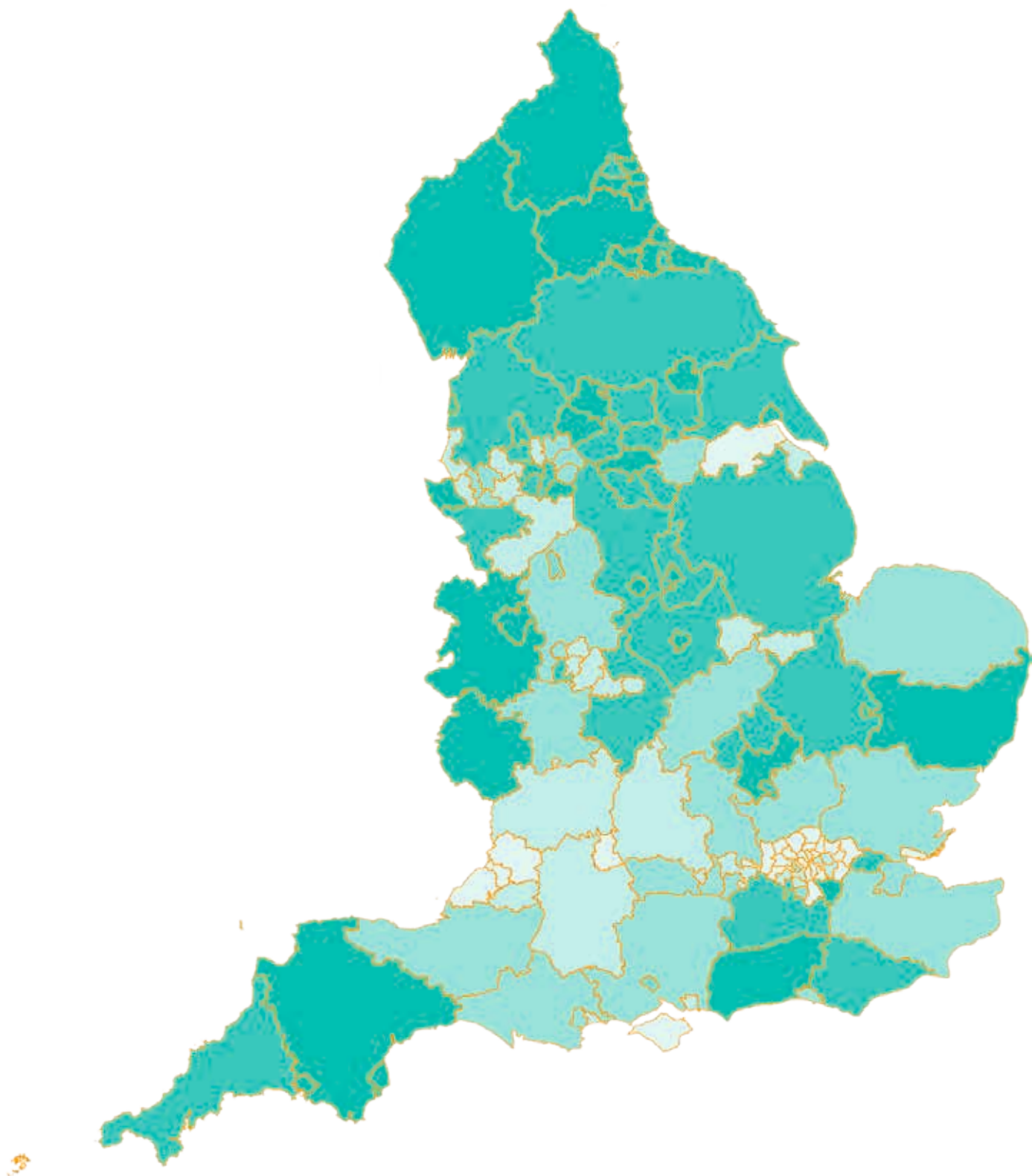


Annex 9

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# Atlas of Variation in Healthcare for Children and Young People



## **Atlas of Variation in Healthcare for Children and Young People**

Annex of the Annual Report of the Chief Medical Officer 2012,  
Our Children Deserve Better: Prevention Pays

Reducing unwarranted variation to increase value and improve quality  
(October 2013)

Introduction.....	08
Maps and chart presentation methods.....	10
Glossary of essential terms.....	115
Acknowledgements.....	119

## Section 1: Determinants of child health ..... 13

### A: Poverty and homelessness

Map 1 Child poverty: Percentage of children aged under 16 years living in families in receipt of out-of-work benefits or tax credits where their reported income is less than 60% of the median income, by local authority, 2010.....	14
Map 2 Family homelessness: Rate of households accepted as unintentionally homeless and eligible for assistance per 1,000 households, by local authority, 2011–2012.....	15

### B: Vulnerable Children

Map 3 Children in the child protection system: Rate of children aged 0–17 years who were the subject of a child protection plan, per 10,000 children aged 0–17 years, by local authority, at 31 March 2012.....	18
Map 4 Healthcare (medical) for looked-after children: Percentage of looked-after children (in care for at least 12 months) who had their annual health assessment, by local authority, 2011–2012.....	19
Map 5 Healthcare (dental) for looked-after children: Percentage of looked-after children (in care for at least 12 months) who had their teeth checked by a dentist, by local authority, 2011–2012.....	20

### C: Education

Map 6 School readiness: Percentage of children at the end of foundation stage (at age 5) who are assessed as having achieved a 'good level of development', by local authority, at January 2012.....	23
Map 7 Special educational needs (SEN): Percentage of children in state-funded schools with a statement of SEN, by local authority, at January 2012.....	24

### D: Crime & Youth Justice

Map 8 Crime and youth justice: Rate of young people aged 10–17 years receiving their first reprimand, warning or conviction, per 100,000 population aged 10–17 years, by local authority 2011–2012.....	27
---	----

## Section 2: Health promotion .....29

### A: Mortality

Map 9 Perinatal mortality: Perinatal mortality rate per 1,000 births, by local authority, 2009–2011.....	30
Map 10 Infant mortality: Infant mortality rate per 1,000 live births, by local authority, 2009–2011.....	31
Map 11 Childhood mortality: Directly standardised mortality rate for children aged 1–17 years, per 100,000 children aged 1–17 years, by local authority, 2009–2011.....	32

### B: Injury

Map 12 Hospital admissions due to injury: Rate of hospital admissions due to injury in children aged 0–17 years, per 10,000 children aged 0–17 years, by local authority, 2011–2012.....	35
Map 13 Injuries from road traffic accidents: Rate of children aged 0–15 years killed or seriously injured in road traffic accidents, per 100,000 children aged 0–15 years, by local authority, 2009–2011.....	36
Map 14 Mortality from accidental injury: Directly standardised rate of death in children and young people aged 0–24 years due to all accidental injury, per 100,000 children and young people aged 0–24 years, by local authority, 2002–2011.....	37
Map 15 Mortality from non-accidental injury: Directly standardised rate of death in children and young people aged 0–24 years due to all non-accidental injury, per 100,000 children and young people aged 0–24 years, by local authority, 2002–2011.....	38

### C: Weight

Map 16 Weight in 4–5-year-old children: Percentage of pupils in Reception class classified as overweight or obese, by local authority, 2011–2012.....	41
Map 17 Weight in 10–11-year-old children: Percentage of pupils in Year 6 classified as overweight or obese, by local authority, 2011–2012.....	42

### D: Alcohol, smoking and substance misuse

Map 18 Alcohol-related hospital admissions: Hospital admission rate for people aged 0–17 years due to alcohol-specific conditions, per 100,000 people aged 0–17 years, by local authority, 2008–2009 to 2010–2011.....	45
--	----

## E: Dental health

Map 19 Dental health: Hospital admission rate for dental caries in children aged 1–4 years, per 100,000 children aged 1–4 years, by local authority, 2009–2012 .....	48
--	----

## F: Immunisations

Map 20 Diphtheria, tetanus, polio, pertussis and Haemophilus influenzae type b (DTaP/IPV/Hib) vaccine coverage at 2 years: Percentage of immunisation completion for routine vaccinations against DTaP/IPV/Hib at 2 years, by local authority, 2011–2012 .....	50
--	----

Map 21 Pneumococcal conjugate vaccine (PCV) coverage at 2 years: Percentage of immunisation completion for routine vaccinations against pneumococcal disease at 2 years, by local authority, 2011–2012 .....	51
--	----

Map 22 Measles, mumps and rubella (MMR) vaccine coverage at 5 years: Percentage of immunisation coverage for routine vaccinations against MMR at 5 years, by local authority, 2011–2012 .....	52
---	----

Map 23 Human papillomavirus (HPV) vaccine coverage at 13 years: Percentage of immunisation coverage for routine vaccinations against HPV for girls aged 12–13 years, by local authority, 2011–2012 .....	53
--	----

## G: Sexually Transmitted Infection

Map 24 Chlamydia: Rate of diagnoses of genital Chlamydia trachomatis in young people aged 15–24 years, per 100,000 people aged 15–24 years, by local authority, 2012 .....	56
--	----

## Section 3: Child health in the perinatal period .....59

### A: Teenage pregnancy

Map 25 Teenage conceptions: Conceptions in females aged <18 years, per 1,000 females aged 15–17 years, by local authority, 2011 .....	60
---	----

Map 26 Teenage births: Percentage of delivery episodes where the mother is aged <18 years, by local authority, 2011/12 .....	61
--	----

### B: Antenatal health

Map 27 Low birth weight: Percentage of live and stillborn infants who have a birth weight <2,500g, by local authority, 2011 .....	64
---	----

Map 28 Smoking in pregnancy: Percentage of women who currently smoke at the time of delivery, by local authority, 2011–2012 .....	65
---	----

## C: Breastfeeding

Map 29 Breastfeeding initiation: Percentage of infants who are given breastmilk within 48 hours of delivery, by local authority, 2011–2012 .....	68
--	----

Map 30 Breastfeeding at 6–8 weeks: Percentage of infants who are totally or partially breastfeeding at 6–8 weeks, by local authority, 2011–2012 .....	69
---	----

## D: Postnatal Health

Map 31 Postnatal health: Rate of emergency admissions to hospital of babies within 14 days of being born per 1,000 deliveries, by local authority, 2011–2012 .....	72
--	----

## E: Preterm birth

Map 32 Neonatal mortality: Percentage of infants born at <30 weeks' gestation and admitted to neonatal units, who died ≤28 days, by neonatal network of booking, directly standardised by gestational age, 2012 .....	74
---	----

Map 33 Breastfeeding at discharge: Percentage of infants born at <30 weeks' gestation and admitted to neonatal units who were receiving any mother's milk at discharge from neonatal care, by neonatal network of discharge, directly standardised by Index of Multiple Deprivation (IMD), 2012 .....	75
---	----

Map 34 Survival free of any impairment at age 2 years: Percentage of infants born at <30 weeks' gestation and admitted to neonatal units who survived to 2 years of age free of any impairment (mild, moderate or severe), by region, born in 2010 .....	76
--	----

## Section 4: Healthcare for children and young people ....79

### A: Accident & Emergency Attendances

Map 35 Emergency attendance: Rate of attendance to Accident and Emergency departments in persons aged 4 years and under, per 1,000 population aged 4 years and under, by local authority, 2010–2011 .	80
---	----

### B: Unplanned Hospital Admissions

Map 36 Duration of non-elective hospital admissions: Mean length of stay (days) for non-elective admissions in children aged 0–17 years, by local authority, 2011–2012 .....	82
--	----

Map 37 Zero-day admissions: Percentage of hospital admissions in children aged 0–17 years where the duration of stay was shorter than 24 hours, by local authority, 2011–2012 .....	83
---	----

Map 38 Emergency readmissions: Percentage of emergency admissions in children aged 0–15 years occurring within 28 days of the last, previous discharge from hospital after admission, by local authority, 2010–2011 .....	84
---	----

## Section 5: Healthcare for acutely ill children.....87

### A: Bronchiolitis

Map 39 Bronchiolitis: Hospital admission rate: Directly standardised rate of emergency admissions with bronchiolitis in children aged under 2 years, per 100,000 children aged under 2 years, by local authority, 2011–2012 .....	88
---	----

Map 40 Bronchiolitis: Duration of hospital stay: Mean length of stay (days) for bronchiolitis in children aged under 2 years, by local authority, 2011–2012 .....	89
---	----

### B: Lower Respiratory Tract Infections (LRTIs)

Map 41 LRTIs: Hospital admission rate: Directly standardised rate of emergency admissions with LRTIs in children aged 4 years and under, per 100,000 children aged 4 years and under, by local authority, 2011–2012 .....	92
---	----

Map 42 LRTIs: Duration of hospital stay: Mean length of stay (days) for LRTIs in children aged 4 years and under, by local authority, 2011–2012 .....	93
---	----

### C: Ear, Nose and Throat Surgery

Map 43 Tonsillectomy: Directly standardised rate of elective tonsillectomy in children aged 0–17 years, per 100,000 children aged 0–17 years, by local authority, 2011–2012 .....	95
---	----

Map 44 Aural ventilation tube insertion: Directly standardised rate of aural ventilation tube (grommet) insertion in children aged 0–17 years, per 100,000 children aged 0–17 years, by local authority, 2011–2012 .....	96
--	----

## Section 6: Children with long term conditions.....99

### A: Asthma

Map 45 Asthma: Crude emergency admission rate for children with asthma, per 100,000 population aged 0–18 years, by local authority, 2011–2012 .....	100
---	-----

### B: Epilepsy

Map 46 Epilepsy: Crude emergency admission rate for children with epilepsy, per 100,000 population aged 0–18 years, by local authority, 2011–2012 .....	102
---	-----

Map 47 Epilepsy: Duration of hospital stay: Mean length of emergency inpatient stay (days) for children with epilepsy aged 0–18 years, by local authority, 2011–2012 .....	103
--	-----

### C: Diabetes

Map 48 Diabetes: Percentage of children and young people aged 0–24 years with diabetes cared for in a Paediatric Diabetes Unit (PDU) whose most recent HbA1c measurement was less than 58 mmol/mol (7.5%), by PDU, 2010/11 .....	106
--	-----

## Section 7: Mental health.....109

### A: Prevalence and outcomes

Indicator 49 Mental health: prevalence of problems: Variation in community prevalence of mental health disorders for 11–13 year olds in secondary schools, by local authority, 2009–2011 (controlling for known risk factors).....	110
--	-----

Indicator 50 Mental health: specialist service outcomes: Variation in change in mental health disorders following contact with Specialist Services for 11–18 year olds accessing Child and Adolescent Mental Health Services (CAMHS), by CAMHS units, 2008–12 .....	110
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This section of the Annual Report of the Chief Medical Officer 2012, *Our Children Deserve Better; Prevention Pays* illustrates the current state of child health in England by highlighting existing variation in healthcare and health outcomes for children and young people. It builds on the work of Right Care's NHS Atlas of Variation in Healthcare for Children and Young People, published in March 2012<sup>1</sup>, and expands on the analysis of healthcare indicators by using a broader range of measures of child health.

## Unwarranted variation

Variation occurs because healthcare exists as part of a complex system. That variation exists is beyond debate – the stories which clinicians, commissioners and, most importantly, children, young people and their families could tell about how health services vary would fill the pages of this report several times over. It is useful to separate out the aspects of variation which are inevitable or desirable, and explore and tackle unwarranted variation – 'variation that cannot be explained by patient illness or preference'.<sup>2</sup>

There are many legitimate reasons why variation occurs. There may be differences in population demography or socio-economic status, and variation may even be desirable if it is the result of local innovation and excellence. Unwarranted variation, however, describes that which cannot be explained either by patient choice or by the nature of their illness.

Policy debate around reducing variation often focuses on reducing healthcare inefficiency and providing value to the NHS. However, examining variation can highlight inequity and inequality in:

- quality of care
- access and appropriateness of healthcare
- health outcomes.

There are many possible reasons for unwarranted variation:

- Where the evidence for preventive or therapeutic interventions is inconclusive, variations in interpretation and practice may lead to variable outcomes.
- Where evidence is clear, it may be that there are limitations to systems that prevent high-quality care from being delivered.
- Supply of resources may directly influence healthcare utilisation, magnifying variation with no demonstrable improvement in outcome.

To understand the causes of unwarranted variation in child health, we must also look beyond healthcare. Variation in how policies and guidance are applied, and variable access to proven interventions, are not problems which belong exclusively to healthcare. They exist in educational and social care services, which may have a significant impact on health outcomes in children.

## Child health atlas project

The first NHS Atlas of Variation in Healthcare for Children and Young People (2012) gave clinicians, commissioners and the public information about how healthcare services for children and young people differ between regions in terms of quality, activity, expenditure and outcome. It sought to move beyond the headlines of 'postcode lottery' and into interpretations of variation, identifying causes and practical suggestions for improvement to healthcare services.

It was used extensively, and was well received by, commissioners, policy makers, clinicians and service users. Public Health England has committed to continuing to produce this resource<sup>3</sup> in order to continue to:

- highlight variations
- illustrate healthcare on a population basis
- drive accountability and transparency in commissioning and delivering healthcare.

The indicators included in section one of this Atlas illustrate variation not only in healthcare, but also in child public health and its broader determinants. It demonstrates the value of viewing child health in a broader context, in tandem with the Annual Report of the Chief Medical Officer 2012 (Special Report – *Our Children Deserve Better; Prevention Pays*).

## Policy implications

Highlighting unwarranted variation in health services and outcomes is of little consequence unless we start to unravel the causes. Indicators in this report are accompanied by commentaries which describe the evident variation and explore the underlying reasons. Commentaries include suggestions for possible actions to tackle variation, many of them focused on local options for commissioners and clinicians.

Populations that are similar, but in which health outcomes vary significantly, provide an especially rich source of learning. Showing clinicians and commissioners the outcomes that are possible in comparable populations can help to shed the perception that variation is inevitable, and exclusively related to patient factors. Instead, it should provide motivation to explore approaches and interventions to improve health and healthcare for the children and young people.

Reliable and timely data, presented meaningfully are key to understanding, planning and evaluating child health and healthcare services well. Many indicators were suggested for this Atlas but could not be included as data were not available or complete. Others indicators could not be included due to lack of standardisation or linkage between data systems, either within health services or among related agencies such as educational and social care services. Some issues transcend regional boundaries or individual conditions and pathways.

1 [www.rightcare.nhs.uk/index.php/atlas/children-and-young-adults/](http://www.rightcare.nhs.uk/index.php/atlas/children-and-young-adults/)

2 Wennberg JE. (2010). *Tracking Medicine. A Researcher's Quest to Understand Health Care*. Oxford University Press.

3 Department of Health (2013). *Improving children and young people's health outcomes: a system wide response*. [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/214928/9328-TSO-2900598-DH-SystemWideResponse.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/214928/9328-TSO-2900598-DH-SystemWideResponse.pdf)



Efforts are under way to improve the quality of, and access to, data for research and service improvement; the leadership provided by the newly established Child and Maternal Health Intelligence Network and the Children and Young People's Health Outcomes Board will be vital in developing data systems to help better understand and improve the health of children and young people. Strategic clinical networks for children and young people will work to improve integrated pathways of care. The advent of these networks will also provide an opportunity for data sharing.

Research into variation analysis is a relatively young science. Investigating the causes of unwarranted variation, and supporting related innovations to drive improvement in healthcare, may improve outcomes for children and young people's health; sustaining research has the potential to pay dividends.

## Acknowledgments

This version of the Atlas would not be possible without the foundations laid by Muir Gray, Philip DaSilva and Erica Ison at NHS Right Care in their pioneering Atlas series. The Child and Maternal Health Intelligence Network and child health colleagues within Public Health England have been, and continue to be, vital to the production of the majority of the indicators included in this Atlas. Most of all, I am thankful for the many contributing clinicians, experts and researchers who have contributed data and expertise to this Atlas.

## Selection of indicators

Experts in clinical child health and health data analysis in public health observatories and Department of Health policy teams were consulted about the selection and development of indicators for the NHS Atlas of Variation in Healthcare for Children and Young People (2012). Topics were selected to include as wide a range of child health services as possible, and indicators relating to those topics were chosen because they were deemed of particular interest with respect to unwarranted variations in healthcare.

For this iteration of the Atlas, the Editor has chosen to widen the range of indicators beyond healthcare to include public health indicators. Many of the new indicators have been chosen to reflect the recommendations of the Children and Young People's Health Outcomes Forum report (2012).<sup>1</sup> The Editor has also chosen to update 14 indicators from the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

Limitations of data quality and availability have precluded the inclusion of some topics that would benefit from variation analysis. This Atlas should be viewed as a stimulus to encourage commissioners and clinicians to investigate health outcomes in local populations.

Public Health England welcomes suggestions for potential new indicators for inclusion in their online range of indicators <http://atlas.chimat.org.uk/IAS/dataviews/> or <http://datagateway.phe.org.uk/>.

## Data sources

Data for most of the indicators have been extracted by colleagues at Public Health England from existing national datasets, including:

- Health and Social Care Information Centre Indicator Portal
- Department for Education statistics
- Health Protection Agency Centre for Infections
- Hospital Episode Statistics
- Office for National Statistics
- Integrated Performance Measure Return.<sup>2</sup>

For the remaining indicators, data from research institutions and national audits have been used to generate the maps; provenance of these datasets is given in the relevant commentaries.

The metadata, including details of data provenance, will be made available online at the Child and Maternal Health Intelligence Network, Public Health England ([www.chimat.org.uk/CMO2012](http://www.chimat.org.uk/CMO2012) or <http://datagateway.phe.org.uk>) and at [data.gov.uk](http://data.gov.uk).

## Classification

Data have been mapped by several geographies: by local authorities, provider units and clinical networks. The choice of geography has been made based on appropriateness – what is termed 'data attribution'. However, for some indicators, data may not be available in a suitable format for mapping with the optimal geography and instead a pragmatic choice has been made. In particular, it has not yet been possible to map some healthcare indicators by clinical commissioning group (CCG), and they have instead been presented by local authority. These indicators will be presented by CCG in Public Health England's online data atlas in the near future, where possible.

Data for each of the indicators included in the Child Health Atlas are displayed as both a chart and map to show variation in terms of magnitude and geographical location within England. London is shown as a page inset on all maps in order to keep detail that otherwise might be lost.

The charts and maps for all indicators are colour-classified into thematic displays, which group the areas (e.g. local authorities) into categories and allow the reader to view and compare areas on the map without having to refer to individual values. A simple method of classification using equal counts of areas was used to display all indicators, regardless of distribution of data within indicators. Five equal counts of areas or 'quintiles' were classified for all indicator data where possible. However, as most of the indicators include a total number of areas that are not divisible by five, in most cases the classifications do not include exactly the same number of areas. The method used to create the classification was to rank order the areas from highest to lowest values, then divide the ranks into five equal categories. However, in some cases, indicators included tied ranks (i.e. where some area values were exactly the same) and no areas were split into different categories where the rank was equal; this meant that an equal split was not possible in these cases. For the few indicators where there were many tied ranks of equal data, the split between categories was adjusted to ensure a 'best fit' of equal numbers, without splitting areas with the same values.

The disadvantage of using quintiles and equal counts of data is that this method does not take into account the distribution of the data, and categories can be created with very different ranges of variation between the highest and lowest values. This should be taken into consideration when comparing areas in different categories within indicators.

The classification is shaded from light green (lowest value) to dark green (highest value) on both the charts and maps. The ranges and their shading do not indicate whether a high or low value for an area represents either good or poor performance.

The charts have been originally produced in Microsoft Excel 2010 and the maps originally created using InstantAtlas.

1 <http://webarchive.nationalarchives.gov.uk/20130805112926/http://www.dh.gov.uk/health/files/2012/07/CYP-report.pdf>

2 Previously known as Vital Signs Monitoring Return.



## Standardisation

Standardisation allows like to be compared with like, by making sure that differences in the number of events (e.g. deaths or infections) observed in two or more populations are not due to differences in the age and sex profile between the different populations (e.g. suppose population A has a higher death rate than population B; however, if population A also has a higher proportion of older people, then we would expect there to be more deaths and it would be misleading to infer that people are dying at a faster rate in population A than population B). The two main methods of standardisation are directly standardised rates and indirectly standardised rates.

Directly standardised rates adjust for differences in age and sex distribution by applying the observed rates (e.g. of death or infection) for each age-band in the study population to a standard population structure in order to obtain a weighted average rate.

Indirectly standardised rates adjust for differences in age and sex distribution by applying the observed rates (e.g. of death or infection) for each age-band in a standard population (e.g. England) to the population of the same age bands in the study area.

The directly standardised rate is the method that has been used to standardise data in the Child Health Atlas, and the data have been standardised by age alone.

For certain indicators, it has been possible to investigate correlations between the data and socio-economic deprivation; these are presented as separate visualisations in the accompanying commentaries. Values from the Index of Multiple Deprivation (IMD) 2010 have been used. The IMD is a composite rating of seven markers of social deprivation: income, employment, health and disability, education and skills, housing and services, living environment and crime.

## Confidence intervals

The indicators have error terms associated with them to give an indication of the level of uncertainty of the calculation, referred to as confidence intervals. Statistical uncertainties usually arise because the indicators are based on a random sample of finite size from a population of interest. Confidence intervals are used to assess what would happen if we were to repeat the same study, over and over, using different samples each time. The precise statistical definition of a 95% confidence interval states that, on repeated sampling, 95 times out of 100 the true population value would be within the calculated confidence interval range and for 5 times out of 100 the true value would be either higher or lower than the range. Where these confidence intervals have been calculated for indicators in the Atlas, they are displayed on the bar graphs of the indicator as a banded line.

The smaller the confidence interval, the more stable the indicator; a larger number of events leads to a smaller interval.

## Exclusions

For each of the indicators mapped to an upper-tier local authority geography or provider unit, the calculation of the full range of variation is given in the accompanying commentaries; in addition, the range has then been calculated from which the highest five values and the lowest five values have been excluded. This is because 'outliers' could be the result of errors in data management (e.g. some data may not have been returned or events may have been recorded twice). This exclusion was originally suggested by Professor Sir Mike Richards for Atlas 1.0, and Right Care has continued to use the 'Richards heuristic' in subsequent Atlases.

For some indicators, where a local indicator value is created from less than five events, then these values are removed from the map and associated chart (e.g. where the indicator value is the rate of elective admissions to hospital per population, the events are the number of admissions to hospital). The indicator values are removed for two reasons:

- They are not considered sufficiently reliable, where chance could have too much influence over the value.
- They are considered potentially disclosive of individuals in the local area.

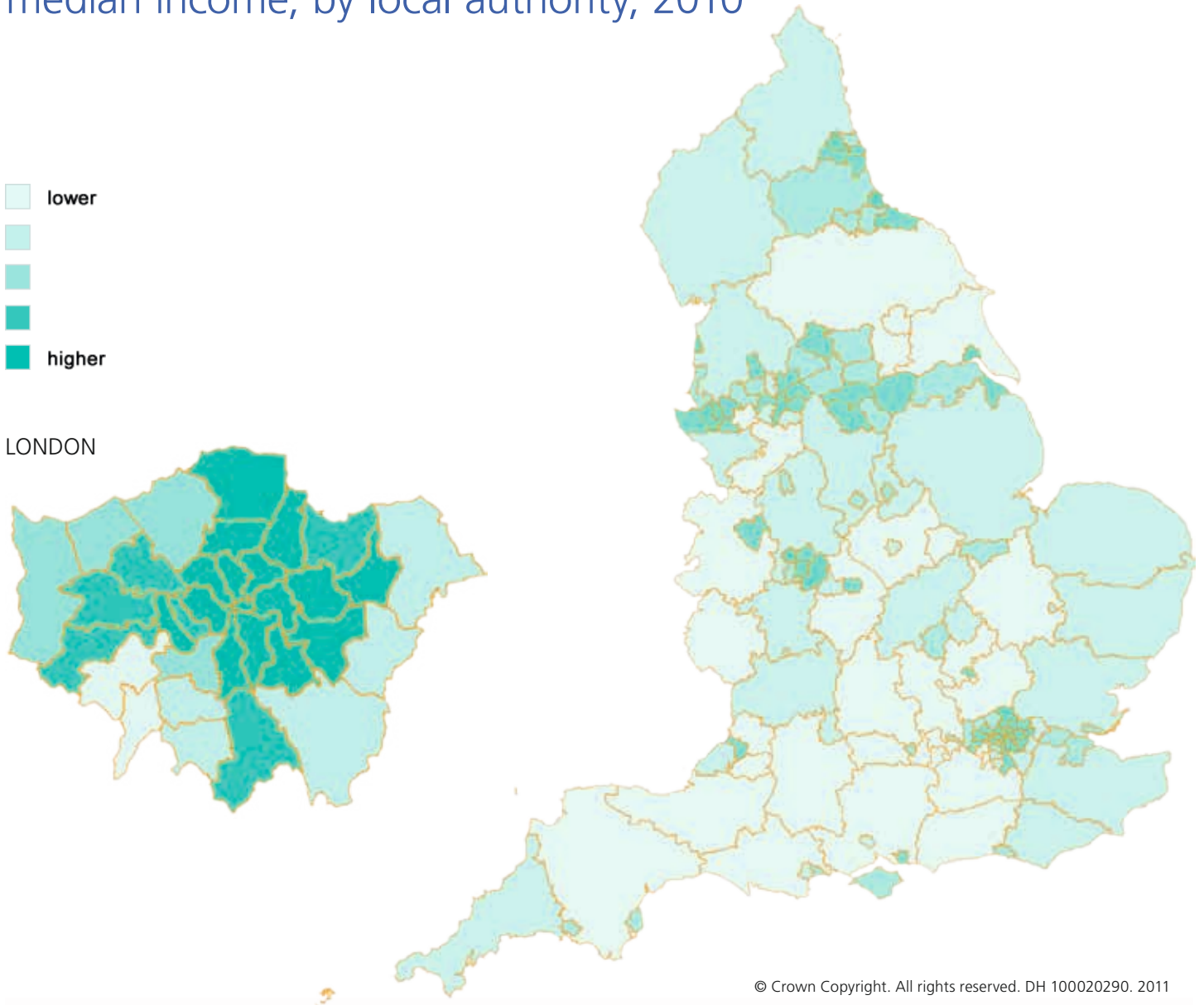
Section 1:

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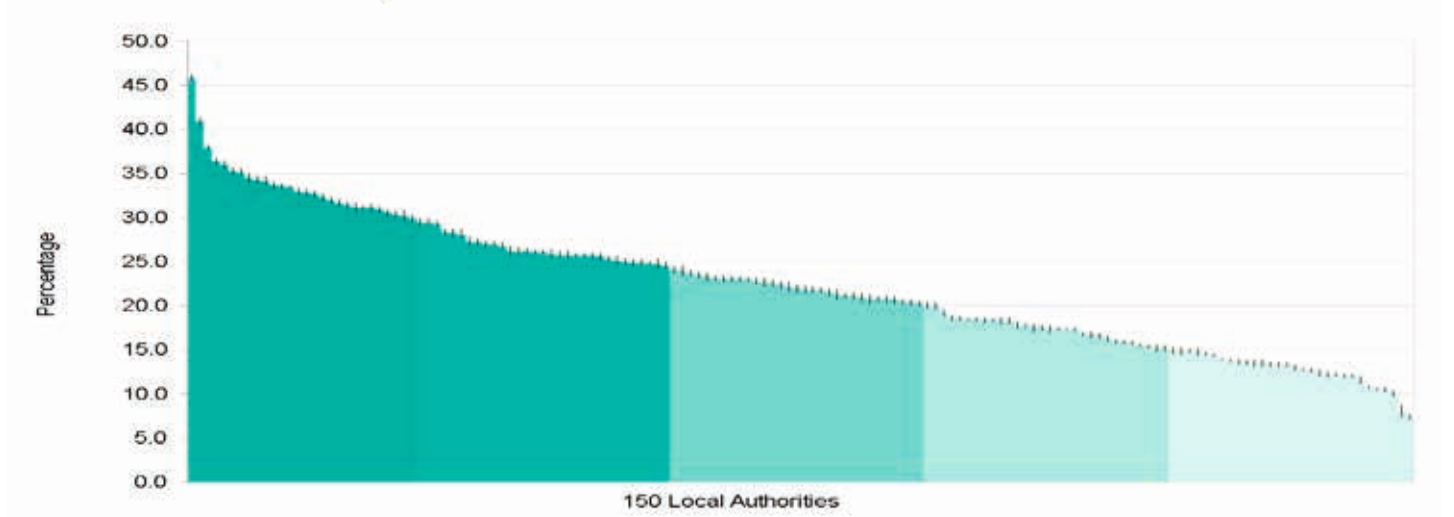
# Determinants of child health

A: Poverty and homelessness

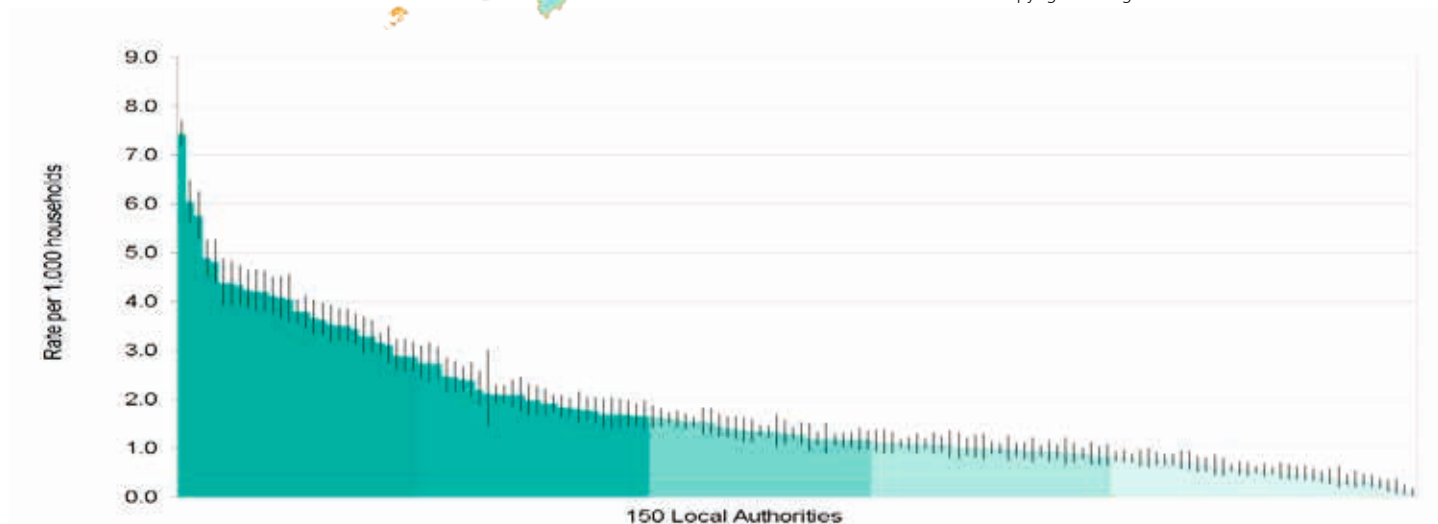
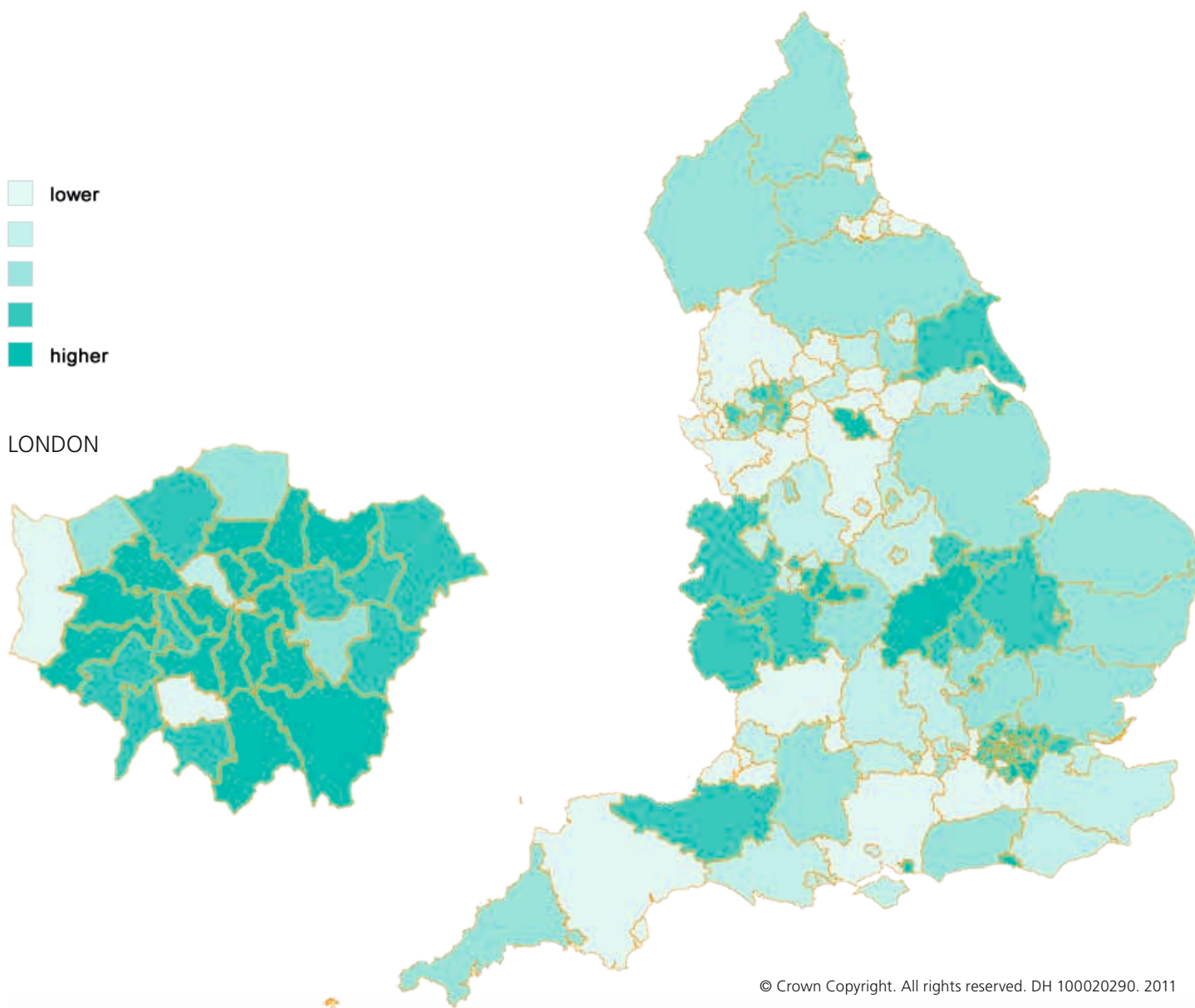
**Map 1** Child poverty: Percentage of children aged under 16 years living in families in receipt of out-of-work benefits or tax credits where their reported income is less than 60% of the median income, by local authority, 2010



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**Map 2** Family homelessness: Rate of households accepted as unintentionally homeless and eligible for assistance per 1,000 households, by local authority, 2011–2012



# Section 1: Determinants of child health

## Context

Social and material disadvantage is now well established as a predictor of poor health, social and educational outcomes in children.<sup>1</sup> Although there is debate over the definitions of how to measure poverty, whether relative or absolute inequality is more important, and the impact of other mitigating factors on future development, there is little argument that the effect of this disadvantage has a lasting impact on the life course.

An inadequate living environment has lasting effects on a child's health, and is a risk factor for the development of poor health in future. Homelessness is only the extreme end of the spectrum of poor living conditions – many children and families are living in poor-quality, overcrowded housing, or in food or fuel poverty.<sup>2,3</sup>

The Child Poverty Act 2010 made law the Government's aspiration to reduce child poverty in the UK to below 1 in 10 of all children by 2020.<sup>4</sup> 'Children in poverty' is included as an outcome measure in the Public Health Outcomes Framework 2013–16. The Children and Young People's Health Outcomes Forum report 2012 recommended 'Number of children and young people living in decent housing' for inclusion as a national outcome measure.

## Magnitude of variation

### Map 1: Child poverty

For local authorities in England, the percentage of children aged under 16 years living in families in receipt of out-of-work benefits or tax credits, where their reported income is less than 60% of the median income, ranges from 7.4% to 45.9% (i.e. a six-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 10.8% to 35.3%, and the variation is over three-fold.

### Map 2: Family homelessness

For local authorities in England, the rate of households accepted as unintentionally homeless and eligible for assistance, per 1,000 households, ranges from 0.1 to 7.4 (a 74-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 0.3 to 4.4, and the variation is nearly 15-fold.

Child poverty is, unsurprisingly, correlated with living in a deprived neighbourhood. What is more surprising is that rates of family homelessness are only weakly associated with living in a deprived area (see Figure 1A.1), which suggests that there are alternative reasons for unwarranted variation.

## Options for action

Although the causes of poverty and homelessness are complex and multifactorial, their effects on the future health and wellbeing of affected children may be mitigated by targeted early interventions on:

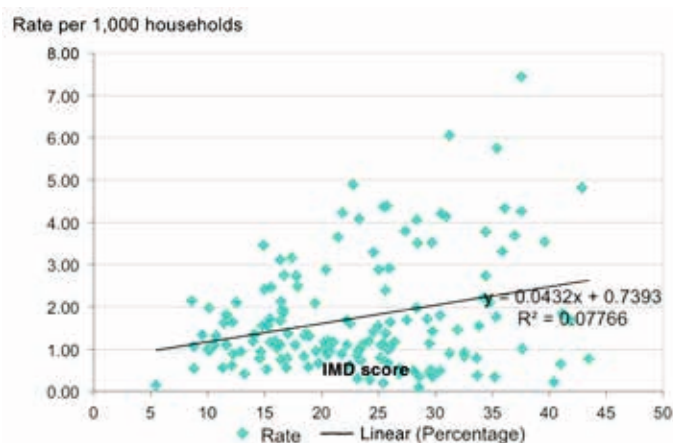
- perinatal factors (such as antenatal health and nutrition, and healthy behaviours)
- support for at-risk parents and families, such as Family Nurse Partnerships
- community services to support early years education and child development, including health visitors and Sure Start programmes.

Commissioners can reduce variation by ensuring that these evidence-based, targeted interventions are appropriately resourced.

Measures of poverty and homelessness are not the only indicators to assess the impact of material and social disadvantage. Commissioners and local authorities can better identify at-risk populations by also evaluating other indicators of disadvantage for their population.

Housing stock and quality have tangible public health consequences. Health and Wellbeing Boards may wish to consider prioritising this issue.

**Figure 1A.1 Correlation between deprivation and rate of family homelessness, by local authority, 2011–2012 (High IMD score indicates more deprived area)**



1 Marmot M et al. (2010). Fair Society, Healthy Lives: Strategic Review of Health Inequalities in England Post-2010. Marmot Review; London.  
2 BMA Board of Science (2013). Growing up in the UK: Ensuring a healthy future for our children. BMA; London.  
3 National Children's Bureau (2013). Greater Expectations: Raising aspirations for our children. Available from: [www.ncb.org.uk/12976](http://www.ncb.org.uk/12976).  
4 Department for Education (2010). Child Poverty Act. Available from: [www.education.gov.uk/childrenandyoungpeople/families/childpoverty/a0066302/the-child-poverty-act](http://www.education.gov.uk/childrenandyoungpeople/families/childpoverty/a0066302/the-child-poverty-act).

