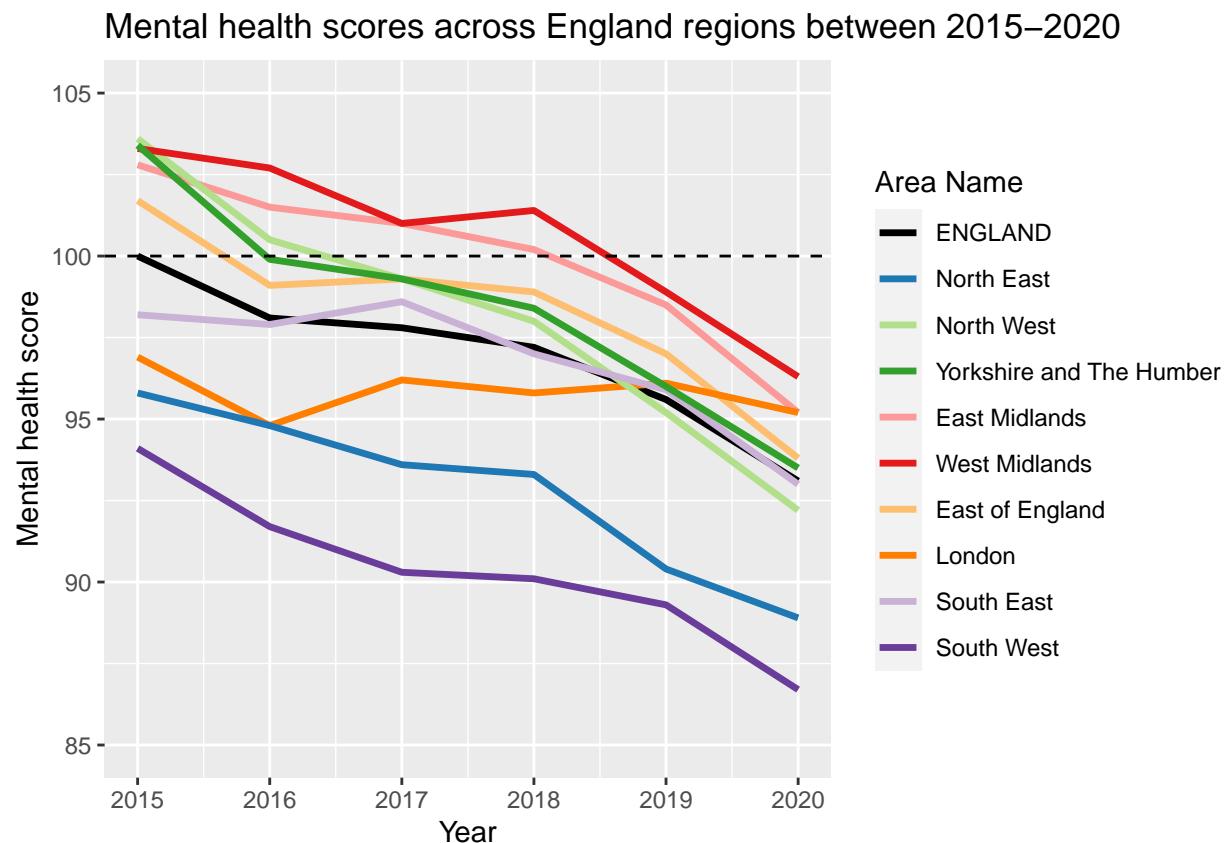


Figure 3: Child mental health score line plot 2015-2020

However, although Figures 1-3 show a general (and significant) downward trend in child mental health scores between 2015-2020, the differences are quite small. Most scores still generally stay between 90-100, showing that there is a <1 standard deviation decrease in mental health scores across the years, which is not very large. From both Figure 1 and Figure 3 we can see that lower mental health scores are seen in the south-west, north-eastern and coastal LTLAs/regions of England in particular, suggesting that mental health scores are not distributed equally across the country. According to the Ministry of Housing, Communities and Local Government (MHCLG) 2019 English Indices of Deprivation(5), the most deprived areas in England are also often found in the north/south-western/coastal regions, providing evidence that children's mental health may be associated with neighbourhood deprivation. This is also in line with the well-documented inequalities in health outcomes between deprived and affluent neighbourhoods (2).

Limitations

One of the key limitations of our analysis is that our data on children's mental health score was assessed only from whether or not a pupil had mental, social or emotional health issues listed as their primary special education need (SEN). On one hand, this limitation is useful as it is difficult to accurately ascertain whether changes in child mental health is truly representative of changes in child mental health complications over the years, or whether it is a result of better awareness/willingness to seek help/diagnosis. By limiting our data to only cases where mental health issues is a primary SEN, which thus represents cases of substantial child mental health difficulty, it excludes the proportion of cases that may be a result of better mental health awareness and not necessarily the result of 'true' mental health issues. On the other hand, this limitation of the data is problematic as it does not take into account children who may not go to school, or those who may have mental health issues but do not have it as a primary SEN. Lack of mental health considerations as a primary SEN does not necessarily denote no mental health issues. Further to this, the Health Score Index used in our analysis is still a relatively new and experimental measure/statistic and is by no means an absolute measure of child mental health. Conclusions drawn from analysis of such data should therefore be taken with a grain of salt.