## Resources

For more on the Government's strategy and accountability for tackling child poverty, see:

- Child Poverty Act (2010)  
([www.education.gov.uk/childrenandyoungpeople/families/childpoverty/a0066302/the-child-poverty-act](http://www.education.gov.uk/childrenandyoungpeople/families/childpoverty/a0066302/the-child-poverty-act))
- A New Approach to Child Poverty: Tackling the Causes of Disadvantage and Transforming Families' Lives  
([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/177031/CM-8061.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/177031/CM-8061.pdf))

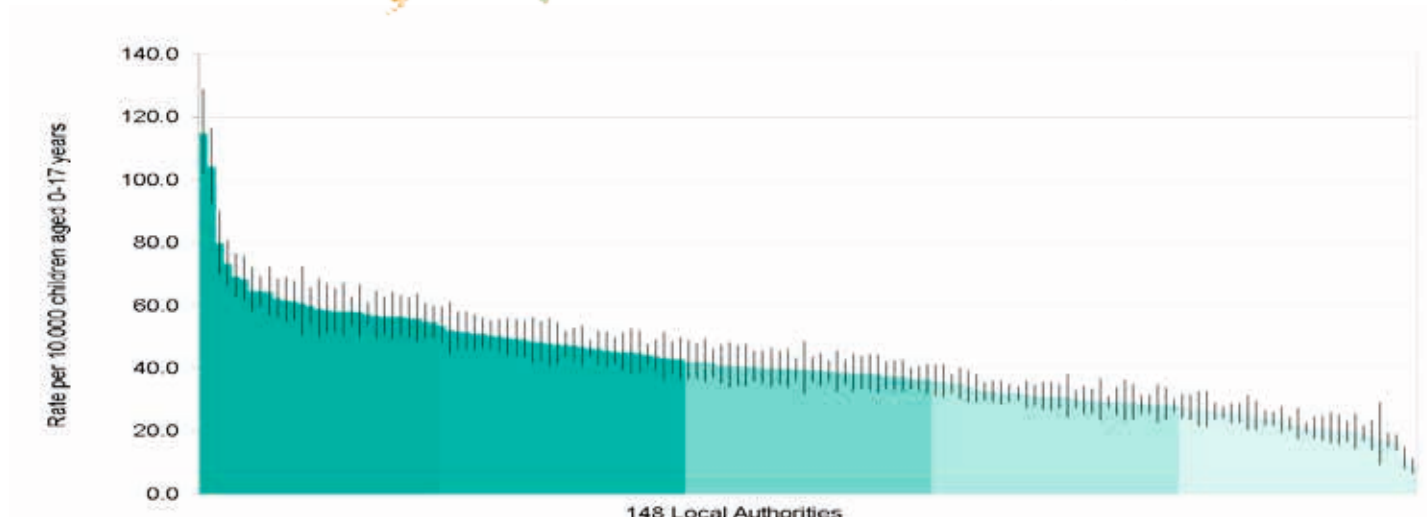
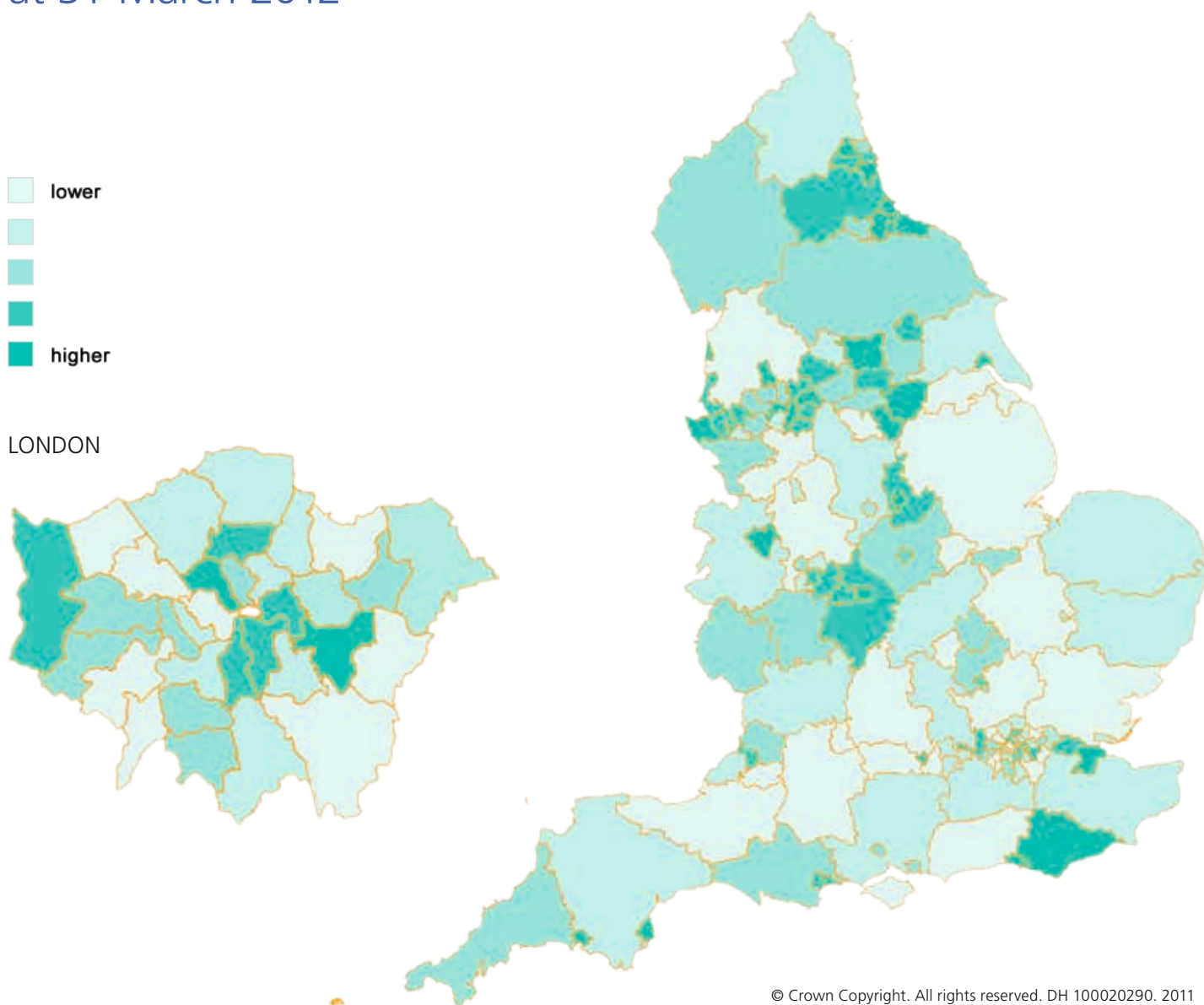
Also see:

- UNICEF report card 10: Child poverty across industrialised nations:  
Adamson P (2012). Measuring child poverty: New league tables of child poverty in the world's rich countries  
([www.unicef-irc.org/publications/660](http://www.unicef-irc.org/publications/660))
- End Child Poverty's 'Child Poverty Map of the UK 2013'  
([www.endchildpoverty.org.uk/images/ecp/130212%20ECP%20local%20report%20final\(2\).pdf](http://www.endchildpoverty.org.uk/images/ecp/130212%20ECP%20local%20report%20final(2).pdf))
- National Children's Bureau (2013). Greater Expectations  
([www.ncb.org.uk/12976](http://www.ncb.org.uk/12976)).

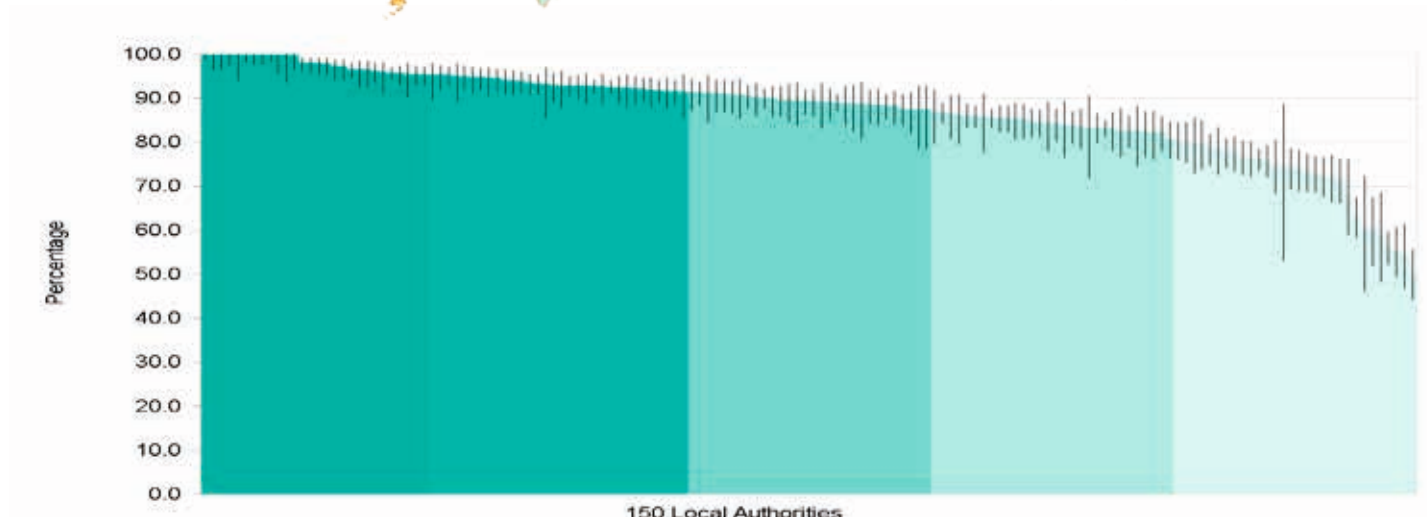
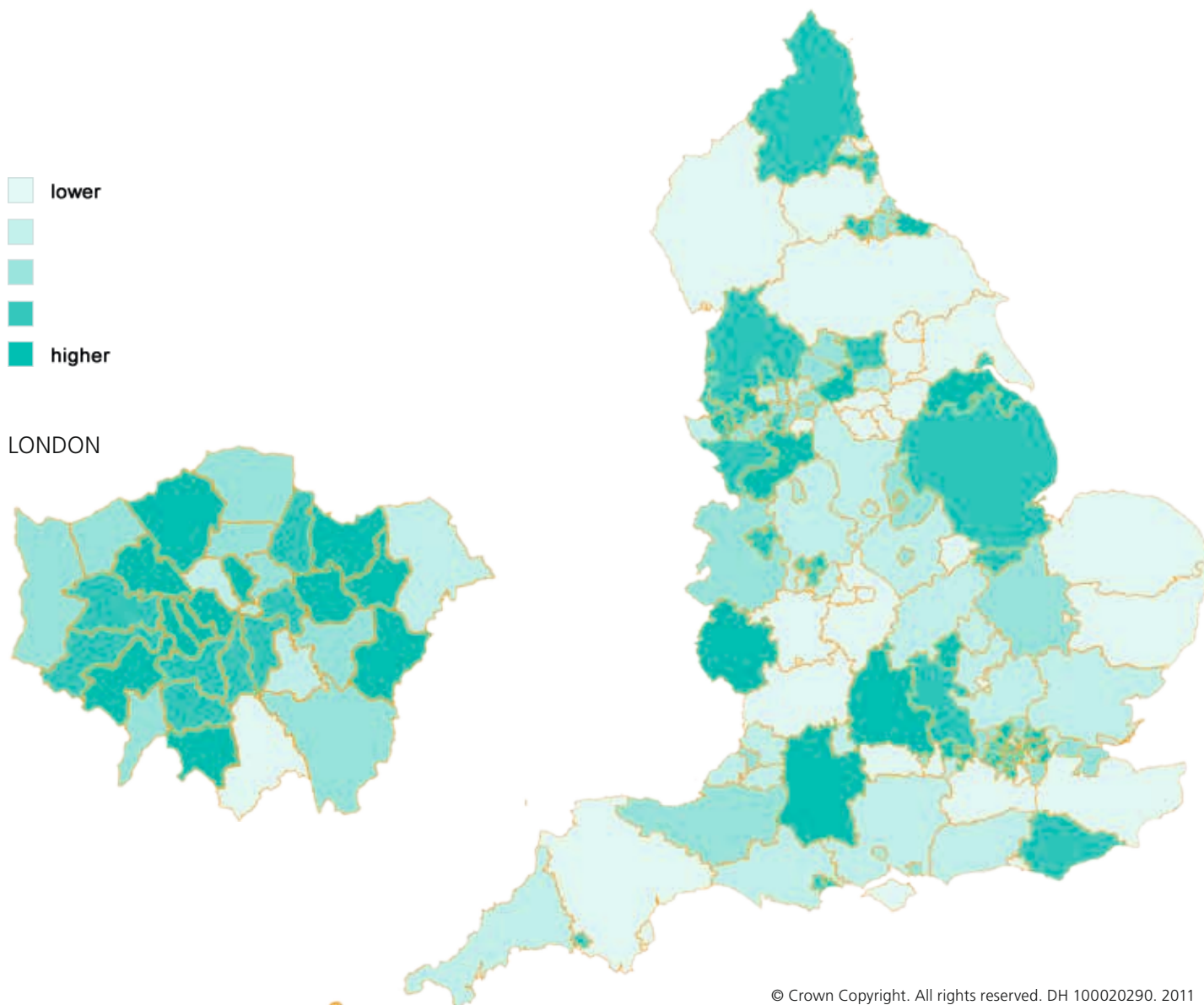


**B: Vulnerable children**

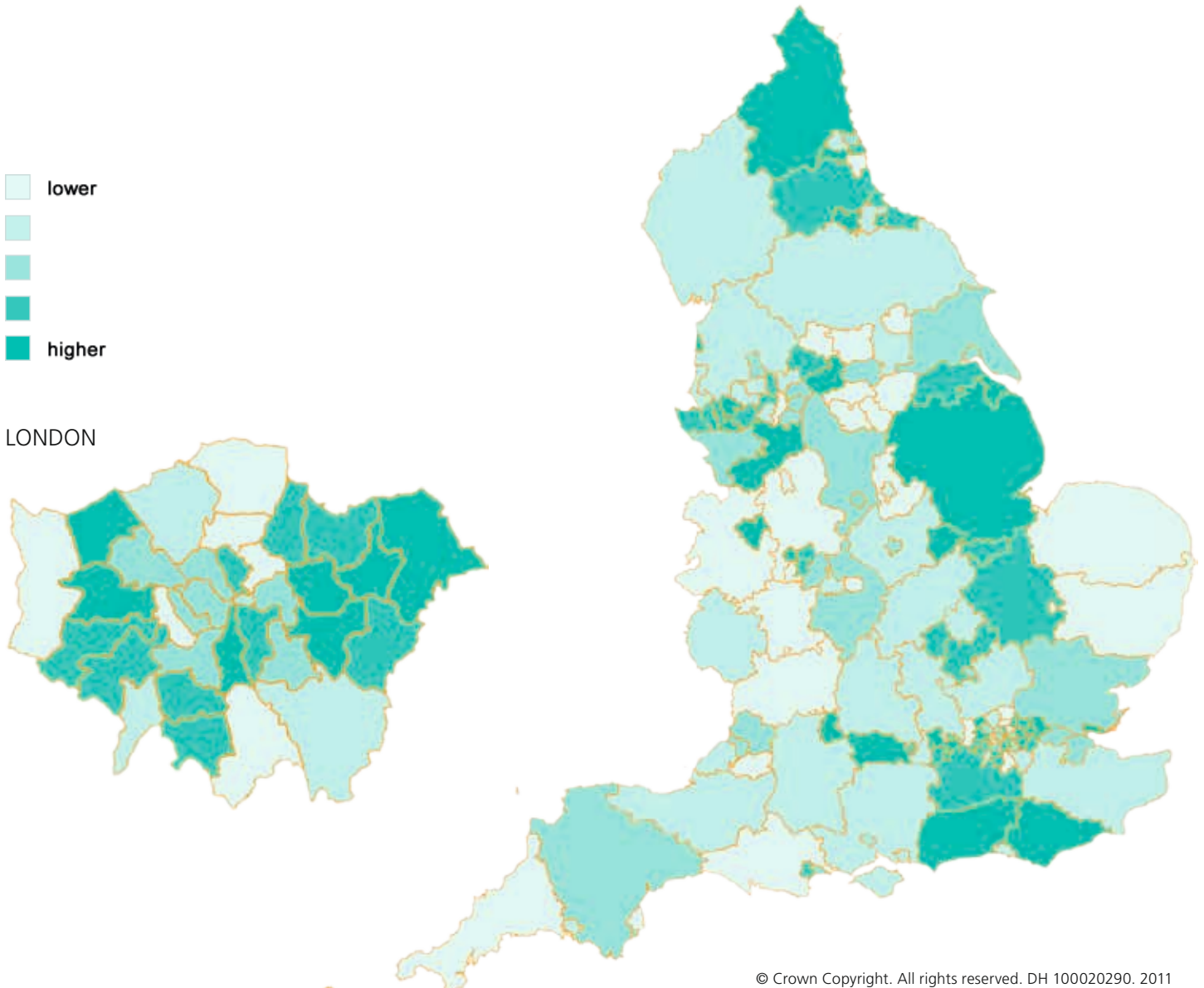
**Map 3** Children in the child protection system: Rate of children aged 0–17 years who were the subject of a child protection plan, per 10,000 children aged 0–17 years, by local authority, at 31 March 2012



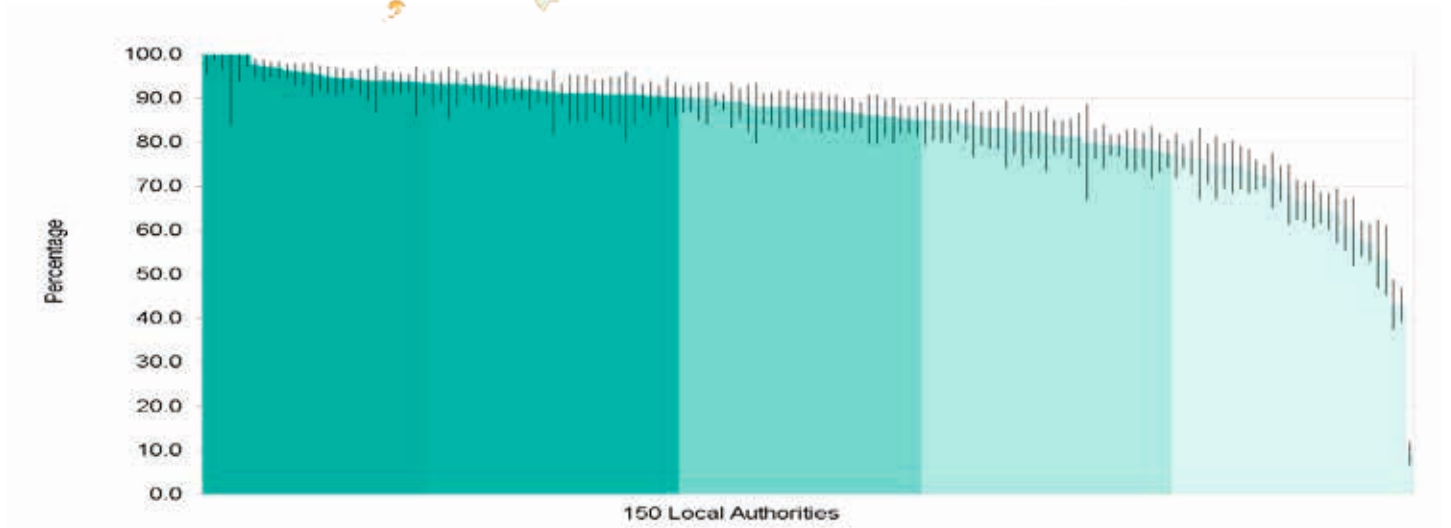
**Map 4** Healthcare (medical) for looked-after children: Percentage of looked-after children (in care for at least 12 months) who had their annual health assessment, by local authority, 2011–2012



**Map 5** Healthcare (dental) for looked-after children: Percentage of looked-after children (in care for at least 12 months) who had their teeth checked by a dentist, by local authority, 2011–2012



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## Context

Child maltreatment has a prevalence of between 1 in 10 and 1 in 25 children.<sup>1</sup> The self-reported figures for maltreatment are higher, with reported rates of maltreatment of 5.9% in children aged under 11 years, 18.6% of 11–17 year olds, and 25.3% of 18–24 year olds.<sup>2</sup>

In England, children who are identified as being at serious risk of maltreatment are placed under a child protection plan. The number of children who are placed under a child protection plan is a crude indicator for child maltreatment – it reports only those children who are deemed to require intervention, without information on the thresholds for intervention. Increasing rates of children placed under a child protection plan may represent higher prevalence of maltreatment, more cases being identified or changes in the threshold for intervention.

The overall rates for child maltreatment do not appear to have changed significantly over the past 30 years.<sup>3</sup> However, the number of children (both absolute and as a proportion of all children) being placed under a child protection plan in England has increased by 63% over the past decade.<sup>4</sup>

‘Looked-after children’ refers to children who are placed in the care of the state, away from their parents or family and under the supervision of a social worker. On 31 March 2012, more than 1 in 200 children in England were in care, with over half being due to maltreatment (including neglect). Other reasons include physical disability, parental absence or incapacity. While many children benefit from the secure environment provided by being placed in care, looked-after children tend to display poorer health, educational and social outcomes.<sup>5</sup>

There is a statutory requirement for looked-after children to undergo a health assessment and dental review on entry to care and at least annually thereafter. These assessments are designed to identify otherwise unrecognised health needs, and should lead to a health plan which forms part of the overall care plan. Although evidence for these assessments as a health screening tool is limited, they demonstrate benefits for health promotion and ensure inter-agency communication between health and social care.<sup>6</sup>

The two indicators involving looked-after children exclude

children who have been in care for less than 12 months – while statutory data are collected for all children in care, the data are only reported for children who have been in care for more than a year.

## Magnitude of variation

### Map 3: Children in the child protection system

For local authorities in England, the rate of children aged 0–17 years who were the subject of a child protection plan, per 10,000 children aged 0–17 years, ranges from 8.9 to 114.9 (just under a 13-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 18.5 to 68.6, and the variation is 3.7-fold.

### Map 4: Healthcare (medical) for looked-after children

For local authorities in England, the percentage of looked-after children (in care for at least 12 months) who had their annual health assessment ranges from 50% to 100% (a two-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 60% to 100%, and the variation is 1.7-fold.

### Map 5: Healthcare (dental) for looked-after children

For local authorities in England, the percentage of looked-after children (in care for at least 12 months) who had their teeth checked by a dentist ranges from 9% to 100% (an 11-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 57.3% to 100%, and the variation is 1.7-fold.

The rate of children placed under a child protection plan is positively associated with area deprivation. Although this correlates with the literature on inequalities in the distribution of child maltreatment, these data relate only to those children who come to the attention of social services and are deemed to require safeguarding measures.

Variation in the numbers of children placed under child protection plans may reflect capacity of services as much as the genuine extent of the maltreatment problem in the local population. This may be due to:

- variation in expertise in identifying, assessing and flagging child protection concerns to appropriate services
- capacity-driven variation in thresholds for placing children under a plan, and subsequently removing them from such a plan at the appropriate time.

For variation among local authorities in the provision of annual health and dental assessments for looked-after children, it is clear that any variation from 100% is inadequate. There is no association between the area deprivation scores and compliance with either of these statutory assessments.

1 Woodman J, Gilbert R. (2013). Child maltreatment: moving towards a public health approach. In BMA Board of Science. Growing up in the UK: Ensuring a healthy future for our children. BMA: London.

2 Radford L, Corral S, Bradley C et al. (2011). Child Abuse and neglect in the UK today. NSPCC. Available from: [www.nspcc.org.uk/inform/research/findings/child\\_abuse\\_neglect\\_research\\_PDF\\_wdf84181.pdf](http://www.nspcc.org.uk/inform/research/findings/child_abuse_neglect_research_PDF_wdf84181.pdf).

3 Gilbert R, Fluke J, O'Donnell M et al. (2012). Child maltreatment: variation in trends and policies in six developed countries. *Lancet* 379: 758–72.

4 Harker L et al. (2013). How safe are our children? NSPCC. Available from: [www.nspcc.org.uk/inform/research/findings/how-safe/how-safe-2013-report\\_wdf95435.pdf](http://www.nspcc.org.uk/inform/research/findings/how-safe/how-safe-2013-report_wdf95435.pdf).

5 Viner R, Taylor B. (2005). Adult health and social outcomes of children who have been in public care: population-based study. *Pediatrics* 115(4): 894–9.

6 Hill CM, Watkins J. (2003). Statutory health assessments for looked-after children: what do they achieve? *Child Care Health Dev.* 29(1): 3–13.



### Options for action

Where maltreatment is identified, children are not necessarily assessed to be at high enough risk to reach the threshold for a child protection plan.<sup>1</sup> Simply measuring the rate of investigation, recognition and monitoring of maltreatment may significantly underestimate the true prevalence of maltreatment. Commissioners and local authorities can investigate a range of indicators when assessing the adequacy of their child safeguarding processes and outcomes, including measuring the rate and impact of interventions to tackle maltreatment.

Commissioners and local authorities may want to note there is evidence to support a population-based, preventive approach to child maltreatment, involving investment in community-based, family-oriented services to support parenting.<sup>2</sup>

It is plausible that resourcing levels in health and social care services may account for some of the variation in these indicators. Commissioners and Health and Wellbeing Boards can use these data as a starting point to consider whether their services are appropriately resourced to address the scale of the local problem.

Local child safeguarding processes could be improved by:

- sharing information on performance
- collaborating in order to standardise the assessment process where possible.

The new Child Protection Information Sharing project (see 'Resources' later in this section) should improve information sharing from local authorities to urgent and emergency healthcare settings for looked-after children and those children placed under a child protection plan.

There is variation in access to the minimum standard of healthcare for looked-after children (statutory health assessment). It requires co-ordinated effort from a range of local professionals (NHS England, CCGs, local authorities and social care) to ensure that:

- routine healthcare assessments are arranged, and that they are carried out
- services are commissioned to adequately deliver assessments and other healthcare needs which arise
- access to healthcare, both routine and as needed, is regularly assessed and reported, and the appropriate service is held accountable for failures in access or provision.

### Resources

World Health Organization Regional Office for Europe (2013) European report on preventing child maltreatment ([www.who.int/violence\\_injury\\_prevention/publications/child\\_injuries/en/index.html](http://www.who.int/violence_injury_prevention/publications/child_injuries/en/index.html)).

The National Institute for Health and Care Excellence has produced the following relevant documents:

- Clinical guidance, When to suspect child maltreatment (2009) ([www.nice.org.uk/cg89](http://www.nice.org.uk/cg89)) – with further guidance expected to be produced by 2016.
- Quality standards for the health and wellbeing of looked-after children and young people (2013) (<http://guidance.nice.org.uk/QS31>).
- Public health guidance, Promoting the quality of life of looked-after children and young people ([www.nice.org.uk/ph28](http://www.nice.org.uk/ph28)).

Department for Children, School and Families and Department of Health (2009). Statutory Guidance on Promoting the Health and Wellbeing of Looked-after Children (<http://media.education.gov.uk/assets/files/pdf/s/promotinghealth.pdf>).

Department for Education (2013). Working Together to Safeguard Children – A guide to inter-agency working to safeguard and promote the welfare of children (<http://media.education.gov.uk/assets/files/pdf/w/working%20together.pdf>).

Department for Education (2012). The Children's Safeguarding Performance Information Framework ([www.education.gov.uk/childrenandyoungpeople/safeguardingchildren/protection/b00209694/perf-info](http://www.education.gov.uk/childrenandyoungpeople/safeguardingchildren/protection/b00209694/perf-info)).

Child Protection Information Sharing project (CP-IS) ([www.gov.uk/government/news/child-protection-information-sharing-project](http://www.gov.uk/government/news/child-protection-information-sharing-project)).

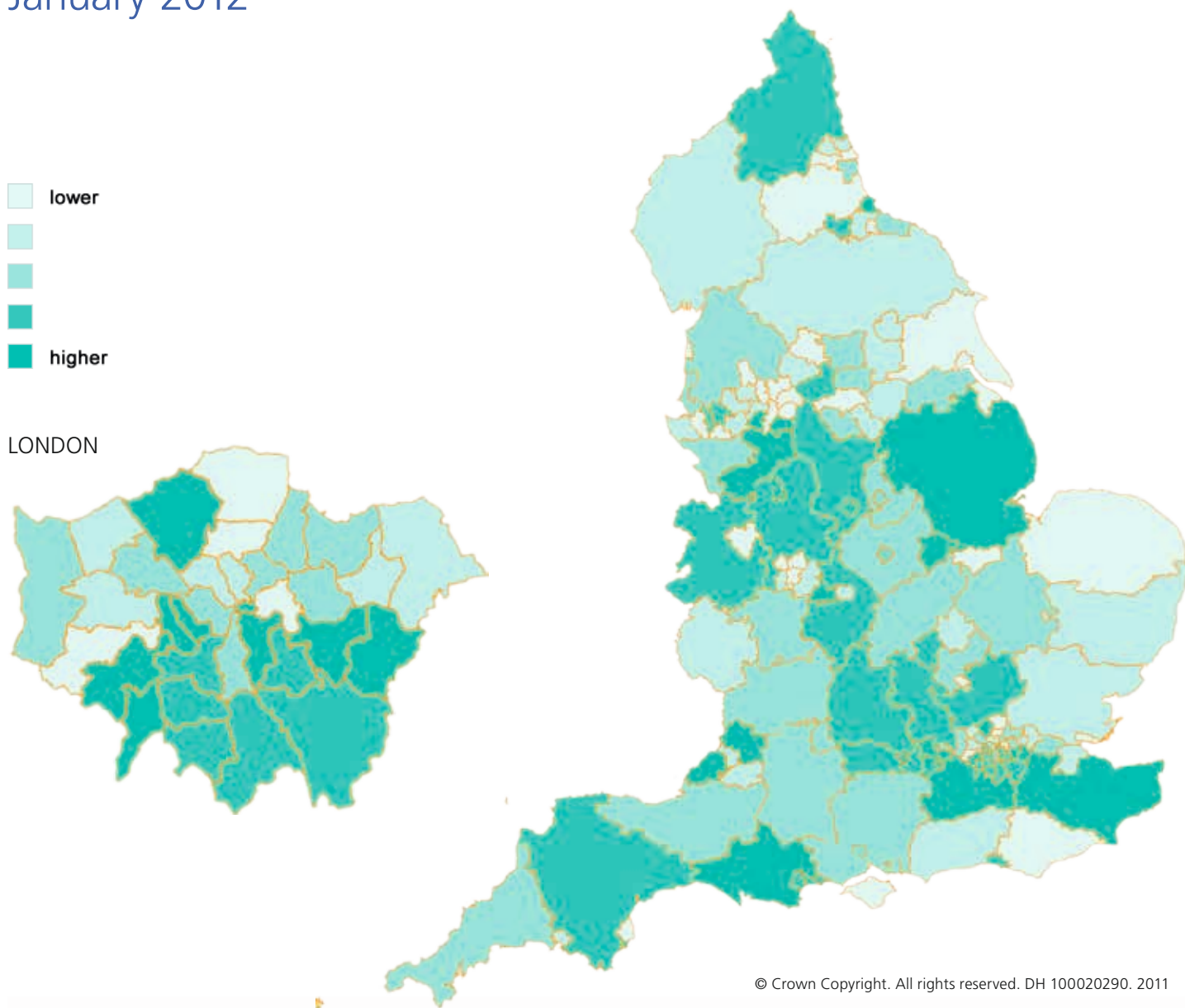
Harker L et al. (2013). How safe are our children? NSPCC ([www.nspcc.org.uk/Inform/research/findings/howsafe/how-safe-2013-report\\_wdf95435.pdf](http://www.nspcc.org.uk/Inform/research/findings/howsafe/how-safe-2013-report_wdf95435.pdf)).

1 Gilbert R, Kemp A, Thoburn J et al. (2009). Recognising and responding to child maltreatment. *Lancet* 373; 167-80.

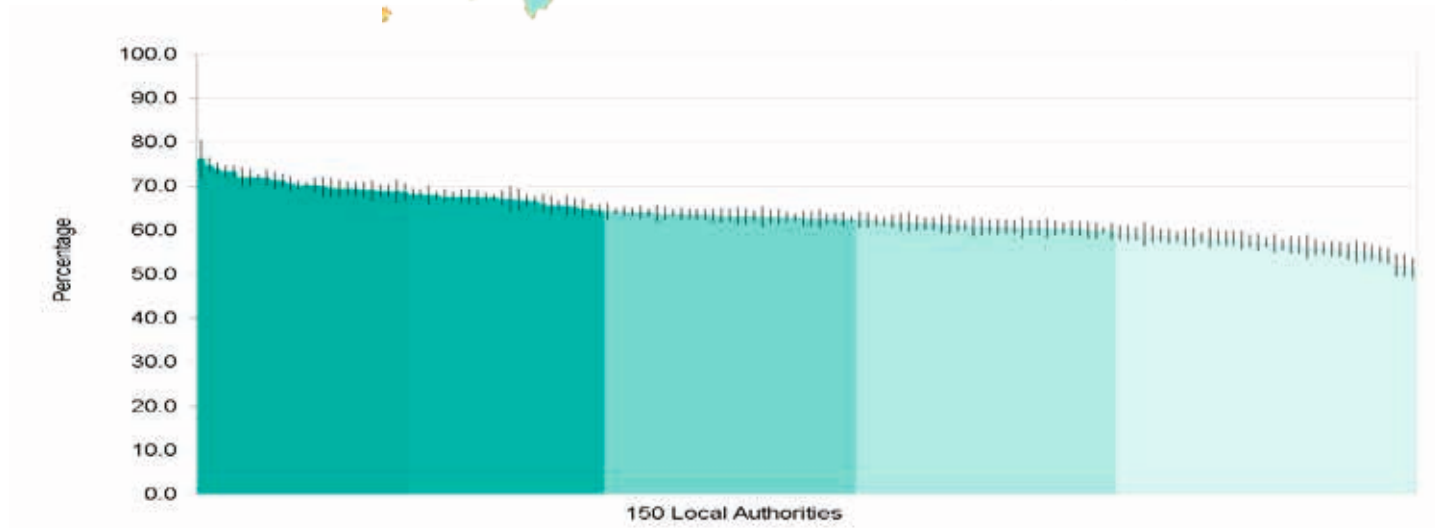
2 Woodman J, Gilbert R. (2013). Child maltreatment: moving towards a public health approach. In BMA Board of Science. Growing up in the UK: Ensuring a healthy future for our children. BMA, London.

C: Education

**Map 6** School readiness: Percentage of children at the end of foundation stage (at age 5) who are assessed as having achieved a 'good level of development', by local authority, at January 2012

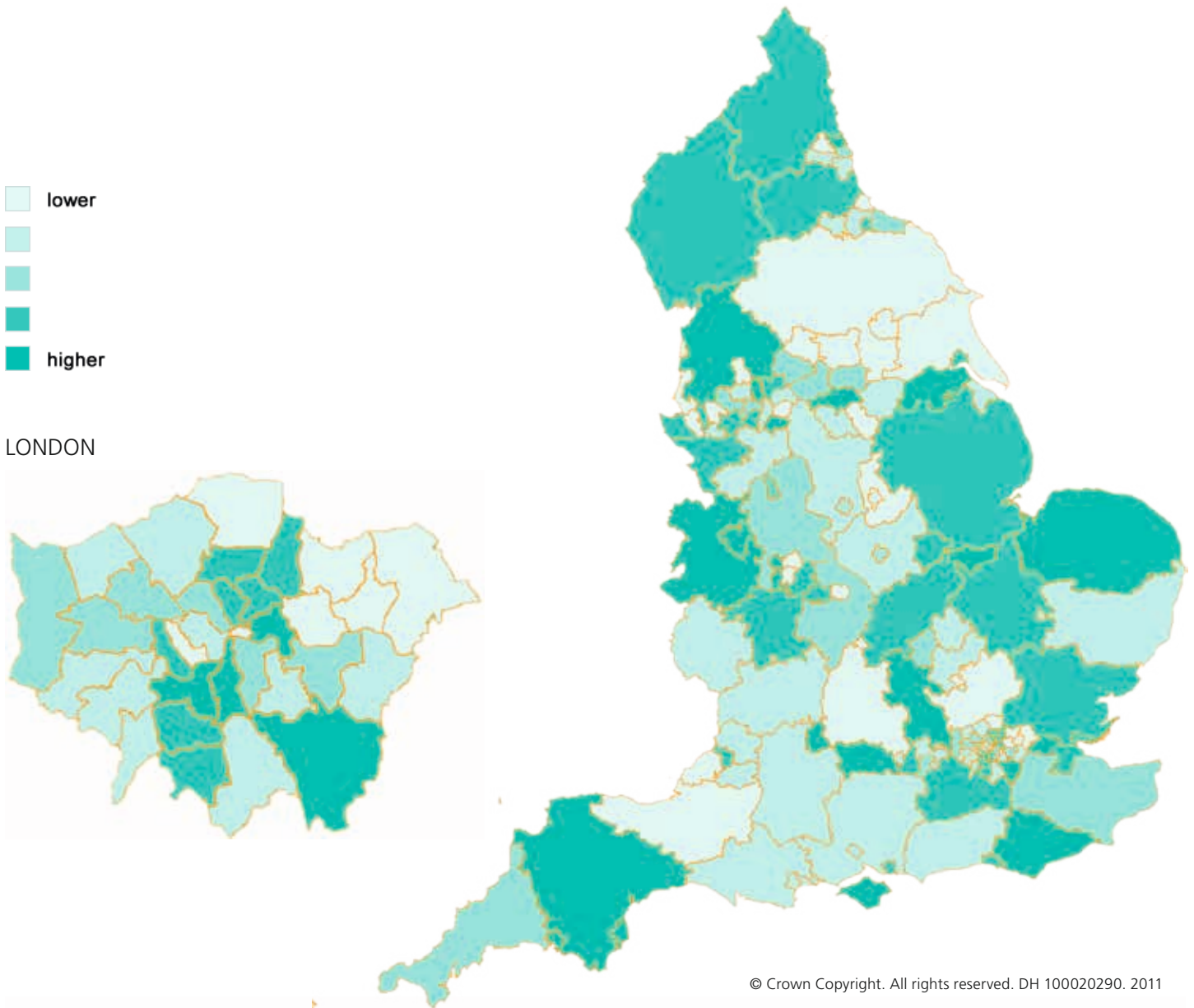


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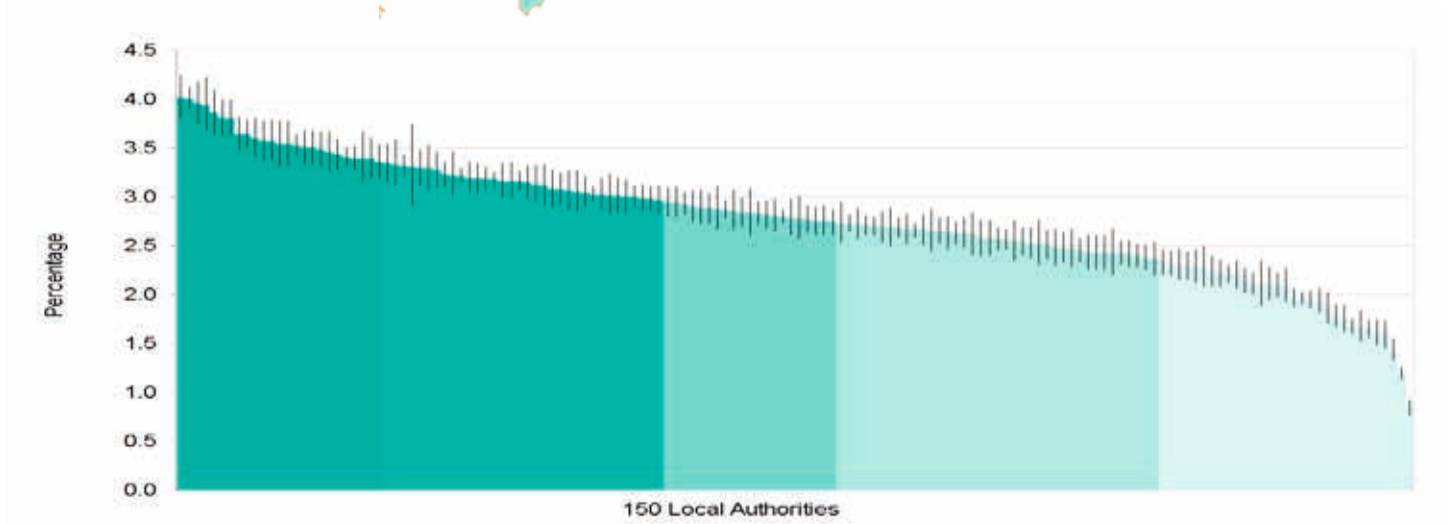




**Map 7** Special educational needs (SEN): Percentage of children in state-funded schools with a statement of SEN, by local authority, at January 2012



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## Context

The preschool period of the life course is strongly correlated with long-term health outcomes and educational attainment.

'School readiness' – i.e. having achieved appropriate development in the early years in social, emotional, communication, language and literacy domains – is a key predictor of educational attainment. At a population level, low rates of school readiness may be due to factors such as deprivation or prevalence of child disability. However, it may also reflect variation in early detection of developmental problems.

Children with SEN have a learning difficulty that requires special educational provision. A learning difficulty means that the child has:

- significantly greater difficulty learning compared with the majority of children in the same age-group
- a disability preventing or hindering them from using general educational facilities provided in the local authority for children of the same age-group.

There are currently four levels of special educational provision: usual support, School Action, School Action Plus, and a statement of SEN. Children with a statement of SEN are either not making progress under School Action or School Action Plus or they require considerable additional support due to severe and complex needs. The local authority reviews the statement at least once a year. All children in special schools have a statement of SEN.

The Children and Families Bill<sup>1</sup> will replace statements of SEN with an Education, Health and Care Plan, which is designed to allow better integration of services for children, to extend age of coverage to 25 years of age and to allow families to take control of their child's personal budget if they so wish.

'School readiness' is included as a placeholder in the Public Health Outcomes Framework 2013–16.

For Map 7, a similar indicator relating only to primary schools – 'Percentage of primary school children in state-funded schools with a statement of SEN' – was included in the Atlas of Variation in Healthcare for Children and Young People (2012).

## Magnitude of variation

### Map 6: School readiness

For local authorities in England, the percentage of children at the end of foundation stage (at age 5) who are assessed as having achieved a 'good level of development' ranges from 51.5% to 76.5% (1.5-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 55% to 72.2%, and the variation is 1.3-fold.

### Map 7: SEN

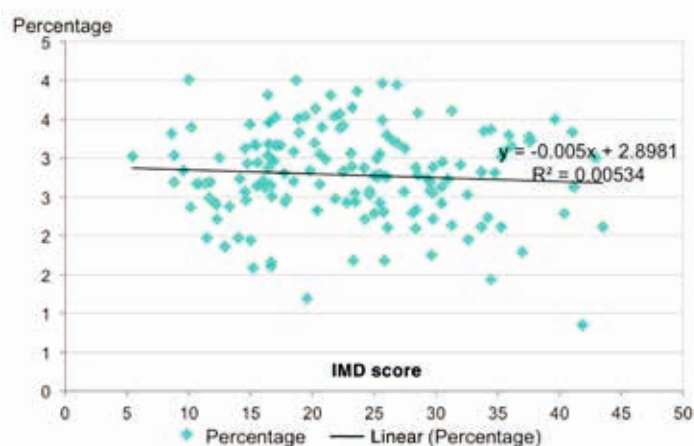
For local authorities in England, the percentage of children in state-funded schools with a statement of SEN ranges from 0.8% to 4.0% (five-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 1.7% to 3.8%, and the variation is over two-fold.

Possible reasons for variation are differences in:

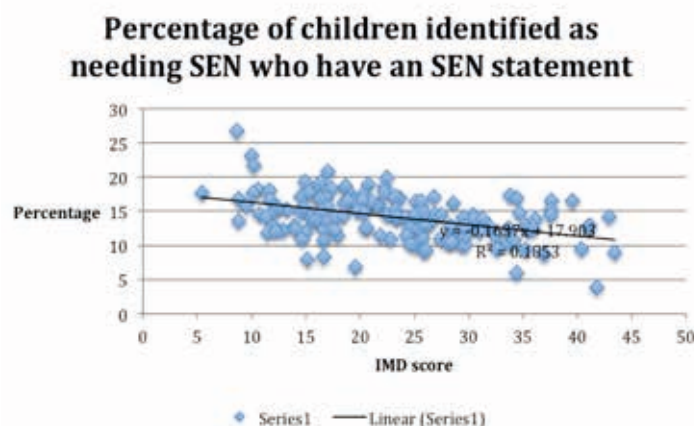
- prevalence of complex medical conditions, although it is unlikely to account for the degree observed
- deprivation levels in different areas
- resource allocation for child health, including health visiting, school health and community child health services
- criteria used to decide whether existing resources in each school are sufficient to support children with SEN, without the need for statements.

While school readiness is strongly correlated with deprivation, the relationship between SEN and deprivation is more complex. Our data show no association between an area's level of deprivation and the proportion of schoolchildren who have a statement of SEN (see Figure 1C.1). However, there is a negative association between an area's level of deprivation

**Figure 1C.1 Correlation between deprivation and percentage of all school pupils with a statement of SEN, by local authority, 2012 (High IMD score indicates more deprived area)**



**Figure 1C.2 Correlation between deprivation and percentage of pupils identified as having SEN who have a statement of SEN, by local authority, 2011–2012 (High IMD score indicates more deprived area)**



1 <http://services.parliament.uk/bills/2012-13/childrenandfamilies.html>

## Section 1: Determinants of child health

and the proportion of children with identified SEN who have received a formal statement of SEN (see Figure 1C.2). This suggests inequity in the provision of educational support in England: children with SEN living in more deprived areas are less likely to receive a statement than their peers in less deprived areas, though the reasons for this difference are unclear.

### Options for action

The data show inequality in both level of intervention (in statements of SEN and the support that entails) and in outcomes (school readiness and prevalence of SEN in general). Early-years development is strongly correlated with long-term health outcomes. Local commissioners may want to note that The Annual Report of the Chief Medical Officer 2012 (Special Report – Our Children Deserve Better; Prevention Pays) discusses the importance of early investment in great detail in Chapter 3 ‘The economic case for a shift to prevention’.

Local authorities and commissioners can analyse child health service spending, availability of nursery places and availability of staff, such as speech therapists. By doing this, they can identify how to better support all levels of identified educational need in school, and improve efforts to meet the proposed measures of early development in the Tickell Report (see ‘Resources’ later in this section), and measures in the Early Years Foundation Stage Profile (statutory assessment requirement for children reaching the end of the Foundation Stage).

Commissioners and health and education professionals in agencies caring for children with additional needs can improve performance by:

- sharing information on performance
- collaborating to standardise the assessment process
- using evidence-based modelling of future workload to inform workforce planning
- redeploying resources to prevention/early intervention through better and earlier identification of at-risk children.