In addition, some of the LTLA codes in our data do not match the LTLA codes of our shapefile, even though they may correspond to the same area, meaning we had to exclude some health score data that did not have any shapefile geometry match. This may be a result of LTLA codes/names changing over the years but unfortunately because of this, our spatial map plot contains a hole where there is no mental health data due to the mismatching LTLA codes. Ideally, we would be able to determine which LTLA codes from our health index score data file correspond to each mismatching LTLA code from our shapefile but regrettably in this instance, we have not managed to accomplish this.

Conclusion

To conclude, our analysis provide indication that children's mental health have generally showed a downward trend between 2015-2020 with a sharper drop in mental health scores between 2018-2020. We also found that there were regional differences in mental health scores, with north-eastern and south-western areas showing lower mental health scores on average. However, our analysis is limited by the nature of our data and more robust/absolute measurements of child mental health would be required in order to draw concrete conclusions.

References

1. Mental Health of Children and Young People in England 2022 -wave 3 follow up to the 2017 survey [Internet]. NDRS. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-england/2022-follow-up-to-the-2017-survey#resources>
2. Institute of Health Equity. Fair Society Healthy Lives (The Marmot Review) - Institute of Health Equality [Internet]. Institute of HealthEquity. 2010. Available from: <https://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review>
3. Bignardi G, Dalmaijer ES, Anwyl-Irvine AL, Smith TA, Siugzdaite R, Uh S, et al. Longitudinal increases in childhood depression during the COVID-19 lockdown in a UK cohort. 2020 Jul 10.
4. Newlove-Delgado T. Commentary: “Levelling down” or “building back fairer”? A commentary/reflection on Wright et al. (2021). JCPP Advances. 2021 Apr;1(1).
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Appendix

Table 1: Mental health scores for each England LTLA 2015-2020

Area Code	Area Name	Area Type	2015	2016	2017	2018	2019	2020
E92000001	ENGLAND	Country	100.0	98.1	97.8	97.2	95.6	93.1
E12000001	North East	Region	95.8	94.8	93.6	93.3	90.4	88.9
E06000001	Hartlepool	LTLA	101.5	102.5	100.8	100.7	99.3	95.1
E06000002	Middlesbrough	LTLA	90.1	90.1	90.1	90.1	90.1	89.2
E06000003	Redcar and Cleveland	LTLA	85.5	82.1	86.4	85.5	88.2	86.9
E06000004	Stockton-on-Tees	LTLA	94.9	101.7	97.4	95.8	92.7	93.9
E06000005	Darlington	LTLA	90.2	90.2	90.2	90.2	90.2	87.7
E06000047	County Durham	LTLA	93.8	96.0	95.6	96.5	91.8	89.3
E06000057	Northumberland	LTLA	92.5	87.6	90.4	88.5	87.5	86.2
E08000021	Newcastle upon Tyne	LTLA	97.6	87.8	96.7	90.5	92.8	93.3
E08000022	North Tyneside	LTLA	103.2	106.5	97.0	95.9	86.0	81.7
E08000023	South Tyneside	LTLA	97.0	94.5	91.1	94.7	82.9	79.7
E08000024	Sunderland	LTLA	95.5	98.0	88.1	93.2	87.3	86.9
E08000037	Gateshead	LTLA	107.5	100.9	97.4	96.7	97.5	97.1
E12000002	North West	Region	103.6	100.5	99.3	98.0	95.2	92.2
E06000006	Halton	LTLA	95.9	78.2	92.7	94.5	84.0	81.1
E06000007	Warrington	LTLA	104.9	104.9	104.9	104.9	104.9	102.6
E06000008	Blackburn with Darwen	LTLA	100.8	94.3	91.5	88.8	85.6	84.7
E06000009	Blackpool	LTLA	92.1	98.9	79.4	88.9	71.1	71.9
E06000049	Cheshire East	LTLA	114.2	111.8	111.7	106.7	108.0	105.7
E06000050	Cheshire West and Chester	LTLA	104.3	106.3	101.3	104.6	97.3	96.2
E10000006	Cumbria	UTLA	117.6	108.9	111.1	107.8	108.3	102.7
E07000026	Allerdale	LTLA	116.8	108.9	106.1	107.3	101.7	104.5
E07000027	Barrow-in-Furness	LTLA	109.5	108.9	111.2	99.0	107.7	94.6
E07000028	Carlisle	LTLA	113.8	100.8	104.2	102.7	103.3	93.4
E07000029	Copeland	LTLA	120.0	112.3	118.5	112.2	117.3	113.7
E07000030	Eden	LTLA	116.1	97.5	108.6	106.5	106.2	100.0
E07000031	South Lakeland	LTLA	126.7	120.9	119.3	117.2	115.3	110.0
E10000017	Lancashire	UTLA	109.3	109.3	107.2	106.8	104.4	102.6
E07000117	Burnley	LTLA	98.8	103.9	96.8	97.4	95.6	92.1
E07000118	Chorley	LTLA	122.9	116.9	112.7	110.3	110.8	111.1
E07000119	Fylde	LTLA	114.9	117.0	114.1	115.1	110.8	108.3
E07000120	Hyndburn	LTLA	100.5	111.9	101.3	118.1	107.1	102.9
E07000121	Lancaster	LTLA	100.6	100.6	100.6	100.6	100.6	100.0
E07000122	Pendle	LTLA	107.4	110.3	115.8	109.0	107.4	109.2
E07000123	Preston	LTLA	118.0	112.0	114.3	107.9	108.3	106.9
E07000124	Ribble Valley	LTLA	124.6	121.9	128.7	126.8	126.3	120.3
E07000125	Rossendale	LTLA	118.5	110.2	109.3	104.2	104.6	101.5
E07000126	South Ribble	LTLA	107.0	107.0	107.0	107.0	107.0	103.1
E07000127	West Lancashire	LTLA	107.5	111.5	98.5	101.1	88.7	87.8
E07000128	Wyre	LTLA	97.5	97.5	97.5	97.5	97.5	96.2
E08000001	Bolton	LTLA	105.5	97.8	97.3	97.6	99.4	95.1
E08000002	Bury	LTLA	103.4	96.9	100.3	96.3	88.7	83.9
E08000003	Manchester	LTLA	96.3	93.0	91.0	88.6	87.3	84.1
E08000004	Oldham	LTLA	105.0	103.4	105.5	100.9	97.9	96.8
E08000005	Rochdale	LTLA	106.4	103.0	105.5	100.3	100.9	95.4
E08000006	Salford	LTLA	101.0	89.2	81.3	83.7	76.9	76.8