### Resources

Department for Education (2013). Children and Families Bill (<http://services.parliament.uk/bills/2012-13/childrenandfamilies.html>)

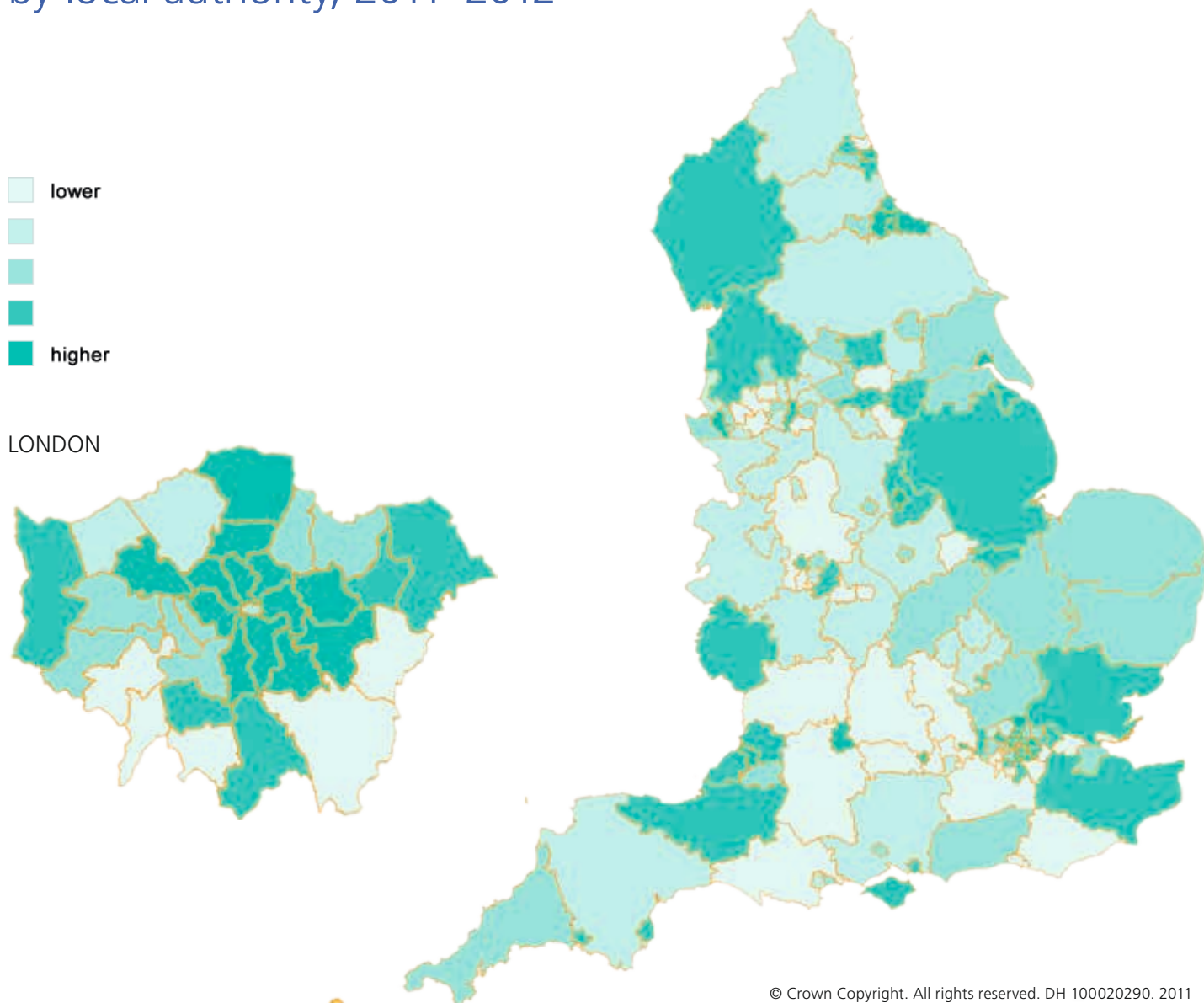
Tickell C (2011). The Early Years: Foundations for life, health and learning. An Independent Report on the Early Years Foundation Stage to Her Majesty’s Government (<http://media.education.gov.uk/MediaFiles/B/1/5/%7BB15EFF0D-A4DF-4294-93A1-1E1B88C13F68%7DTickell%20review.pdf>).

Early Years Foundation Stage Profile Data (<http://data.gov.uk/dataset/early-years-foundation-stage-profile-results-england-2010>).

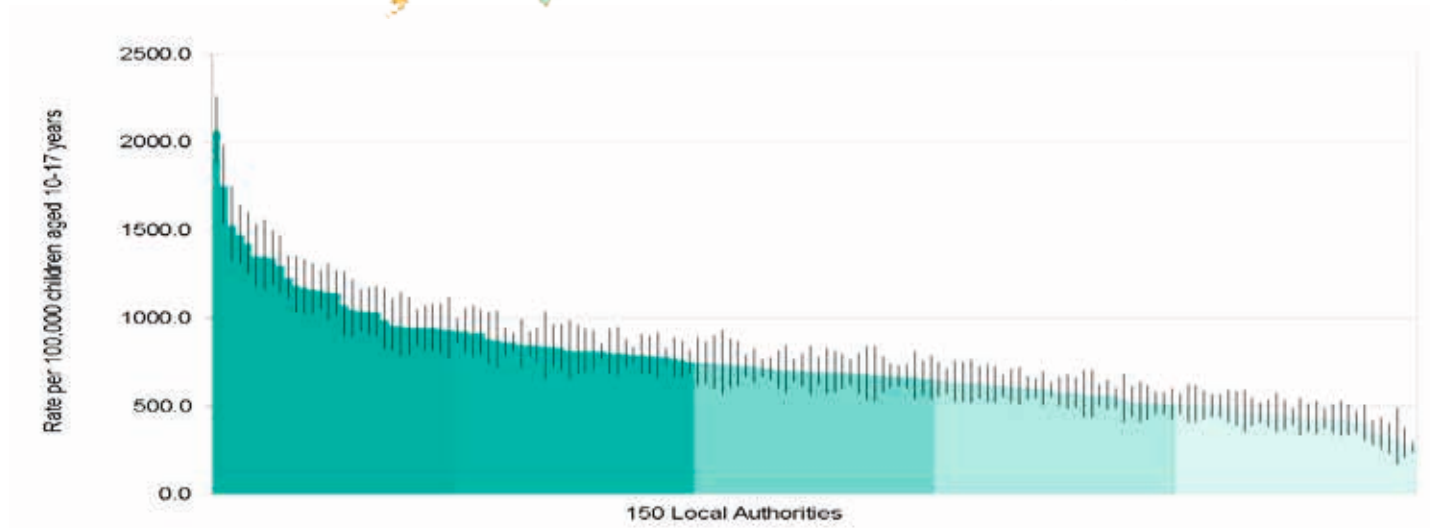
Early Years Foundation Stage Profile – assessment scales reference sheet (<https://orderline.education.gov.uk/bookstore.asp?FO=1307426&Action=PDFDownload&ProductID=9781445907512>)

D: Crime and youth justice

**Map 8** Crime and youth justice: Rate of young people aged 10–17 years receiving their first reprimand, warning or conviction, per 100,000 population aged 10–17 years old, by local authority, 2011–2012



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# Section 1: Determinants of child health

## Context

At a population level, contact with the youth justice system is strongly associated with multiple risk factors that start with the perinatal period and include early parental attachment, child development and social and behavioural risk factors in childhood and adolescence.

The number of first-time offences committed by 10–17 year olds is falling, as is the number of children and young people in custody. Fewer children and young people are reoffending, but the overall reoffending rate is rising, which suggests that there is a smaller group of children and young people who are becoming more entrenched in criminal and antisocial behaviour.<sup>1</sup>

This indicator is included in the Public Health Outcomes Framework 2013–16.

## Magnitude of variation

**Map 8:** For local authorities in England, the rate of young people aged 10–17 years receiving their first reprimand, warning or conviction, per 100,000 population aged 10–17 years old, ranges from 267 to 2,066 (nearly eight-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 349 to 1,352, and the variation is nearly four-fold.

The link between deprivation and rates of first offending is well recognised, and these data confirm this correlation.

## Options for action

Options for primary and secondary prevention could take a life-course approach in order to improve resilience and pro-social behaviours and interactions in early childhood.

Local authorities could target variation by ensuring that evidence-based, youth crime prevention strategies are resourced appropriately. Options include approaches which have been shown to be beneficial in the reduction of youth offending, such as school-based initiatives; family and multi-systemic therapy; youth work, including mentoring; and restorative justice programmes.<sup>2</sup>

## Resources

Public Health England has produced web resources to aid planning of health and wellbeing needs assessments related to children and young people in the youth justice system. The Child and Maternal Health Intelligence Network, Public Health England.

Ministry of Justice and Youth Justice Board. Developing the secure estate for children and young people in England and Wales – Plans until 2015 (<http://yjbpublications.justice.gov.uk/en-gb/scripts/prodView.asp?idproduct=502&eP=>).

Centre for Mental Health (2009). Chance of a lifetime: Preventing early conduct problems and reducing crime ([www.centreformentalhealth.org.uk/publications/chance\\_of\\_a\\_lifetime.aspx?ID=604](http://www.centreformentalhealth.org.uk/publications/chance_of_a_lifetime.aspx?ID=604)).

Young Minds and Prison Reform Trust (2013). Turning young lives around: How health and justice services can respond to children with mental health problems and learning disabilities who offend ([www.prisonreformtrust.org.uk/Portals/0/Documents/turningyounglivesaroundFINAL.pdf](http://www.prisonreformtrust.org.uk/Portals/0/Documents/turningyounglivesaroundFINAL.pdf)).

1 Youth Justice statistics 2011/12. Available from: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/218552/yjb-stats-2011-12.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/218552/yjb-stats-2011-12.pdf)

2 Stevens A, Kessler I, Gladstone B. (2006). Review of Good Practices in Preventing Juvenile Crime in the European Union. Available at: [www.eucpn.org/pubdocs/A%20review%20of%20good%20practice%20in%20preventing%20juvenile%20crime%20in%20the%20EU.pdf](http://www.eucpn.org/pubdocs/A%20review%20of%20good%20practice%20in%20preventing%20juvenile%20crime%20in%20the%20EU.pdf).

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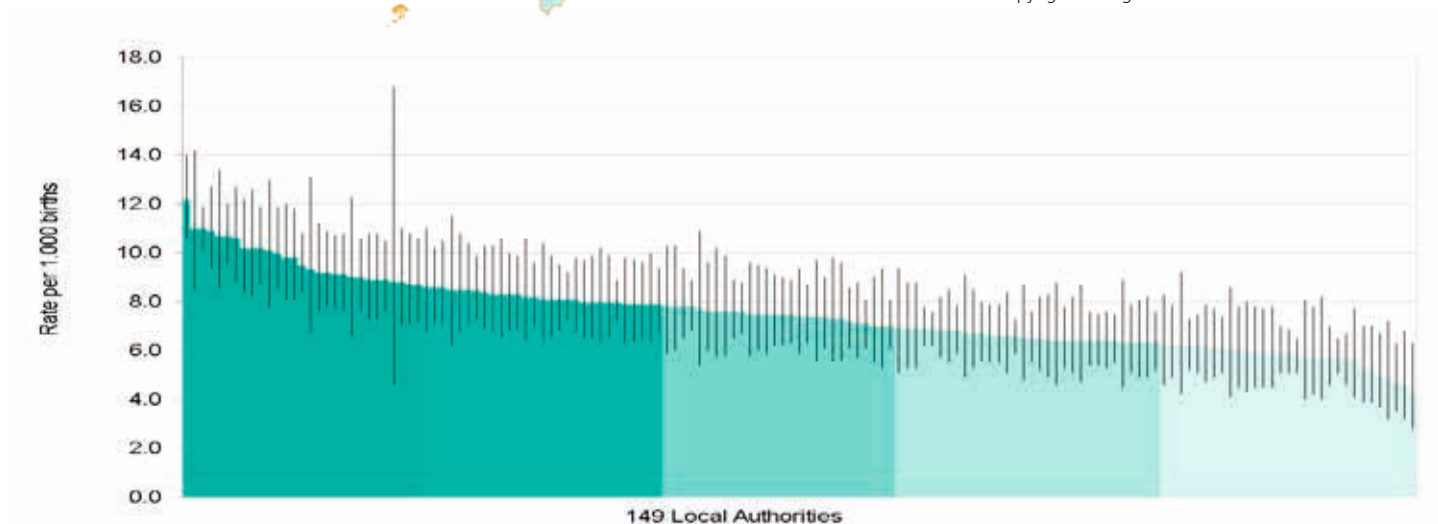
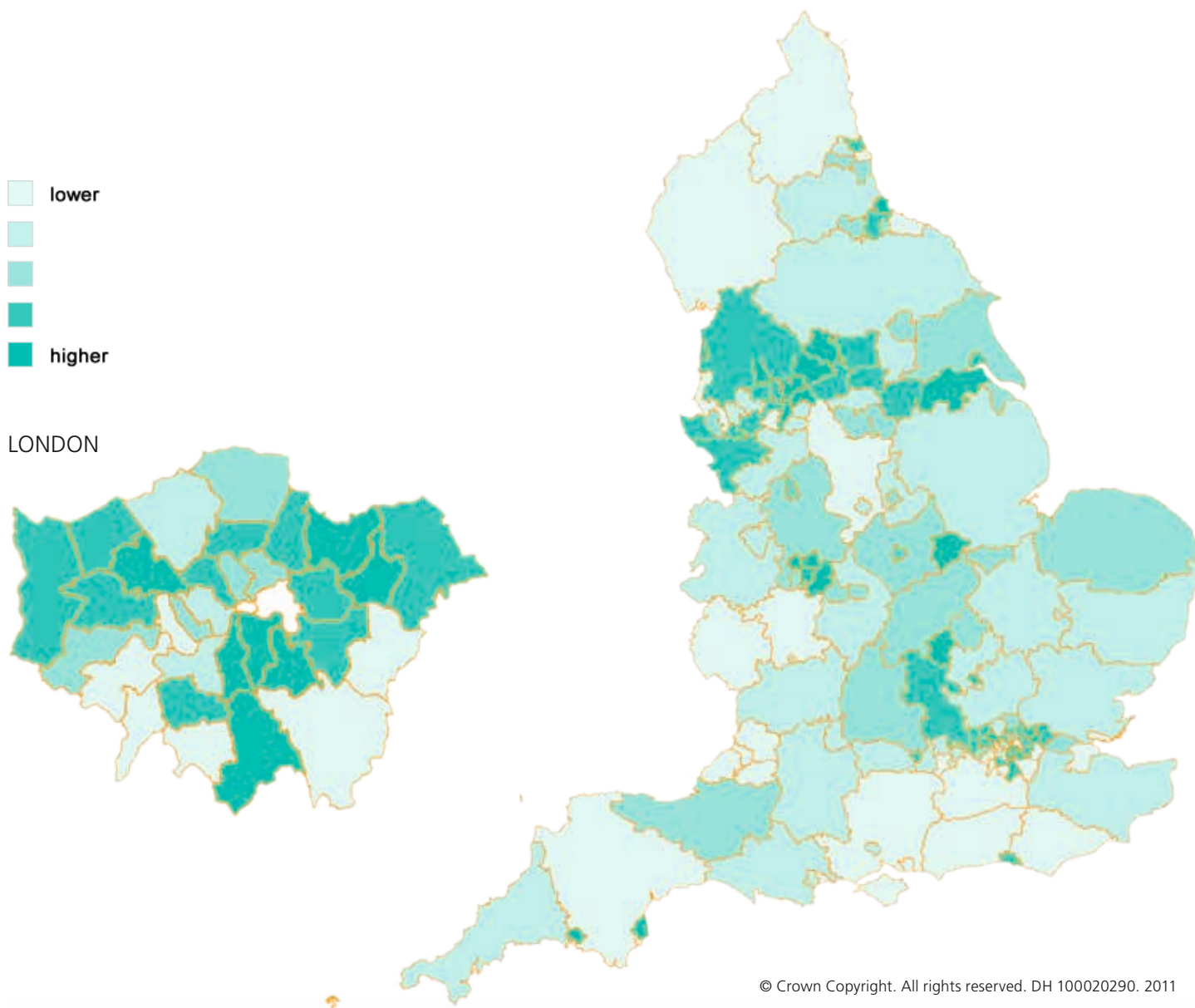
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# Child health promotion

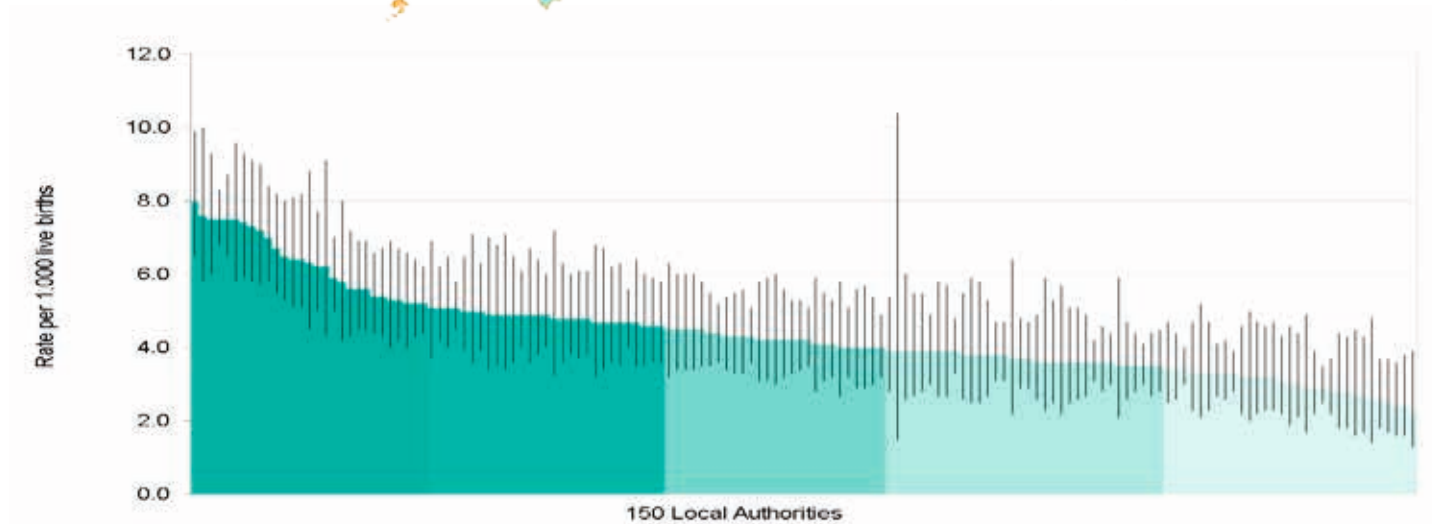
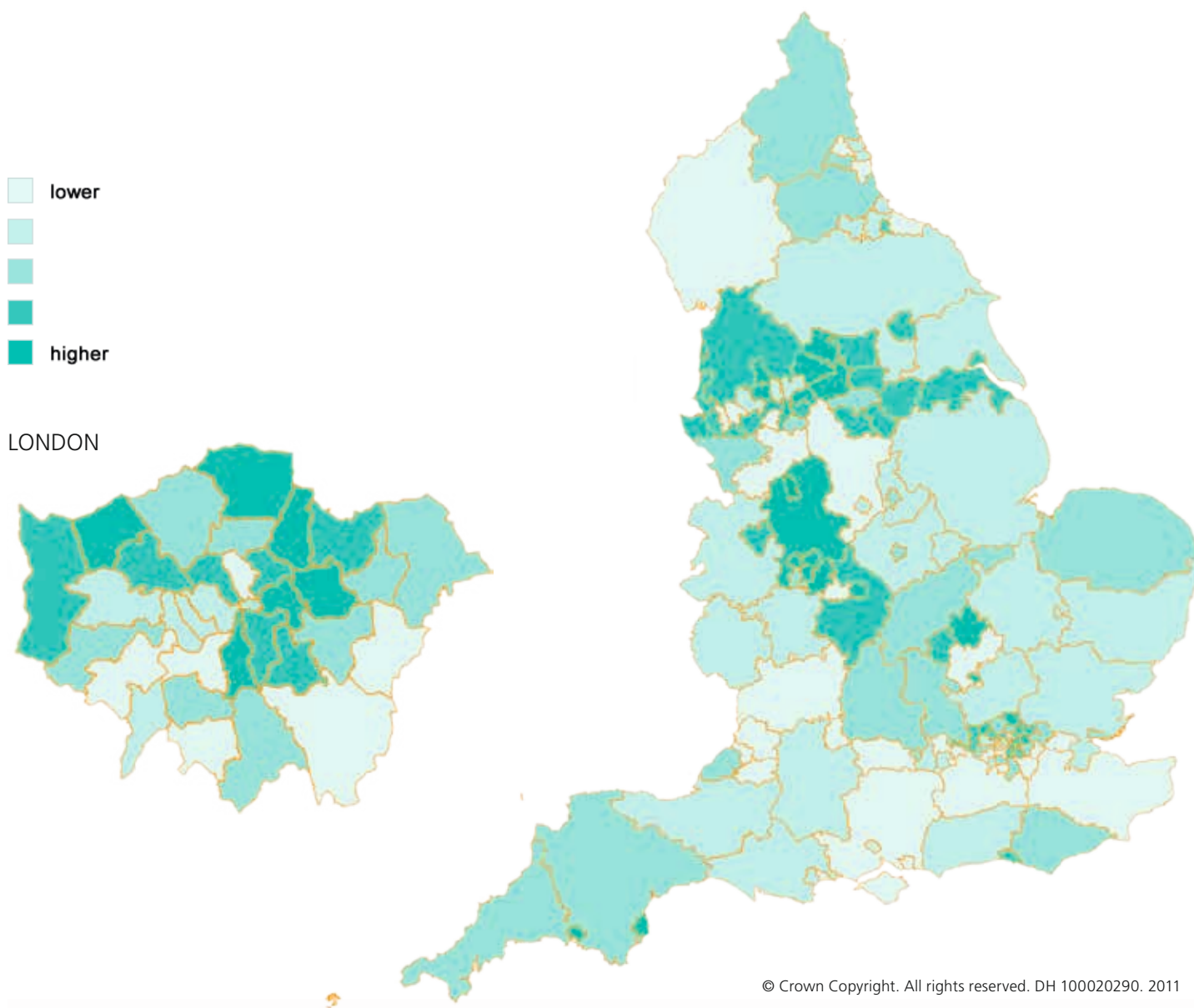


A: Mortality

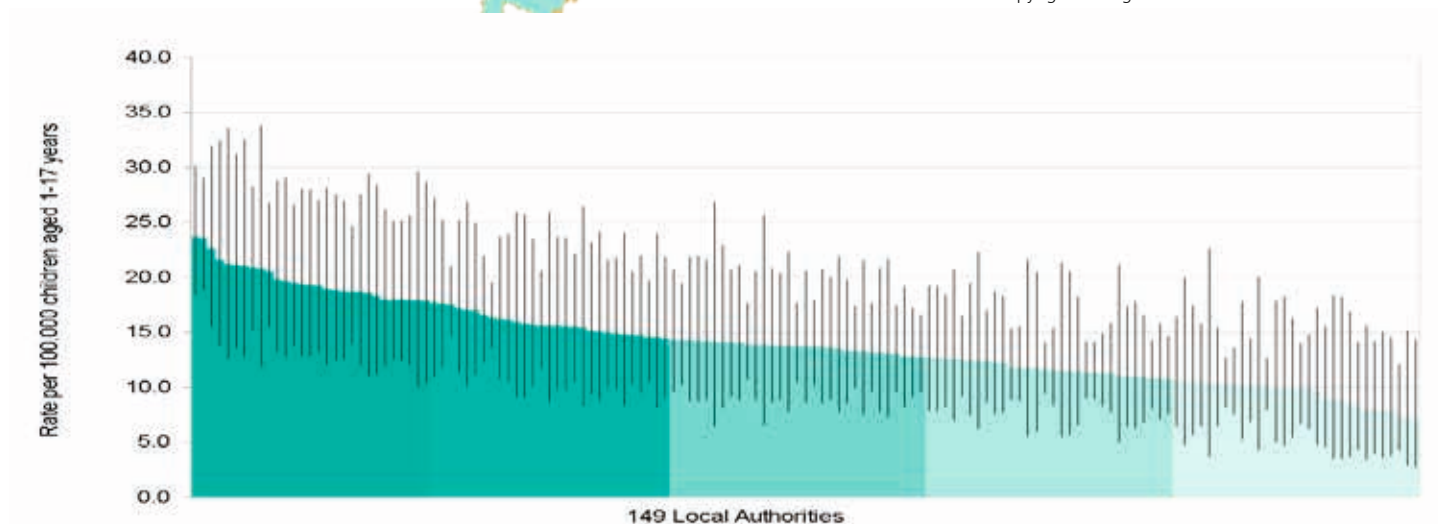
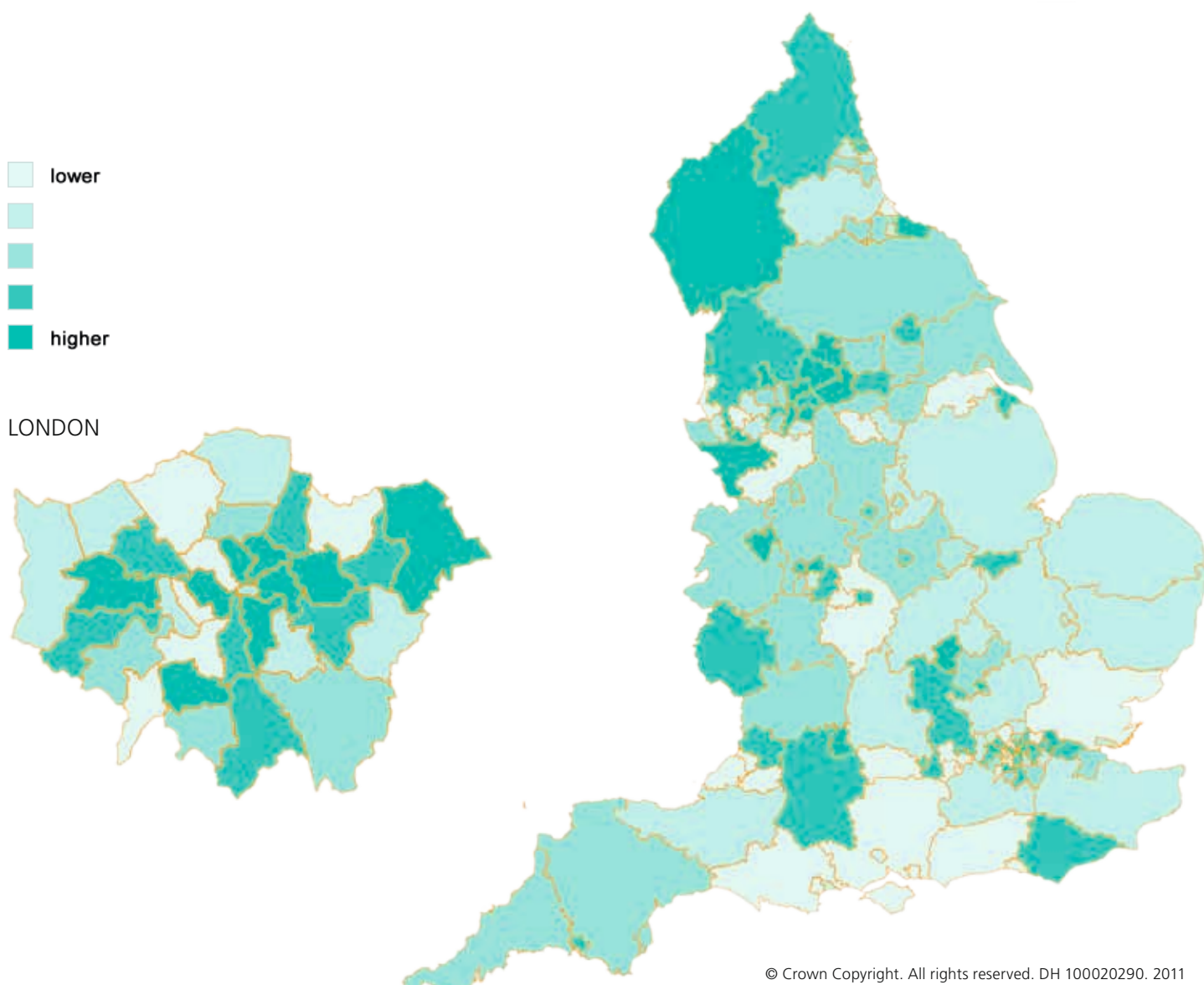
**Map 9** Perinatal mortality: Perinatal mortality rate per 1,000 births, by local authority, 2009–2011



**Map 10** Infant mortality: Infant mortality rate per 1,000 live births, by local authority, 2009–2011



**Map 11** Childhood mortality: Directly standardised mortality rate for children aged 1–17 years, per 100,000 children aged 1–17 years, by local authority, 2009–2011



## Context

Mortality is an important indicator of population health. However, it is a fairly crude measure, especially for children in developed countries such as England, where deaths are relatively rare. All three measures used here are known to correlate with levels of deprivation, with the association being particularly strong in perinatal and infant mortality.

Perinatal mortality comprises all stillbirths (babies born dead after 24 weeks' gestation) and early neonatal deaths (babies born alive who die within 7 days of birth), expressed as a rate per 1,000 of all births. Perinatal mortality is an indicator that highlights the state of maternal health and nutrition, as well as healthcare in the antenatal, obstetric and neonatal period.

Infant mortality measures all deaths in children who die before their first birthday as a rate per 1,000 live births. Low birth weight and prematurity are particularly strong risk factors for infant mortality – and both are strongly associated with deprivation. Unsurprisingly, infant mortality is itself strongly correlated with deprivation and, as an outcome measure, it is considered to be related more to wider determinants of health than directly to healthcare.

Mortality in childhood in England, beyond the first year, is most likely to be due to injuries. Although the death rate from injury in England is much lower than in many other comparable countries, it is strongly associated with deprivation.

Perinatal mortality was included in the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

Infant mortality is included in the Public Health Outcomes Framework 2013–16. 'Childhood mortality' and 'Potential years of life lost from causes considered amenable to healthcare' were recommended for inclusion as national outcome measures in the report of the Children and Young People's Health Outcomes Forum (2012).

## Magnitude of variation

### Map 9: Perinatal mortality

For local authorities in England, the perinatal mortality rate per 1,000 births for 2009–2011 ranges from 4.2 to 12.2 (nearly three-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 5.2 to 10.7, and the variation is two-fold. By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2009) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 5.0 to 11.0, and the variation was greater than two-fold.

### Map 10: Infant mortality

For local authorities in England, the infant mortality rate per 1,000 live births for 2009–2011 ranges from 2.2 to 8.0 (3.6-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 2.6 to 7.5, and the variation is nearly three-fold.

### Map 11: Child mortality

For local authorities in England, the directly standardised mortality rate for children aged 1–17 years (per 100,000 children aged 1–17 years) for 2009–2011 ranges from 6.9 to 23.7 (3.4-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 7.9 to 21.1, and the variation is 2.7-fold.

These data support the association between all three mortality markers and socio-economic deprivation. Many public health and social risk factors, such as obesity, smoking, ethnic background and teenage pregnancy, can influence the rates of stillbirth and preterm birth; some preterm babies will die before 7 days of age. However, variation in the quality and access to antenatal and perinatal healthcare may account for unwarranted variations in perinatal mortality.

## Options for action

Commissioners and local authorities can analyse the patterns of child, infant and perinatal mortality in their populations, especially in comparison with populations with similar demographic and socio-economic characteristics.

Infant mortality is amenable to improvement. Action in key areas such as teenage pregnancy and parenthood, antenatal health, maternal smoking and housing can have a significant impact upon reducing infant mortality.<sup>1</sup> To better understand opportunities for improvement, commissioners and local authorities can analyse the patterns of child, infant and perinatal mortality in their populations, especially in comparison with populations with similar characteristics.

Commissioners may be able to improve the quality of their local pre-pregnancy, antenatal, intrapartum and neonatal care by:

- studying local variations in perinatal mortality in order to identify whether variations in outcomes are warranted or unwarranted
- ensuring that there is adequate capacity and training of community-based and hospital-based health professionals in order to deliver a high-quality antenatal and perinatal service for mothers and babies, including nutritional and other preventive health advice.

<sup>1</sup> Department of Health (2010). Tackling health inequalities in infant and maternal health outcomes: report of the infant mortality national support team. Available from: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/215869/dh\\_122844.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215869/dh_122844.pdf).

### Resources

Office for National Statistics: Full report on Child, Infant and Perinatal Mortality (data available up to 2011) ([www.ons.gov.uk/ons/rel/vsob1/child-mortality-statistics--childhood--infant-and-perinatal/2011/stb-cms-2011.html#tab-Child-mortality-rates](http://www.ons.gov.uk/ons/rel/vsob1/child-mortality-statistics--childhood--infant-and-perinatal/2011/stb-cms-2011.html#tab-Child-mortality-rates)).

The National Institute for Health and Care Excellence (NICE) has produced a suite of guidelines for:

- maternal and child nutrition (<http://guidance.nice.org.uk/PH11>)
- management of pregnancy and birth (<http://guidance.nice.org.uk/Topic/GynaecologyPregnancyBirth>)
- routine postnatal care ([www.nice.org.uk/CG037](http://www.nice.org.uk/CG037)).

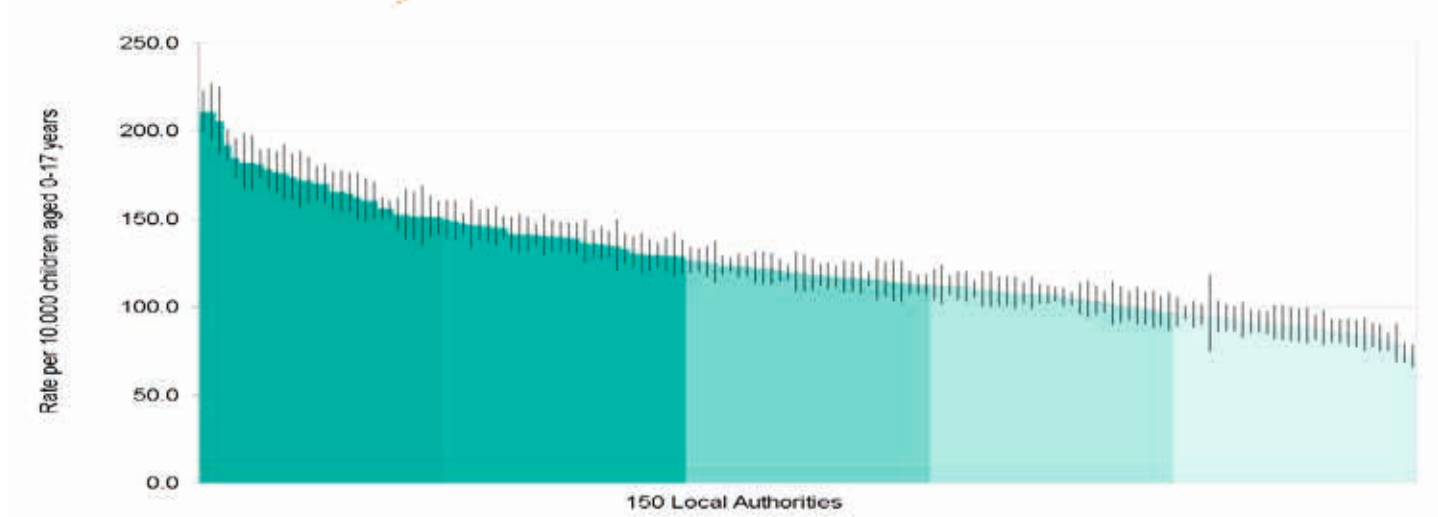
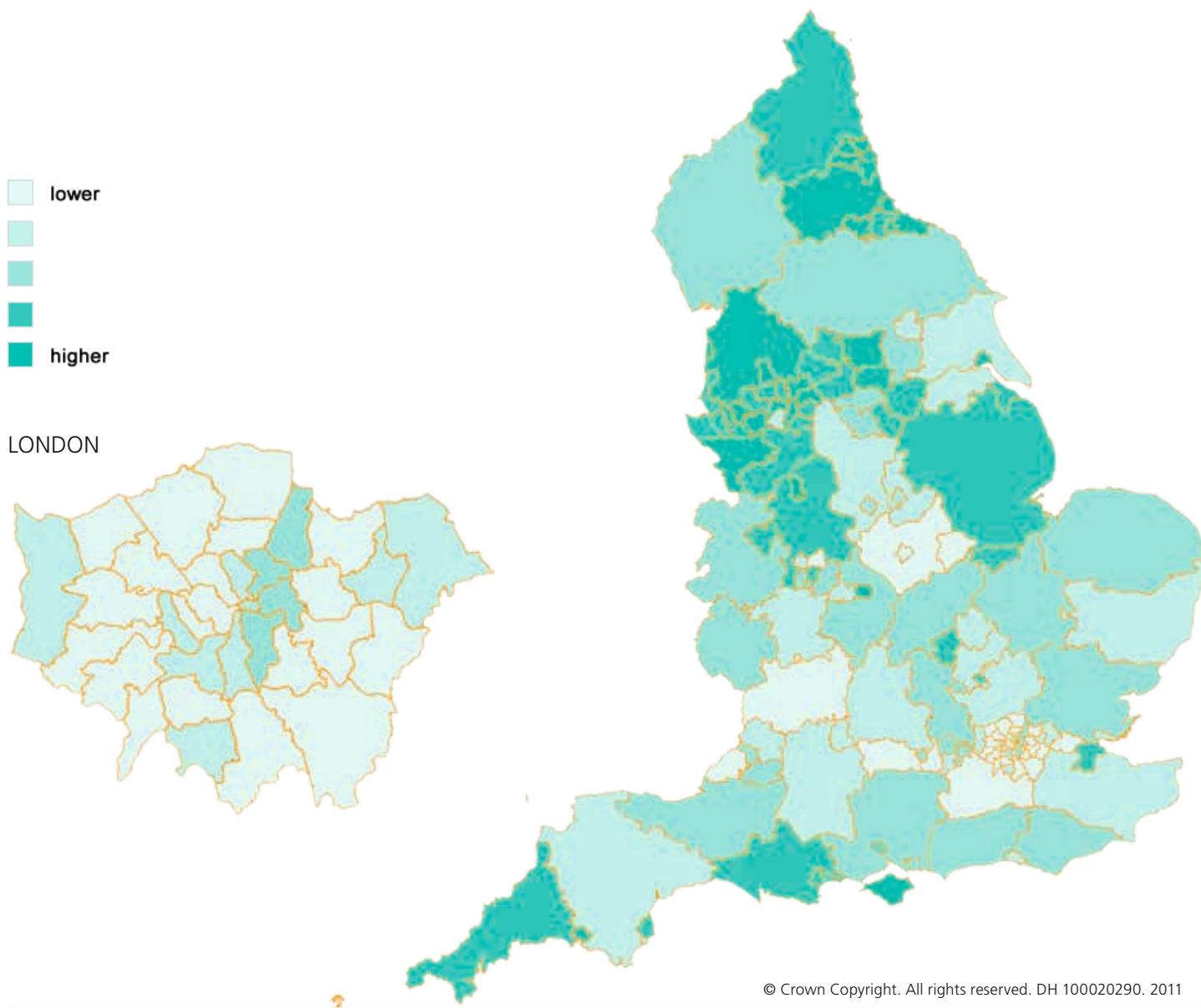
There is also a NICE quality standard for specialist neonatal care, which describes best practice and recommends measures to assess the quality of the service ([www.nice.org.uk/guidance/qualitystandards/specialistneonatalcare/specialistneonatalcarequalitystandard.jsp](http://www.nice.org.uk/guidance/qualitystandards/specialistneonatalcare/specialistneonatalcarequalitystandard.jsp)).

Department of Health (2010). Tackling health inequalities in infant and maternal health outcomes: report of the infant mortality national support team ([www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/215869/dh\\_122844.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215869/dh_122844.pdf)).



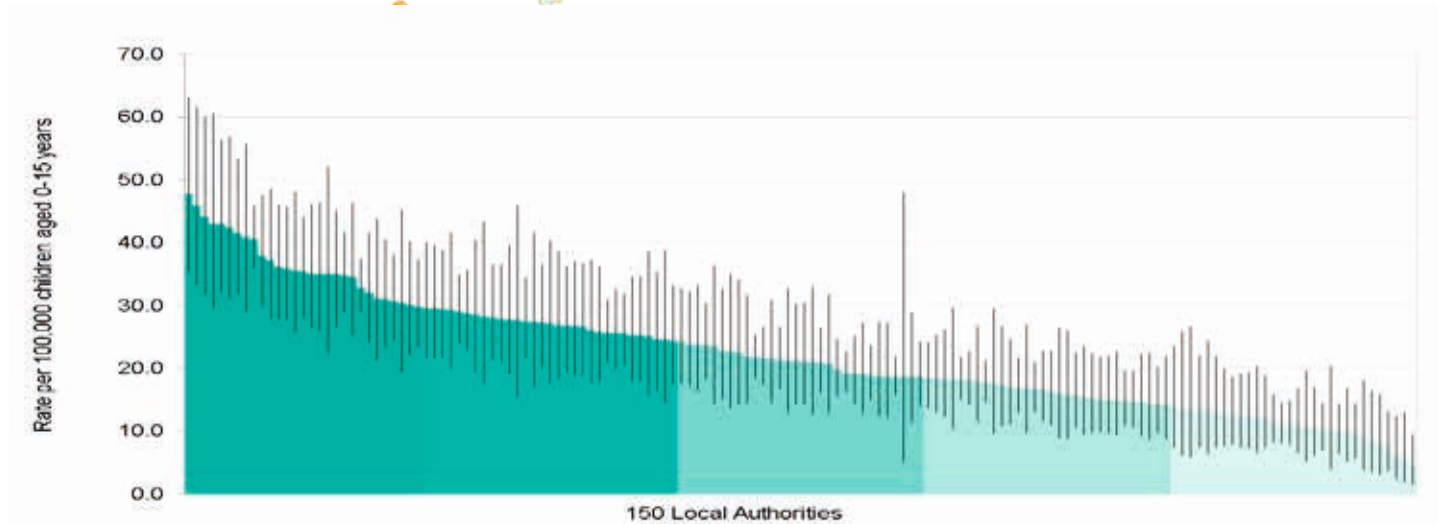
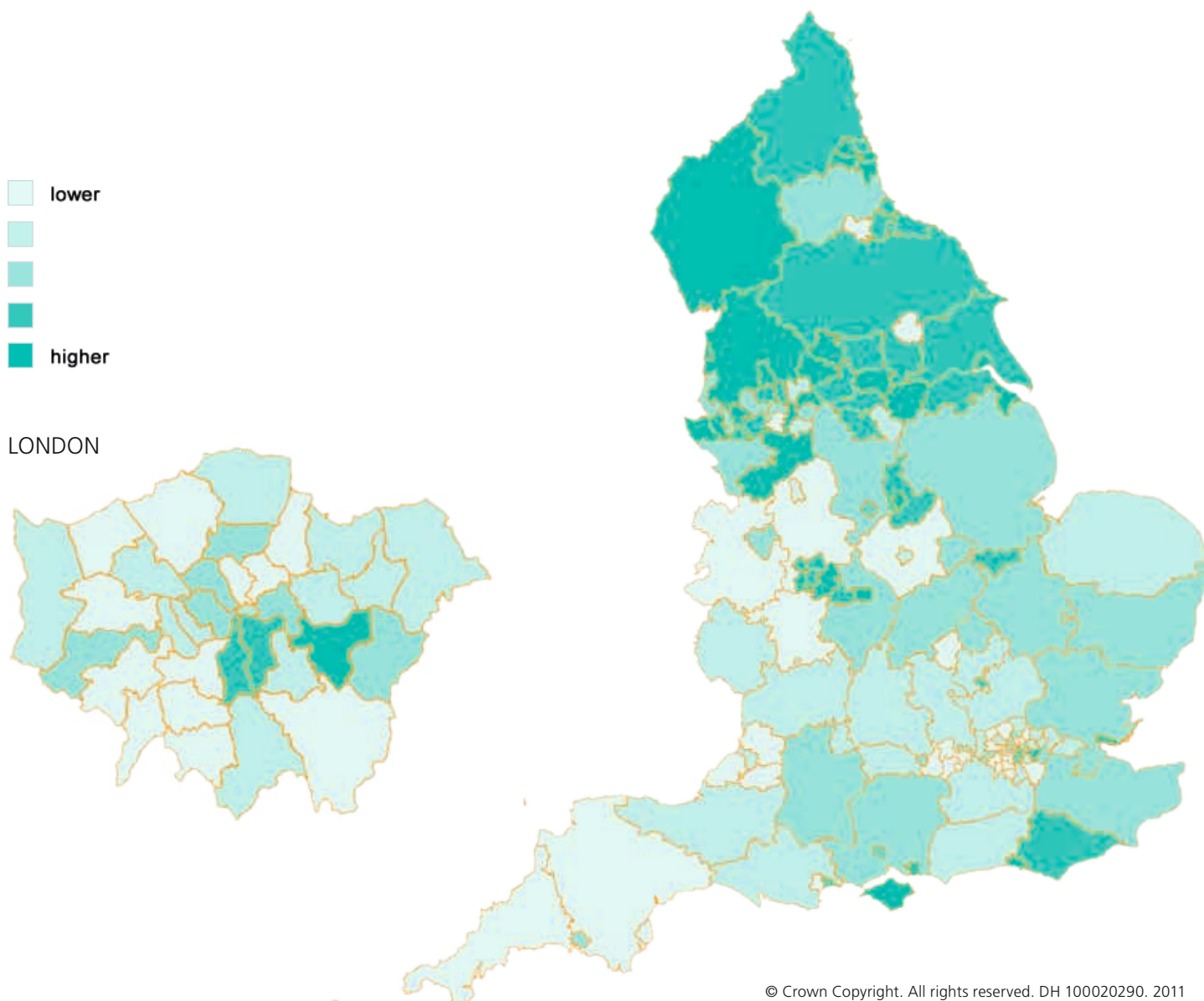
B: Injury

**Map 12** Hospital admissions due to injury: Rate of hospital admissions due to injury in children aged 0–17 years, per 10,000 children aged 0–17 years, by local authority, 2011–2012

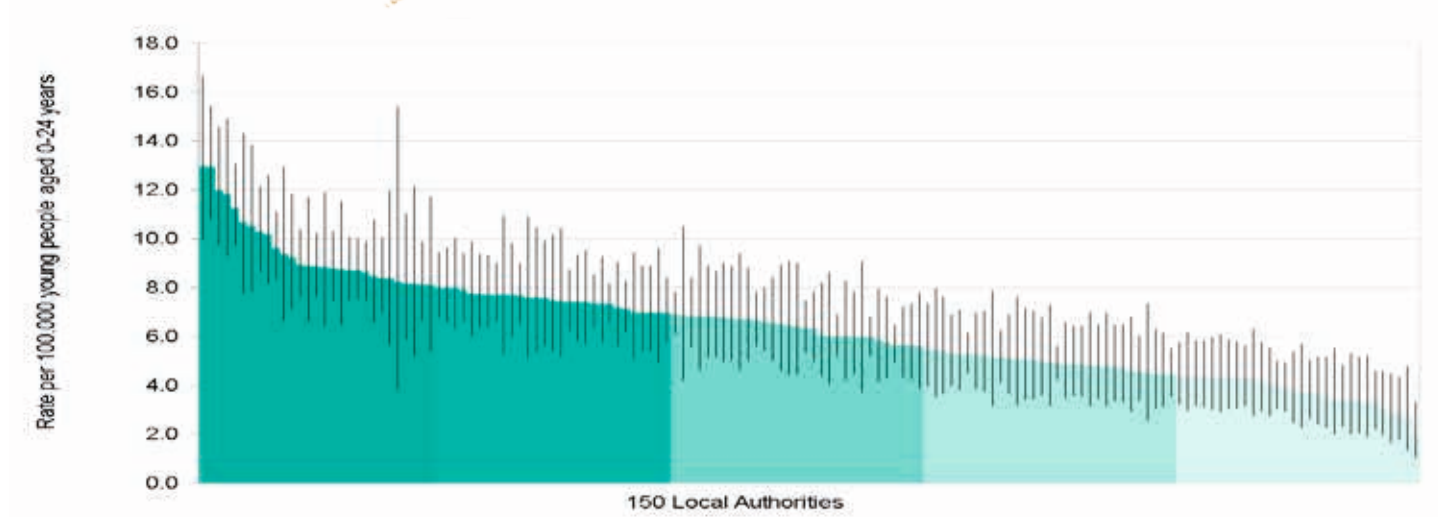
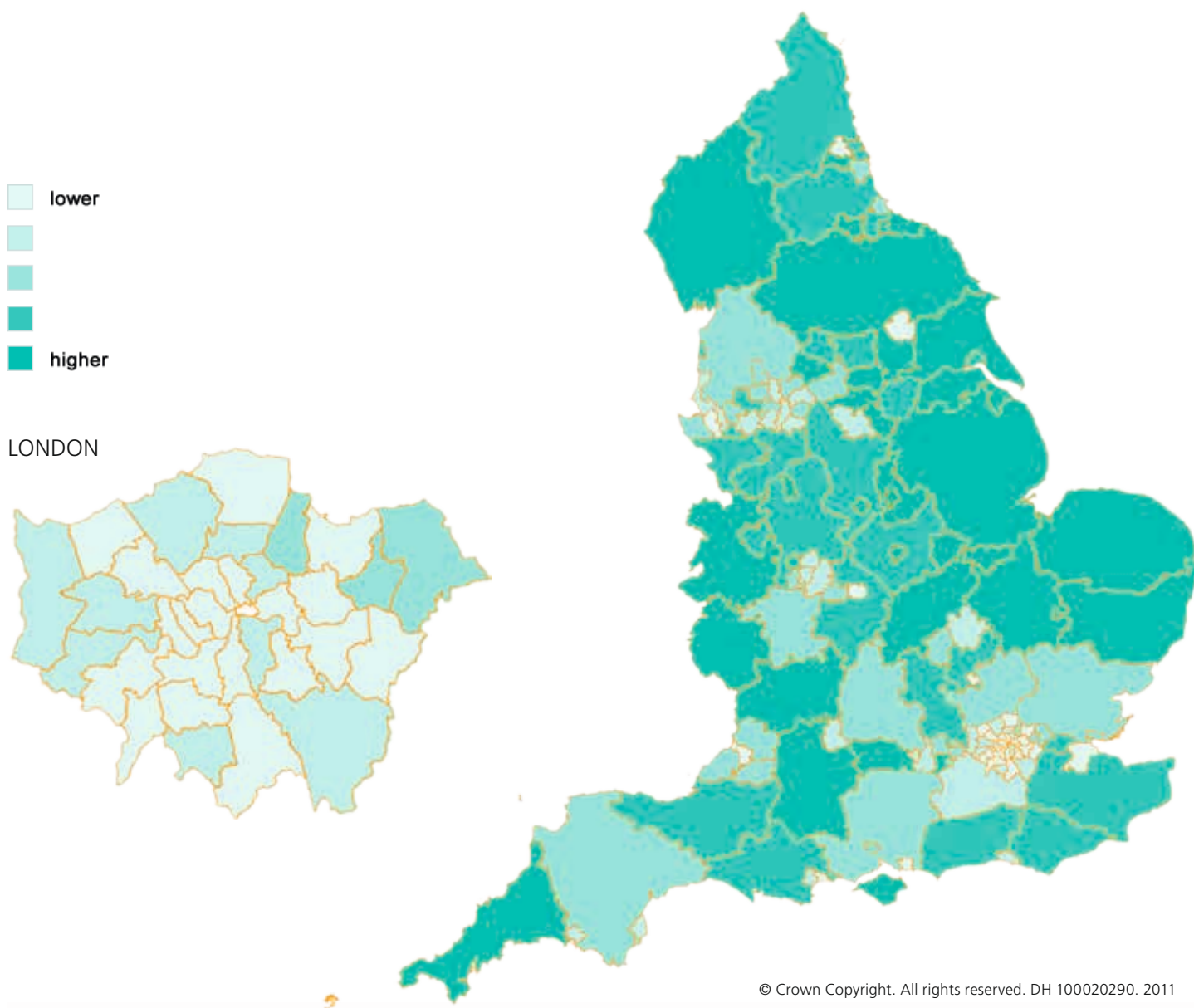




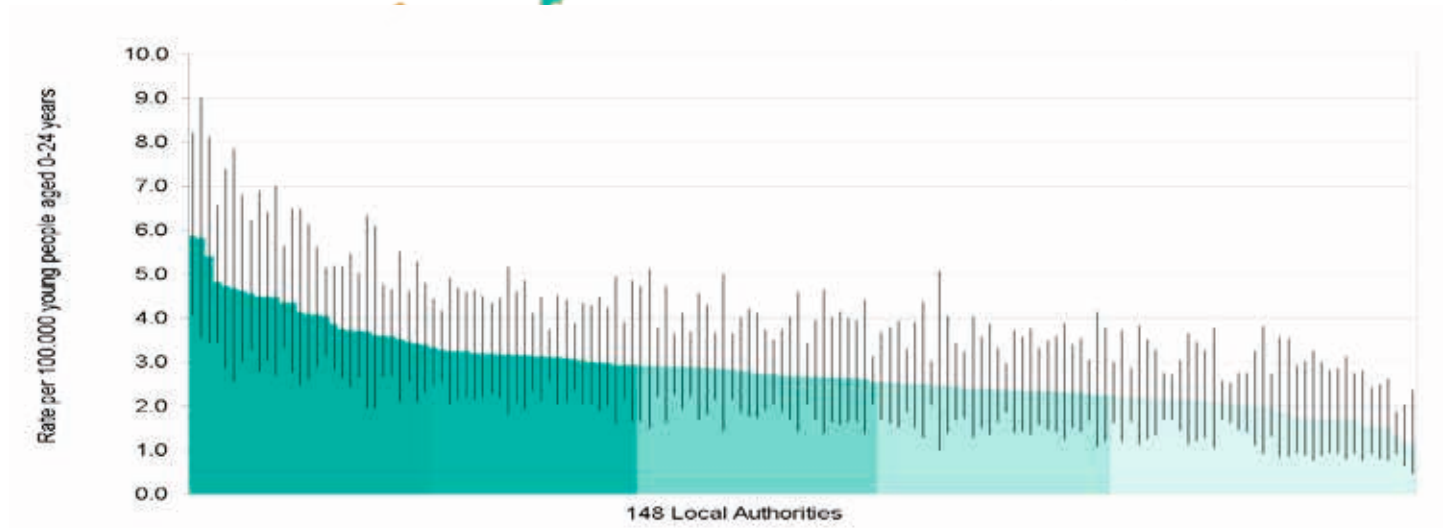
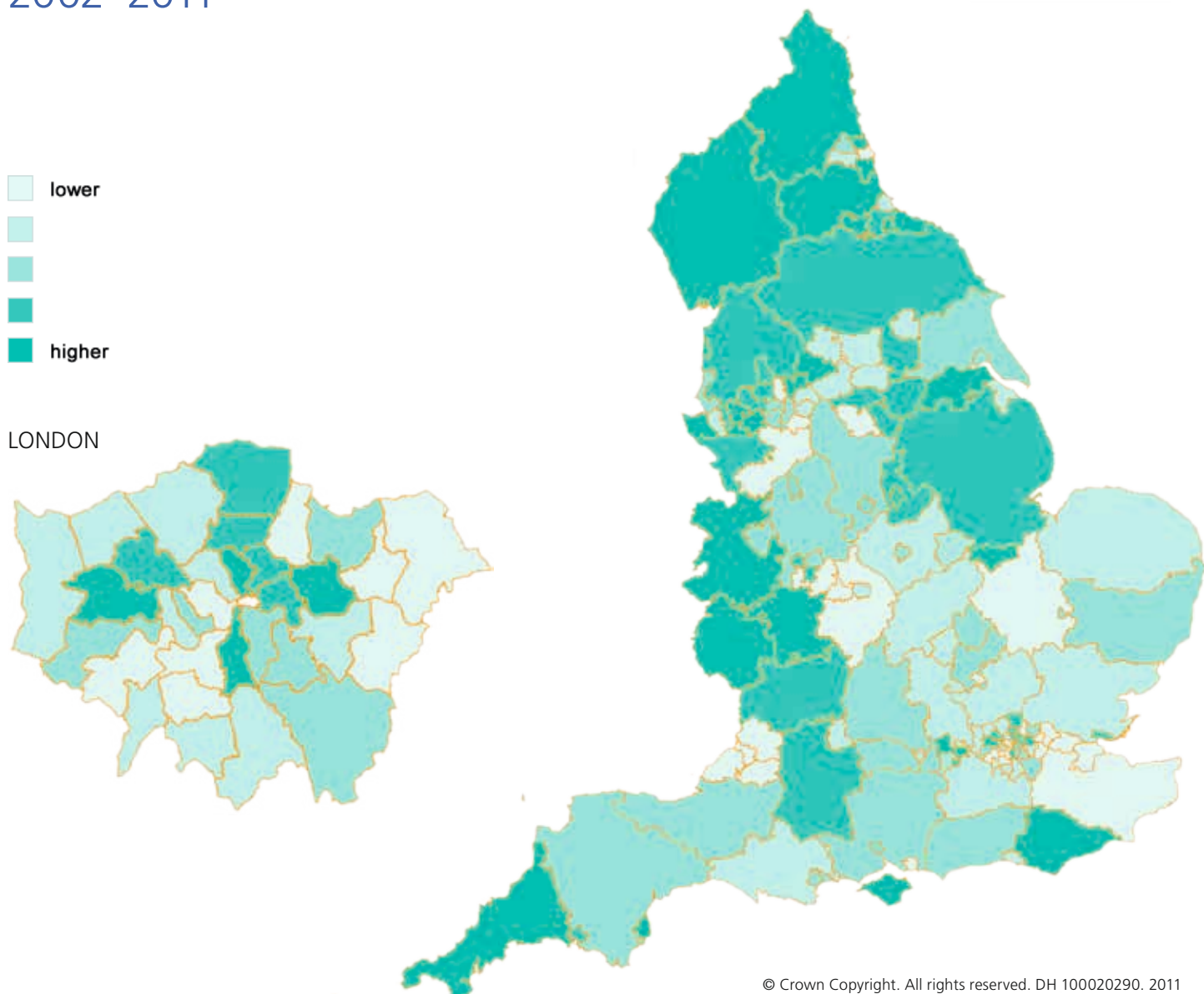
**Map 13** Injuries from road traffic accidents: Rate of children aged 0–15 years killed or seriously injured in road traffic accidents, per 100,000 children aged 0–15 years, by local authority, 2009–2011



**Map 14** Mortality from accidental injury: Directly standardised rate of death in children and young people aged 0–24 years due to all accidental injury, per 100,000 children and young people aged 0–24 years, by local authority, 2002–2011



**Map 15** Mortality from non-accidental injury: Directly standardised rate of death in children and young people aged 0–24 years due to all non-accidental injury, per 100,000 children and young people aged 0–24 years, by local authority, 2002–2011





## Context

Injuries are a leading cause of hospitalisation, morbidity and premature mortality in children and young people. Hospitalisation from injury is much more common in children aged under 5 years, with 143 admissions for injury per 10,000 children in 2010–2011 compared with 116 for children aged 5–17 years.<sup>1</sup> Healthcare services face a significant burden when the volume of relatively minor injuries is considered in conjunction with the long-term burden some serious injuries effect.

Non-accidental injuries consist primarily of assault and self-harm, and show two peaks: one in the pre-school age range as a result of maltreatment, and another in adolescence from violence. Accidental injuries in England are most likely to be caused by road traffic accidents in older children, while in younger children accidents in the home such as drowning, poisoning, falls and burns predominate.<sup>2</sup>

Despite being one of the commonest causes of death, mortality from injury, both accidental and non-accidental, has steadily declined over the past 30 years in England and is still rare in absolute terms.<sup>3</sup> The mortality data presented here are therefore aggregated over a 10-year period, and presented for children and young people up to 24 years of age.

The indicator 'Killed or seriously injured casualties on England's roads' is included in the Public Health Outcomes Framework 2013–16.

## Magnitude of variation

### Map 12: Hospital admissions due to injury

For local authorities in England, the rate of hospital admissions due to injury in children aged 0–17 years, per 10,000 children aged 0–17 years, ranges from 72.4 to 211.1 (nearly three-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 84.3 to 182.7, and the variation is two-fold.

### Map 13: Injuries from road traffic accidents

For local authorities in England, the rate of children aged 0–15 years killed or seriously injured in road traffic accidents, per 100,000 children aged 0–15 years, ranges from 4.4 to 47.9 (nearly 11-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 8.4 to 42.5, and the variation is five-fold.

### Map 14: Mortality from accidental injury

For local authorities in England, the directly standardised rate of death in children and young people aged 0–24 years

due to all accidental injury, per 100,000 children and young people aged 0–24 years, ranges from 2 to 13 (6.5-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 3.3 to 10.7, and the variation is greater than three-fold.

### Map 15: Mortality from non-accidental injury

For local authorities in England, the directly standardised rate of death in children and young people aged 0–24 years due to all non-accidental injury, per 100,000 children and young people aged 0–24 years, ranges from 1.1 to 5.9 (more than five-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 1.6 to 4.7, and the variation is threefold.

## Options for action

Prevention of non-accidental injury is increasingly acknowledged as requiring a population-based approach. A system approach, involving professionals from commissioning groups, local authorities, public health, education and health visiting, can aid early detection and mitigate the impact of risk factors for self-harm and child maltreatment.

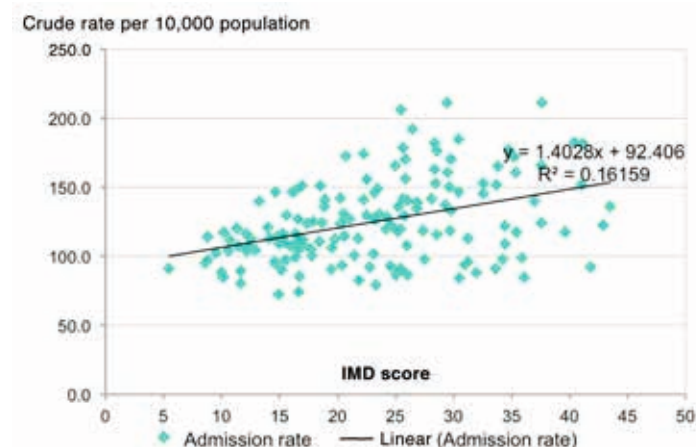
For unintentional injuries, interventions aimed at the riskiest environments – road safety and injuries in the home – are likely to have the greatest impact.<sup>4</sup>

1 Public Health England Injury Profiles data. Available from: [www.apho.org.uk/default.aspx?QN=INJURY\\_PAGE02](http://www.apho.org.uk/default.aspx?QN=INJURY_PAGE02).

2 Fauth R, Ellis A, editors (2010). Reducing unintentional injuries in childhood. London.

3 Hardelid P, Davey J, Dattani N, Gilbert R. (2013). Child deaths due to injury in the four UK countries: a time trends study from 1980 to 2010. PLoS One. 8(7): e68323

**Figure 2B.1 Correlation between deprivation and hospital admission rate for injuries in children aged 0–15 years, by local authority, 2011–2012 (High IMD score indicates more deprived area)**



4 Annual Report of the Chief Medical Officer 2012 (Special Report – Our Children Deserve Better; Prevention Pays)

### Resources

The National Institute for Health and Care Excellence has published a range of public health guidance for the prevention of injury:

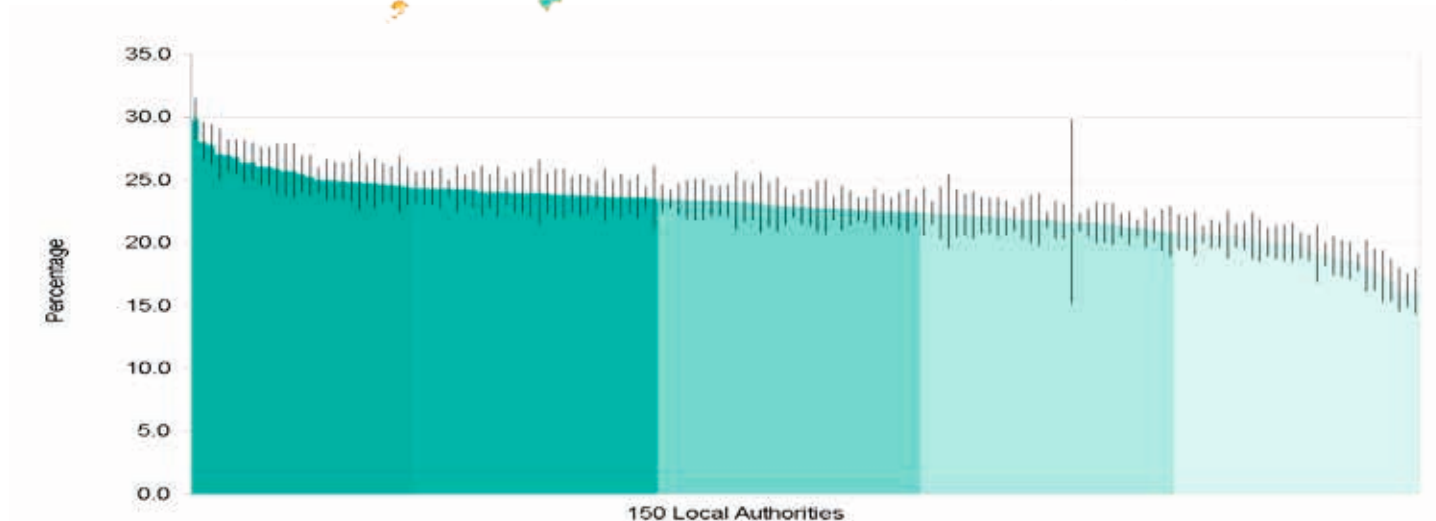
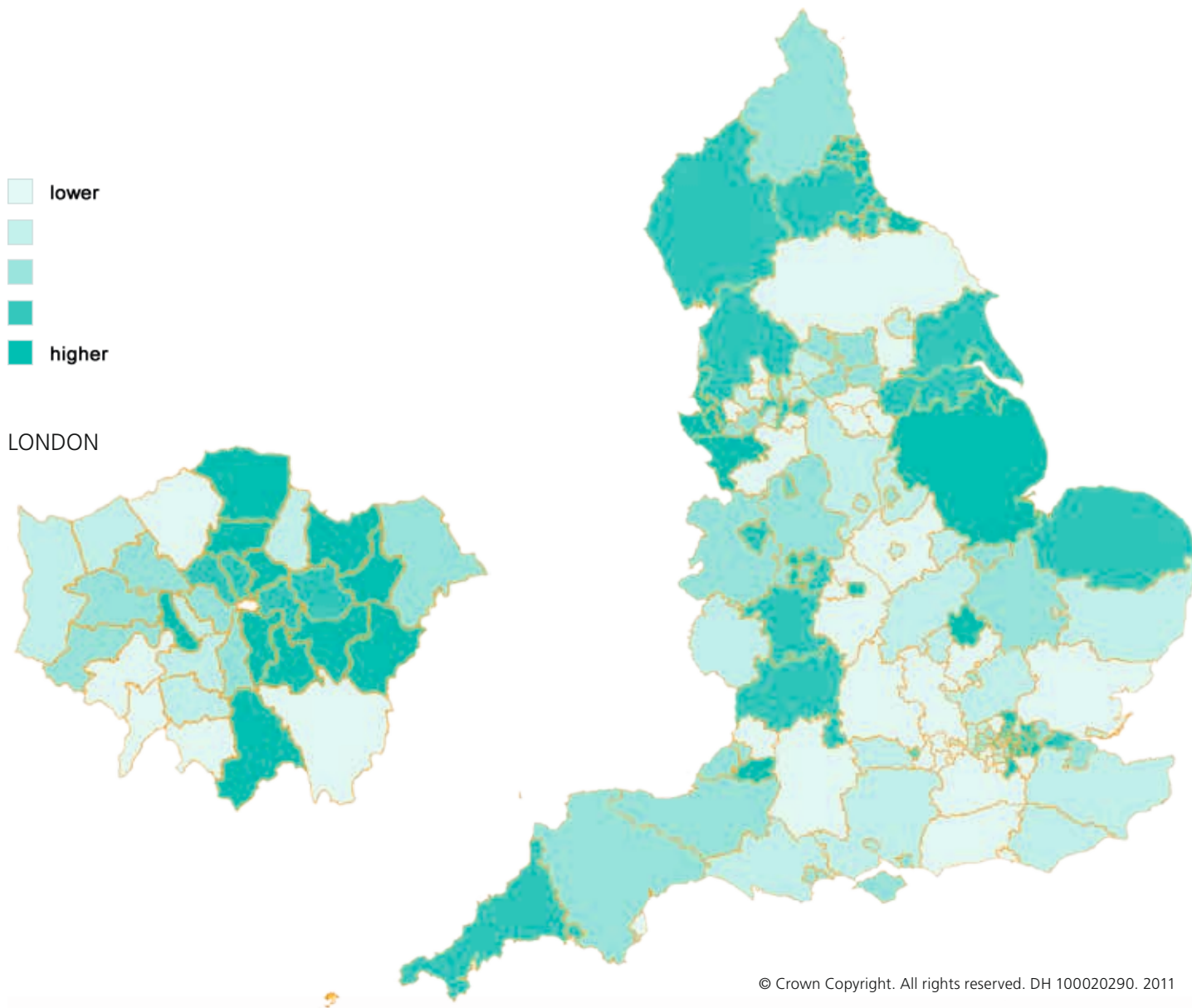
- Strategies to prevent unintentional injuries among the under-15s (2010) ([www.nice.org.uk/PH29](http://www.nice.org.uk/PH29)).
- Preventing unintentional injuries among the under-15s in the home (2010) ([www.nice.org.uk/PH30](http://www.nice.org.uk/PH30)).
- Preventing unintentional road injuries among under-15s (2010) ([www.nice.org.uk/PH31](http://www.nice.org.uk/PH31)).

Public Health England produces Injury Profiles for local authorities to assess and highlight variations among local authorities for a multitude of indicators for injury ([www.apho.org.uk/default.aspx?QN=INJURY\\_DEFAULT](http://www.apho.org.uk/default.aspx?QN=INJURY_DEFAULT)).

Child Health Reviews – UK, a project backed by the Royal College of Paediatrics and Child Health, is (at time of writing, October 2014) conducting an all-cause analysis of mortality, and is due to report in 2015. ([www.rcpch.ac.uk/chr-uk](http://www.rcpch.ac.uk/chr-uk)).

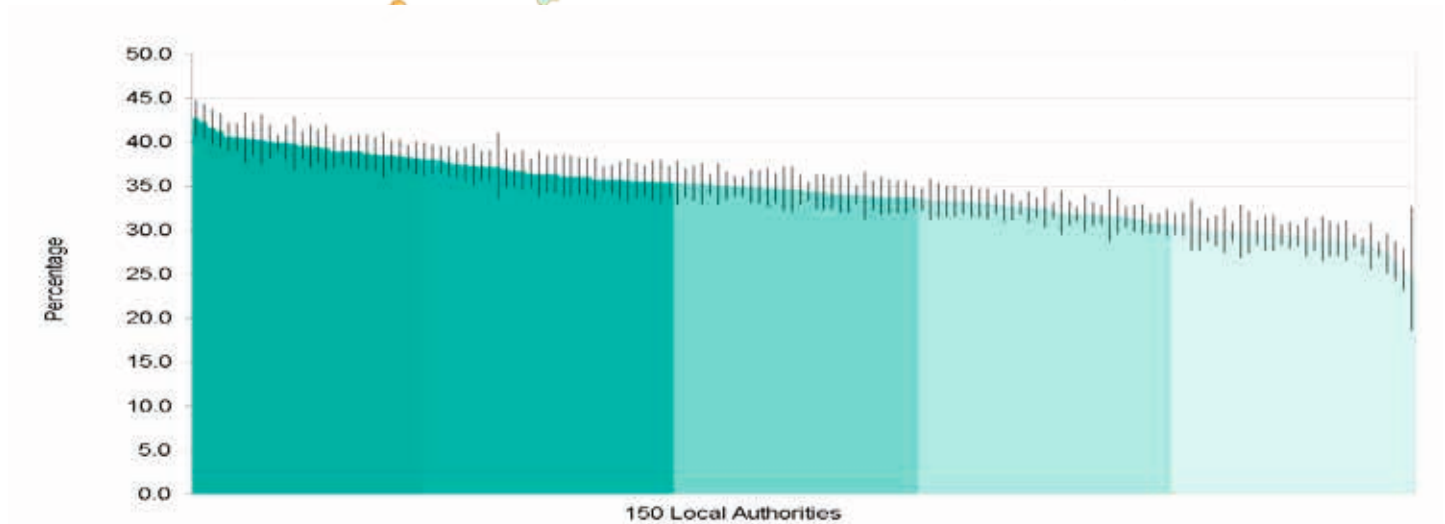
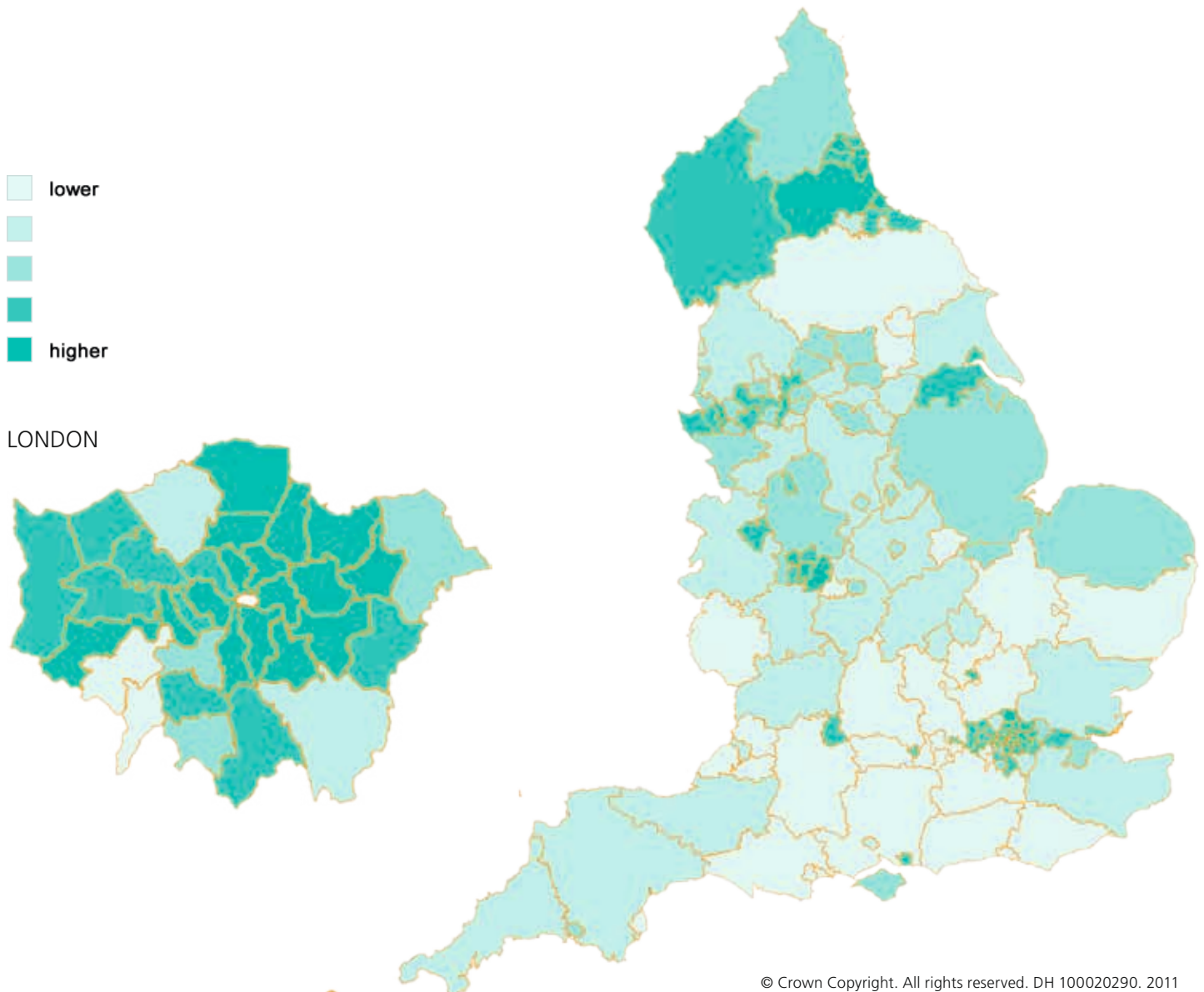
C: Weight

**Map 16** Weight in 4–5-year-old children: Percentage of pupils in Reception class classified as overweight or obese, by local authority, 2011–2012





**Map 17** Weight in 10–11-year-old children: Percentage of pupils in Year 6 classified as overweight or obese, by local authority, 2011–2012



**Map 16** Weight in 4–5-year-old children: Percentage of pupils in Reception class classified as overweight or obese, by local authority, 2011–2012

**Map 17** Weight in 10–11-year-old children: Percentage of pupils in Year 6 classified as overweight or obese, by local authority, 2011–2012

## Context

Obesity is a significant public health problem in England. Childhood obesity rates have been steadily rising for the past decade (data from pupils in Year 6 continue to show annual increases in obesity prevalence by 0.32% per year),<sup>1</sup> although there is some evidence to suggest that rates may now be plateauing. Obesity in childhood is associated with an increased risk of being overweight or obese in adulthood.

Obesity is associated with poor physical health and emotional wellbeing, including:

- type 2 diabetes mellitus
- non-alcoholic liver disease (which, as a result, is the most common chronic disease of the liver in children and young people in the developed world)
- lower self-reported physical and psychosocial wellbeing
- increased lifetime risk of cardiovascular disease and of certain cancers.

At a population level, the causes of obesity are complex and multifactorial. There is significant variation in rates of obesity among age groups, gender, geographical distribution and socio-economic status.

'Excess weight in 4–5 and 10–11 year olds' is included in the Public Health Outcomes Framework 2013–16.

## Magnitude of variation

### Map 16: Weight in 4–5-year-old children

For local authorities in England, the percentage of pupils in Reception class (aged 4–5 years) classified as overweight or obese ranged from 16.1 to 29.8 (nearly two-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 17.8 to 26.8, and the variation is 1.5-fold.

### Map 17: Weight in 10–11-year-old children

For local authorities in England, the percentage of pupils in Year 6 (aged 10–11 years) classified as overweight or obese ranged from 25.0 to 42.8 (nearly two-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 28.1 to 40.6, and the variation is 1.4-fold.

There is a clear association between being obese and living in an area of deprivation (see Figure 2C.1 for Year 6 pupils).

However, there is no clear association between being overweight (rather than obese) and living in an area of deprivation, either in Reception or Year 6. This may suggest that progression from overweight to obesity is more common in children living in an area of deprivation.

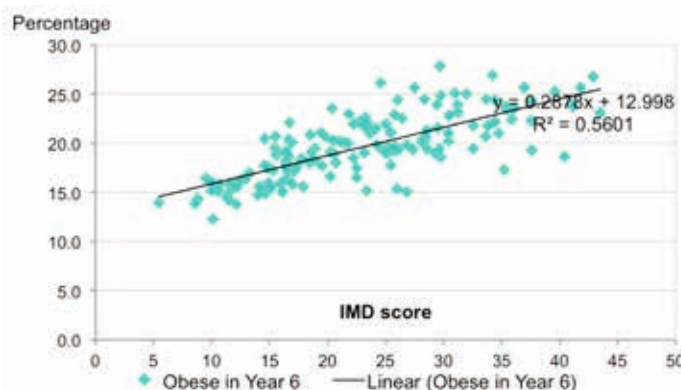
## Options for action

Commissioners can begin to analyse whether local variations are warranted or unwarranted by assessing the proportion of overweight and obese children and young people in their populations in comparison with demographically similar regions.

Commissioners can move towards delivering evidence-based, integrated interventions for healthy eating and physical activity by working with local government, education and social care to adopt a co-ordinated approach, and considering adequate capacity and training of relevant community- and school-based professionals.

Treatment of obesity in children and young people is complicated by the fact that simply reducing calorie intake may interfere with growth and development. However, there is evidence that a co-ordinated and multicomponent approach involving both healthy eating and physical activity can be effective, particularly if implemented as part of a school- or family-based initiative.

**Figure 2C.1** Correlation between deprivation and percentage of Year 6 pupils classified as obese, by local authority, 2011–2012 (High IMD score indicates more deprived area)



<sup>1</sup> National Obesity Observatory, [www.noo.org.uk](http://www.noo.org.uk).

### Resources

A detailed overview of social and biological aspects of obesity, as well as evidence on interventions and policy, is available in the Foresight report:

- Foresight Report: Tackling Obesities – Future Choices (2007) HMSO ([www.bis.gov.uk/assets/foresight/docs/obesity/17.pdf](http://www.bis.gov.uk/assets/foresight/docs/obesity/17.pdf)).

More current analysis from the National Obesity Observatory:

- Ridler C, Dinsdale H, Rutter H. (2013). National Child Measurement Programme: Changes in children's body mass index between 2006/07 and 2011/12. National Obesity Observatory, Oxford ([www.noo.org.uk/uploads/doc/vid\\_17929\\_NCMP\\_Changes\\_children.pdf](http://www.noo.org.uk/uploads/doc/vid_17929_NCMP_Changes_children.pdf)).

National strategy for tackling obesity:

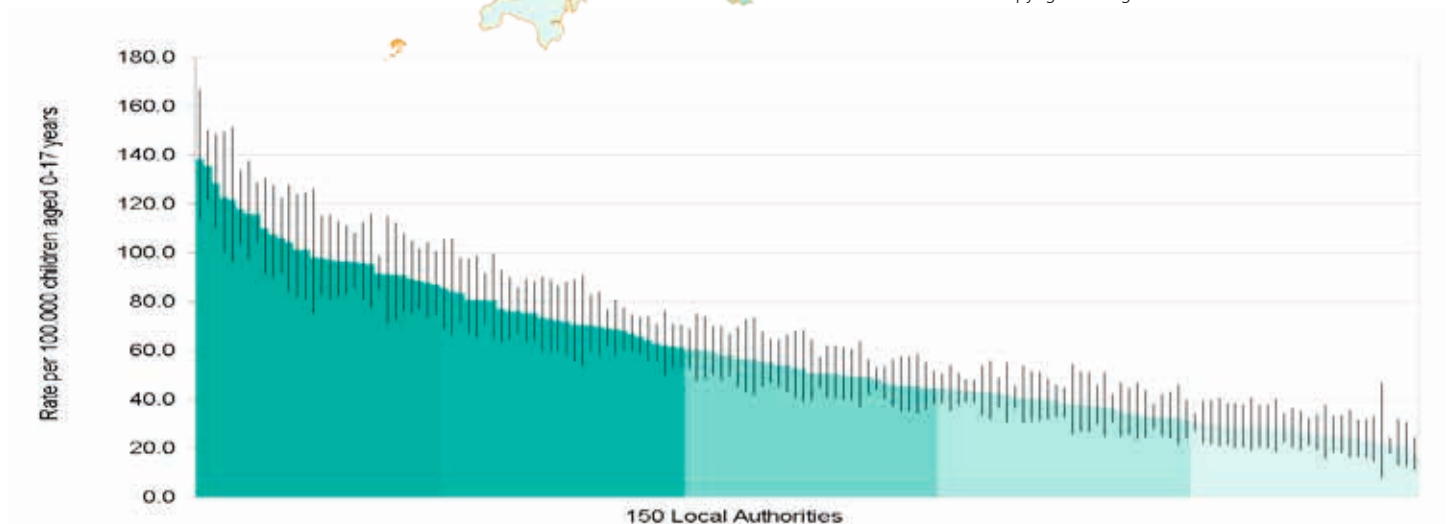
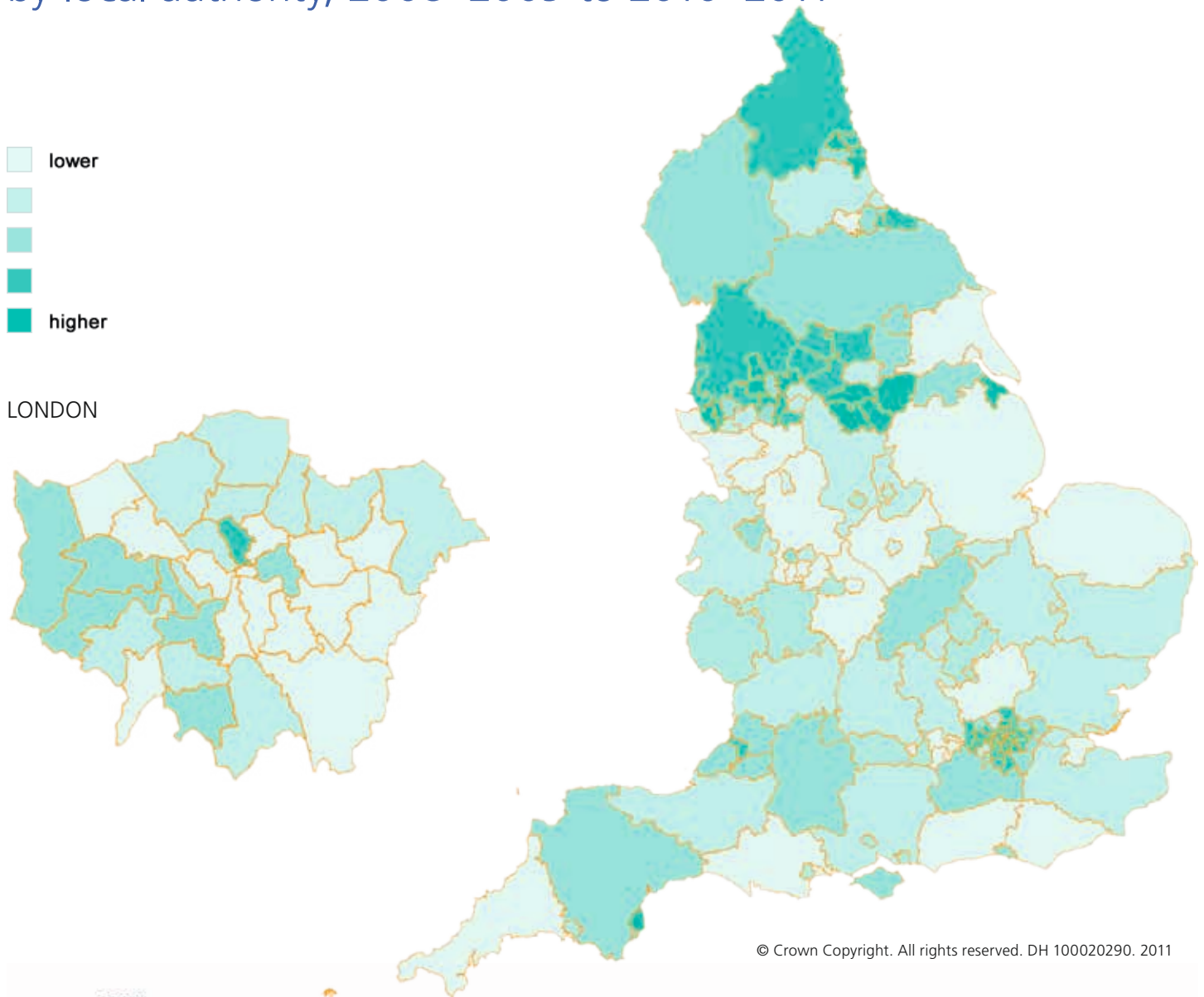
- Department of Health (2011). Healthy Lives, Healthy People: A call to action on obesity in England. London ([www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/134840/dh\\_130487.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/134840/dh_130487.pdf)).

The National Institute for Health and Care Excellence has produced evidence-based guidance on a life-course, pathway approach to prevention and interventions for obesity:

- NICE Clinical Guideline CG43 (2006). Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children ([www.nice.org.uk/cg043](http://www.nice.org.uk/cg043)).

D: Alcohol, smoking and substance misuse

**Map 18** Alcohol-related hospital admissions: Hospital admission rate for people aged 0–17 years due to alcohol-specific conditions, per 100,000 people aged 0–17 years, by local authority, 2008–2009 to 2010–2011





## Section 2: Child health promotion

### Context

Alcohol misuse in children and young people, along with smoking and substance misuse, remains a concern for public health, despite impressive reductions in prevalence of all three behaviours in children and young people. In 2012, 43% of 11–15 year olds had already consumed alcohol at least once. Some 25% of 15 year olds had drunk alcohol within the last week. Children who had a drink within the last week consumed, on average, 12.5 units.<sup>1</sup>

In England, approximately:

- 120,000 children aged 11–15 years smoke regularly
- 200,000 had taken drugs in the past month
- 320,000 had drunk alcohol in the past week.<sup>1</sup>

UK adolescents are, on average, more likely than their European counterparts to report frequent intoxication and heavy drinking – as well as more positive expectations of being drunk.<sup>2</sup>

Early age of drinking onset is associated with an increased risk of developing alcohol dependence in adulthood. Similarly, most current smokers report having started smoking in adolescence and early adulthood.

Alcohol-related hospital admissions and attendances place a considerable burden on healthcare services. Alcohol abuse and dependence are strongly associated with a range of physical and mental health problems, including an increased risk of:

- other risk-taking behaviours and their consequences, such as injuries, violence, and risky sexual behaviours
- self-harm, suicide and other mental health problems
- longer-term complications such as alcoholic liver disease and certain cancers.

‘Alcohol-related admissions to hospital’ is included as a placeholder in the Public Health Outcomes Framework 2013–16.

### Magnitude of variation

#### Map 18: Alcohol-related admissions

For local authorities in England, the rate of hospital admissions in people aged 0–17 years for alcohol-specific conditions, per 100,000 people aged 0–17 years, ranged from 16.9 to 138.3 (an eight-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 22.5 to 117.9, and the variation is greater than five-fold.

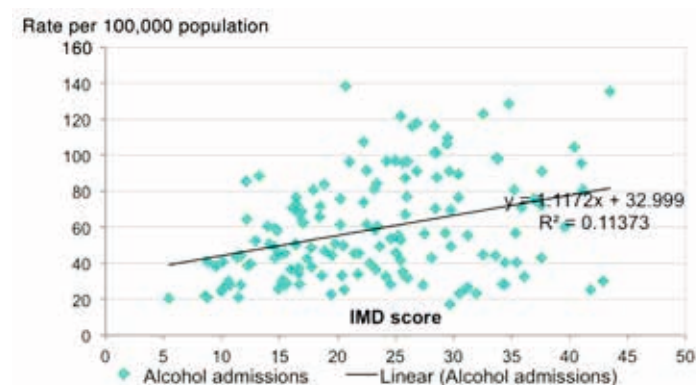
1 Health and Social Care Information Centre (2012). Smoking, drinking and drug use among young people in England, 2012. Available from: [www.hscic.gov.uk/catalogue/PUB11334](http://www.hscic.gov.uk/catalogue/PUB11334).

2 The 2011 European School Survey Project on Alcohol and Other Drugs (ESPAD) Report (2012). Available from: [www.espad.org/en/Reports--Documents/ESPAD-Reports/](http://www.espad.org/en/Reports--Documents/ESPAD-Reports/).

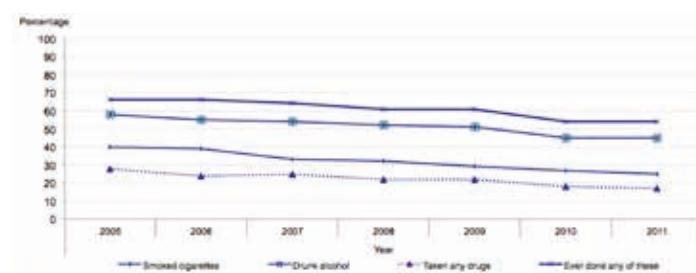
Alcohol misuse, like smoking and substance misuse, is associated with deprivation and this finding is corroborated to some degree by our data. However, the correlation seen in Figure 2D.1, is unlikely to be strong enough to fully explain the variation.

Alcohol consumption, smoking and substance misuse comprise a set of risk-taking behaviours which cluster together, with shared risk factors and shared consequences for ill health. Those who undertake one of these behaviours are at higher risk of also undertaking the others. In 2012, 17% of all 15 year olds in England reported taking drugs at least once, and 23% reported having smoked at least once.<sup>1</sup> Although there has been a downward trend over the past few years in self-reported rates for all three behaviours, the overall rates are still unacceptably high (see Figure 2D.2).

**Figure 2D.1 Correlation between deprivation and hospital admission rates for alcohol-related conditions, by local authority, 2008–2009 to 2010–2011 (High IMD score indicates more deprived area)**



**Figure 2D.2 Percentage of school pupils aged 10–15 years who reported having ever smoked, drunk alcohol and/or taken drugs, 2011**



## Options for action

Hospital attendance for alcohol-related reasons represents only the extreme end of the spectrum of alcohol-related health problems in children and young people. However, hospital attendance presents opportunities for intervention and secondary prevention. These include:

- referral to alcohol and youth services
- broader, more integrated health interventions such as family services
- safeguarding
- broader health promotion.

Commissioners can analyse rates of smoking, alcohol and substance misuse in children and young people in their populations and, through comparison with demographically similar local authorities, decide whether local variations are warranted or unwarranted.

Adolescence is a key period for intervention to change behaviours which may otherwise become entrenched well into adulthood.

School health and youth services are key resources in the prevention, detection and treatment of smoking, alcohol and substance misuse.

Commissioners can move towards delivering evidence-based, integrated interventions for prevention and treatment of alcohol and substance misuse, and for smoking cessation, by working with local government, education and social care to adopt a co-ordinated approach, and considering adequate capacity and training of relevant community- and school-based professionals.

Commissioners can consider how they ensure their populations can access suitable, multiprofessional addiction services (services for children and young people which are young people friendly and accessible).