Area Code	Area Name	Area Type	2015	2016	2017	2018	2019	2020
E08000007	Stockport	LTLA	97.7	91.6	91.8	92.2	93.5	89.3
E08000008	Tameside	LTLA	106.0	101.9	103.6	99.5	91.7	88.5
E08000009	Trafford	LTLA	105.3	103.0	107.4	101.9	105.0	101.2
E08000010	Wigan	LTLA	98.7	94.2	93.5	90.4	88.0	82.4
E08000011	Knowsley	LTLA	86.6	86.6	86.6	86.6	86.6	85.0
E08000012	Liverpool	LTLA	94.0	95.5	90.1	93.5	86.6	83.5
E08000013	St. Helens	LTLA	89.1	87.2	91.1	87.1	88.8	86.9
E08000014	Sefton	LTLA	112.3	111.2	108.9	102.8	101.5	95.5
E08000015	Wirral	LTLA	95.9	90.7	85.8	85.8	77.8	74.8
E12000003	Yorkshire and The Humber	Region	103.4	99.9	99.3	98.4	96.0	93.5
E06000010	Kingston upon Hull, City of	LTLA	104.3	99.5	106.4	99.8	98.8	95.5
E06000011	East Riding of Yorkshire	LTLA	117.6	114.9	115.5	114.5	110.7	106.9
E06000012	North East Lincolnshire	LTLA	116.7	121.8	107.5	103.1	99.9	94.0
E06000013	North Lincolnshire	LTLA	109.4	107.9	105.4	103.5	95.2	90.2
E06000014	York	LTLA	92.6	92.6	92.6	92.6	92.6	91.6
E10000023	North Yorkshire	UTLA	108.5	106.0	104.5	101.3	98.8	95.0
E07000163	Craven	LTLA	117.6	111.3	109.7	106.0	114.2	112.6
E07000164	Hambleton	LTLA	92.8	92.8	92.8	92.8	92.8	91.5
E07000165	Harrogate	LTLA	117.8	112.4	115.8	112.4	104.2	96.8
E07000166	Richmondshire	LTLA	119.1	112.8	108.8	103.3	102.4	98.2
E07000167	Ryedale	LTLA	120.5	103.7	110.4	79.3	98.6	96.8
E07000168	Scarborough	LTLA	99.9	108.9	95.1	102.1	86.5	82.2
E07000169	Selby	LTLA	98.2	98.2	98.2	98.2	98.2	96.8
E08000016	Barnsley	LTLA	92.5	90.4	88.3	91.0	87.3	86.6
E08000017	Doncaster	LTLA	96.1	96.1	96.1	96.1	96.1	95.0
E08000018	Rotherham	LTLA	105.1	101.3	100.4	98.8	94.6	92.1
E08000019	Sheffield	LTLA	95.2	95.2	95.2	95.2	95.2	93.1
E08000032	Bradford	LTLA	101.3	89.3	91.1	89.7	89.0	88.6
E08000033	Calderdale	LTLA	102.7	97.9	100.4	100.9	100.8	97.4
E08000034	Kirklees	LTLA	107.5	107.6	102.9	100.6	96.2	93.5
E08000035	Leeds	LTLA	105.2	97.2	97.4	98.0	95.0	92.6
E08000036	Wakefield	LTLA	98.4	95.4	95.1	98.4	93.5	90.6
E12000004	East Midlands	Region	102.8	101.5	101.0	100.2	98.5	95.2
E06000015	Derby	LTLA	98.3	90.7	92.2	90.2	93.4	89.6
E06000016	Leicester	LTLA	92.7	92.7	92.7	92.7	92.7	90.7
E06000017	Rutland	LTLA	115.5	118.2	113.7	115.6	111.6	103.0
E06000018	Nottingham	LTLA	94.8	89.1	90.2	90.7	89.5	88.1
E10000007	Derbyshire	UTLA	95.4	94.6	95.1	94.2	94.9	91.0
E07000032	Amber Valley	LTLA	99.9	103.8	97.5	95.2	92.0	90.3
E07000033	Bolsover	LTLA	83.6	78.6	83.3	84.1	88.6	84.6
E07000034	Chesterfield	LTLA	90.1	86.9	90.3	84.7	83.0	79.4
E07000035	Derbyshire Dales	LTLA	101.1	102.4	101.5	102.6	105.6	100.2
E07000036	Erewash	LTLA	97.3	97.3	97.3	97.3	97.3	89.4
E07000037	High Peak	LTLA	93.2	93.2	93.2	93.2	93.2	90.6
E07000038	North East Derbyshire	LTLA	97.0	99.5	102.9	104.5	106.0	105.0
E07000039	South Derbyshire	LTLA	98.7	91.6	93.0	91.9	96.1	90.5
E10000018	Leicestershire	UTLA	115.7	113.4	113.0	108.2	106.1	100.4
E07000129	Blaby	LTLA	119.7	117.3	107.5	99.1	98.6	89.0
E07000130	Charnwood	LTLA	112.5	106.1	106.1	101.1	102.2	99.6
E07000131	Harborough	LTLA	123.3	124.5	122.3	117.0	108.2	104.3
E07000132	Hinckley and Bosworth	LTLA	110.8	111.6	117.9	112.4	109.0	103.1