## Resources

Alcohol Concern has a series of helpful briefing documents on background, policy, interventions and commissioning guidance:

- Reducing underage alcohol harm in Accident and Emergency settings (2011) ([www.alcoholconcern.org.uk/publications/other-publications/reducing-underage-alcohol-harm](http://www.alcoholconcern.org.uk/publications/other-publications/reducing-underage-alcohol-harm)).
- Investing in alcohol treatment (2010) ([www.alcoholconcern.org.uk/publications/other-publications/investing-in-alcohol-treatment-reducing-costs-and-improving-lives.-alcohol-concerns-learning-from-10-years-of-consultancy-and-training](http://www.alcoholconcern.org.uk/publications/other-publications/investing-in-alcohol-treatment-reducing-costs-and-improving-lives.-alcohol-concerns-learning-from-10-years-of-consultancy-and-training)).
- Lessons learnt from alcohol harm reduction initiatives across England: HubCAPP briefing (2010) ([www.alcoholconcern.org.uk/publications/other-publications/lessons-learnt-from-alcohol-harm-reduction-initiatives-across-england-hubcapp-briefing](http://www.alcoholconcern.org.uk/publications/other-publications/lessons-learnt-from-alcohol-harm-reduction-initiatives-across-england-hubcapp-briefing)).

- Guidance for user-led commissioning: how to involve alcohol service users in commissioning (2008) ([www.alcoholconcern.org.uk/publications/other-publications/user-led-commissioning](http://www.alcoholconcern.org.uk/publications/other-publications/user-led-commissioning)).

The Home Office published a national alcohol strategy in 2012:

- The Government's Alcohol Strategy (2012). HMSO, London ([https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/224075/alcohol-strategy.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224075/alcohol-strategy.pdf))

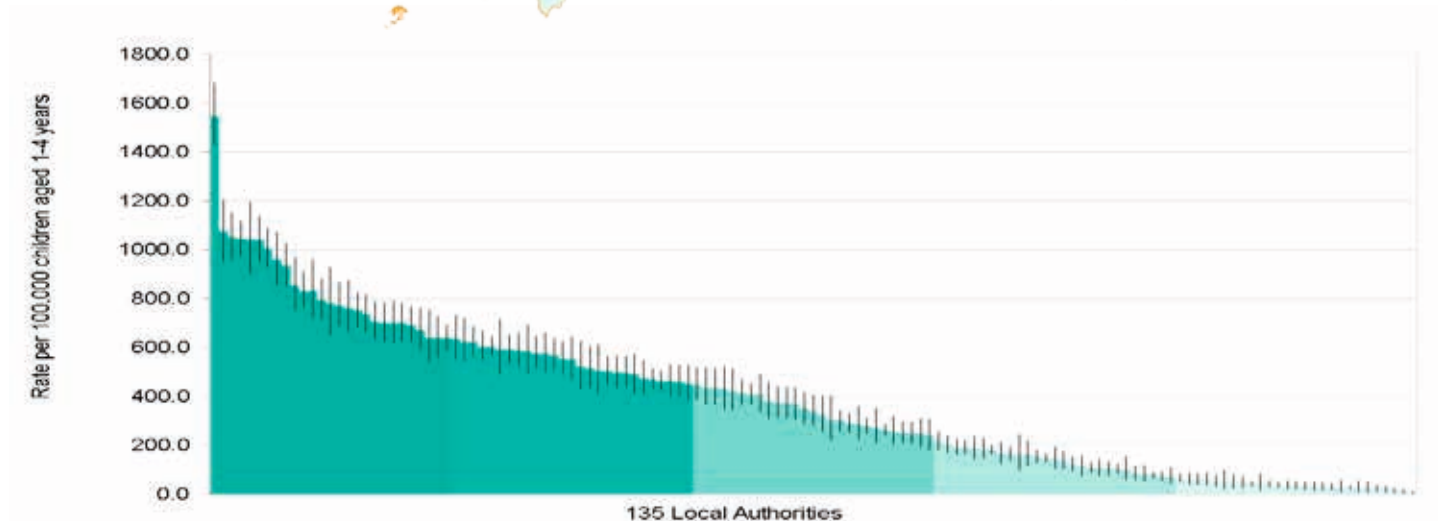
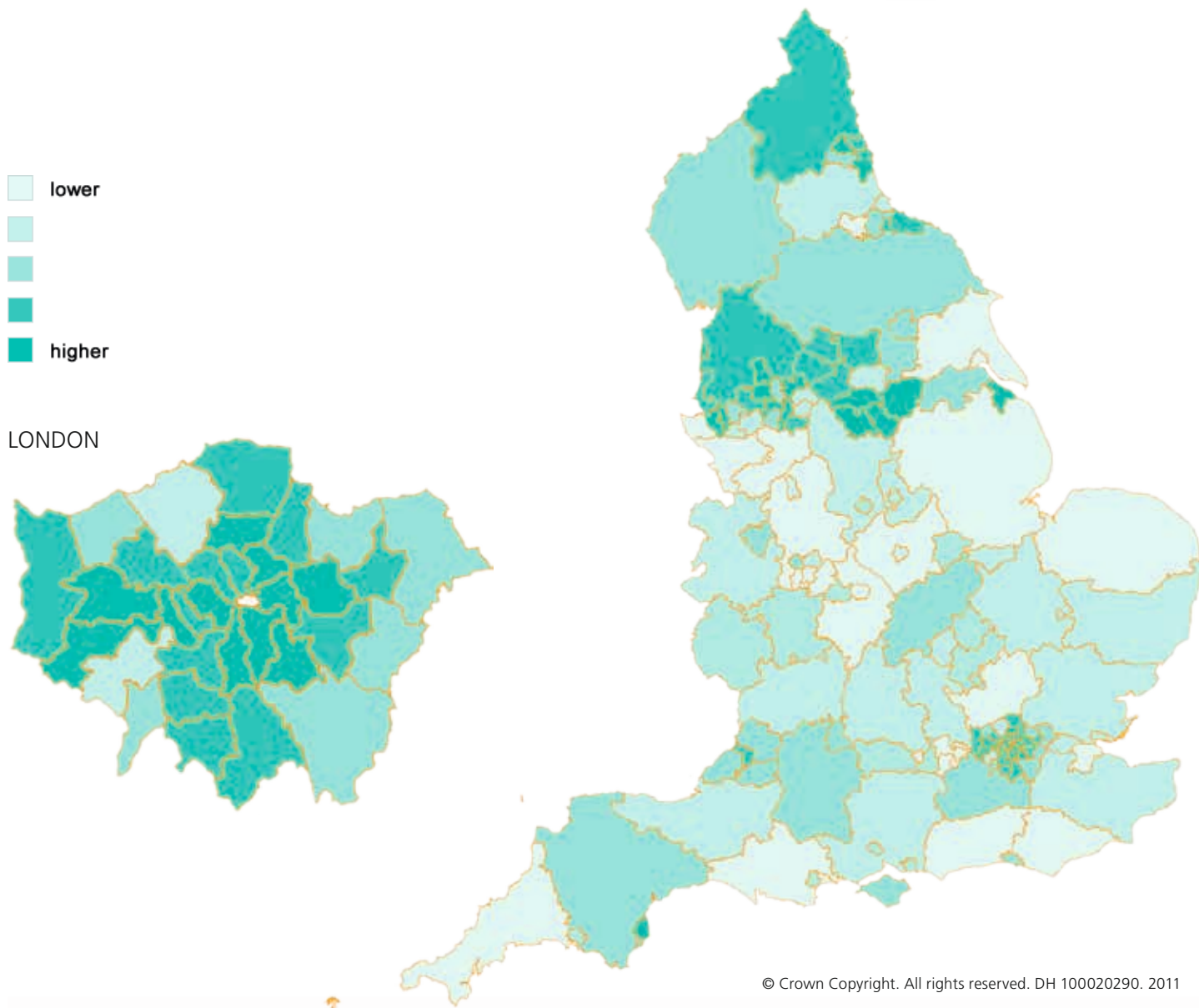
The National Institute for Health and Care Excellence has produced evidence-based guidance on prevention, diagnosis and treatment of alcohol dependence:

- NICE Clinical Guideline CG115 (2011). Alcohol use disorders: diagnosis, assessment and management of harmful drinking and alcohol dependence. NICE ([www.nice.org.uk/CG115](http://www.nice.org.uk/CG115)).



E: Dental health

**Map 19** Dental health: Hospital admission rate for dental caries in children aged 1–4 years, per 100,000 children aged 1–4 years, by local authority, 2009–2012



## Context

Tooth decay in childhood is common and preventable. Early childhood caries can have significant impacts on the health and wellbeing of preschool children, and constitute a considerable burden on healthcare services in the form of emergency hospital and dental attendances, hospitalisation and operative intervention.

Early childhood caries is a public health problem which is multifactorial in origin. It is associated with socio-economic deprivation, but has specific risk factors which include a diet rich in fermentable carbohydrates, oral hygiene practices and the acquisition of specific cariogenic bacteria.<sup>1</sup>

Dental health in England has improved significantly over the past 50 years as a result of public health interventions such as oral health education, dietary changes and access to dental services. However, it remains a significant problem, particularly among the most deprived populations.

A similar indicator, 'Tooth decay in children aged 5', is included in the NHS Public Health Outcomes Framework 2013–16.

## Magnitude of variation

**Map 19:** For local authorities in England, the hospital admission rate for dental caries in children aged 1–4 years, per 100,000 children aged 1–4 years, ranges from 7 to 1,550.3 (over 200-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 25.9 to 1,041, and the variation is 40-fold.

The rate of admission for dental caries is correlated with deprivation. However, there is considerable variation which may be affected by:

- preventive and public health interventions in the population
- early recognition of children at risk of developing dental caries
- access to dental care
- assessment of dental emergencies and criteria for admission and operative intervention.

## Options for action

Hospital admission rate is only one indicator for dental health among children and young people, and will significantly underestimate the population prevalence of disease. Commissioners and local authorities can look to broader indicators to closely monitor the dental health of their populations, including prevalence and incidence data.

Oral health shows marked inequalities, which are related to both increased risk of developing caries as well as poorer access to dental care. Evidence-based preventive interventions (including water fluoridation) and early treatment to at-risk groups, in particular to areas of high deprivation, can be an effective way for commissioners and local authorities to tackle variation.

## Resources

Scottish Intercollegiate Guidelines Network guidance: Preventing dental caries in children at high caries risk (2000) ([www.sign.ac.uk/pdf/sign47.pdf](http://www.sign.ac.uk/pdf/sign47.pdf)).

National Institute for Health and Care Excellence guidance:

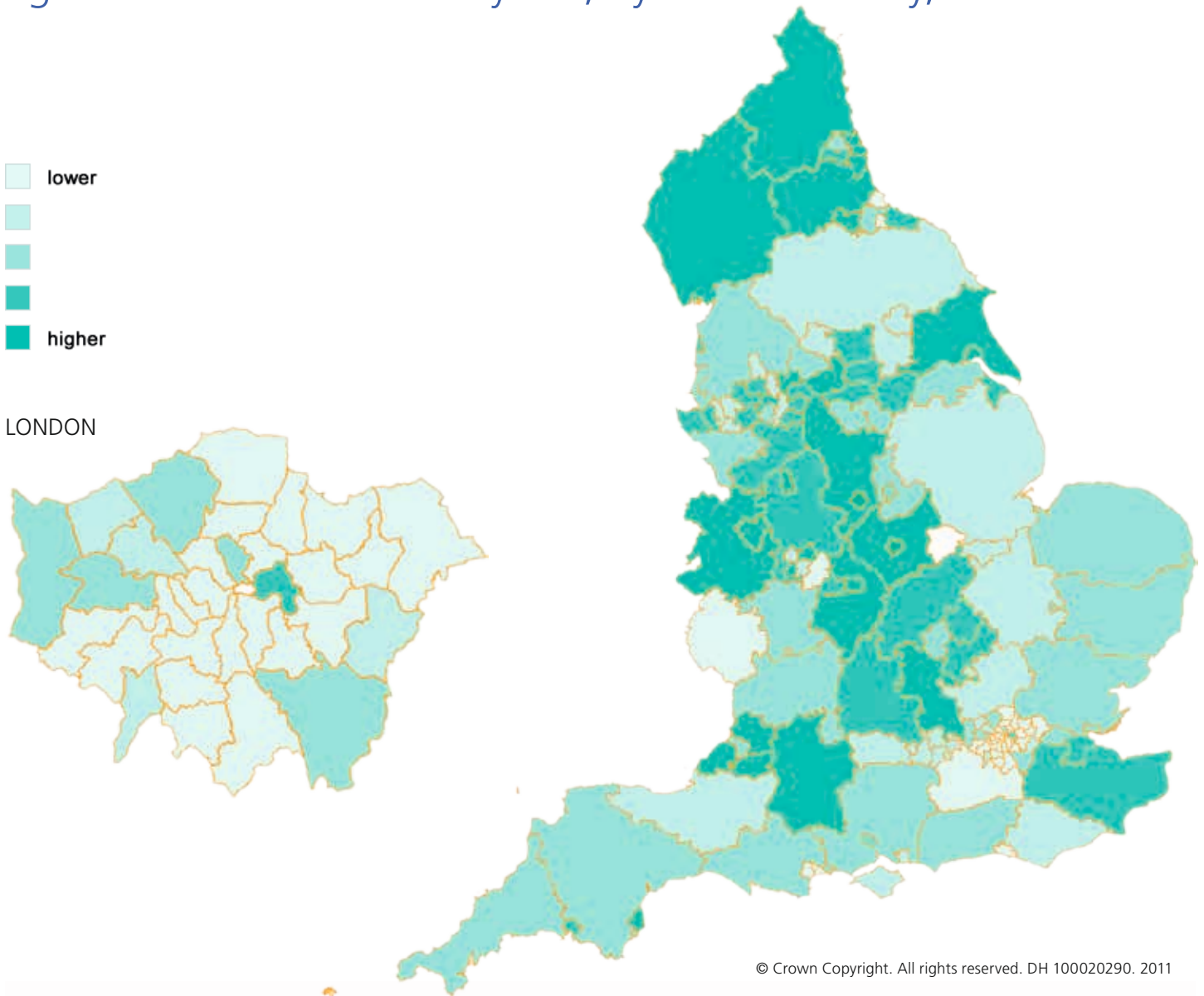
- Oral health promotion: A guide to effective working in pre-school settings (1999) ([www.nice.org.uk/niceMedia/documents/ohp\\_preschool.pdf](http://www.nice.org.uk/niceMedia/documents/ohp_preschool.pdf)).
- Oral health: local authority strategies to improve oral health particularly among vulnerable groups. In progress (<http://guidance.nice.org.uk/PHG/61>).

European Academy of Paediatric Dentistry (2008). Guidelines on prevention of early dental caries ([www.eapd.eu/dat/1722F50D/file.pdf](http://www.eapd.eu/dat/1722F50D/file.pdf)).

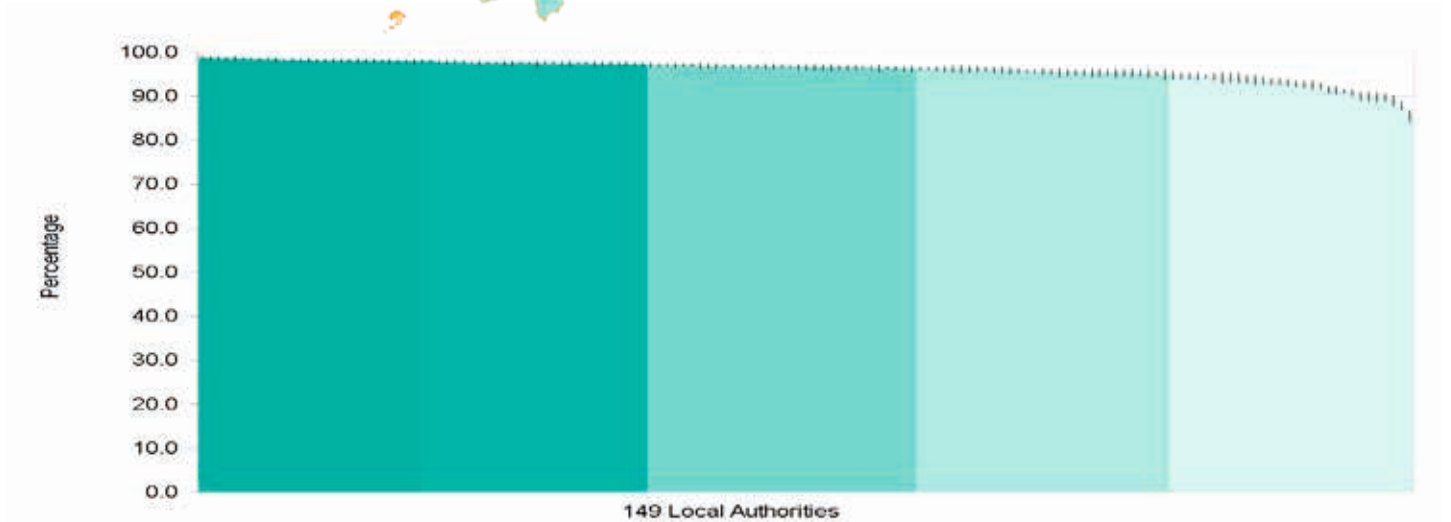
<sup>1</sup> Harris R, Nicoll AD, Adair PM, Pine CM (2004). Risk factors for dental caries in young children: a systematic review of the literature. *Community Dental Health* 21:71–85.

F: Immunisations

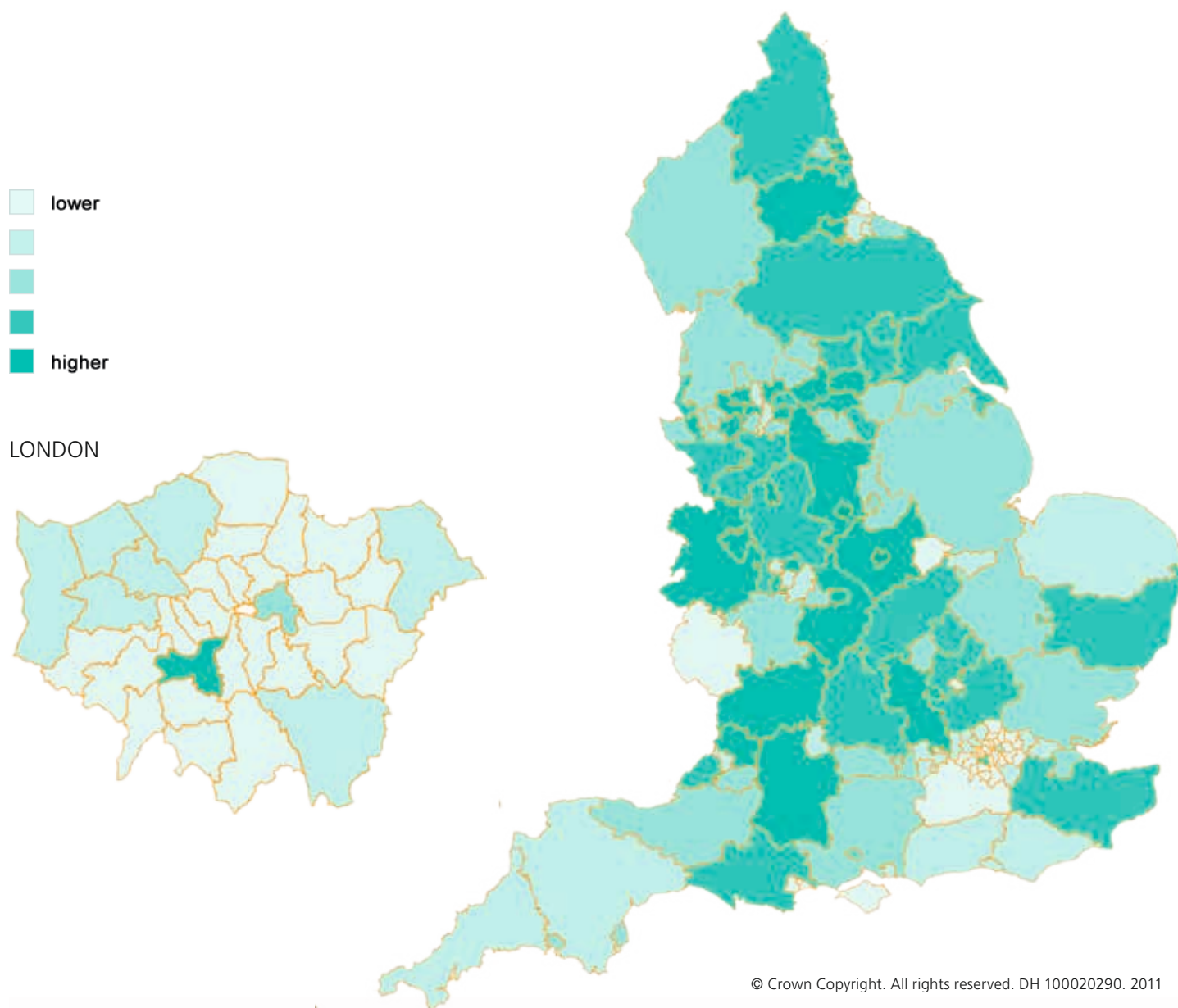
**Map 20** Diphtheria, tetanus, polio, pertussis and *Haemophilus influenzae* type b (DTaP/IPV/Hib) vaccine coverage at 2 years: Percentage of immunisation completion for routine vaccinations against DTaP/IPV/Hib at 2 years, by local authority, 2011–2012



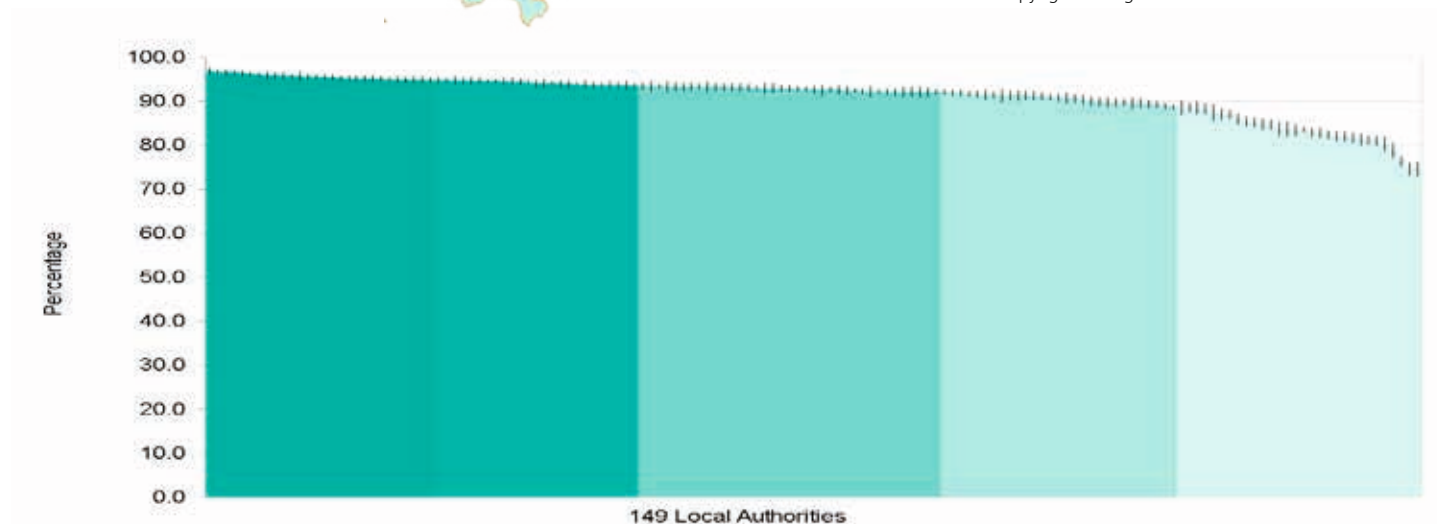
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**Map 21** Pneumococcal conjugate vaccine (PCV) coverage at 2 years: Percentage of immunisation completion for routine vaccinations against pneumococcal disease at 2 years, by local authority, 2011–2012

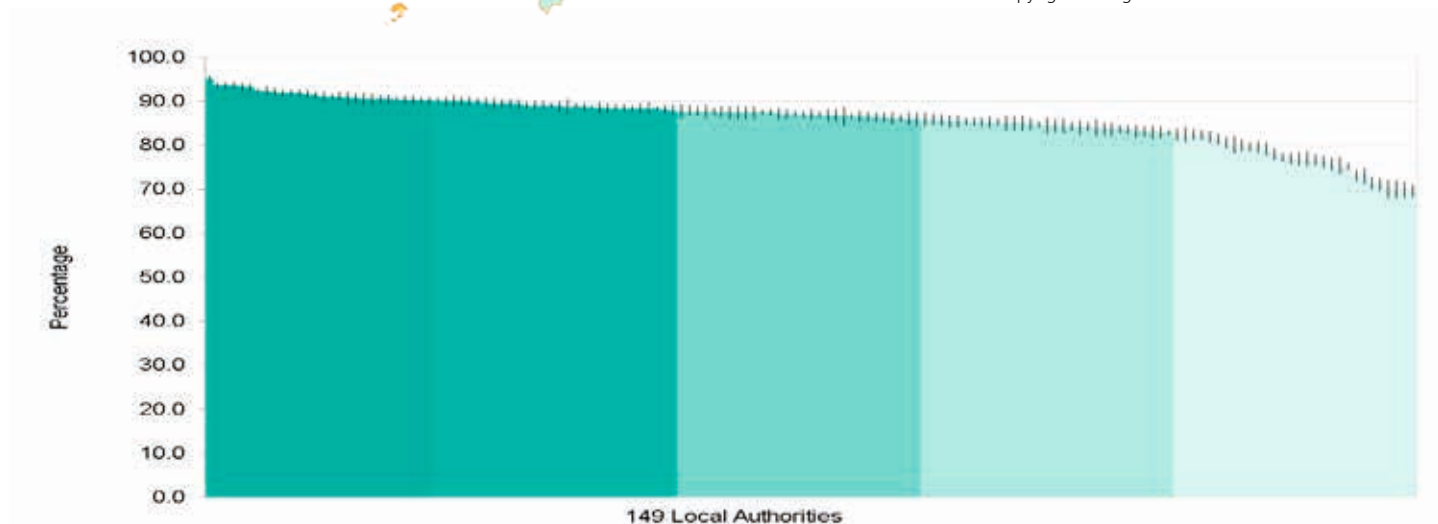
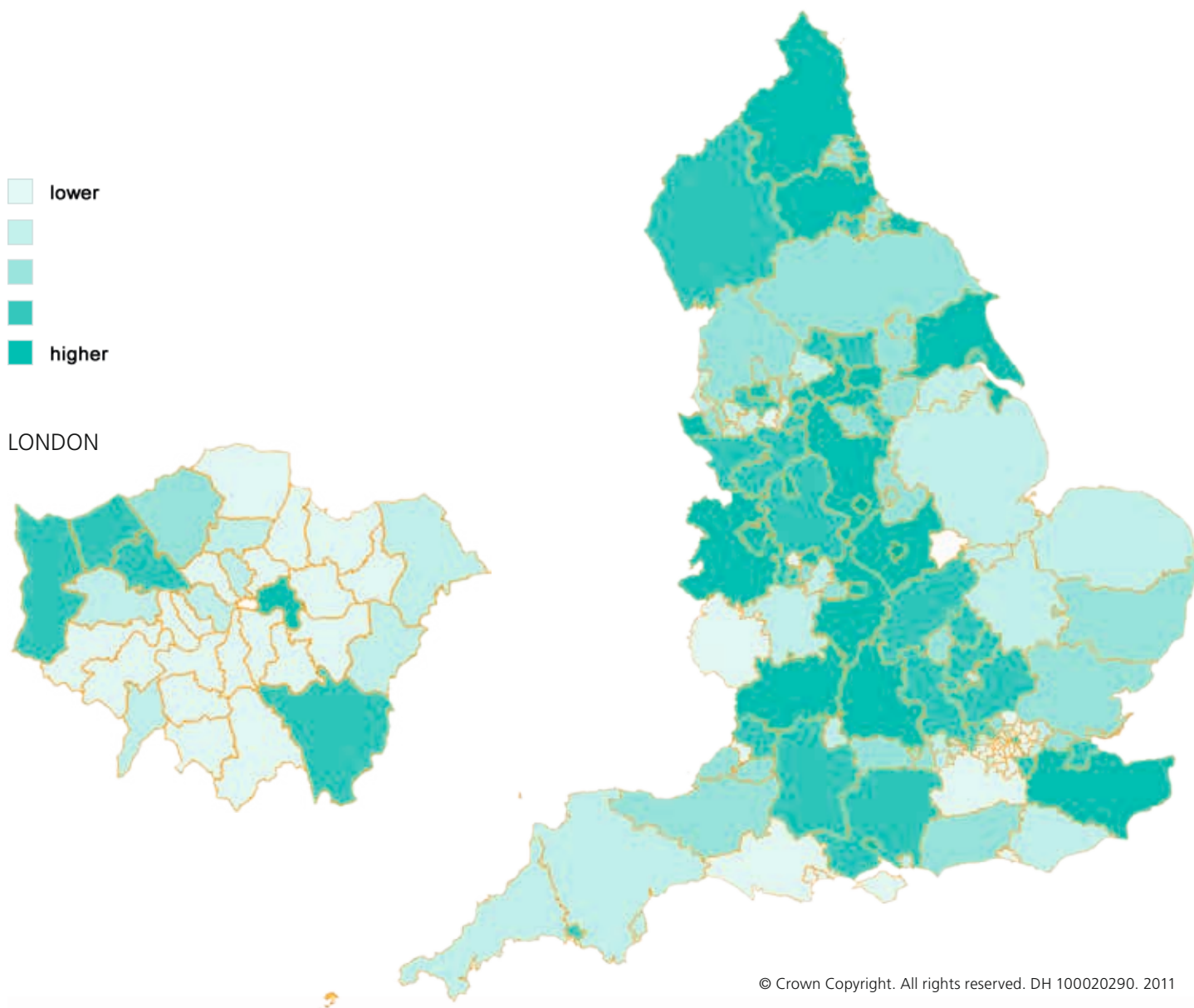


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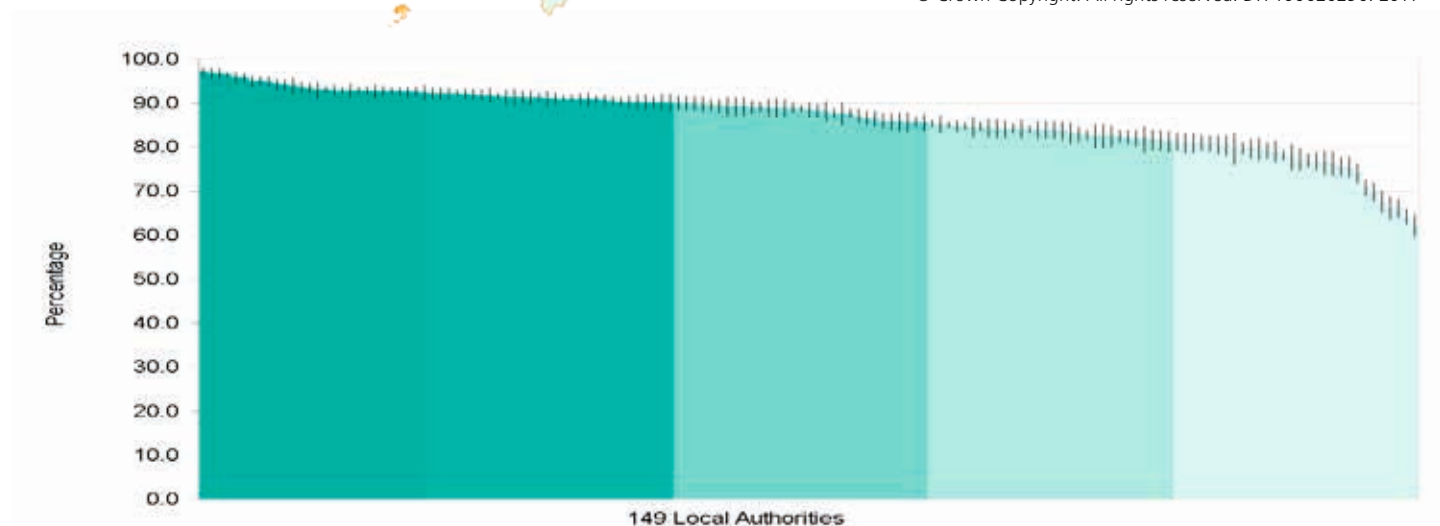
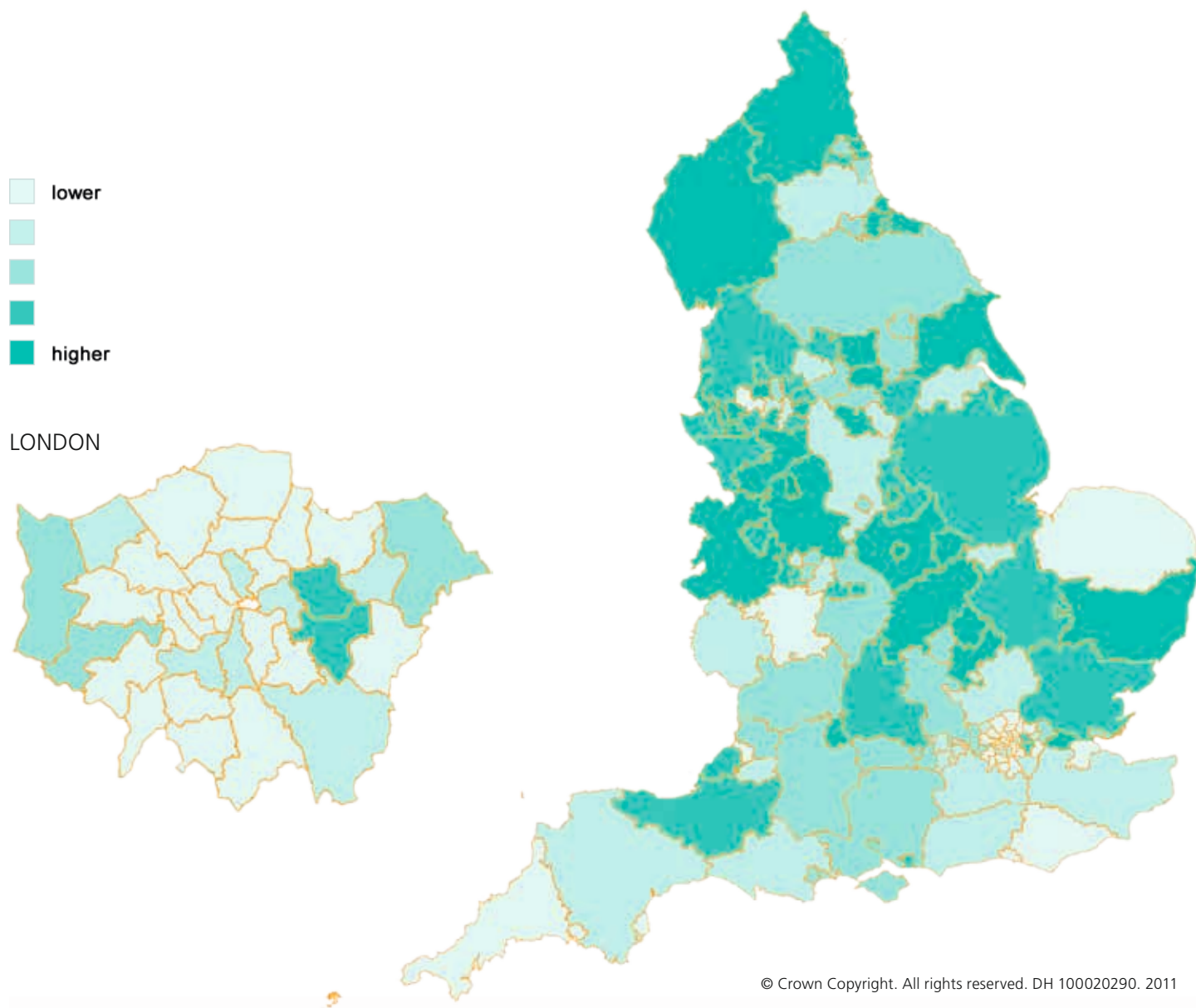


**Map 22** Measles, mumps and rubella (MMR) vaccine coverage at 5 years: Percentage of immunisation coverage for routine vaccinations against MMR at 5 years, by local authority, 2011–2012





**Map 23** Human papillomavirus (HPV) vaccine coverage at 13 years: Percentage of immunisation coverage for routine vaccinations against HPV for girls aged 12–13 years, by local authority, 2011–2012



### Context

Childhood immunisations have transformed the health of children worldwide. For individuals, they may:

- prevent infection
- reduce deaths and morbidity from common, and often serious, infections
- reduce rates of related illnesses, such as certain cancers or secondary infections.

High levels of population immunity to some infectious diseases may protect those who are not immunised, known as 'herd immunity'.

Vaccines are cost-effective. The Health Protection Agency has demonstrated the economic benefits of vaccines currently included in the routine childhood immunisation schedule.<sup>1</sup>

Despite efforts to promote uptake, opportunities for immunisation are missed.<sup>2,3</sup> Investment (e.g. in Sure Start programmes) does not guarantee:

- improvement in overall rates<sup>4</sup>
- reduction of socio-economic inequalities in uptake.<sup>5</sup>

While most infants undergo routine immunisations, a small but significant minority of children remain unimmunised. In older children and adolescents, vaccination coverage is patchier. Recent outbreaks of vaccine-preventable diseases such as pertussis and measles have attracted media coverage but encouraging vaccination uptake remains essential.

In the UK:

- infants at 2 years of age should have received doses of vaccination against DTaP/IPV/Hib, meningococcal meningitis type c, rotavirus, pneumococcus and MMR
- by age 5, all children should have received further doses to maintain their immunity
- at 12–13 years, all girls are routinely offered the HPV vaccination, which helps to prevent future development of cervical cancer<sup>6</sup>
- by age 15, all vaccination programmes should be complete.

1 Health Protection Agency (2005). *Protecting the health of the Nation's children: the benefit of vaccines: 2005*. Available from: [www.hpa.org.uk/Publications/InfectiousDiseases/InfectionControl/0505Childrenhealthvaccinereport/](http://www.hpa.org.uk/Publications/InfectiousDiseases/InfectionControl/0505Childrenhealthvaccinereport/).

2 Conway SP (1999). Opportunistic immunisation in hospital. *Archives of Diseases in Childhood* 81:422 doi:10.1136/adc.81.5.422

3 Walton S, Elliman D and Bedford H (2007). Missed opportunities to vaccinate children admitted to a paediatric tertiary hospital. *Archives of Diseases in Childhood* 92:620 doi:10.1136/adc.2006.104778

4 Melhuish E, Belsky J, Leyland AH et al. (2008). Effects of fully-established Sure Start Local Programmes on 3-year-old children and their families living in England: a quasi-experimental observational study. *Lancet* 372:1641.

5 Reading R, Colver A, Openshaw S et al. (1994). Do interventions that improve immunisation uptake also reduce social inequalities in uptake? *British Medical Journal* 308:1142.

6 Department of Health (2013). *Immunisation against infectious disease: the green book*. Available from: [www.gov.uk/government/organisations/public-health-england/series/immunisation-against-infectious-disease-the-green-book#publications](http://www.gov.uk/government/organisations/public-health-england/series/immunisation-against-infectious-disease-the-green-book#publications).

The immunisation programme is constantly reviewed and new vaccines added as they become effective, available and affordable.

Four vaccinations have been selected for visualisation:

- At age 2 years: combined five-in-one vaccine for DTaP/IPV/Hib.
- At age 2 years: PCV.
- At age 5 years: MMR vaccination.
- Girls at age 12–13 years: HPV vaccination.

The first two indicators were included in the Atlas of Variation in Healthcare for Children and Young People (2012).

'Population vaccination coverage' is included in the NHS Public Health Outcomes Framework 2013–16.

### Magnitude of variation

#### Map 20: DTaP/IPV/Hib coverage at 2 years

For local authorities in England, the percentage of immunisation completion for routine vaccinations against DTaP/IPV/Hib at 2 years ranged from 85.7% to 98.8%. When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 90% to 98.6%.

However, this means that the percentage of children who did not receive the full course of DTaP/IPV/Hib vaccination ranged from 1.2% to 14.3% (nearly twelve-fold variation), and when the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 1.4% to 10% and the variation is seven-fold.

By comparison, after removing outliers in a similar way, the range (for 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 1.5% to 12.4%, and the variation was eight-fold.

#### Map 21: PCV coverage at 2 years

For local authorities in England, the percentage of immunisation completion for routine vaccinations against pneumococcal disease at 2 years ranged from 74.7% to 97% (range for percentage **not** having received the vaccine being 3% to 25.3% – an 8.4-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 81.1% to 96.3%, the range for percentage **not** having received the vaccine therefore being 3.7% to 18.9% – a five-fold variation.

By comparison, after removing outliers in a similar way, the range (for 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 5% to 28.5%, and the variation was nearly six-fold.

#### Map 22: MMR coverage at 5 years

For local authorities in England, the percentage of immunisation completion for routine vaccinations against MMR at 5 years ranged from 69.7% to 95.3% (range for

percentage **not** having received the vaccine being 4.7% to 30.3% – a 6.4-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 71.4% to 93.3%, the range for percentage **not** having received the vaccine therefore being 6.7% to 28.6% – a four-fold variation.

## Map 23: HPV coverage at 13 years:

For local authorities in England, the percentage of immunisation coverage for routine vaccinations against HPV for girls aged 12–13 years ranged from 62.3% to 97.2% (range for percentage **not** having received the vaccine being 2.8% to 27.7% – a thirteen-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 69.9% to 96%, the range for percentage **not** having received the vaccine therefore being 4% to 30.1% – a seven-fold variation.

In comparison with 2009–2010 data, DTaP/IPV/Hib coverage at 2 years has remained relatively static, while PCV coverage at 2 years is showing reduced range of variation through improved coverage in previously poorer performing areas. These improvements in uptake may reflect the fact that PCV is a relatively recent addition to the immunisation schedule: there is further scope for improvement.

## Options for action

Clinical leadership among public health, primary care and secondary care health professionals is key to maximising immunisation rates. Effective joint working between organisations and professionals may improve immunisation rates, especially in light of recent changes in commissioning and public health mechanisms. Child public health is currently the least well represented specialist function of community paediatric teams,<sup>7</sup> and plays an important role in the promotion of immunisation.

The National Institute for Health and Care Excellence recommends that commissioners ensure that their information and data collection systems can identify children who have missed immunisations, and offer them the opportunity to receive them in a timely manner.

The improvements shown in the population coverage for certain vaccines may not reflect a uniform improvement across all population subgroups. Further improvements may occur through targeting at-risk groups for improvement in immunisation rates, particularly among children who:

- have missed previous immunisations
- are not registered with a GP
- are from certain ethnic minority groups or non-English-speaking families

- are vulnerable, such as children with disabilities or a chronic illness, looked-after children, children who are homeless and children who are asylum seekers.

The reasons for partial immunisation may be different from the reasons given by people who refuse immunisation for their children; this should be taken into account when working to increase uptake rates.<sup>8</sup>

## Resources

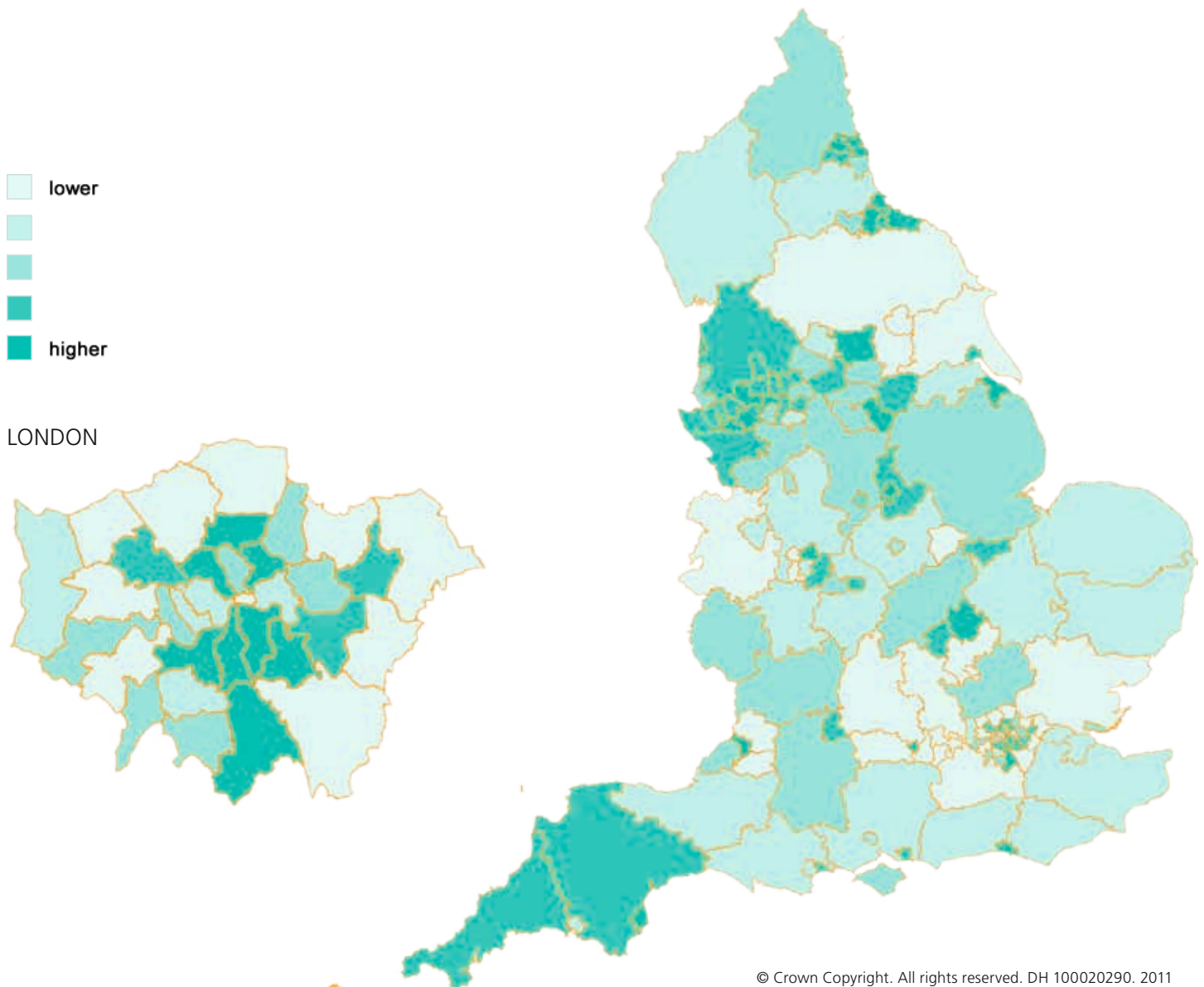
- NICE Guidance (2009). Guidance on differences in the uptake of immunisations (including targeted vaccines) in people younger than 19 years. Public health guidance, PH21 ([www.nice.org.uk/PH21](http://www.nice.org.uk/PH21)).