Area Code	Area Name	Area Type	2015	2016	2017	2018	2019	2020
E07000133	Melton	LTLA	121.5	119.8	118.0	115.4	115.1	105.7
E07000134	North West Leicestershire	LTLA	106.7	106.7	106.7	106.7	106.7	99.4
E07000135	Oadby and Wigston	LTLA	126.3	121.5	125.7	120.5	114.5	108.0
E10000019	Lincolnshire	UTLA	97.8	98.9	98.2	97.6	97.1	93.8
E07000136	Boston	LTLA	98.4	98.4	98.4	98.4	98.4	99.9
E07000137	East Lindsey	LTLA	91.5	91.5	91.5	91.5	91.5	84.3
E07000138	Lincoln	LTLA	69.7	69.7	69.7	69.7	69.7	70.0
E07000139	North Kesteven	LTLA	107.3	114.1	114.1	113.9	109.9	107.6
E07000140	South Holland	LTLA	114.9	115.1	109.0	105.0	105.7	100.0
E07000141	South Kesteven	LTLA	104.5	104.5	104.5	104.5	104.5	96.7
E07000142	West Lindsey	LTLA	97.9	97.9	97.9	97.9	97.9	100.5
E10000024	Nottinghamshire	UTLA	107.3	106.3	106.1	105.8	104.1	101.2
E07000170	Ashfield	LTLA	101.6	101.6	101.6	101.6	101.6	97.6
E07000171	Bassetlaw	LTLA	124.3	115.5	114.0	113.6	106.6	98.9
E07000172	Broxtowe	LTLA	100.8	100.8	100.8	100.8	100.8	105.8
E07000173	Gedling	LTLA	101.2	101.2	101.2	101.2	101.2	100.2
E07000174	Mansfield	LTLA	109.2	111.3	110.7	109.4	104.1	99.4
E07000175	Newark and Sherwood	LTLA	102.1	102.1	102.1	102.1	102.1	101.0
E07000176	Rushcliffe	LTLA	112.7	112.7	112.7	112.7	112.7	106.0
E06000061	North Northamptonshire	LTLA	109.7	106.9	107.5	107.0	95.3	95.5
E06000062	West Northamptonshire	LTLA	106.7	108.6	101.9	105.5	100.4	97.7
E12000005	West Midlands	Region	103.3	102.7	101.0	101.4	98.9	96.3
E06000019	Herefordshire, County of	LTLA	88.3	88.3	88.3	88.3	88.3	84.4
E06000020	Telford and Wrekin	LTLA	91.4	91.4	91.4	91.4	91.4	89.7
E06000021	Stoke-on-Trent	LTLA	99.4	102.0	99.3	98.0	97.4	94.4
E06000051	Shropshire	LTLA	109.4	107.6	108.8	106.5	104.3	102.0
E10000028	Staffordshire	UTLA	111.2	111.3	109.7	109.4	106.3	102.5
E07000192	Cannock Chase	LTLA	117.1	111.2	109.7	109.9	108.3	99.1
E07000193	East Staffordshire	LTLA	114.0	123.0	115.3	123.0	107.3	104.6
E07000194	Lichfield	LTLA	97.5	97.5	97.5	97.5	97.5	94.4
E07000195	Newcastle-under-Lyme	LTLA	111.2	105.5	107.5	101.9	103.8	101.0
E07000196	South Staffordshire	LTLA	119.7	119.1	118.3	113.5	113.2	108.8
E07000197	Stafford	LTLA	103.0	103.0	103.0	103.0	103.0	102.3
E07000198	Staffordshire Moorlands	LTLA	117.2	114.5	115.7	113.5	111.6	105.7
E07000199	Tamworth	LTLA	112.2	120.8	112.1	116.7	107.8	104.8
E10000031	Warwickshire	UTLA	99.8	98.0	95.9	95.9	94.1	91.1
E07000218	North Warwickshire	LTLA	121.8	112.6	112.6	107.8	101.4	96.5
E07000219	Nuneaton and Bedworth	LTLA	101.7	101.0	92.3	98.0	88.2	83.2
E07000220	Rugby	LTLA	91.9	89.0	88.3	83.9	90.2	90.8
E07000221	Stratford-on-Avon	LTLA	98.1	98.1	98.1	98.1	98.1	95.1
E07000222	Warwick	LTLA	95.5	95.5	95.5	95.5	95.5	92.2
E10000034	Worcestershire	UTLA	91.8	97.9	96.0	99.0	97.0	94.5
E07000234	Bromsgrove	LTLA	90.8	90.8	90.8	90.8	90.8	92.8
E07000235	Malvern Hills	LTLA	105.0	111.6	109.6	117.9	113.6	110.3
E07000236	Redditch	LTLA	86.1	90.3	85.6	91.9	84.4	82.3
E07000237	Worcester	LTLA	78.0	94.5	91.3	100.8	95.8	89.8
E07000238	Wychavon	LTLA	96.4	104.6	102.6	99.5	101.6	101.7
E07000239	Wyre Forest	LTLA	96.0	96.0	96.0	96.0	96.0	89.2
E08000025	Birmingham	LTLA	104.4	106.6	103.3	105.6	100.9	99.6
E08000026	Coventry	LTLA	99.9	98.7	99.0	97.9	98.2	96.4
E08000027	Dudley	LTLA	104.2	99.3	99.6	97.2	95.4	94.8

Area Code	Area Name	Area Type	2015	2016	2017	2018	2019	2020
E08000028	Sandwell	LTLA	106.1	93.1	90.7	94.0	93.8	90.1
E08000029	Solihull	LTLA	98.4	92.3	90.4	91.9	89.7	89.5
E08000030	Walsall	LTLA	122.8	115.9	113.7	110.1	106.8	101.8
E08000031	Wolverhampton	LTLA	103.5	106.3	104.8	105.1	99.0	94.1
E12000006	East of England	Region	101.7	99.1	99.3	98.9	97.0	93.8
E06000031	Peterborough	LTLA	103.9	103.9	103.9	103.9	103.9	100.3
E06000032	Luton	LTLA	96.2	94.5	96.9	101.0	100.9	104.0
E06000033	Southend-on-Sea	LTLA	106.5	102.4	103.3	100.7	98.9	95.4
E06000034	Thurrock	LTLA	102.5	99.8	101.3	99.3	96.1	93.1
E06000055	Bedford	LTLA	112.5	101.8	102.8	98.7	100.2	98.5
E06000056	Central Bedfordshire	LTLA	101.9	98.6	97.2	98.2	93.1	86.9
E10000003	Cambridgeshire	UTLA	99.3	100.4	102.1	100.7	98.0	96.2
E07000008	Cambridge	LTLA	100.7	102.5	101.0	95.7	94.3	94.7
E07000009	East Cambridgeshire	LTLA	102.4	95.7	95.4	90.9	89.5	86.1
E07000010	Fenland	LTLA	94.4	94.4	94.4	94.4	94.4	94.8
E07000011	Huntingdonshire	LTLA	99.3	101.3	106.7	108.0	104.6	103.1
E07000012	South Cambridgeshire	LTLA	99.7	104.1	106.6	106.1	100.7	96.2
E10000012	Essex	UTLA	104.7	101.3	100.9	101.5	100.0	96.4
E07000066	Basildon	LTLA	104.4	97.2	99.1	103.1	102.9	100.1
E07000067	Braintree	LTLA	97.0	97.0	97.0	97.0	97.0	96.2
E07000068	Brentwood	LTLA	131.3	129.7	128.5	136.0	128.5	119.2
E07000069	Castle Point	LTLA	105.8	108.1	104.2	106.1	103.3	100.8
E07000070	Chelmsford	LTLA	115.1	107.1	108.7	106.0	104.2	101.4
E07000071	Colchester	LTLA	95.6	95.6	95.6	95.6	95.6	91.3
E07000072	Epping Forest	LTLA	106.8	104.9	101.1	103.5	100.5	99.5
E07000073	Harlow	LTLA	92.7	88.5	87.2	86.9	84.1	85.0
E07000074	Maldon	LTLA	103.7	92.8	92.6	93.7	95.3	88.3
E07000075	Rochford	LTLA	104.7	104.7	104.7	104.7	104.7	101.6
E07000076	Tendring	LTLA	103.3	96.0	95.1	91.8	88.0	80.9
E07000077	Uttlesford	LTLA	104.8	104.8	104.8	104.8	104.8	99.6
E10000015	Hertfordshire	UTLA	101.9	98.2	98.1	96.2	93.7	91.1
E07000095	Broxbourne	LTLA	95.5	92.7	91.9	89.9	88.7	86.1
E07000096	Dacorum	LTLA	101.8	96.9	97.9	94.8	89.2	85.4
E07000098	Hertsmere	LTLA	92.3	89.1	91.4	89.6	88.0	87.0
E07000099	North Hertfordshire	LTLA	91.8	88.6	91.8	93.9	89.6	86.3
E07000102	Three Rivers	LTLA	115.1	115.1	110.5	112.0	106.2	102.6
E07000103	Watford	LTLA	111.7	111.7	111.7	111.7	111.7	108.0
E07000240	St Albans	LTLA	110.1	102.1	100.4	96.4	96.3	93.6
E07000241	Welwyn Hatfield	LTLA	86.1	86.1	86.1	86.1	86.1	86.8
E07000242	East Hertfordshire	LTLA	117.1	113.6	110.3	106.4	103.6	101.1
E07000243	Stevenage	LTLA	93.3	83.4	86.7	79.6	76.7	73.5
E10000020	Norfolk	UTLA	94.8	91.1	89.6	90.6	88.7	84.3
E07000143	Breckland	LTLA	86.5	86.5	86.5	86.5	86.5	80.1
E07000144	Broadland	LTLA	103.4	99.5	86.7	89.2	80.7	76.9
E07000145	Great Yarmouth	LTLA	90.8	89.3	82.8	96.0	89.9	85.7
E07000146	King's Lynn and West Norfolk	LTLA	104.8	95.7	93.4	86.7	88.7	85.0
E07000147	North Norfolk	LTLA	95.0	90.6	84.5	81.8	88.4	79.0
E07000148	Norwich	LTLA	75.0	75.1	87.2	91.7	84.0	82.1
E07000149	South Norfolk	LTLA	107.5	101.0	102.7	102.2	102.2	99.6
E10000029	Suffolk	UTLA	102.9	103.0	105.4	104.5	103.4	99.1
E07000200	Babergh	LTLA	115.1	115.6	118.8	120.3	106.1	101.5