7 Royal College of Paediatrics and Child Health (2013). Medical Workforce Census 2011. RCPCH, London. Available at: [www.rcpch.ac.uk/system/files/protected/page/RCPCH%20census%20FINAL\\_0.pdf](http://www.rcpch.ac.uk/system/files/protected/page/RCPCH%20census%20FINAL_0.pdf).

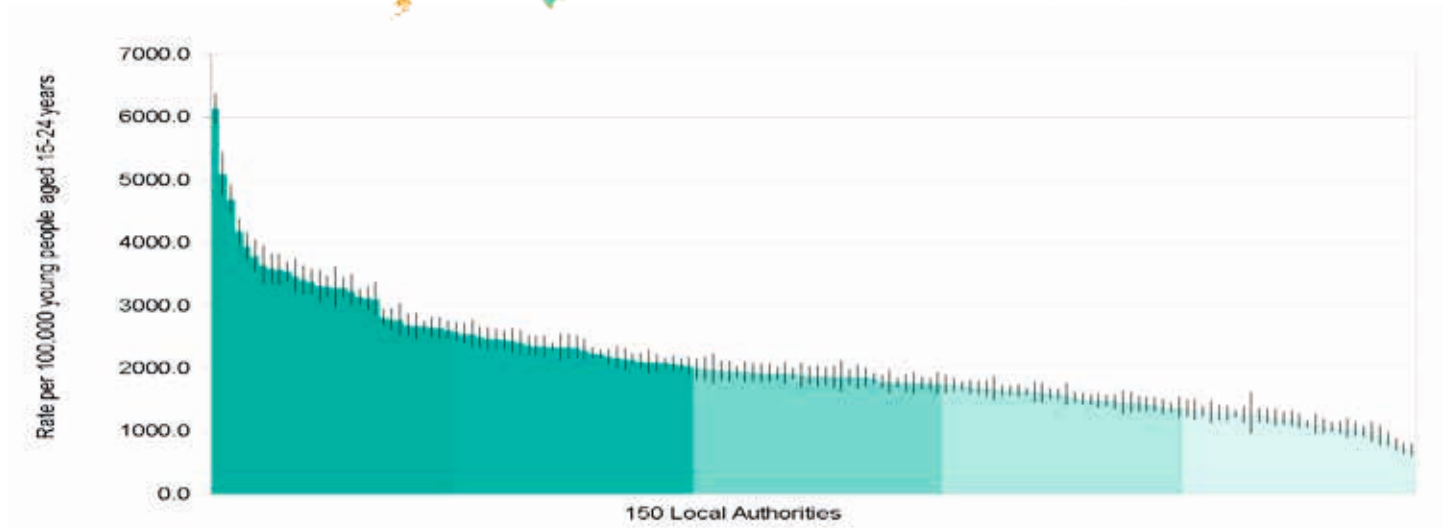
8 Samad L, Tate AR, Dezateux C et al. (2006). Differences in risk factors for partial and no immunisation in the first year of life: prospective cohort study. *British Medical Journal* 332:1312.

G: Sexually transmitted infections

**Map 24** Chlamydia: Rate of diagnoses of genital *Chlamydia trachomatis* in young people aged 15–24 years, per 100,000 people aged 15–24 years, by local authority, 2012



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## Context

Sexually transmitted infections (STIs) refer to infections which are transmitted through sexual contact. Commonest among these are chlamydia, gonorrhoea, syphilis, hepatitis B and C, and human immunodeficiency virus (HIV). Rates of STIs are highest in those aged under 25 years.<sup>1</sup>

Chlamydia (genital infection by *Chlamydia trachomatis*) is among the commonest bacterial STIs in England, particularly prevalent in young sexually active adults. Because it is often asymptomatic, many infections remain undetected, and can go on to cause long-term health problems such as pelvic inflammatory disease, ectopic pregnancy and subfertility. Once diagnosed, it can be treated with a course of antibiotics.

The National Chlamydia Screening Programme (NCSP) has been implementing chlamydia screening for sexually active young adults since 2003.

Any increase in the rate of diagnosis of chlamydia is more likely to reflect better detection, rather than being an indication of true increase in prevalence – although earlier and better diagnosis can lead to reduction in prevalence and future complications.

This indicator is included in the Public Health Outcomes Framework 2013–16.

## Magnitude of variation

**Map 24:** For local authorities in England, the rate of chlamydia diagnoses in young people aged 15–24 years, per 100,000 people aged 15–24 years, ranges from 702.8 to 6,131.9 (nearly nine-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 988.3 to 3,798.5, and the variation is nearly four-fold.

The NCSP recommends that local areas aim towards a diagnosis rate of over 2,300 per 100,000 population – a figure that only 47 out of 149 local authorities have been able to achieve.

The rate of chlamydia diagnosis is correlated with deprivation (see Figure 2G.1). This relationship, which mirrors the relationship that also exists between teenage pregnancy and deprivation, suggests that a targeted approach towards sexual health literacy and other related interventions in socio-economically deprived areas might be an effective means of reducing variation for local authorities.

## Options for action

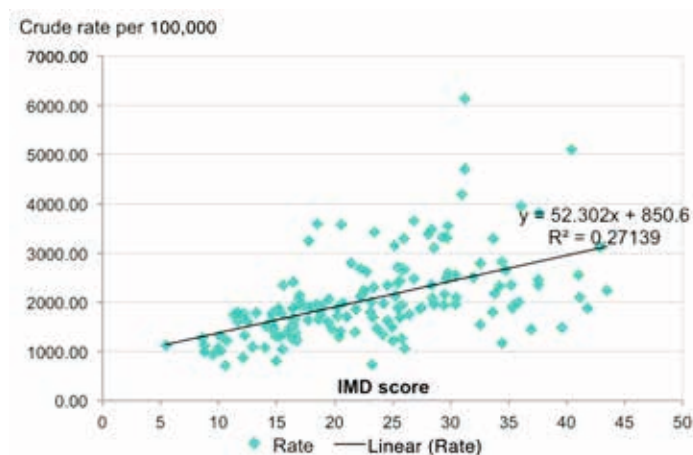
Chlamydia diagnosis rate is only one indicator of the sexual health of children and young people. Other STIs, in particular gonorrhoea, are becoming increasingly problematic in the context of antimicrobial resistance.<sup>2</sup> Commissioners and health and wellbeing boards are accountable for the sexual health of their populations based on a broad range of indicators. An example is the Sexual Health Balanced Scorecard (see 'Resources' later in this section).

Commissioners may maximise value by commissioning appropriate STI screening services through opportunistic health contacts such as general practice, sexual health services, abortion services, pharmacies and existing resources.

Adequate support and resource for public health messaging around sex education, sexual health services and proactive contraceptive advice is key. School- and community-based interventions have been shown previously to be particularly effective. Youth work, school nurses and pharmacy services, if appropriately resourced, can all play a significant role in this process.

It is important in sexual health services to take into account the needs of young people; following the You're Welcome criteria for young-people friendly health services will help to achieve this.<sup>3</sup>

**Figure 2G.1 Correlation between deprivation and rate of chlamydia diagnosis per 100,000 population, by local authority, 2012 (High IMD score indicates more deprived area)**



1 Public Health England (2013). Sexually transmitted infections and chlamydia screening in England, 2012. Health Protection Report 7(23), 2013. Available from: [www.hpa.org.uk/hpr/archives/2013/hpr2313.pdf](http://www.hpa.org.uk/hpr/archives/2013/hpr2313.pdf).

2 Public Health England (2013). Sexually transmitted infections and chlamydia screening in England, 2012. Health Protection Report 7(23), 2013. Available from: [www.hpa.org.uk/hpr/archives/2013/hpr2313.pdf](http://www.hpa.org.uk/hpr/archives/2013/hpr2313.pdf).

3 Department of Health (2007). You're Welcome - making health services young people friendly. Available from: <http://media.education.gov.uk/assets/files/pdf/y/youre%20welcome%20quality%20criteria%20making%20health%20services%20young%20people%20friendly.pdf>



### Resources

Department of Health (2013). A Framework for Sexual Health Improvement ([www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/142592/9287-2900714-TSO-SexualHealthPolicyNW\\_ACCESSIBLE.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/142592/9287-2900714-TSO-SexualHealthPolicyNW_ACCESSIBLE.pdf)).

The National Institute for Health and Care Excellence has produced national guidance related to one-to-one interventions in sexual health and for prevention of pregnancy in teenagers:

- Prevention of sexually transmitted infections and under 18 conceptions: guidance (2007) (<http://guidance.nice.org.uk/PH3/Guidance/pdf/English>).

Public Health England has a suite of tools to help commissioners and clinicians to understand local performance and variation in sexual health in their area:

- Sexual health tools and resources for commissioners ([www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/STIs/SexualHealthToolsResourcesForCommissioners/](http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/STIs/SexualHealthToolsResourcesForCommissioners/)).
- Sexual Health Balanced Scorecard ([www.apho.org.uk/sexualhealthbalancedscorecard](http://www.apho.org.uk/sexualhealthbalancedscorecard)).

NCSP ([www.chlamydia-screening.nhs.uk/](http://www.chlamydia-screening.nhs.uk/)).

- Commissioning guidance on integration of screening into core services ([www.chlamydia-screening.nhs.uk/ps//resources/guidelines/NCSP-Commissioner-Integration-Guidance-Feb2012.pdf](http://www.chlamydia-screening.nhs.uk/ps//resources/guidelines/NCSP-Commissioner-Integration-Guidance-Feb2012.pdf)).

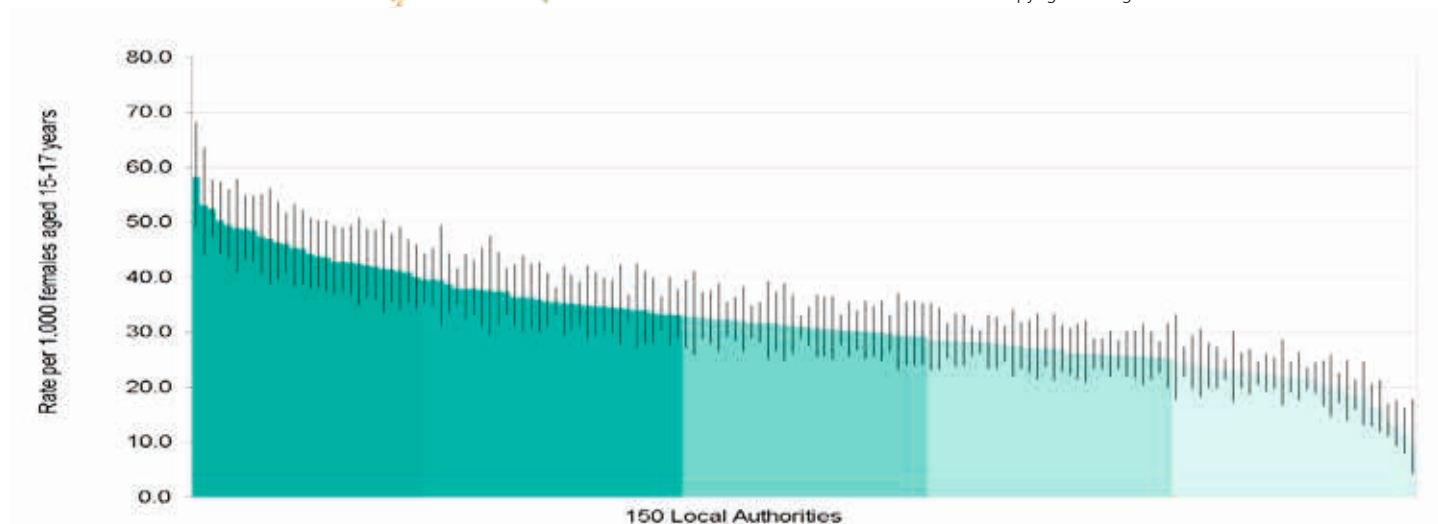
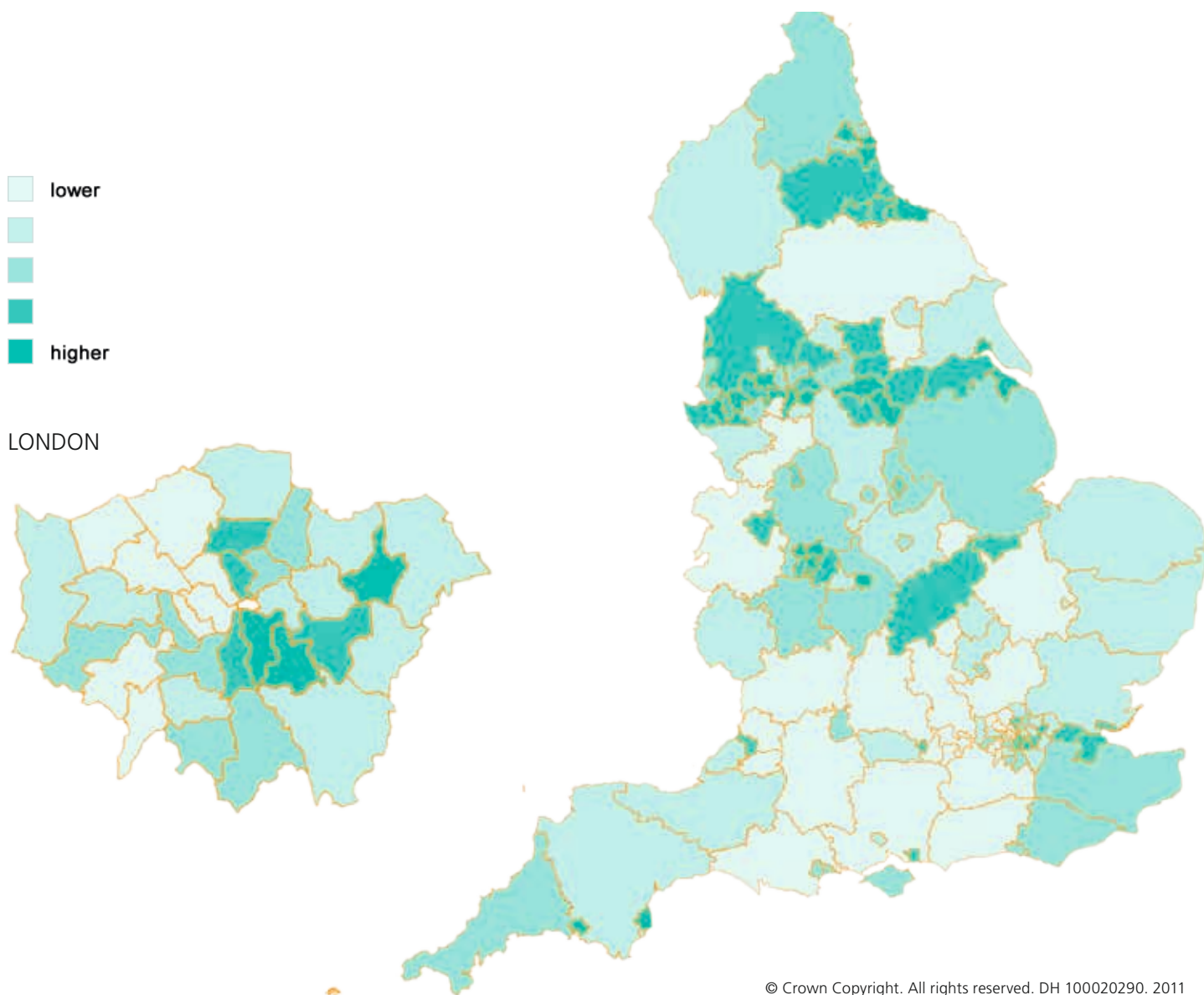
Section 3:

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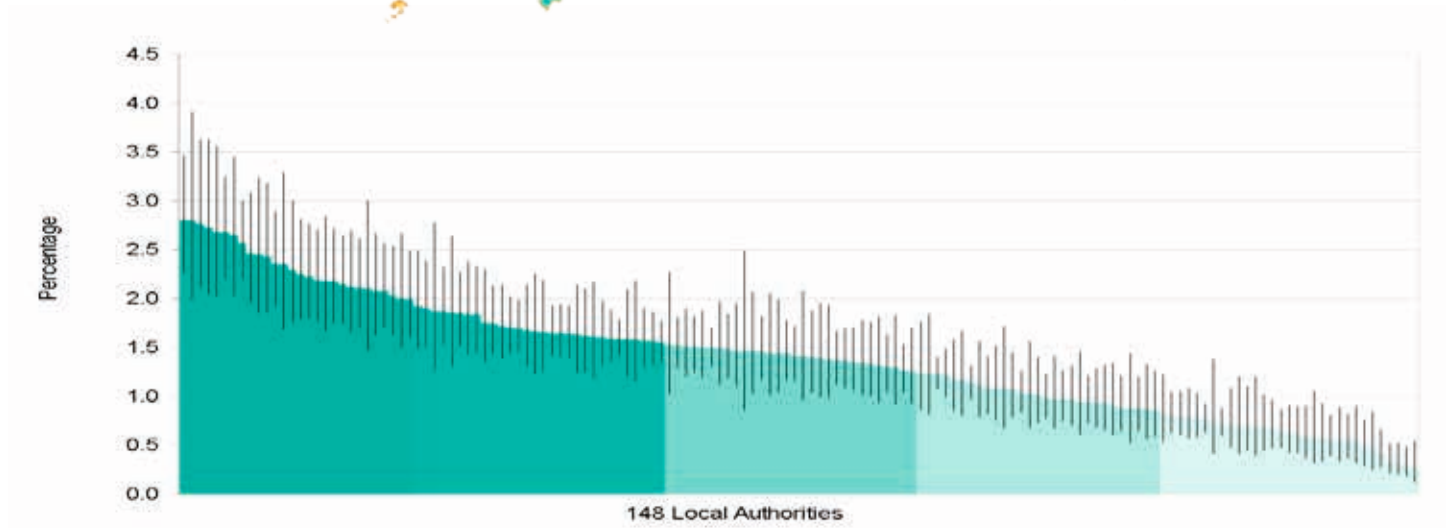
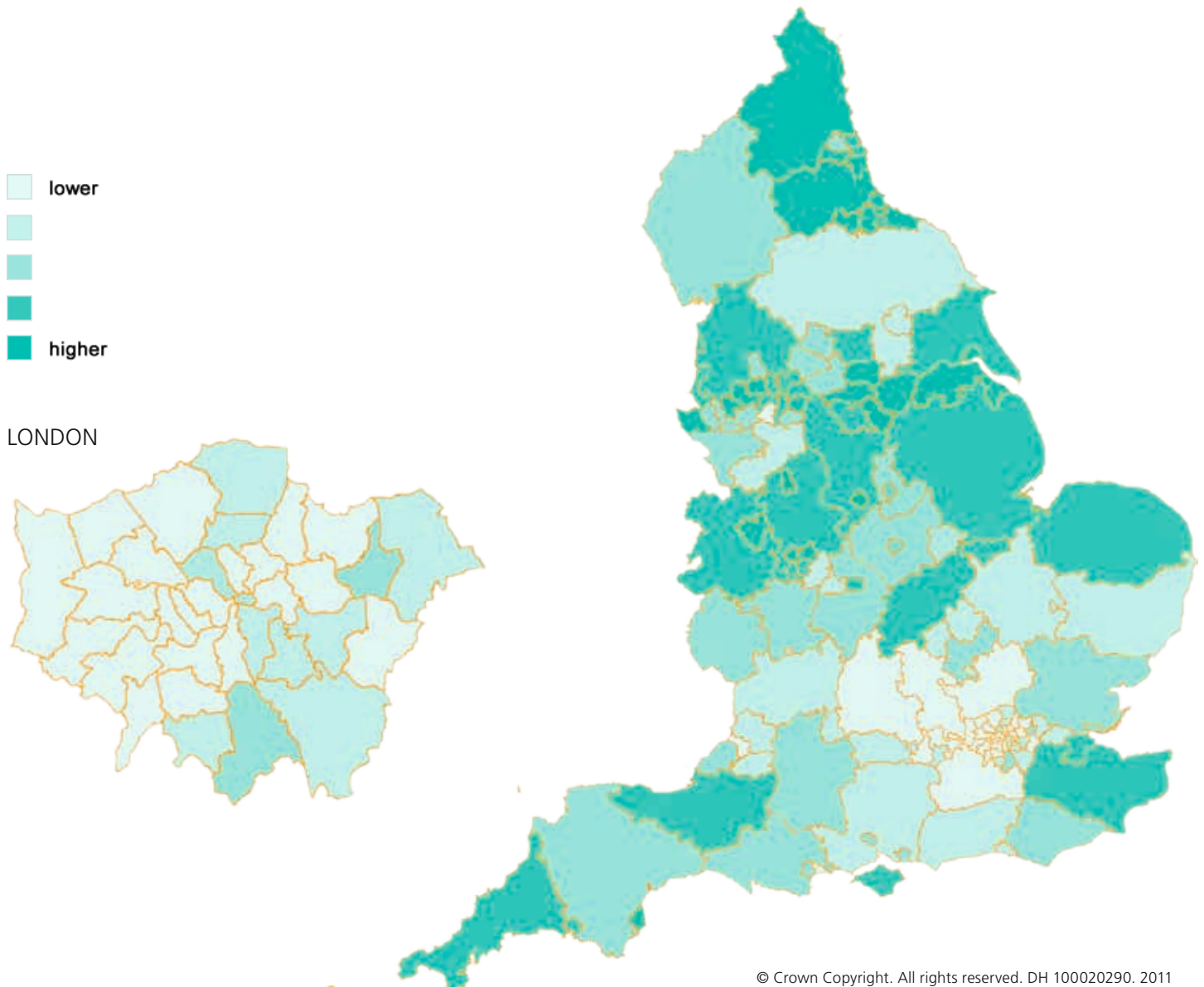
# Child health in the perinatal period

## A: Teenage pregnancy

**Map 25** Teenage conceptions: Conceptions in females aged <18 years, per 1,000 females aged 15–17 years, by local authority, 2011



**Map 26** Teenage births: Percentage of delivery episodes where the mother is aged <18 years, by local authority, 2011



## Context

Rates of teenage pregnancy in the UK have declined steadily since 1969. However, rates are still among the highest in Western Europe, and preventing teenage pregnancy is identified by government as a priority area in sexual health improvement.<sup>1</sup>

Rates of teenage pregnancy and motherhood are strongly related to wider determinants of health, and the effects on mother and child may be partly explained by these relationships. For the teenager herself, teenage pregnancy and motherhood is associated with lower socio-economic status and poorer educational outcomes, although the relationship is not necessarily causal. For the infant, the effect on life course is more significant. Infants of teenage mothers are at higher risk of:

- premature birth
- having a lower birth weight
- higher infant mortality
- poorer educational attainment
- becoming teenage mothers themselves.<sup>2</sup>

These indicators were recommended for inclusion as national outcome measures in the report of the Children and Young People's Health Outcomes Forum (2012). 'Teenage conceptions' is also included in the Public Health Outcomes Framework 2013–16.

## Magnitude of variation

### Map 25: Teenage conceptions

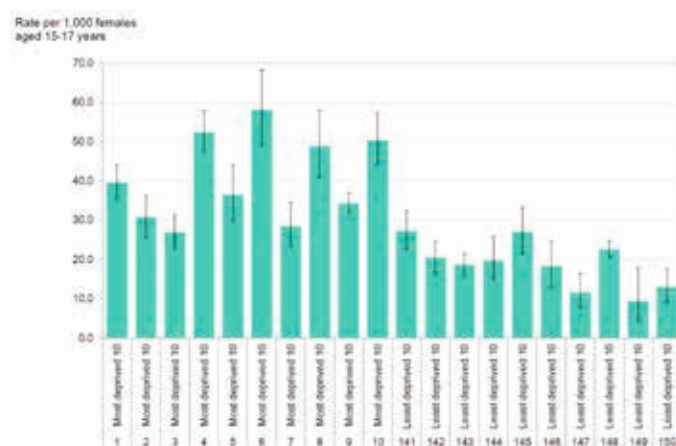
For local authorities in England, the rate of conceptions in females aged <18 years, per 1,000 females aged 15–17 years, ranges from 9.4 to 58.1 (over six-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 16.5 to 48.9, and the variation is three-fold.

### Map 26: Teenage births

For local authorities in England, the percentage of delivery episodes where the mother is aged <18 years ranges from 0.3% to 2.8% (nine-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 0.5% to 2.7%, and the variation is over five-fold.

Rates of teenage conception and delivery are strongly linked with deprivation. However, deprivation alone is unlikely to be the sole factor. Figure 3A.1 shows a two-fold variation in teenage conception rates among the 10 most deprived local authorities,

**Figure 3A.1 Teenage conception rate by local authority, in 10 most deprived and 10 least deprived local authorities, 2011**



and similar magnitude of variation among the 10 least deprived. This would suggest that unwarranted variation exists.

## Options for action

Public health messaging around sex education, sexual health services and proactive contraceptive advice are crucial. School and community-based interventions have been shown to be particularly effective. Youth work, school nurses and pharmacy services all play a role in this process and resourcing levels could be considered.

Commissioners and health professionals can work together to:

- assess whether performance locally compares favourably with that in localities which have a similar population profile
- share good practice, particularly among localities that have a similar socio-economic and age profile
- identify whether there are any unwarranted variations among social, ethnic or other groups in the local population, in order to target any relevant interventions.

Particularly where rates of teenage births are high, commissioners can investigate, working jointly with health and social care to resource and deliver community services that support teenage mothers leading to improved outcomes for mothers and infants.

It is important that antenatal and maternity services for teenage mothers are age-appropriate and that they take the needs of young mothers and their families into account, following the You're Welcome criteria for young people friendly health services.<sup>3</sup> Commissioning guidance is available (see 'Resources' later in this section).

1 A Framework for Sexual Health Improvement (2013). Available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/142592/9287-2900714-TSO-SexualHealthPolicyNW\\_ACCESSIBLE.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/142592/9287-2900714-TSO-SexualHealthPolicyNW_ACCESSIBLE.pdf).

2 Swann C, Bowe K, McCormick G, Kosmin M. (2003). Teenage pregnancy and parenthood: a review of reviews. Health Development Agency, London. Available at: [www.nice.org.uk/niceMedia/documents/teenpreg\\_evidence\\_briefing\\_summary.pdf](http://www.nice.org.uk/niceMedia/documents/teenpreg_evidence_briefing_summary.pdf).

3 Department of Health (2007). You're Welcome – making health services young people friendly, 2007. Available from: <http://media.education.gov.uk/assets/files/pdf/y/youre%20welcome%20quality%20criteria%20making%20health%20services%20young%20people%20friendly.pdf>.



## Resources

Review of progress, evidence and case studies of interventions to reduce teenage pregnancy in England over the past decade:

- Department for Education (2010). Teenage pregnancy strategy: Beyond 2010 ([www.education.gov.uk/childrenandyoungpeople/healthandwellbeing/teenagepregnancy/a0066808/teenage-pregnancy-guidance](http://www.education.gov.uk/childrenandyoungpeople/healthandwellbeing/teenagepregnancy/a0066808/teenage-pregnancy-guidance))

Up-to-date government policy on this area is laid out here:

- A Framework for Sexual Health Improvement (2013) ([www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/142592/9287-2900714-TSO-SexualHealthPolicyNW\\_ACCESSIBLE.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/142592/9287-2900714-TSO-SexualHealthPolicyNW_ACCESSIBLE.pdf)).

The Department for Education and Department of Health have jointly produced several planning and commissioning guides to develop maternity services for young parents:

- Getting maternity services right for pregnant teenagers and young fathers (2010) ([www.swpho.nhs.uk/resource/item.aspx?RID=41060](http://www.swpho.nhs.uk/resource/item.aspx?RID=41060))
- Teenage parents: Who cares? A guide to commissioning and delivering maternity services for young parents (2008). ([www.swpho.nhs.uk/resource/item.aspx?RID=41058](http://www.swpho.nhs.uk/resource/item.aspx?RID=41058))

Local government and health and wellbeing boards will have a co-ordinating role in setting strategy for implementing services to reduce rates of teenage pregnancy:

- Local Government Association (2013). Tackling teenage pregnancy: Local government's new public health role ([www.local.gov.uk/publications/-/journal\\_content/56/10180/3964823/PUBLICATION](http://www.local.gov.uk/publications/-/journal_content/56/10180/3964823/PUBLICATION))

The National Institute for Health and Care Excellence (NICE) has produced national guidance related to one-to-one interventions in sexual health and for prevention of pregnancy in teenagers:

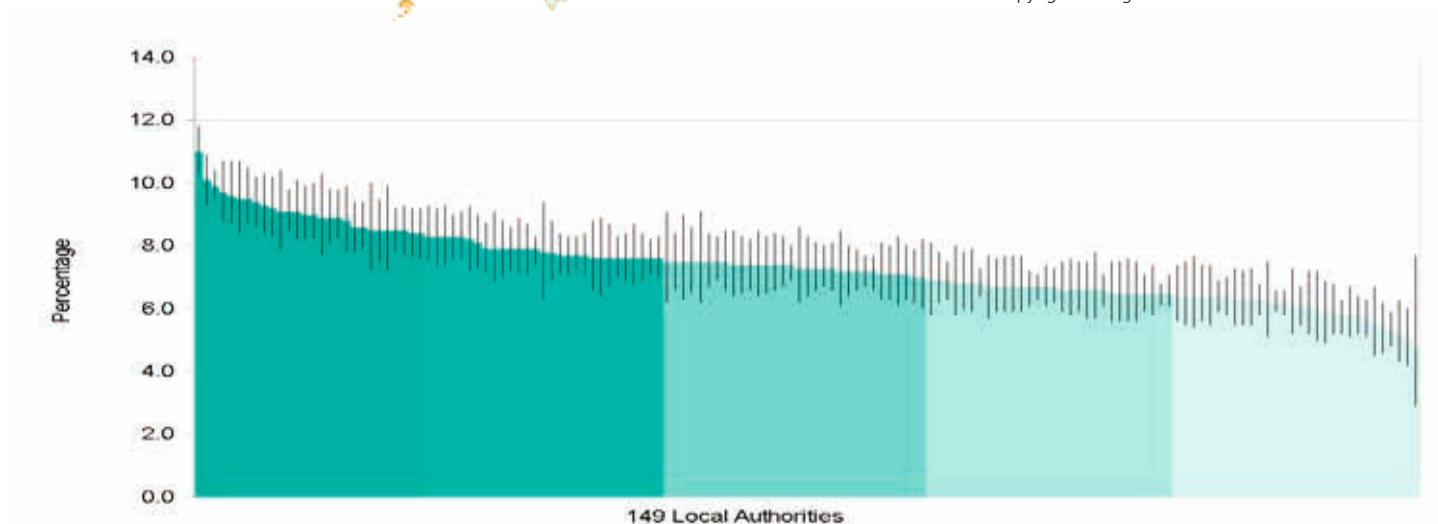
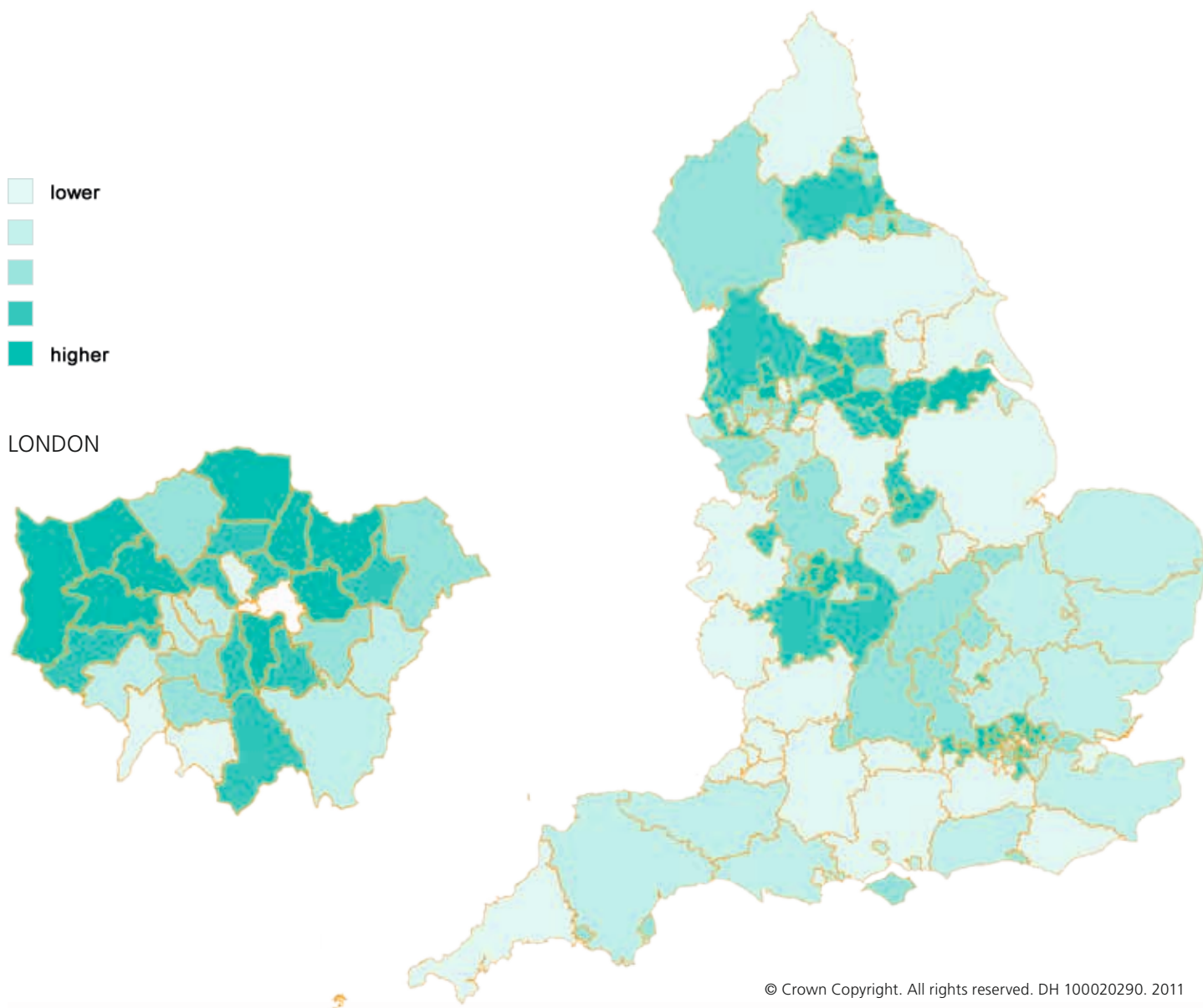
- Prevention of sexually transmitted infections and under 18 conceptions: guidance (2007) (<http://guidance.nice.org.uk/PH3/Guidance/pdf/English>).

In addition, NICE has produced a review of systematic reviews which outlines the evidence for public health interventions both to reduce teenage pregnancy rates and to support teenage parents:

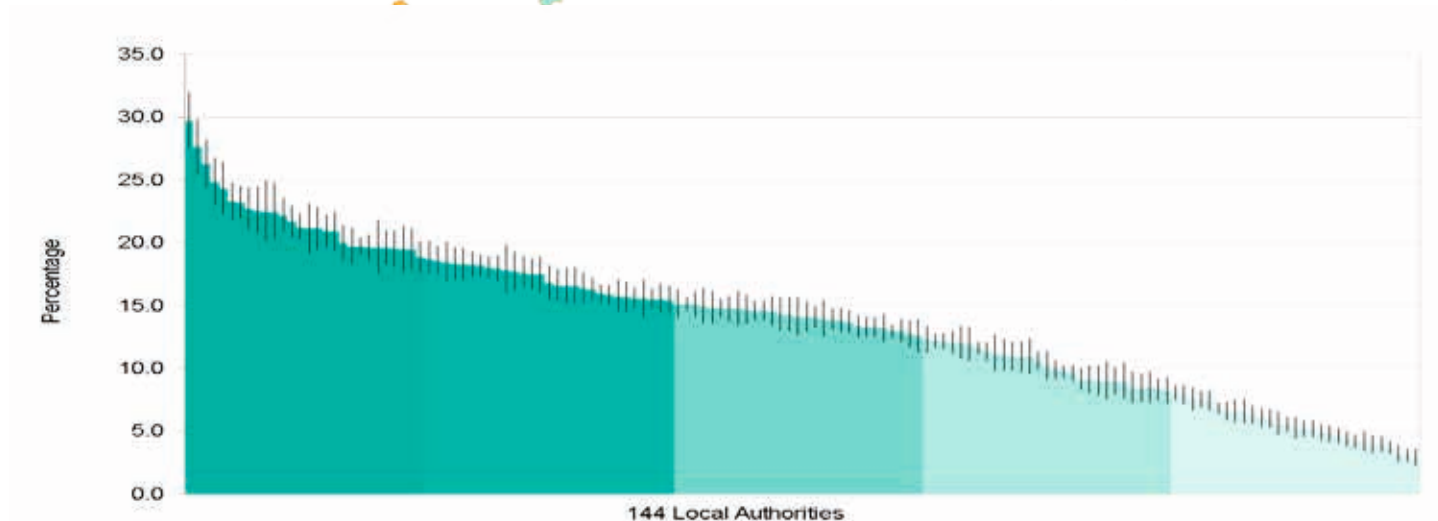
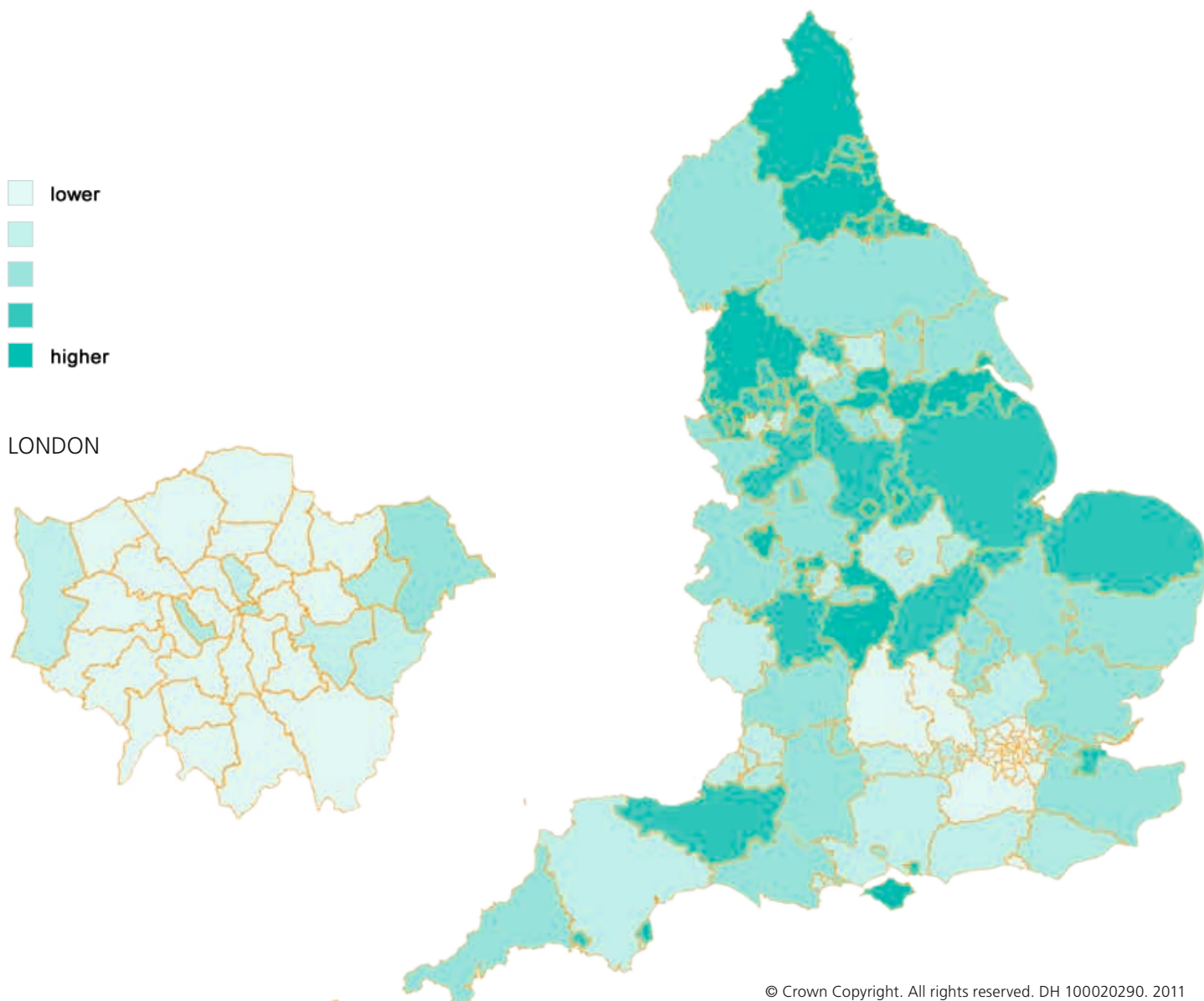
- Trivedi D et al. for NICE (2007). Update on review of reviews on teenage pregnancy and parenthood ([www.nice.org.uk/nicemedia/pdf/TeenagePregnancyUpdateReviewFeb08.pdf](http://www.nice.org.uk/nicemedia/pdf/TeenagePregnancyUpdateReviewFeb08.pdf)).

B: Antenatal health

**Map 27** Low birth weight: Percentage of live and stillborn infants who have a birth weight <2,500g, by local authority, 2011



**Map 28** Smoking in pregnancy: Percentage of women who currently smoke at the time of delivery, by local authority, 2011–2012



## Section 3: Child health in the perinatal period

### Context

The state of maternal health in the antenatal period has profound implications for the future health of the infant. Smoking and low birth weight are two selected indicators among many which highlight the state of maternal health and nutrition, as well as the quality of antenatal healthcare.

Smoking in pregnancy is known to cause deleterious effects on the health of the infant, both in infancy and in the future. These include increasing the risk of low birth weight babies.

Low birth weight may simply be constitutional, but is more often the result of other factors such as poor maternal nutrition, maternal hypertension, smoking, substance misuse or congenital infection. In those circumstances, low birth weight is associated with higher perinatal mortality, lower educational attainment and increased risk of cardiovascular disease and diabetes.<sup>1</sup> At a population level, the rate of infants born with a low birth weight may be a marker of poor maternal health in the antenatal period.

'Low birthweight of term babies' and 'Smoking status at time of delivery' are included in the Public Health Outcomes Framework 2013–16.

'Proportion of women who stop smoking during pregnancy' has also been recommended as a national outcome measure in the report of the Children and Young People's Health Outcomes Forum (2012); this data should be available through the new Maternity Services Secondary Uses Data Set.<sup>2</sup>

### Magnitude of variation

#### Map 27: Low birth weight

For local authorities in England, the percentage of live and stillborn infants who have a birth weight <2,500g ranged from 4.7% to 11% (2.3-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 5.5% to 9.5%, and the variation is 1.7-fold.

#### Map 28: Smoking in pregnancy

For local authorities in England, the percentage of women who currently smoke at the time of delivery ranged from 2.9% to 29.7% (over 10-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 4% to 23.3%, and the variation is nearly six-fold.

Figure 3B.1 Correlation between maternal smoking at delivery and deprivation, by local authority, 2011 (High IMD score indicates more deprived area)

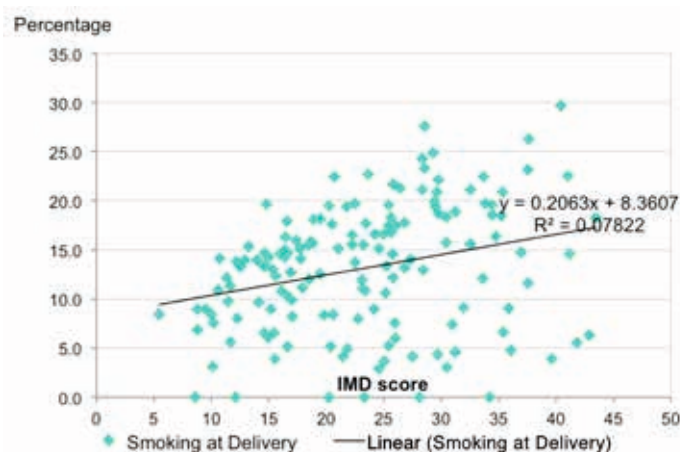
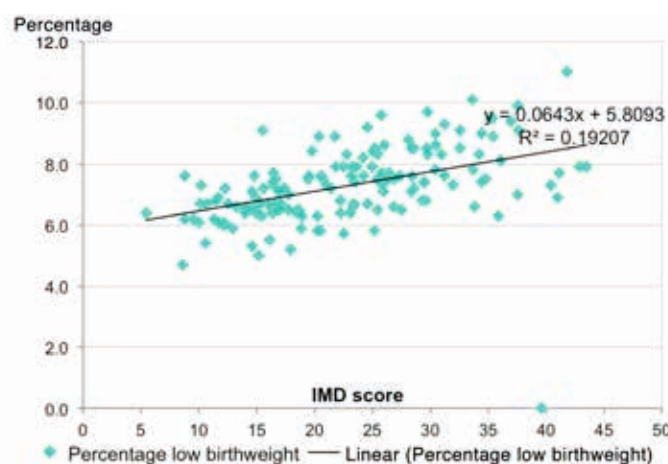


Figure 3B.2 Correlation between low birth weight and deprivation, by local authority, 2011 (High IMD score indicates more deprived area)



Rates of low birth weight babies may be clouded by the inclusion of premature babies in the data. However, since risk and incidence profiles for both low birth weight and premature deliveries are known to be similar, this is unlikely to be able to fully account for the observed variation, but is more likely to reflect a common causal pathway related to antenatal health.

Socio-economic deprivation is known to be associated with both maternal smoking rates and incidence of low birth weight.<sup>3</sup> However, Figure 3B.1 and Figure 3B.2 demonstrate that the correlations shown in our data are relatively modest, meaning that deprivation cannot be the sole reason for the variation observed at local authority level.

Many other factors, such as ethnic background or maternal age, can also influence outcomes related to antenatal health. However, variation in the quality and access to antenatal and perinatal healthcare may account for unwarranted variations in perinatal mortality.

1 Kramer, M. S., Séguin, L., Lydon, J. and Goulet, L. (2000). Socio-economic disparities in pregnancy outcome: why do the poor fare so poorly? *Paediatric and Perinatal Epidemiology* 14: 194–210.

2 [www.hscic.gov.uk/maternityandchildren/maternity](http://www.hscic.gov.uk/maternityandchildren/maternity).

3 Oakley L et al. (2013). Factors associated with breastfeeding in England: an analysis by primary care trust. *BMJ Open* 2013; 3:e002765.

## Options for action

Commissioners can act to ensure the quality of pre-conception and antenatal care by:

- studying local variations in outcomes related to antenatal healthcare, in order to identify whether these variations are warranted or unwarranted
- ensuring that there is adequate capacity and training of community and hospital-based health professionals to deliver a high-quality antenatal and perinatal service for mothers and babies, including nutritional and other preventive health advice
- applying the evidence for the long-term benefits to infants and mothers of improvements in the health of women in the pre-conception period.

## Resources

The National Institute for Health and Care Excellence has produced a suite of guidelines for:

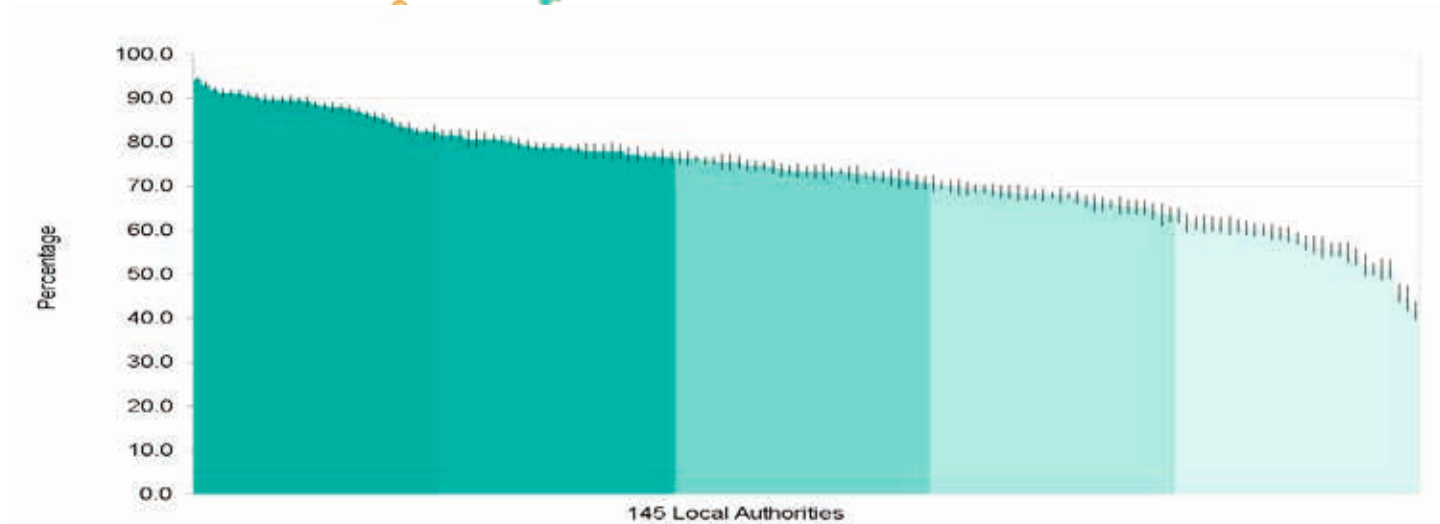
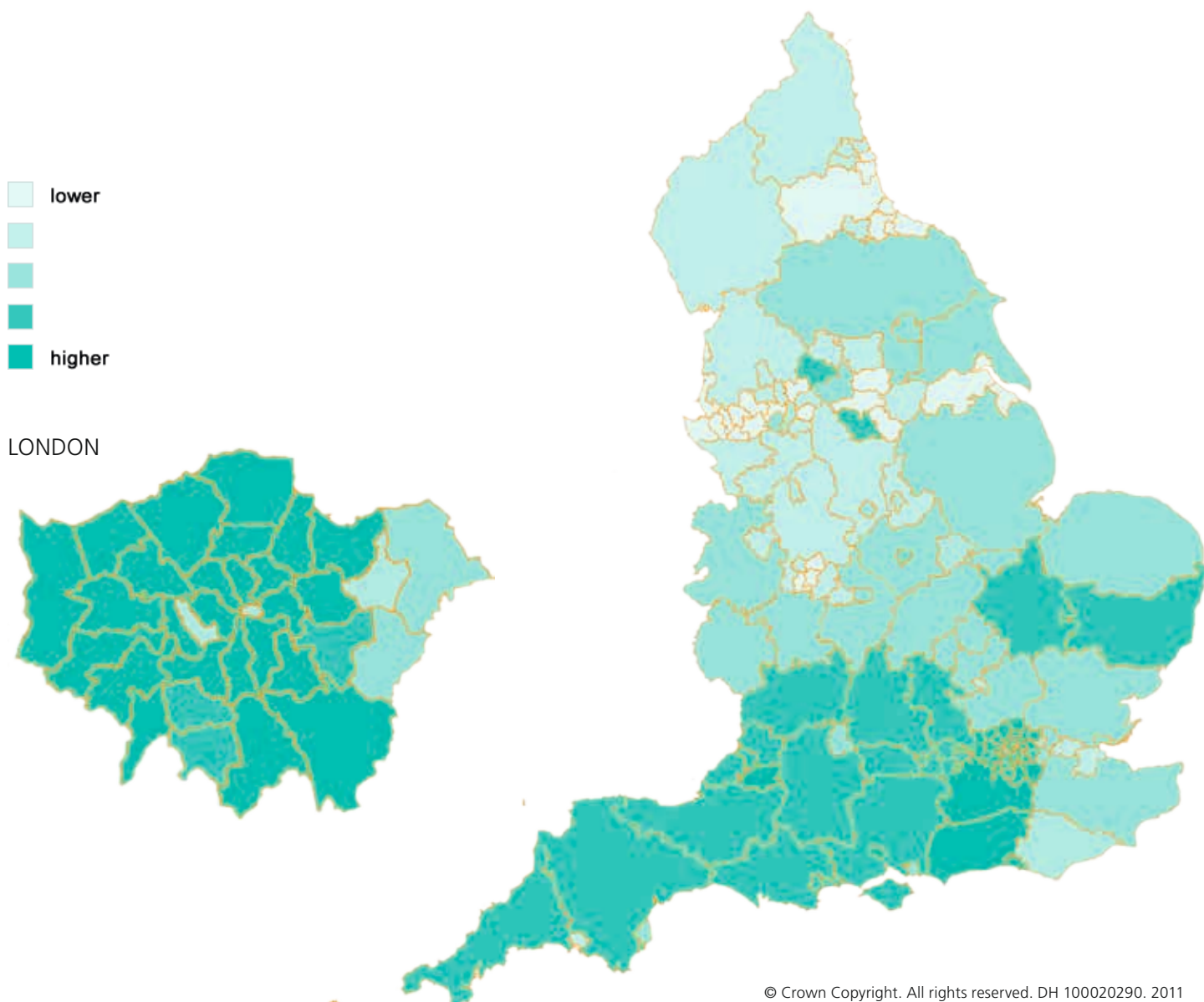
- maternal and child nutrition (<http://guidance.nice.org.uk/PH11>)
- management of pregnancy and birth (<http://guidance.nice.org.uk/Topic/GynaecologyPregnancyBirth>).

Royal College of Obstetrics and Gynaecology, Faculty of Sexual and Reproductive Healthcare. Commissioning Women's Health Services: advice for clinical commissioning groups and NHS England. ([www.rcog.org.uk/files/rcog-corp/CommissioningWomen'sHealthServices\\_standards.xls](http://www.rcog.org.uk/files/rcog-corp/CommissioningWomen'sHealthServices_standards.xls)).

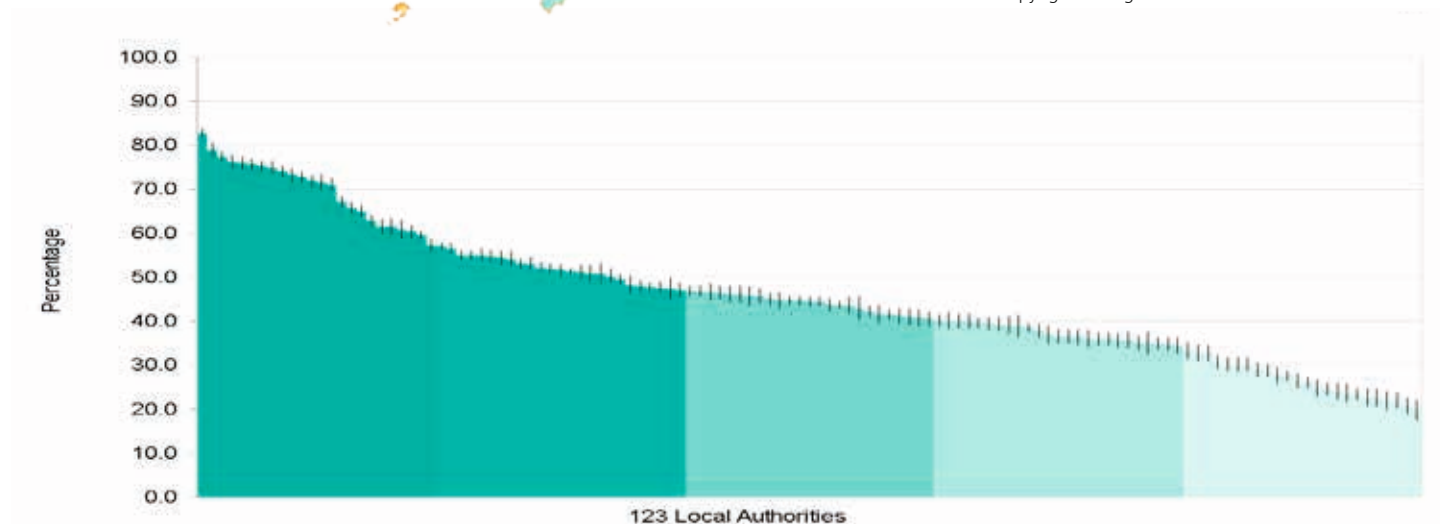
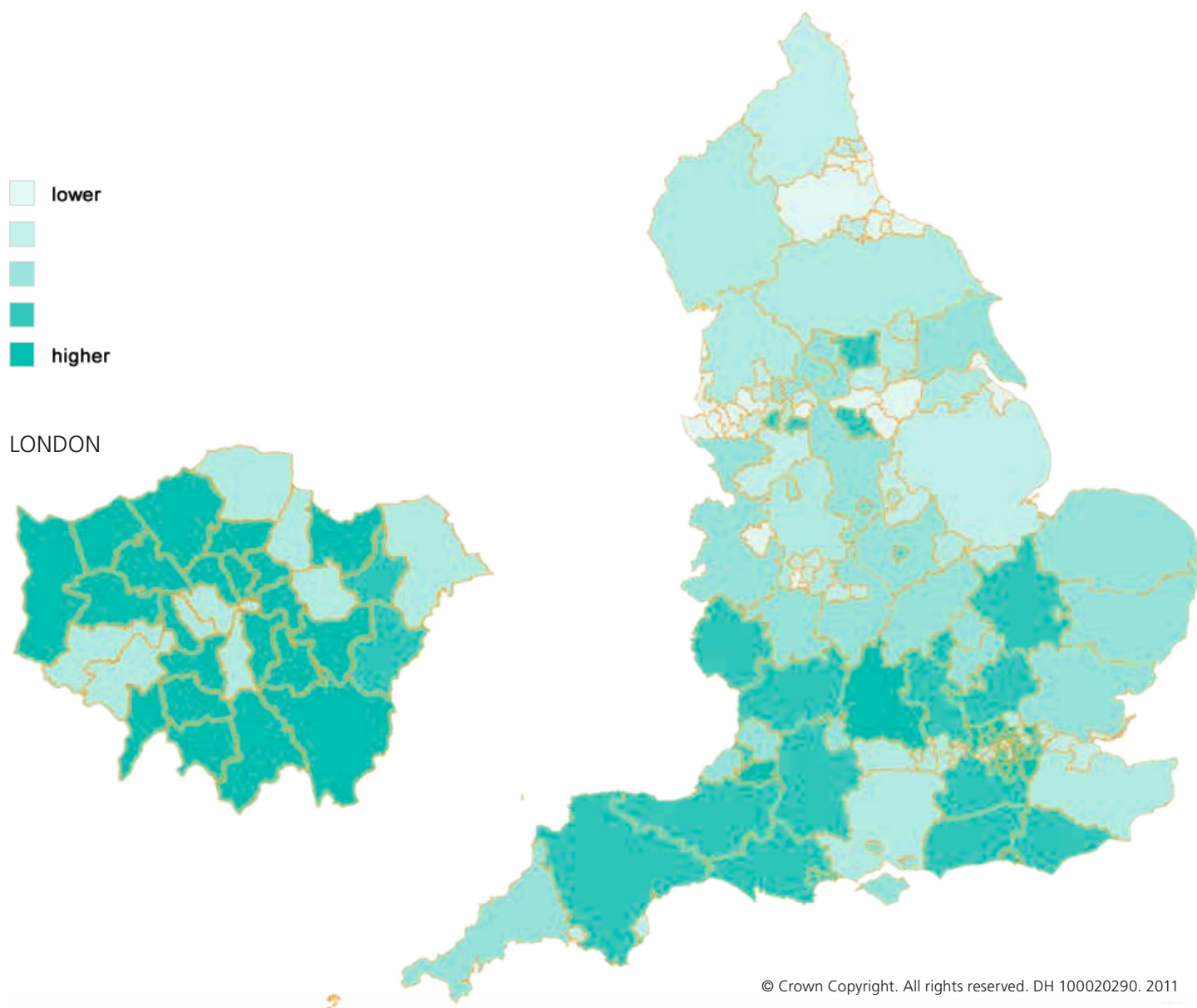


C: Breastfeeding

**Map 29** Breastfeeding initiation: Percentage of infants who are given breastmilk within 48 hours of delivery, by local authority, 2011–2012



**Map 30** Breastfeeding at 6–8 weeks: Percentage of infants who are totally or partially breastfeeding at 6–8 weeks, by local authority, 2011–2012



### Context

The World Health Organization and the Department of Health recommend exclusive breastfeeding of infants up to the age of 6 months. Although a minority of babies cannot breastfeed due to maternal health or other reasons, the benefits of breastfeeding are well established:

- Reduced hospital admissions of infants for diarrhoea and vomiting, and respiratory infections.
- Reduced risk of sudden infant death.
- Reduced lifetime risk of obesity and diabetes.<sup>1</sup>

In addition, women who breastfeed have a reduced risk of ovarian and breast cancers.

In economic studies, increasing rates of breastfeeding in infants have been found to have an overall cost benefit for families, health services and wider society.<sup>2</sup>

These indicators were recommended for inclusion as national outcome measures in the report of the Children and Young People's Health Outcomes Forum (2012).

Breastfeeding is included in the Public Health Outcomes Framework 2013–16.

### Magnitude of variation

#### Map 29: Breastfeeding initiation

For local authorities in England, the percentage of infants who were given breastmilk within 48 hours of delivery ranges from 41.8% to 94.3% (greater than two-fold variation).

When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 51.2% to 91.0%, and the variation is 1.8-fold.

#### Map 30: Breastfeeding at 6–8 weeks

For local authorities in England, the percentage of infants who are totally or partially breastfeeding by the 6–8 week infant examination ranges from 19.7% to 82.8% (four-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 22.7% to 75.7%, and the variation is over three-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2010/11) demonstrated in the NHS Atlas of Variation in Healthcare for Children and Young People (2012) was 23.1% to 74.6%, and the variation was also over three-fold.

The proportion of children being breastfed is heavily influenced by socio-economic factors, with deprivation

being associated with lower levels of breastfeeding.<sup>3</sup> Our data corroborate this association, although the correlation with deprivation is not marked (see Figure 3C.1). Although breastfeeding is a complex issue for which deprivation is only one influencing factor, this finding suggests that considerable unwarranted variation exists.

New mothers vary in the degree of support they need to initiate and sustain breastfeeding. Variation in the provision of local community midwifery, health visitor and perinatal care will significantly impact on rates of breastfeeding among local authorities.

### Options for action

Commissioners and clinicians can review the proportion of infants being breastfed in the local population and share good practice, particularly among localities that have a similar socio-economic and ethnic profile.

Commissioners and health professionals can improve the service they provide by:

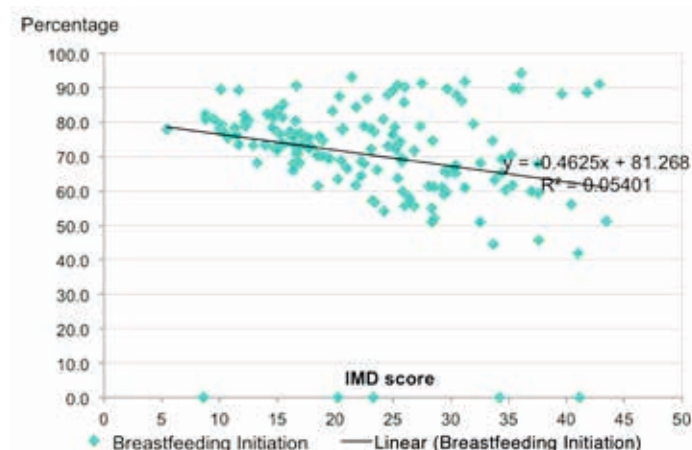
- assessing whether local performance compares favourably with that in localities which have a similar population profile
- identifying whether there are any unwarranted variations among social, ethnic or other groups in the local population, to understand the reasons for low rates in order to target relevant interventions.

Commissioners can help to ensure that there is adequate support for mothers and families, not only to establish breastfeeding, but also to prolong its duration. Actions could include:

- improving education (both antenatal and postnatal)
- dissemination of public health messages.

In particular, these actions should be aimed at groups where rates are found to be especially low.

**Figure 3C.1 Relationship between deprivation and breastfeeding initiation, by local authority, 2011–2012 (High IMD score indicates more deprived area)**



1 Horta BL, Victora CG (2013). Long-term of breastfeeding: a systematic review. World Health Organization. Available at: [http://apps.who.int/iris/bitstream/10665/79198/1/9789241505307\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/79198/1/9789241505307_eng.pdf).

2 Renfrew MJ et al. (2012). Preventing disease and saving resources: the potential contribution of increasing breastfeeding rates in the UK. UNICEF UK. Available at: [www.unicef.org.uk/Documents/Baby\\_Friendly/Research/Preventing\\_disease\\_saving\\_resources.pdf](http://www.unicef.org.uk/Documents/Baby_Friendly/Research/Preventing_disease_saving_resources.pdf).

3 L Oakley et al. (2013). Factors associated with breastfeeding in England: an analysis by primary care trust. *BMJ Open* 3:e002765

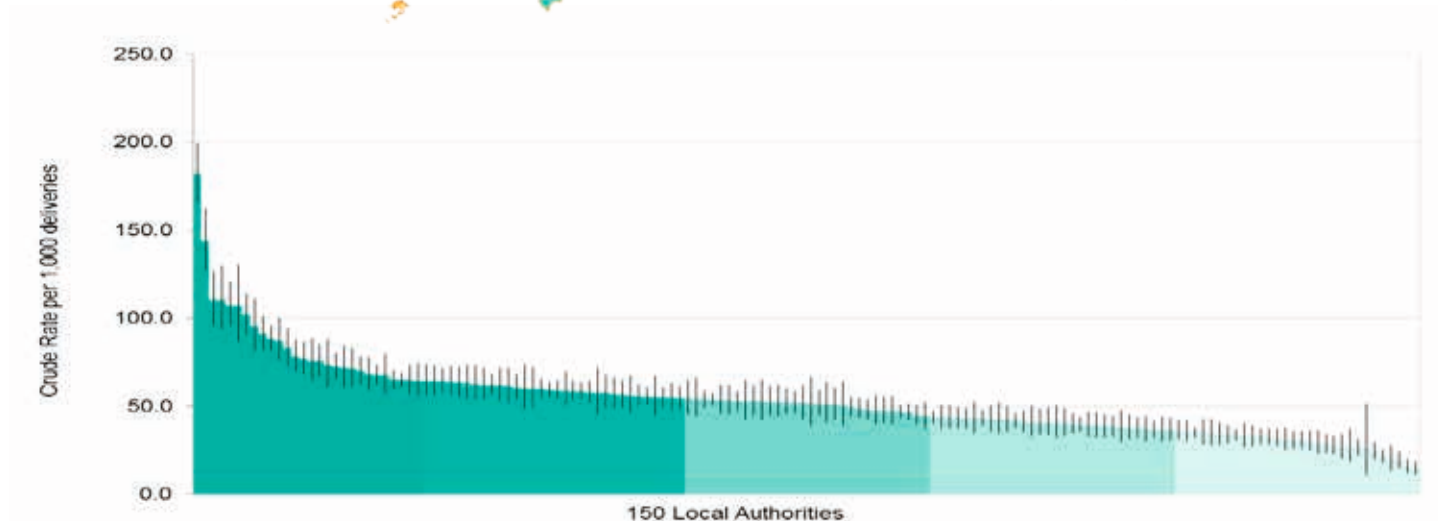
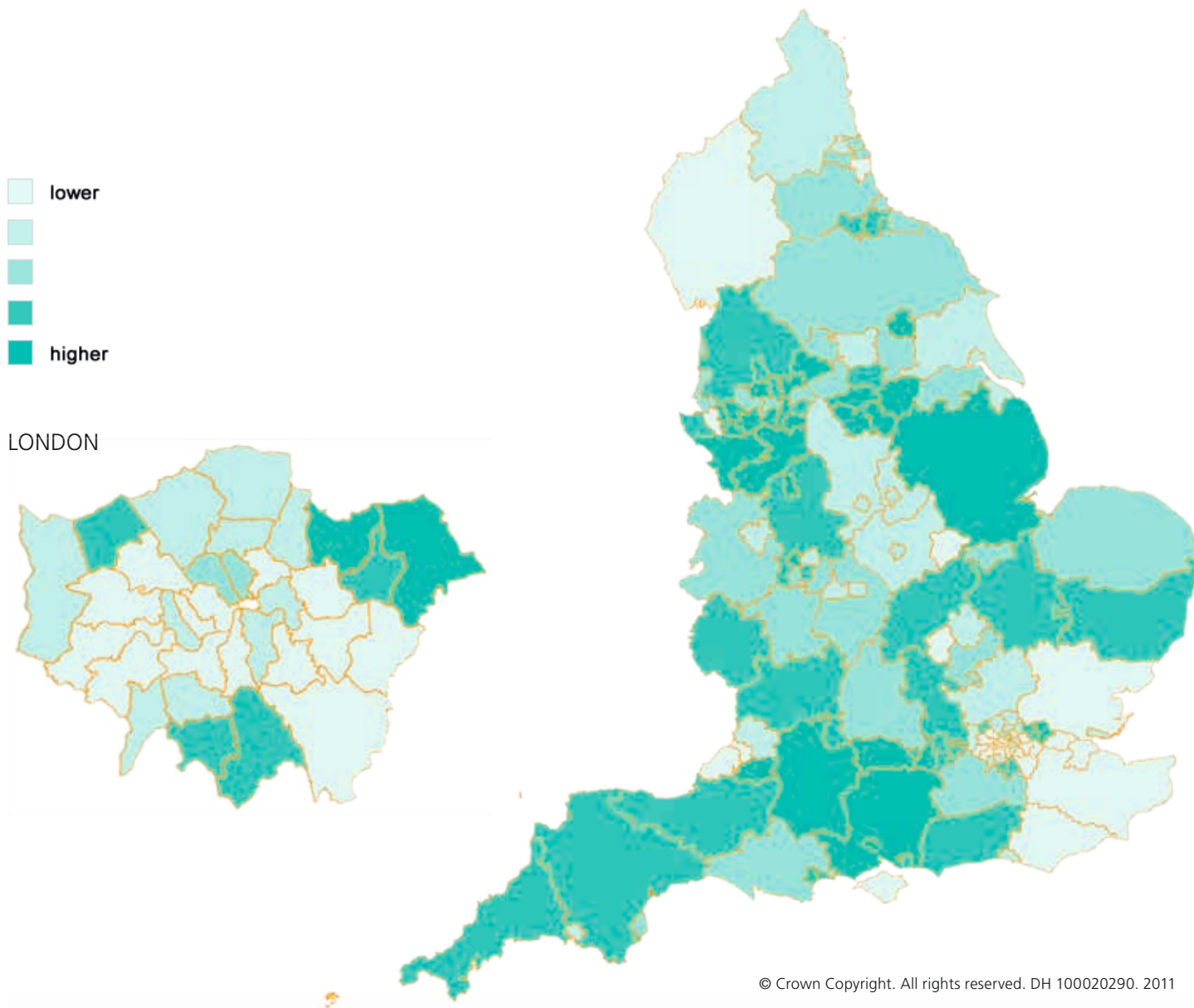
## Resources

The National Institute for Health and Care Excellence has produced a suite of guidance for promoting breastfeeding:

- A briefing on evidence-based actions for breastfeeding promotion – ‘Promotion of breastfeeding initiation and duration: Evidence into practice’ (2006) ([www.nice.org.uk/niceMedia/pdf/EAB\\_Breastfeeding\\_final\\_version.pdf](http://www.nice.org.uk/niceMedia/pdf/EAB_Breastfeeding_final_version.pdf)).
- A commissioning guide to implement a peer support programme for women who breastfeed ([www.nice.org.uk/usingguidance/commissioningguides/breastfeed/breastfeed.jsp](http://www.nice.org.uk/usingguidance/commissioningguides/breastfeed/breastfeed.jsp)).
- Best practice guidelines for routine postnatal care ([www.nice.org.uk/CG037](http://www.nice.org.uk/CG037)) and maternal and child nutrition (<http://guidance.nice.org.uk/PH11>).

D: Postnatal health

**Map 31** Postnatal health: Rate of emergency admissions to hospital of babies within 14 days of being born per 1,000 deliveries, by local authority, 2011–2012





## Context

The Healthcare Commission report 'Towards better births: a review of maternity services in England' drew attention to the problem of re-admission of mothers and babies:

*'High levels of re-admissions of either mother or babies can suggest problems with either the timing or quality of health assessments before the initial transfer or with the postnatal care once the mother is home. Dehydration and jaundice are two common reasons for re-admission of babies and are often linked to problems with feeding. Half of the trusts had an admission rate of 8 per 1,000 babies or greater for these conditions two or more days after birth.'*<sup>1</sup>

Postnatal care provision crosses acute and primary healthcare sectors, with the majority of care taking place in the woman's home. Care is likely to include:

- routine clinical examination and observation of the woman and her baby
- routine infant screening to detect potential disorders
- support for infant feeding
- ongoing provision of information and support.

Helping mothers to know what signs and symptoms indicate something serious and what is normal gives them reassurance and confidence.

Giving babies the best start in life through good-quality postnatal care means that they are less likely to have health problems during childhood and into adulthood.

A similar indicator – 'Emergency admissions of home births and re-admissions to hospital of babies within 14 days of being born per all live births' – was included in the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

'Admission of full-term babies to neonatal care' is included in the NHS Outcomes Framework 2013/14.

## Magnitude of variation

**Map 31:** For local authorities in England, the rate of emergency admissions to hospital of babies within 14 days of being born per 1,000 deliveries ranges from 14.6 to 182.3 (greater than twelve-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 24.3 to 107.1, and the variation is 4.5-fold.

## Options for action

Commissioners and providers can work together to improve the antenatal education and information provided to parents. At each postnatal contact, parents could be offered information and advice to enable them to:

- assess their baby's general condition
- identify signs and symptoms of common health problems in babies
- contact a healthcare professional or emergency service if required.

Commissioners can work with providers to ensure that National Institute for Health and Care Excellence (NICE) guidelines on postnatal care are implemented (see 'Resources', below), and in particular that:

- examination of the newborn is undertaken by suitably qualified healthcare professionals
- each woman has her own personalised care plan which takes into account not only her needs but also her baby's.
- Evaluating babies who develop jaundice within the first 24 hours
- For babies aged  $\geq 24$  hours, monitoring and systematically recording the intensity of the jaundice together with the baby's overall wellbeing, with particular regard to hydration and alertness.

As a minimum standard, all maternity care providers could implement an externally evaluated structured programme that encourages breastfeeding, such as the Baby Friendly Initiative (see "Resources" later in this section).

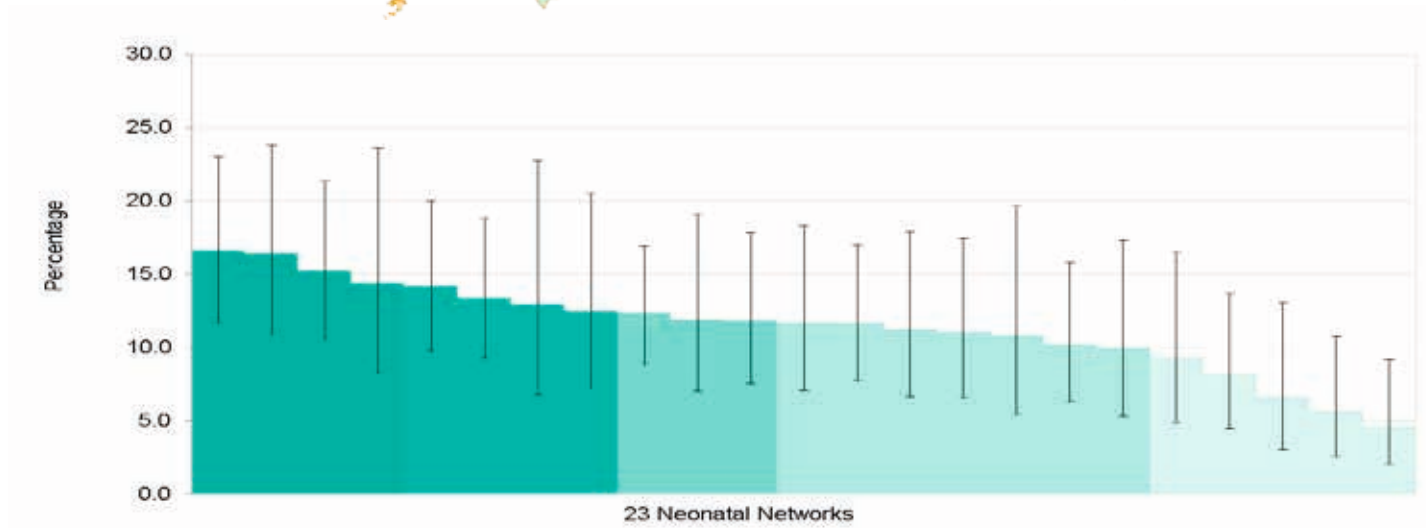
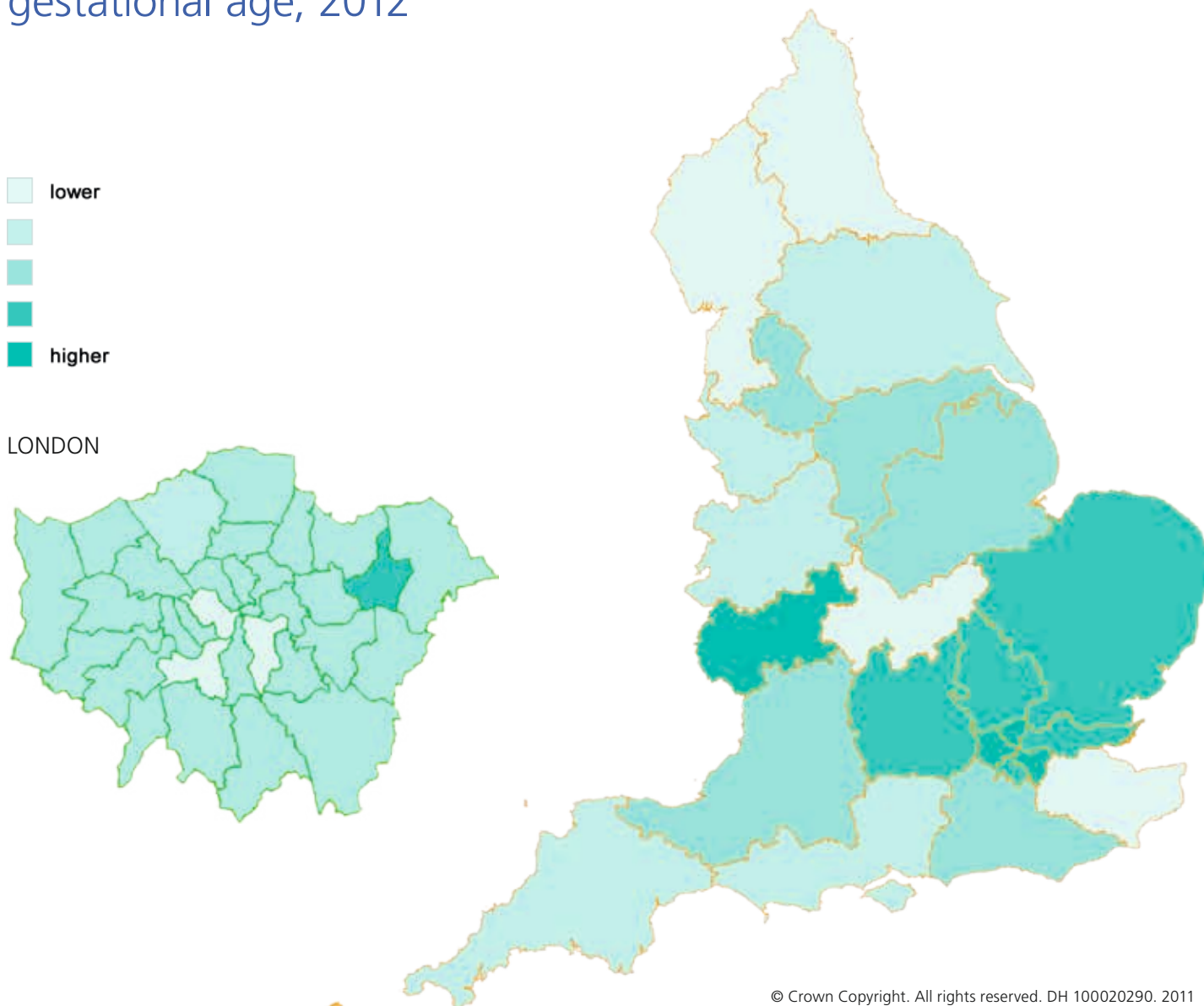
## Resources

- NICE Guidance (2006). Postnatal care: Routine postnatal care of women and their babies. Clinical guidelines, CG37 ([www.nice.org.uk/CG037](http://www.nice.org.uk/CG037)).
- Baby Friendly Initiative ([www.babyfriendly.org.uk](http://www.babyfriendly.org.uk)).
- Royal College of Obstetricians and Gynaecologists (2008). Standards for Maternity Care ([www.rcog.org.uk/womens-health/clinical-guidance/standards-maternity-care](http://www.rcog.org.uk/womens-health/clinical-guidance/standards-maternity-care)).

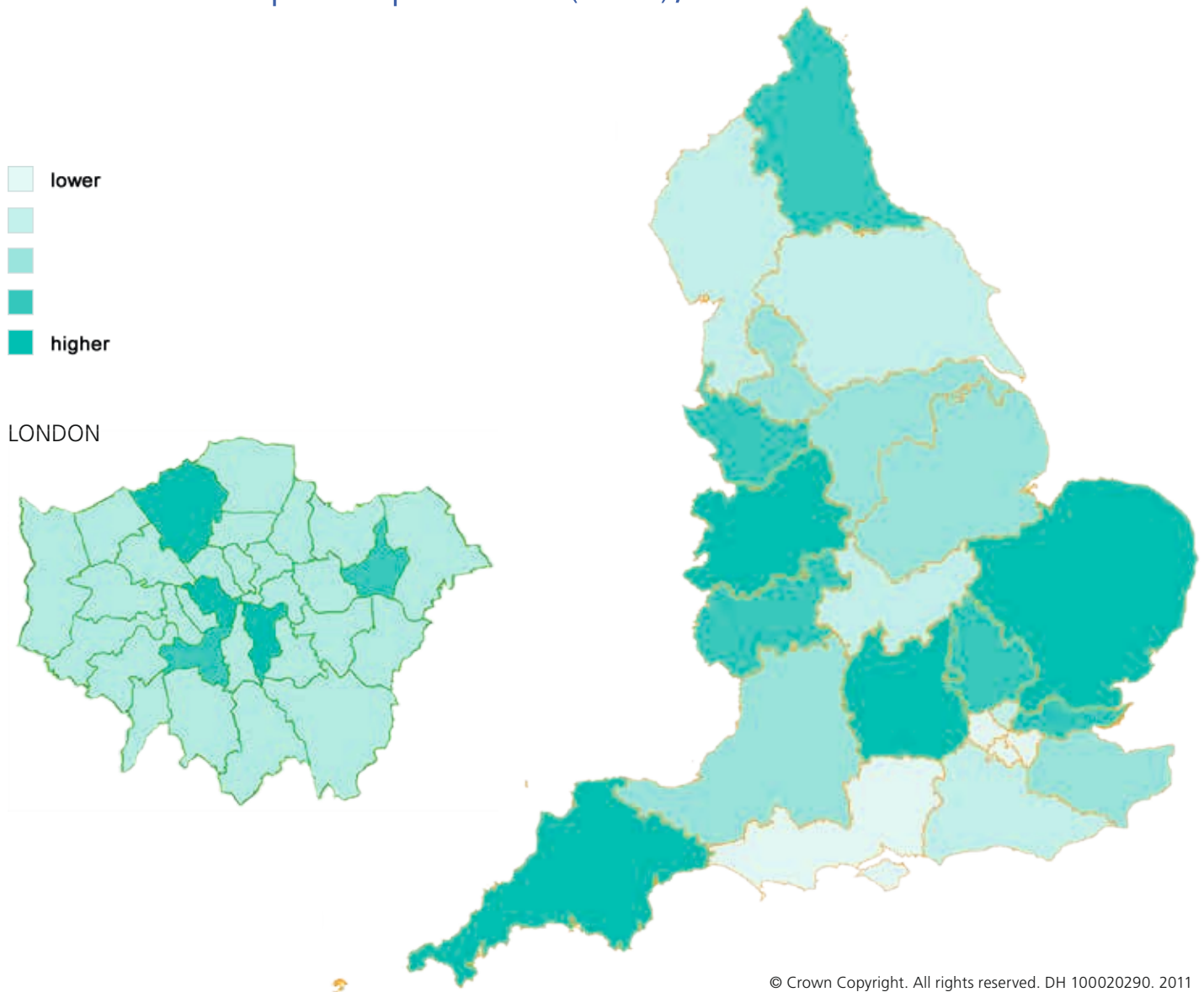
<sup>1</sup> Healthcare Commission (2008). *Towards better births: A review of maternity services in England*. Available at: [http://webarchive.nationalarchives.gov.uk/20101014074803/http://www.cqc.org.uk/\\_db/\\_documents/Towards\\_better\\_births\\_200807221338.pdf](http://webarchive.nationalarchives.gov.uk/20101014074803/http://www.cqc.org.uk/_db/_documents/Towards_better_births_200807221338.pdf).

E: Preterm birth

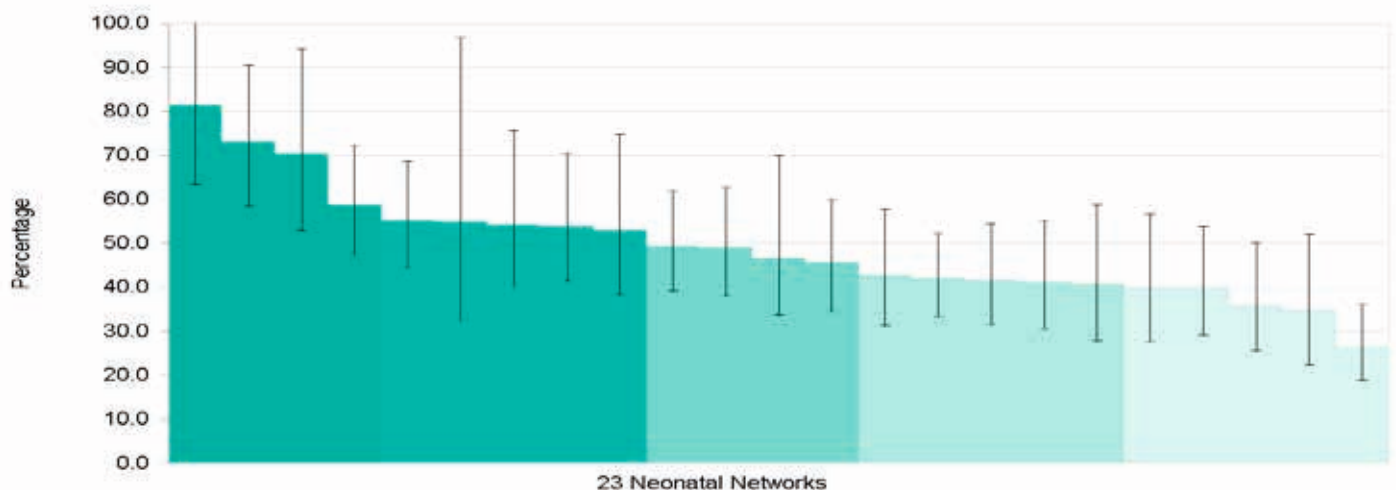
**Map 32** Neonatal mortality: Percentage of infants born at <30 weeks' gestation and admitted to neonatal units, who died ≤28 days, by neonatal network of booking, directly standardised by gestational age, 2012



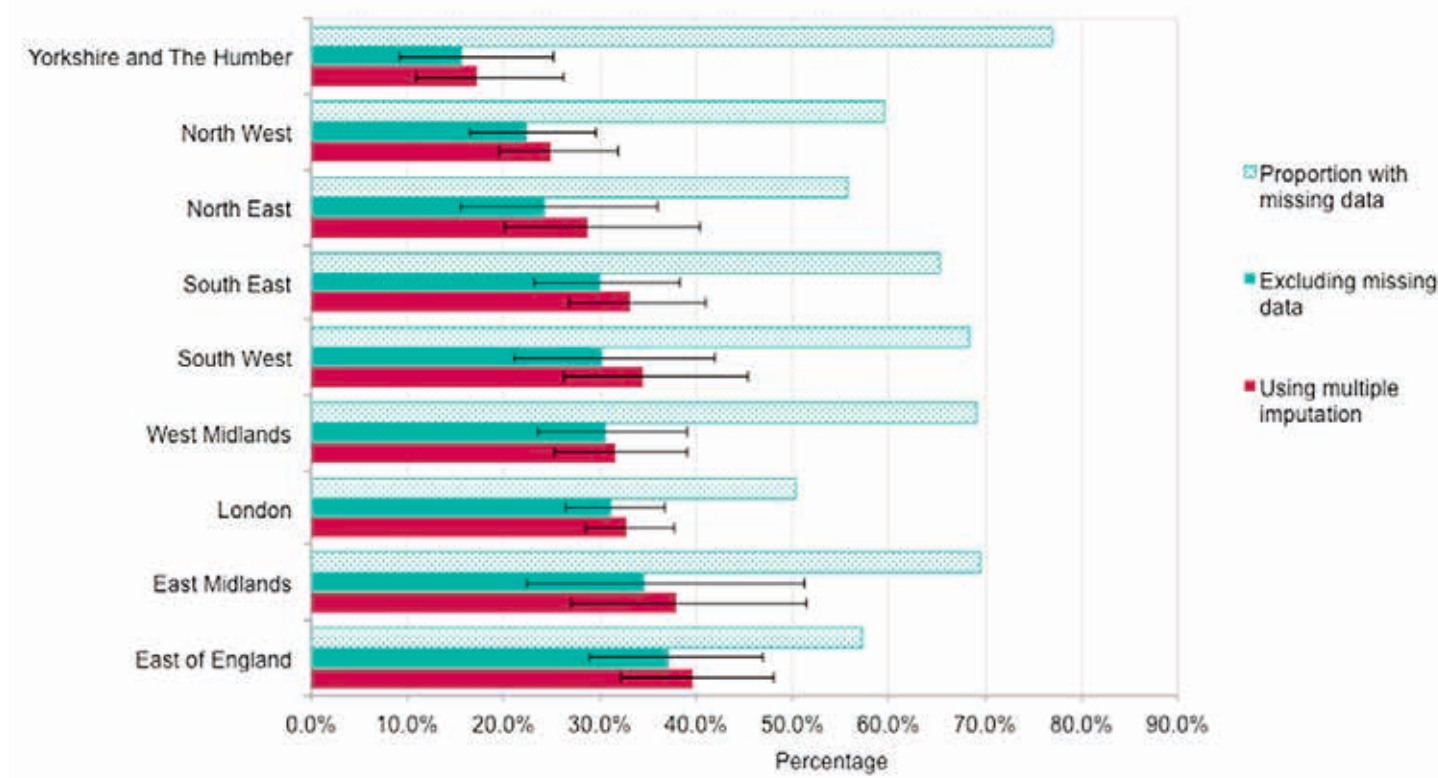
**Map 33** Breastfeeding at discharge: Percentage of infants born at <30 weeks' gestation and admitted to neonatal units who were receiving any mother's milk at discharge from neonatal care, by neonatal network of discharge, directly standardised by Index of Multiple Deprivation (IMD), 2012



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**Map 34** Survival free of any impairment at age 2 years: Percentage of infants born at <30 weeks' gestation and admitted to neonatal units who survived to 2 years of age free of any impairment (mild, moderate or severe), by region, born in 2010





## Context

Approximately 1 in 10 infants are born preterm. This equates to around 70,000 preterm births in England each year. These infants, particularly the most immature, require skilled care provided by neonatal specialised care services, which are delivered through clinical networks.