Area Code	Area Name	Area Type	2015	2016	2017	2018	2019	2020
E07000202	Ipswich	LTLA	101.5	107.4	107.6	111.8	104.8	105.4
E07000203	Mid Suffolk	LTLA	107.2	105.3	106.4	106.9	108.2	101.5
E07000244	East Suffolk	LTLA	86.5	84.9	90.0	85.2	93.7	89.8
E07000245	West Suffolk	LTLA	118.0	116.7	117.5	116.4	111.6	105.0
E12000007	London	Region	96.9	94.8	96.2	95.8	96.1	95.2
E09000002	Barking and Dagenham	LTLA	98.1	83.6	95.3	85.1	95.7	96.5
E09000003	Barnet	LTLA	94.5	95.8	100.3	95.0	93.6	94.6
E09000004	Bexley	LTLA	98.7	96.6	100.2	100.7	96.0	98.5
E09000005	Brent	LTLA	102.8	101.1	105.8	98.6	103.2	101.0
E09000006	Bromley	LTLA	99.7	98.5	95.3	93.1	92.3	88.5
E09000007	Camden	LTLA	89.4	90.1	91.4	91.0	87.1	80.3
E09000008	Croydon	LTLA	94.7	91.7	95.1	90.1	94.5	91.6
E09000009	Ealing	LTLA	99.5	96.4	99.0	101.4	102.5	101.9
E09000010	Enfield	LTLA	91.2	90.0	89.6	91.2	91.6	92.2
E09000011	Greenwich	LTLA	101.0	99.1	97.3	97.1	95.0	93.2
E09000012	Hackney	LTLA	88.0	88.0	85.3	82.5	89.4	88.2
E09000013	Hammersmith and Fulham	LTLA	93.2	96.5	94.4	96.1	98.4	99.7
E09000014	Haringey	LTLA	97.6	93.1	90.2	99.2	93.2	92.3
E09000015	Harrow	LTLA	110.6	111.6	106.0	111.3	107.0	112.7
E09000016	Havering	LTLA	130.2	112.4	123.0	108.2	112.3	109.1
E09000017	Hillingdon	LTLA	112.3	107.1	114.5	106.7	112.2	112.8
E09000018	Hounslow	LTLA	86.7	82.7	85.2	84.7	86.4	85.3
E09000019	Islington	LTLA	86.6	93.9	85.1	81.3	85.2	82.0
E09000020	Kensington and Chelsea	LTLA	96.0	96.0	94.8	91.2	92.2	92.5
E09000021	Kingston upon Thames	LTLA	111.7	108.0	116.3	108.2	111.4	109.2
E09000022	Lambeth	LTLA	90.9	89.4	88.2	93.6	93.1	88.7
E09000023	Lewisham	LTLA	102.8	98.6	103.2	102.1	105.2	101.7
E09000024	Merton	LTLA	100.1	91.2	93.0	90.3	87.1	86.5
E09000025	Newham	LTLA	99.0	91.1	96.6	102.7	106.1	107.1
E09000026	Redbridge	LTLA	102.0	104.2	107.5	106.6	105.1	104.3
E09000027	Richmond upon Thames	LTLA	104.1	105.5	102.7	106.9	105.5	102.8
E09000028	Southwark	LTLA	97.8	92.7	92.0	92.9	91.0	90.3
E09000029	Sutton	LTLA	99.7	100.7	101.6	100.9	99.9	101.3
E09000030	Tower Hamlets	LTLA	88.3	88.3	88.2	90.1	87.8	89.9
E09000031	Waltham Forest	LTLA	87.6	90.5	87.9	97.8	93.4	94.1
E09000032	Wandsworth	LTLA	77.7	79.3	79.9	85.0	82.1	80.9
E09000033	Westminster	LTLA	77.8	81.0	81.4	88.7	85.0	84.3
E12000008	South East	Region	98.2	97.9	98.6	97.0	95.9	93.0
E06000035	Medway	LTLA	85.8	82.7	87.4	85.4	85.1	86.2
E06000036	Bracknell Forest	LTLA	105.5	105.4	107.9	105.6	99.4	96.5
E06000037	West Berkshire	LTLA	112.3	108.6	108.3	105.2	102.1	102.8
E06000038	Reading	LTLA	82.7	86.4	86.5	82.1	86.6	85.2
E06000039	Slough	LTLA	89.3	89.3	95.6	99.7	102.2	101.7
E06000040	Windsor and Maidenhead	LTLA	105.6	99.6	97.5	94.4	90.6	90.9
E06000041	Wokingham	LTLA	101.3	104.4	104.6	106.1	104.6	100.9
E06000042	Milton Keynes	LTLA	101.9	101.9	103.4	100.9	103.1	101.0
E06000043	Brighton and Hove	LTLA	84.5	83.8	93.0	87.3	86.7	84.6
E06000044	Portsmouth	LTLA	92.4	90.9	90.7	87.8	84.7	82.4
E06000045	Southampton	LTLA	80.1	78.7	79.0	76.6	78.6	77.4
E06000046	Isle of Wight	LTLA	94.5	95.9	92.8	87.2	88.9	85.7
E06000060	Buckinghamshire	LTLA	114.9	110.4	113.6	112.9	107.3	103.3

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E10000011	East Sussex	UTLA	100.6	102.1	100.1	97.3	93.7	91.2
E07000061	Eastbourne	LTLA	105.0	100.1	104.0	95.2	90.9	92.2
E07000062	Hastings	LTLA	85.2	99.0	86.5	85.8	79.4	75.3
E07000063	Lewes	LTLA	91.8	93.5	91.8	88.6	87.4	87.7
E07000064	Rother	LTLA	108.6	111.4	109.0	106.4	104.6	97.1
E07000065	Wealden	LTLA	107.6	105.2	105.4	105.5	101.1	98.4
E10000014	Hampshire	UTLA	101.8	102.9	101.9	101.4	99.3	95.4
E07000084	Basingstoke and Deane	LTLA	98.9	104.0	98.5	98.5	96.3	93.6
E07000085	East Hampshire	LTLA	116.9	120.0	118.3	115.7	111.6	106.0
E07000086	Eastleigh	LTLA	101.1	100.2	100.7	100.1	96.8	93.2
E07000087	Fareham	LTLA	106.3	103.8	100.0	100.7	98.3	95.1
E07000088	Gosport	LTLA	99.5	92.7	93.7	89.2	85.7	79.5
E07000089	Hart	LTLA	112.2	112.2	113.8	114.1	113.9	112.1
E07000090	Havant	LTLA	80.3	82.0	79.0	78.0	72.0	69.6
E07000091	New Forest	LTLA	97.4	100.1	103.3	103.5	102.6	99.7
E07000092	Rushmoor	LTLA	101.4	97.0	97.6	88.5	96.7	94.3
E07000093	Test Valley	LTLA	99.1	106.9	104.1	111.5	104.5	96.6
E07000094	Winchester	LTLA	112.7	112.7	112.7	112.7	112.7	107.0
E10000016	Kent	UTLA	98.1	98.5	100.4	96.8	97.7	94.2
E07000105	Ashford	LTLA	104.9	97.8	101.1	97.4	100.1	97.8
E07000106	Canterbury	LTLA	92.0	92.0	92.0	92.0	92.0	89.0
E07000107	Dartford	LTLA	102.1	106.6	109.7	102.5	100.3	98.4
E07000108	Dover	LTLA	88.8	87.0	93.0	90.1	87.0	81.2
E07000109	Gravesham	LTLA	105.3	105.0	110.3	107.1	102.9	98.5
E07000110	Maidstone	LTLA	96.1	99.9	101.7	93.5	98.8	99.2
E07000111	Sevenoaks	LTLA	112.1	110.9	111.8	103.2	104.4	96.4
E07000112	Folkestone and Hythe	LTLA	89.5	89.5	89.5	89.5	89.5	86.6
E07000113	Swale	LTLA	93.6	93.6	93.6	93.6	93.6	88.2
E07000114	Thanet	LTLA	78.4	95.5	90.1	92.7	90.9	87.8
E07000115	Tonbridge and Malling	LTLA	106.9	106.9	106.9	106.9	106.9	102.9
E07000116	Tunbridge Wells	LTLA	114.8	101.1	111.3	97.5	109.5	105.5
E10000025	Oxfordshire	UTLA	92.4	93.3	93.3	92.0	91.9	88.6
E07000177	Cherwell	LTLA	96.1	96.1	96.1	96.1	96.1	93.2
E07000178	Oxford	LTLA	70.9	75.6	76.1	72.5	73.8	73.1
E07000179	South Oxfordshire	LTLA	98.5	98.5	98.5	98.5	98.5	94.1
E07000180	Vale of White Horse	LTLA	95.4	95.4	95.4	95.4	95.4	91.7
E07000181	West Oxfordshire	LTLA	106.6	105.5	104.6	101.2	98.1	92.6
E10000030	Surrey	UTLA	99.9	97.9	98.4	97.7	97.0	93.8
E07000207	Elmbridge	LTLA	102.3	102.3	102.3	102.3	102.3	98.9
E07000208	Epsom and Ewell	LTLA	97.6	94.8	110.1	105.4	107.0	104.6
E07000209	Guildford	LTLA	106.2	105.8	100.3	102.4	97.4	93.0
E07000210	Mole Valley	LTLA	86.4	87.4	94.4	102.5	105.2	103.4
E07000211	Reigate and Banstead	LTLA	96.4	97.7	94.4	93.0	93.4	90.0
E07000212	Runnymede	LTLA	95.0	89.5	90.7	91.4	91.7	89.0
E07000213	Spelthorne	LTLA	96.1	90.4	90.1	90.4	88.4	85.7
E07000214	Surrey Heath	LTLA	98.1	92.0	94.4	86.1	89.7	88.3
E07000215	Tandridge	LTLA	108.8	103.6	105.6	99.5	95.4	92.0
E07000216	Waverley	LTLA	109.0	106.3	102.7	102.3	99.2	97.9
E07000217	Woking	LTLA	97.1	97.1	97.1	97.1	97.1	90.5
E10000032	West Sussex	UTLA	96.5	97.0	95.5	97.1	94.5	91.7
E07000223	Adur	LTLA	88.3	84.3	91.0	87.4	91.6	90.1

Area Code	Area Name	Area Type	2015	2016	2017	2018	2019	2020
E07000224	Arun	LTLA	95.4	95.4	95.4	95.4	95.4	91.7
E07000225	Chichester	LTLA	102.2	98.0	100.4	97.8	95.5	93.9
E07000226	Crawley	LTLA	87.3	90.0	100.9	101.1	101.2	97.4
E07000227	Horsham	LTLA	100.0	105.4	94.4	95.5	93.4	86.3
E07000228	Mid Sussex	LTLA	97.3	93.6	92.4	93.1	91.2	92.4
E07000229	Worthing	LTLA	100.7	106.4	92.9	107.7	93.1	90.4
E12000009	South West	Region	94.1	91.7	90.3	90.1	89.3	86.7
E06000022	Bath and North East Somerset	LTLA	104.7	99.5	96.9	94.7	94.2	88.7
E06000023	Bristol, City of	LTLA	89.9	89.9	89.9	89.9	89.9	83.7
E06000024	North Somerset	LTLA	89.9	89.9	89.9	89.9	89.9	85.3
E06000025	South Gloucestershire	LTLA	104.1	101.2	98.3	96.8	96.7	92.7
E06000026	Plymouth	LTLA	84.0	75.8	75.3	75.9	73.8	75.7
E06000027	Torbay	LTLA	78.2	76.6	72.4	77.1	78.1	80.4
E06000030	Swindon	LTLA	96.6	87.0	90.7	81.8	84.8	81.2
E06000052	Cornwall	LTLA	101.4	96.4	95.2	93.5	91.1	87.5
E06000054	Wiltshire	LTLA	101.7	98.6	97.8	98.1	95.6	94.9
E06000058	Bournemouth, Christchurch and Poole	LTLA	102.8	107.0	97.1	96.8	91.2	87.8
E06000059	Dorset	LTLA	72.2	85.3	89.7	88.0	96.9	94.0
E10000008	Devon	UTLA	86.4	79.5	79.6	81.5	80.5	80.4
E07000040	East Devon	LTLA	96.9	81.9	81.6	83.2	80.5	81.5
E07000041	Exeter	LTLA	71.8	71.8	71.8	71.8	71.8	73.5
E07000042	Mid Devon	LTLA	101.7	95.4	93.5	95.6	93.0	90.2
E07000043	North Devon	LTLA	79.3	75.7	76.7	82.9	86.3	82.9
E07000044	South Hams	LTLA	82.9	82.9	82.9	82.9	82.9	86.6
E07000045	Teignbridge	LTLA	92.4	81.3	80.2	85.4	83.0	80.3
E07000046	Torrige	LTLA	79.7	65.3	70.5	67.9	64.9	64.8
E07000047	West Devon	LTLA	82.1	82.1	82.1	82.1	82.1	85.4
E10000013	Gloucestershire	UTLA	99.3	100.0	96.4	97.6	94.2	90.0
E07000078	Cheltenham	LTLA	103.1	110.4	96.7	100.4	88.4	86.3
E07000079	Cotswold	LTLA	106.6	106.6	106.6	106.6	106.6	97.5
E07000080	Forest of Dean	LTLA	102.3	98.4	91.1	92.6	86.5	85.1
E07000081	Gloucester	LTLA	94.9	94.9	94.9	94.9	94.9	92.2
E07000082	Stroud	LTLA	93.8	93.8	93.8	93.8	93.8	89.0
E07000083	Tewkesbury	LTLA	97.7	97.0	96.8	98.6	96.1	90.5
E10000027	Somerset	UTLA	97.4	89.9	87.8	88.7	88.0	85.6
E07000187	Mendip	LTLA	101.2	90.9	92.9	92.1	91.4	89.5
E07000188	Sedgemoor	LTLA	93.4	82.6	84.3	91.6	88.1	87.2
E07000189	South Somerset	LTLA	99.5	96.3	91.4	90.0	91.1	88.8
E07000246	Somerset West and Taunton	LTLA	95.5	87.8	82.8	82.3	82.1	78.0