Each network includes around 6–8 neonatal units that together provide a full range of neonatal services. Infants requiring the highest level of support are transferred to a neonatal intensive care unit, and then transferred back to the hospital closest to home once this level of support is no longer required.

Neonatal networks do not have distinct geographical boundaries; approximate maps of neonatal networks were created based on previously known primary care trust (PCT) boundaries. Each PCT was allocated to one neonatal network based on where mothers in that PCT were most likely to book their deliveries in 2011. The geographical area of each neonatal network was then defined along the boundaries of the allocated PCTs.

The three indicators mapped here represent key clinical outcomes for very preterm infants, live-born <30 weeks' gestation (i.e. more than 10 weeks early). They describe neonatal mortality and, for those discharged from neonatal care, two additional indicators of life-long health:

- Breastfeeding: a practice associated with many benefits including reduced risk of infection and improved neurocognitive outcome.
- Survival free of impairment at two years: a global index of the long-term consequences of preterm birth.

Data were obtained from the National Neonatal Research Database, a national resource held at the Neonatal Data Analysis Unit (NDAU) at Imperial College London and Chelsea and Westminster NHS Foundation Trust. The UK Neonatal Collaborative comprises all neonatal units in England and Wales that provide agreement for data from neonatal Electronic Patient Records to be extracted and transmitted to the NDAU.

## Magnitude of variation

### Map 32: Neonatal mortality

For neonatal networks in England, the percentage of infants born at <30 weeks' gestation and admitted to neonatal units who died  $\leq 28$  days in 2012 ranges from 4.7% to 16.6%, a greater than three-fold variation. When the three neonatal networks with the highest rates and the three networks with the lowest rates are excluded, the range is 8.2% to 14.4%, and the variation is nearly two-fold.

Infants were assigned to the neonatal network of booking to reflect variation by residence, and because attributing deaths to network of discharge might distort the level of variation due to cross-network referrals for the most unwell infants.

As numbers are small, confidence intervals are wide. However, mortality data from 2011 show a statistically significant correlation with 2012 data, which suggests that the pattern of variation is consistent across years.

### Map 33: Breastfeeding at discharge

For neonatal networks in England, the percentage of infants born at <30 weeks' gestation and admitted to neonatal units that were receiving any mother's milk at discharge standardised by IMD ranges from 26.5% to 81.4%, representing a three-fold variation. When the three neonatal networks with the highest percentages and the three networks with the lowest percentages are excluded, the range is 39.9% to 58.7%, and the variation is 1.5-fold.

Standardising the data for deprivation did not greatly alter the pattern of variation initially seen in the unadjusted data, which suggests that variation in preterm breastfeeding is much less heavily influenced by maternal socio-economic status than among the general population.

### Map 34: Impairment-free survival at age 2 years

For regions in England, the percentage of infants born at <30 weeks' gestation and admitted to neonatal units that survived to 2 years free of any impairment ranges from 15.7% to 37.1%, a 2.4-fold variation; 2-year health status data were only available for 40% of eligible infants. An infant was classified as impaired based on criteria developed by the National Perinatal Epidemiology Unit and the former Oxford Regional Health Authority; mild, moderate and severe impairment are included.<sup>1</sup>

There are a variety of possible reasons for missing data, for example:

- infants may not be brought for follow-up appointments if they are considered well, or alternatively if they are too sick
- families may have moved away or lost contact
- follow-up may have taken place but data were not entered into the neonatal Electronic Patient Record.

If the infants with missing data have different outcomes from infants with complete data, excluding the missing data will give a biased result. We used a technique known as multiple imputation to estimate the missing data based on the known neonatal characteristics of the infants (gestational age, birth weight z-score, sex and region). The impairment-free survival rates and standard errors are estimated for each imputed dataset, and these are combined to produce a revised estimate of the impairment-free survival rate and corresponding 95% confidence interval. The revised estimates range from 17.3% (95% confidence interval 10.9% to 26.2%) to 39.6% (32.2% to 37.8%), which still shows a 2.3-fold variation.

<sup>1</sup> Johnson A. (1994). Disability and perinatal care: measurement of health status at two years. A report of two working groups convened by the National Perinatal Epidemiology Unit (NPEU) and Oxford Regional Health Authority. NPEU, Oxford.



## Section 3: Child health in the perinatal period

This revised estimate reduces some of the bias and uncertainty due to the missing data. However, it is based on the assumption that for infants with similar neonatal characteristics and from the same region, the probability of surviving to 2 years free of impairment is the same whether the outcome is known or missing. As we cannot know whether or not this assumption is true, the results must be interpreted with caution.

### Options for action

There is considerable variation in neonatal mortality and breastfeeding following preterm birth. While this may be due to a number of factors, the magnitude of variation remains largely unaltered following standardisation for major potential confounders, suggesting that local factors are likely to be important. Learning from the highest performing networks, coupled with strong clinical leadership, is likely to improve outcomes nationally with minimal requirement for additional resources.

Health professional teams may consider these results in the light of their own performance and discuss areas for improvement with commissioners. More detailed comparison of network populations and identification of unwarranted variation in outcomes could be achieved through more detailed analyses of the National Neonatal Research Database. Commissioners can work together with providers to ensure that adequate support is made available and relevant action taken to address unwarranted variation.

### Resources

- The Royal College of Paediatrics and Child Health's National Neonatal Audit Programme audits breastfeeding at discharge and 2-year outcomes for infants admitted to neonatal units across England and Wales ([www.rcpch.ac.uk/nnap](http://www.rcpch.ac.uk/nnap)).
- An extended set of analyses, including neonatal mortality attributed to alternative neonatal care locations, exclusive breastfeeding at discharge and sensitivity analyses for the 2-year health status data, are available at the NDAU website, along with methodological details ([www.imperial.ac.uk/ndau](http://www.imperial.ac.uk/ndau)).

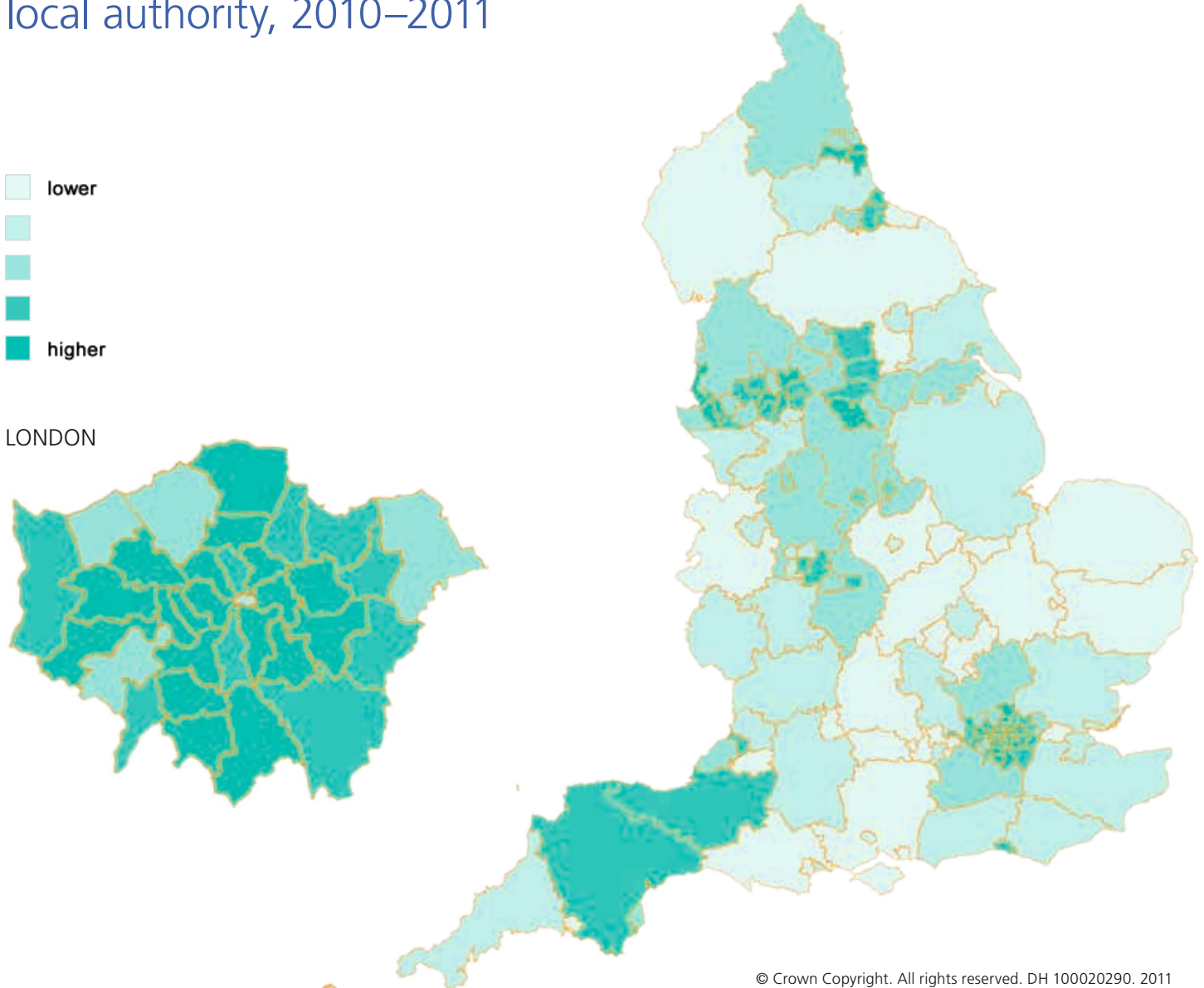
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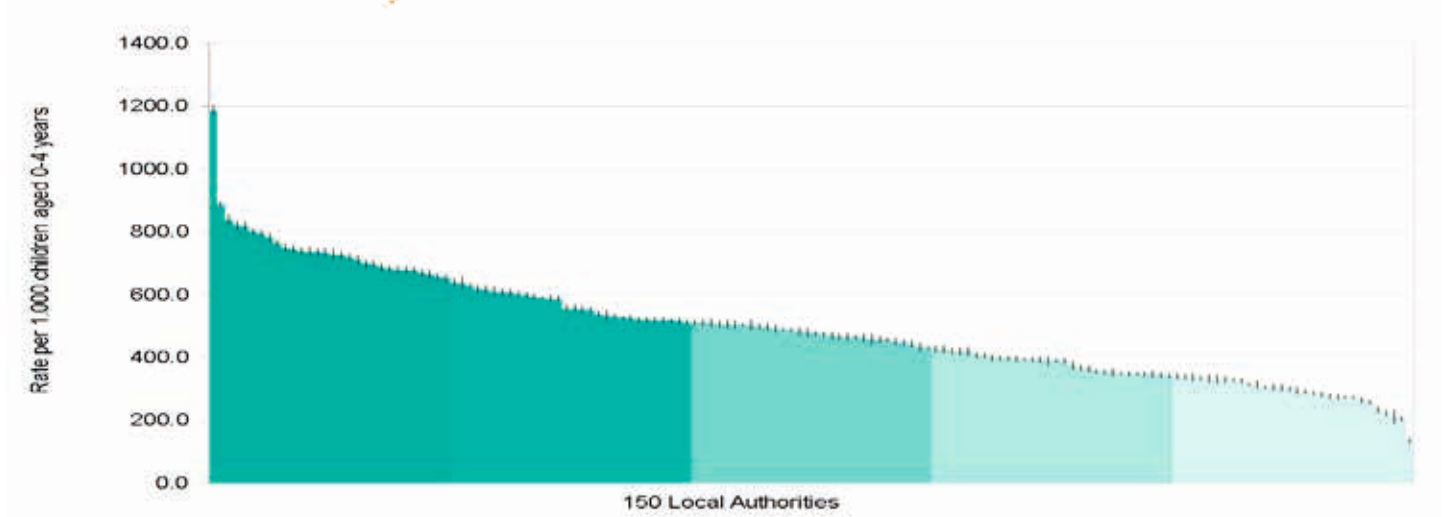
# Healthcare for children and young people

A: Accident and Emergency department attendances

**Map 35** Emergency attendance: Rate of attendance to Accident and Emergency departments in persons aged 4 years and under, per 1,000 population aged 4 years and under, by local authority, 2010–2011



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## Context

In 2010–2011, there were 16.2 million recorded attendances to Accident and Emergency departments in England, an increase of 4.3% from the previous year. More than one-quarter (27.8%) of attendances were made by children and young people (0–19 years).<sup>1</sup>

The recent NHS England Urgent and Emergency Care Review has found that the capacity of primary care to manage the healthcare needs of children and young people is more stretched than it has ever been, and out-of-hours access is a particular issue.<sup>2</sup>

Emergency department attendance for accidental injury occurs most commonly in children aged under 5 years. The same age group also accounts for nearly 70% of self-referrals to Accident and Emergency departments for medical problems in children, such as respiratory problems or feverish illnesses.<sup>3</sup> Targeting a reduction in the variation in Accident and Emergency department attendance for the under-5 age group is likely to realise considerable financial savings and reduce pressure on overstretched Accident and Emergency department services.

This indicator was included in the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

## Magnitude of variation

**Map 35:** For local authorities in England, the rate of attendance to Accident and Emergency departments in persons aged 4 years and under, per 1,000 population aged 4 years and under, ranged from 136.3 to 1,187.4 (nearly nine-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 259.1 to 795.3, and the variation is greater than three-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust (PCT) in 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 231.1 to 805.4, and the variation was 3.5-fold.

These data confirm that emergency attendance rates have increased across England since 2009–2010, although the magnitude of variation has not. However, caution should be exercised when comparing magnitudes of variation since the geographical and population units of analysis have changed from PCTs to local authorities.

While public health measures such as accident prevention or family education on appropriate use of health services are important, the provision of local primary and community care

(particularly out-of-hours urgent care) is likely to account for much of the ongoing variation in demand for emergency care for young children.

## Options for action

Commissioners can use the specific pattern of demand for emergency services in their local area in order to commission services that reflect local needs. Studying local variation in presentation to emergency departments can help to identify the causes of unwarranted variation and to ensure that the right balance of community and hospital-based services is provided.

Although injury and accident prevention is a public health issue, it is also the responsibility of local health services to support education on prevention of injury.

Commissioners can ensure that children have the appropriate level of access in relation to their healthcare needs by safeguarding the quality of local primary and community-based care.

Primary care professionals and local hospital paediatricians can reduce variation by agreeing and implementing standards and guidelines for the management of common conditions. For instance, ensuring that National Institute for Health and Care Excellence guidance on the recognition and management of a young (under 5 years of age) feverish child (see 'Resources' later in this section) is widely disseminated and followed.

## Resources

NHS England Urgent and Emergency Care Review ([www.england.nhs.uk/ourwork/pe/uec-england/](http://www.england.nhs.uk/ourwork/pe/uec-england/)).

NICE (2007). Feverish illness: assessment and initial management in children younger than 5 years ([www.nice.org.uk/CG047](http://www.nice.org.uk/CG047)).

NHS Institute for Innovation and Improvement (2011). A whole system approach to emergency and urgent care for children and young people: A practical step by step guide and resource pack ([www.rcpch.ac.uk/system/files/protected/page/Final%20NHSi%20CYP\\_for%20web.pdf](http://www.rcpch.ac.uk/system/files/protected/page/Final%20NHSi%20CYP_for%20web.pdf)).

Fernandes A for Royal College of General Practitioners (2011). Guidance for commissioning integrated urgent and emergency care: a whole system approach ([www.rcgp.org.uk/revalidation-and-cpd/centre-for-commissioning/~/\\_media/Files/CfC/CfC-Urgent-Emergency-Care.ashx](http://www.rcgp.org.uk/revalidation-and-cpd/centre-for-commissioning/~/_media/Files/CfC/CfC-Urgent-Emergency-Care.ashx)).

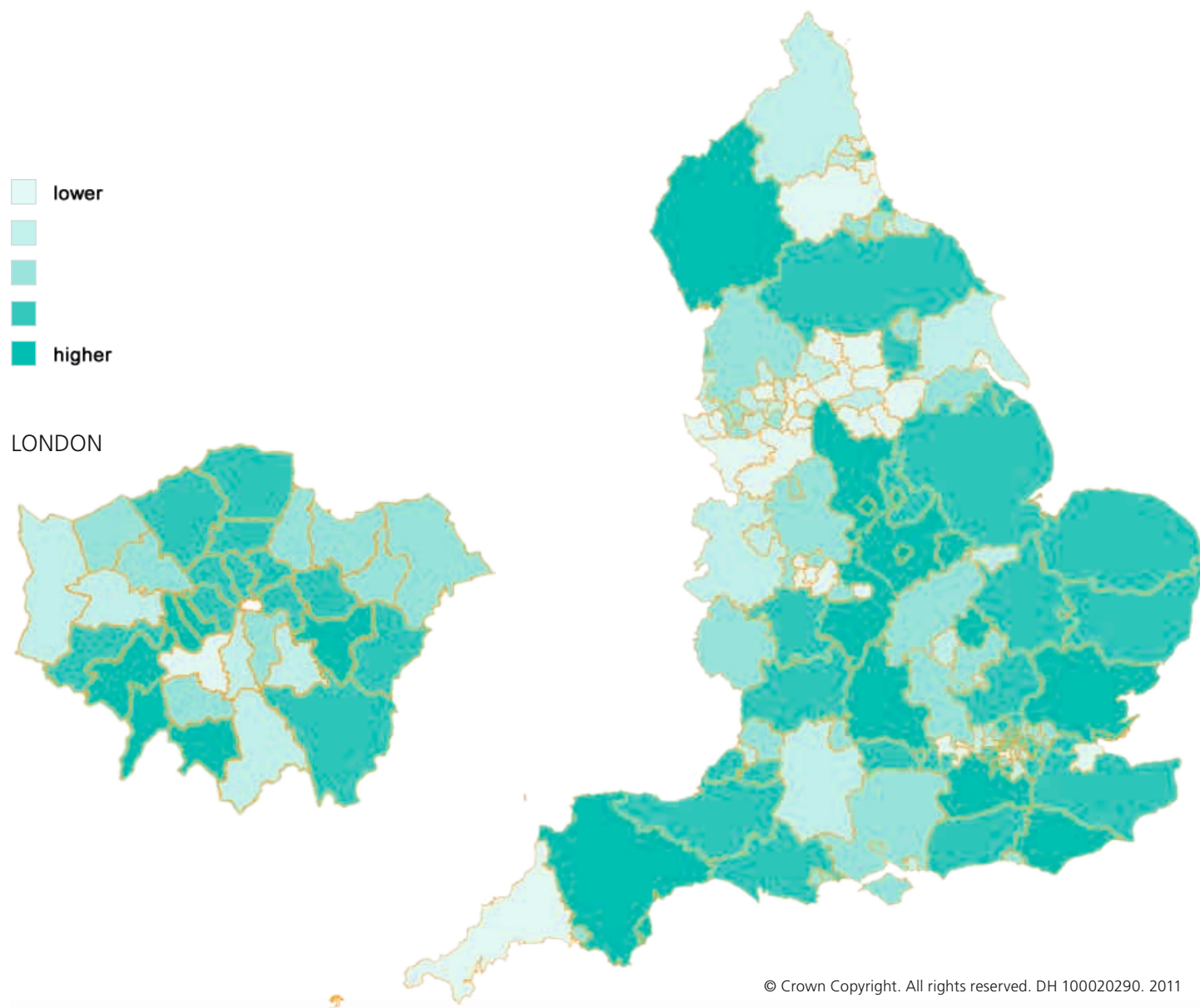
1 Health and Social Care Information Centre. Available at: <https://catalogue.ic.nhs.uk/publications/hospital/AandE/acci-emer-atte-eng-2011-2012/acci-emer-atte-eng-2011-12-rep.pdf>.

2 [www.england.nhs.uk/wp-content/uploads/2013/06/urg-emerg-care-ev-bse.pdf](http://www.england.nhs.uk/wp-content/uploads/2013/06/urg-emerg-care-ev-bse.pdf).

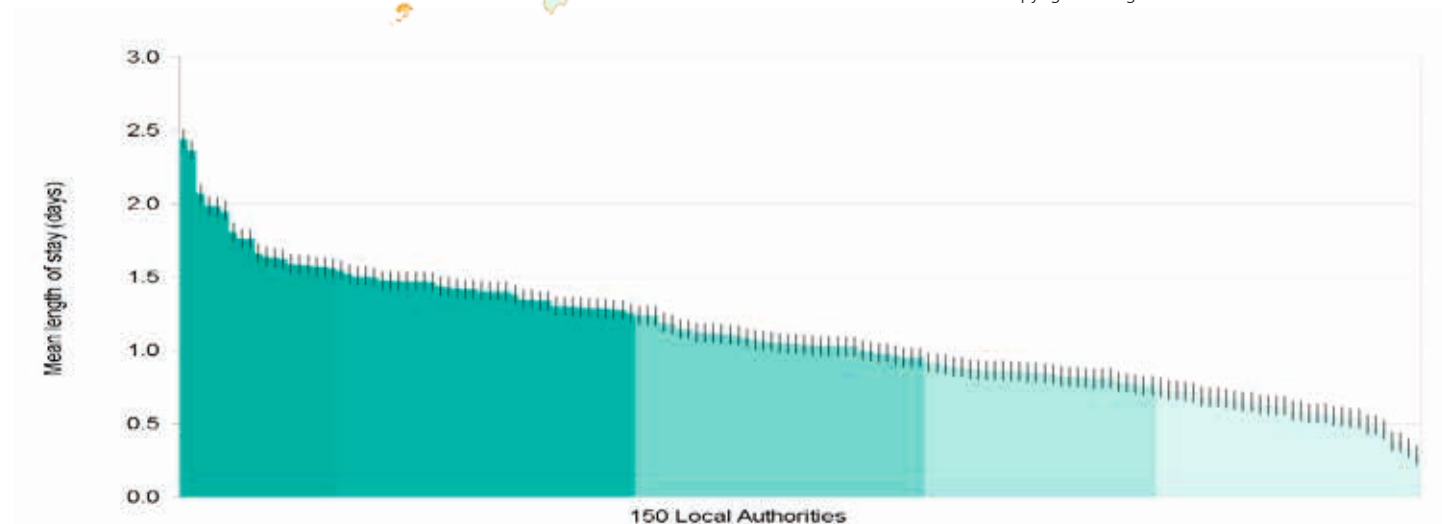
3 Sands R et al. (2011). Medical problems presenting to paediatric emergency departments: 10 years on. *Emergency Medicine Journal*.

B: Unplanned hospital admissions

**Map 36** Duration of non-elective hospital admissions: Mean length of stay (days) for non-elective admissions in children aged 0–17 years, by local authority, 2011–2012

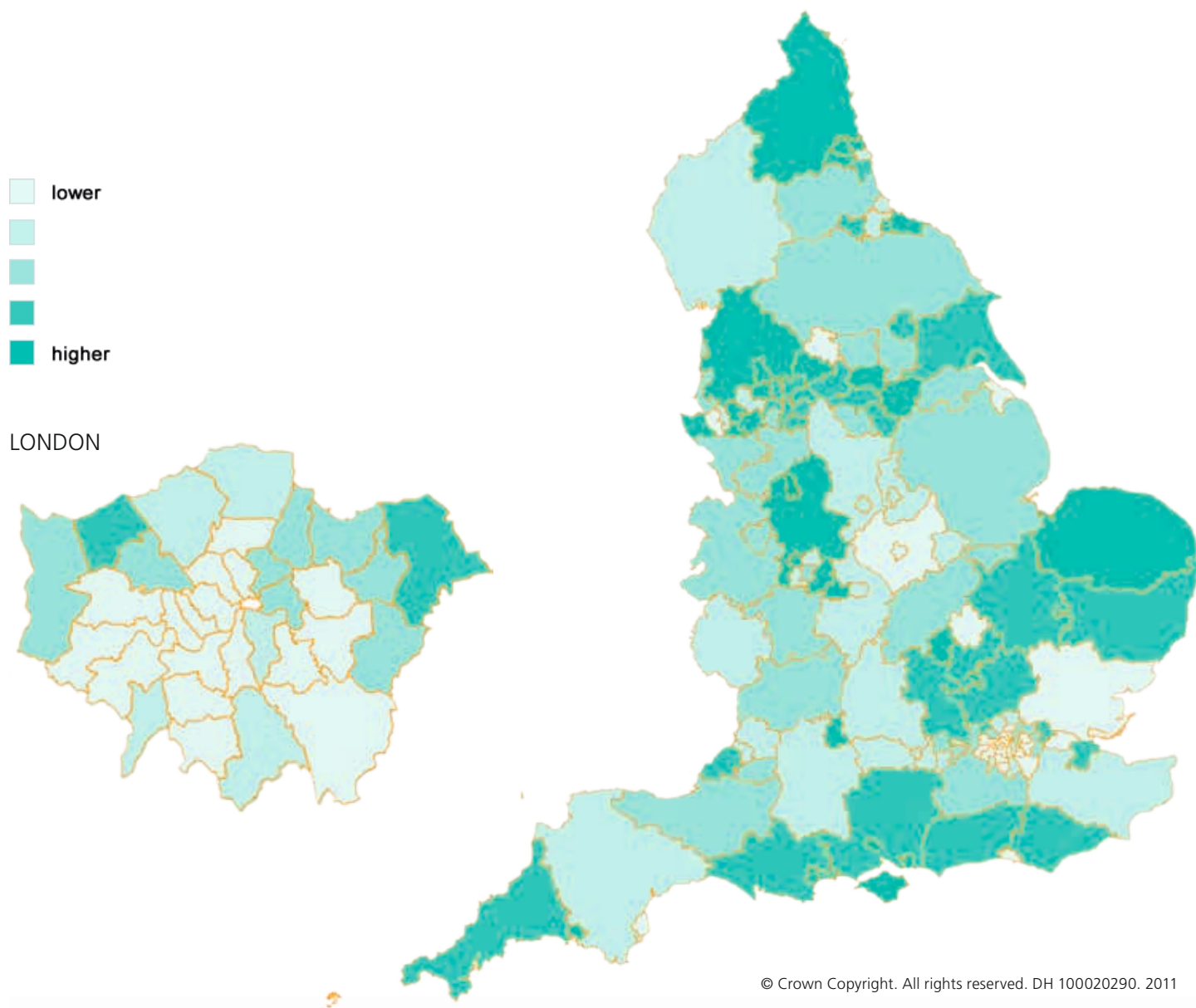


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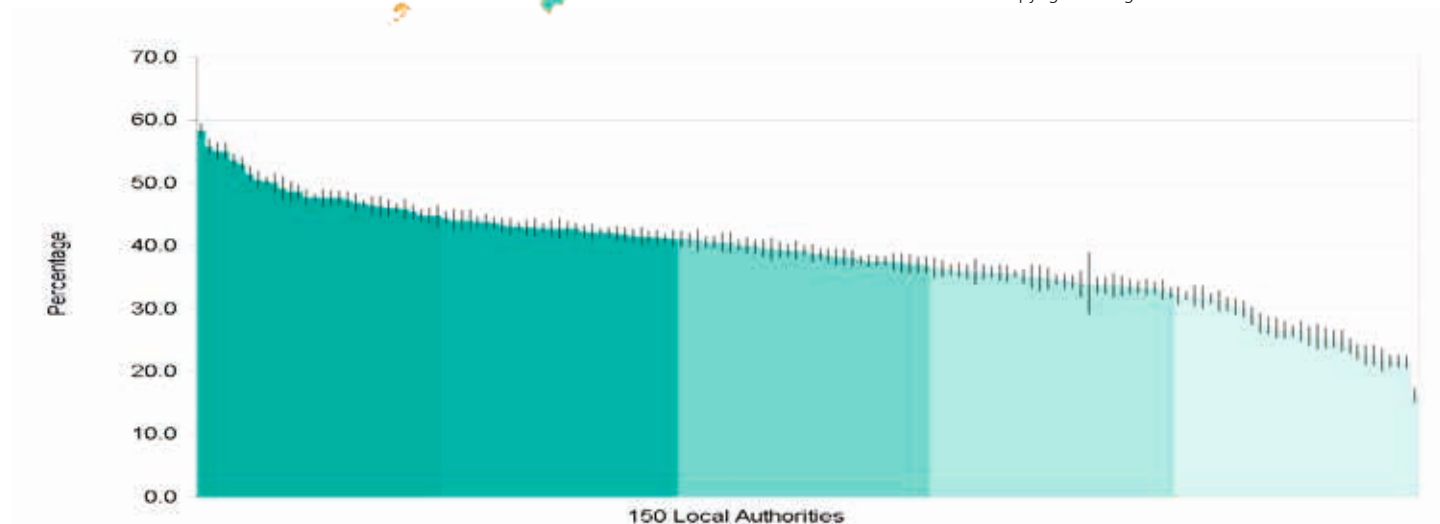




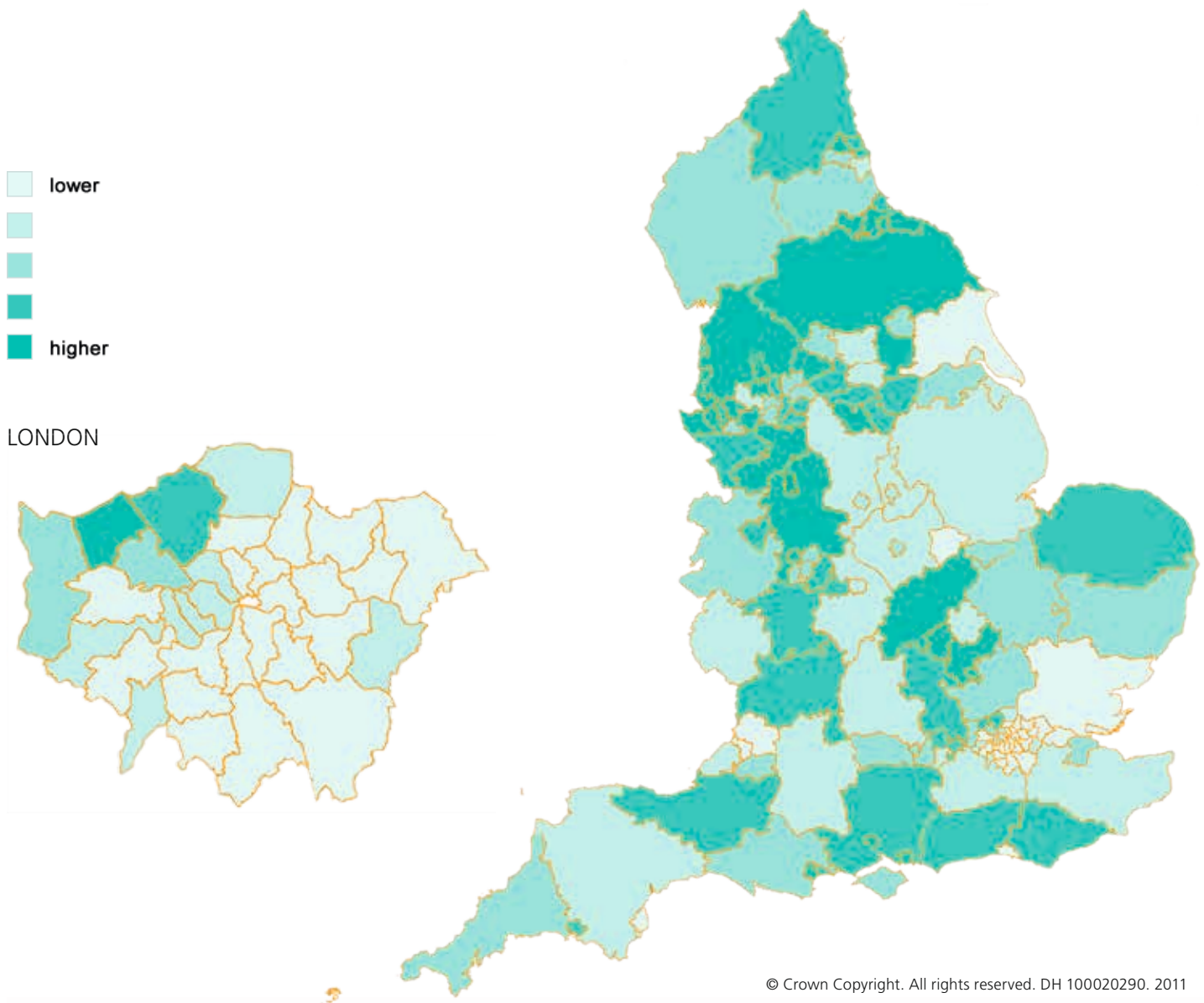
**Map 37** Zero-day admissions: Percentage of hospital admissions in children aged 0–17 years where the duration of stay was shorter than 24 hours, by local authority, 2011–2012



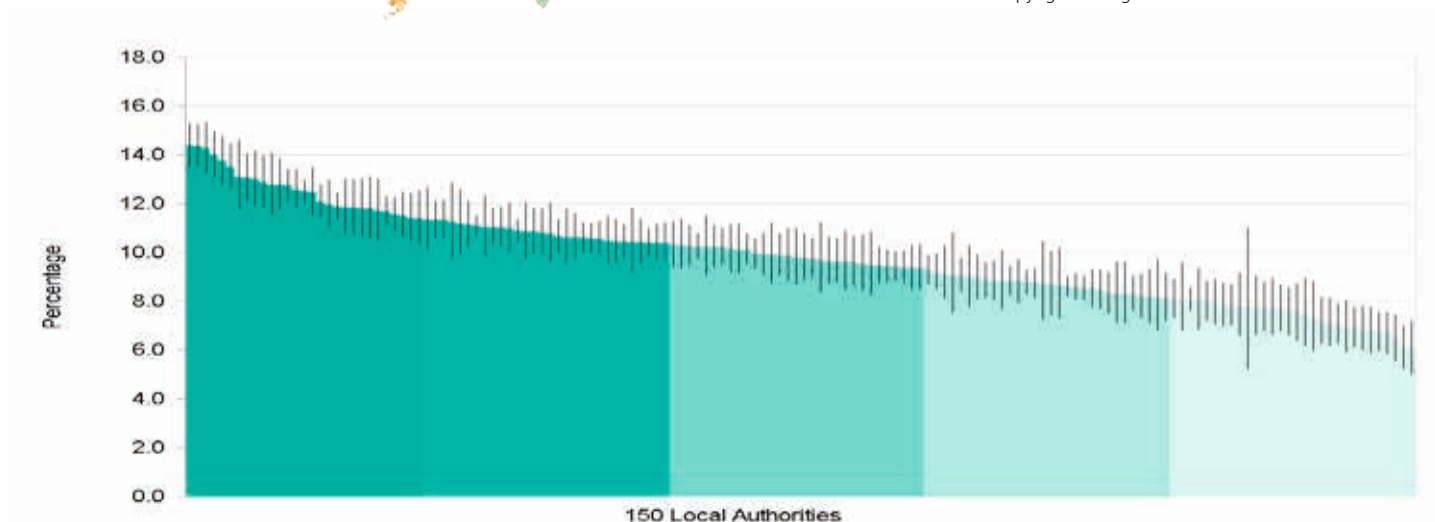
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**Map 38** Emergency readmissions: Percentage of emergency admissions in children aged 0–15 years occurring within 28 days of the last, previous discharge from hospital after admission, by local authority, 2010–2011



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## Context

Emergency admissions for children and young people have been rising steadily over the past decade and increased by 28% between 1999 and 2010. Of these, hospital admissions of fewer than 24 hours' duration, so called 'zero-day admissions', have doubled during the same period.<sup>1</sup> The increase in Short Stay Paediatric Assessment Units in England – where children who may not require overnight admission are admitted, treated and observed for a short length of time before being discharged home – may account for much of this increase.<sup>2</sup> High zero-day admission rates may also reflect:

- systems failure in emergency departments where admission to hospital becomes a default or preferred option
- reduced capacity of primary care to manage patients with ambulatory care-sensitive conditions which would not otherwise require admission to hospital.<sup>1,3</sup>

Emergency readmissions may be the result of a legitimate planned discharge strategy, reflecting the natural history of disease, and may reflect good safety netting and high-quality care. However, variation may also be due to differences in:

- quality of management of the initial admission episode, including thresholds for discharge
- quality of community and primary care post-discharge
- thresholds for admissions from subsequent attendances at emergency departments.

Rate of emergency readmission to hospital is increasingly seen as a quality of care indicator, and has been included in the NHS Outcomes Framework since its inception, at least for adult services.

Excess admissions are a source of waste for health services. More importantly, unnecessary, or unnecessarily prolonged, admission to hospital is distressing to the child and family, causes great disruption to family life and has a financial and emotional cost. Reducing variation in duration of stay and unplanned readmissions will reduce this unnecessary burden for both families and health services. However, there is currently little high-quality evidence for any individual intervention which reduces emergency admissions in children.<sup>4</sup>

1 Gill PJ, Goldacre M, Mant D et al. (2013). Increase in emergency admissions to hospital for children aged under 15 in England, 1999–2010: national database analysis. *Arch Dis Child*. 98:328–334.

2 RCPCH (2013). Back to facing the future. London. Available from: [www.rcpch.ac.uk/system/files/protected/news/Back%20to%20Facing%20the%20Future%20FINAL\\_1.pdf](http://www.rcpch.ac.uk/system/files/protected/news/Back%20to%20Facing%20the%20Future%20FINAL_1.pdf).

3 Saxena S, Bottle A, Gilbert R et al. (2009). Increasing short-stay unplanned hospital admissions among children in England: Time Trends Analysis '97–'06. *PLoS One* 4:e7484.

4 Thompson Coon J, Martin A, Abdul-Rahman AK et al. (2012). Interventions to reduce acute paediatric hospital admissions: a systematic review. *Arch Dis Child* 97:304–11.

## Magnitude of variation

### Map 36: Duration of non-elective hospital admissions

For local authorities in England, the mean length of stay for non-elective admissions in children aged 0–17 years ranged from 0.3 to 2.4 days (eight-fold variation). When the five local authorities with the highest length of stay and the five local authorities with the lowest length of stay are excluded, the range is 0.5 to 2.0 days, and the variation is four-fold.

### Map 37: Zero-day admissions

For local authorities in England, the percentage of hospital admissions in children aged 0–17 years where the duration of stay was shorter than 24 hours ranged from 16.3% to 58.4% (3.6-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 22.6% to 53.1%, and the variation is greater than two-fold.

### Map 38: Emergency readmissions

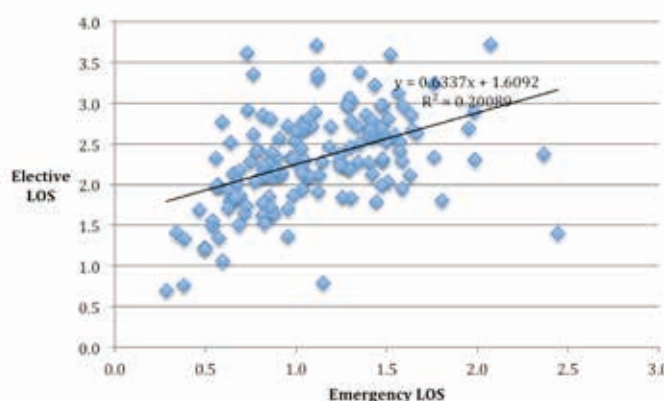
For local authorities in England, the percentage of emergency admissions in children aged 0–15 years occurring within 28 days of the last, previous discharge from hospital after admission ranged from 6.1% to 14.4% (2.4-fold variation). When the five local authorities with the highest percentages and the five local authorities with the lowest percentages are excluded, the range is 6.8% to 13.5%, and the variation is two-fold.

Variation in the duration of stay for non-elective admissions may reflect differences in disease severity at the time of admission. However, it may also reflect variation in healthcare system performance, including differences in:

- hospital discharge processes
- adequacy of community support and services.

If variation in length of stay were the result of system failures such as these, we would expect both elective and non-elective patients to be similarly affected. Indeed, Figure 4B.1 confirms just such a strong correlation, which suggests that the variation is unwarranted.

**Figure 4B.1 Correlation between duration of stay in elective and non-elective admissions, by local authority, 2011–2012**



## Section 4: Healthcare for children and young people

Duration of stay has an impact on readmission rates: discharging patients prematurely from hospital is likely to result in a higher rate of failed discharge and emergency readmission. These data do show such a negative correlation between length of stay and percentage of emergency readmissions (see Figure 4B.2). A careful balance needs to be sought to ensure that patients are discharged at the appropriate time in order to optimise patient safety and use of healthcare resources.

There is little evidence to suggest what an 'appropriate' readmission rate may be, but data from the USA show an average readmission rate of around 6.5%.<sup>1</sup> The rates seen here are significantly higher – however, this is more likely to reflect the differences in our healthcare system rather than differences in clinical practice, and should be interpreted with that in mind.

Zero-day admission rates should not be studied in isolation either. Clearly, there will be a relationship with mean duration of stay. More interestingly, it shows a strong positive correlation with emergency readmission rates (see Figure 4B.3). This may represent the same relationship described

above (in Figure 4B.2), where shorter mean lengths of stay lead to higher readmission rates due to premature discharge from hospital.

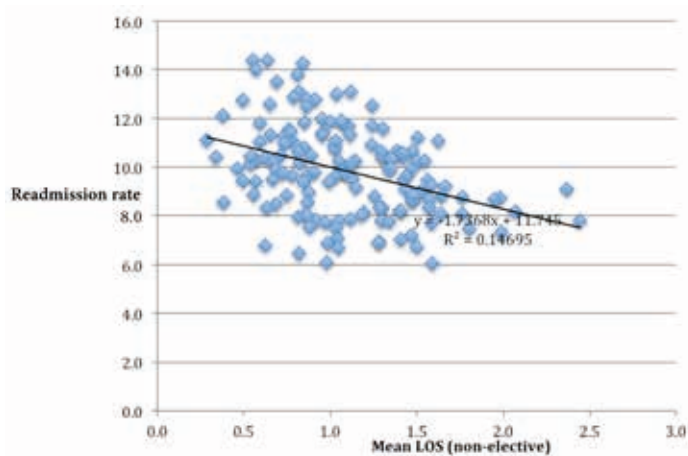
### Options for action

There is a complex interplay between these three indicators, and they should be reviewed together to ensure that their services provide an optimal balance for the healthcare needs of the population.

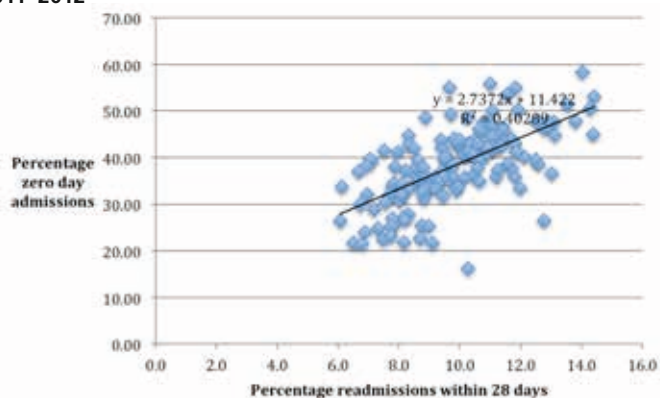
Although these are indicators of emergency department and hospital utilisation, they are also heavily influenced by the quality and capacity of primary care and community services. Commissioners can use these indicators to understand the capacity and quality of the local healthcare system for acutely ill children and young people.

There is increasing consensus that high-quality, sustainable care for acutely ill children and young people will involve consultant-led healthcare delivered in fewer specialist centres, alongside an expansion in primary care expertise and capacity to manage children and young people outside hospital.<sup>2</sup> This is a challenge for commissioners, local authorities and policymakers to address with some urgency.

**Figure 4B.2 Correlation between percentage of emergency readmissions and duration of stay in emergency admissions, by local authority, 2011–2012**



**Figure 4B.3 Correlation between percentage of zero-day admissions and percentage of emergency readmissions, by local authority, 2011–2012**



### Resources

NHS England Urgent and Emergency Care Review ([www.england.nhs.uk/ourwork/pe/uec-england/](http://www.england.nhs.uk/ourwork/pe/uec-england/)).

Royal College of Paediatrics and Child Health (2013). Back to facing the future ([www.rcpch.ac.uk/system/files/protected/news/Back%20to%20Facing%20the%20Future%20FINAL\\_1.pdf](http://www.rcpch.ac.uk/system/files/protected/news/Back%20to%20Facing%20the%20Future%20FINAL_1.pdf)).

NHS Institute for Innovation and Improvement (2011). A whole system approach to emergency and urgent care for children and young people: A practical step by step guide and resource pack ([www.rcpch.ac.uk/system/files/protected/page/Final%20NHSi%20CYP\\_for%20web.pdf](http://www.rcpch.ac.uk/system/files/protected/page/Final%20NHSi%20CYP_for%20web.pdf)).

Fernandes A for Royal College of General Practitioners (2011). Guidance for commissioning integrated urgent and emergency care: a 'whole system' approach ([www.rcgp.org.uk/revalidation-and-cpd/centre-for-commissioning/~media/Files/CfC/CfC-Urgent-Emergency-Care.ashx](http://www.rcgp.org.uk/revalidation-and-cpd/centre-for-commissioning/~media/Files/CfC/CfC-Urgent-Emergency-Care.ashx)).

1 Berry JG, Toomey SL, Zaslavsky AM et al. (2013). Pediatric readmission prevalence and variability across hospitals. *JAMA* 309(4):372–380.

2 Royal College of Paediatrics and Child Health (2013). Back to facing the future. Available from: [www.rcpch.ac.uk/system/files/protected/news/Back%20to%20Facing%20the%20Future%20FINAL\\_1.pdf](http://www.rcpch.ac.uk/system/files/protected/news/Back%20to%20Facing%20the%20Future%20FINAL_1.pdf).

Section 5:

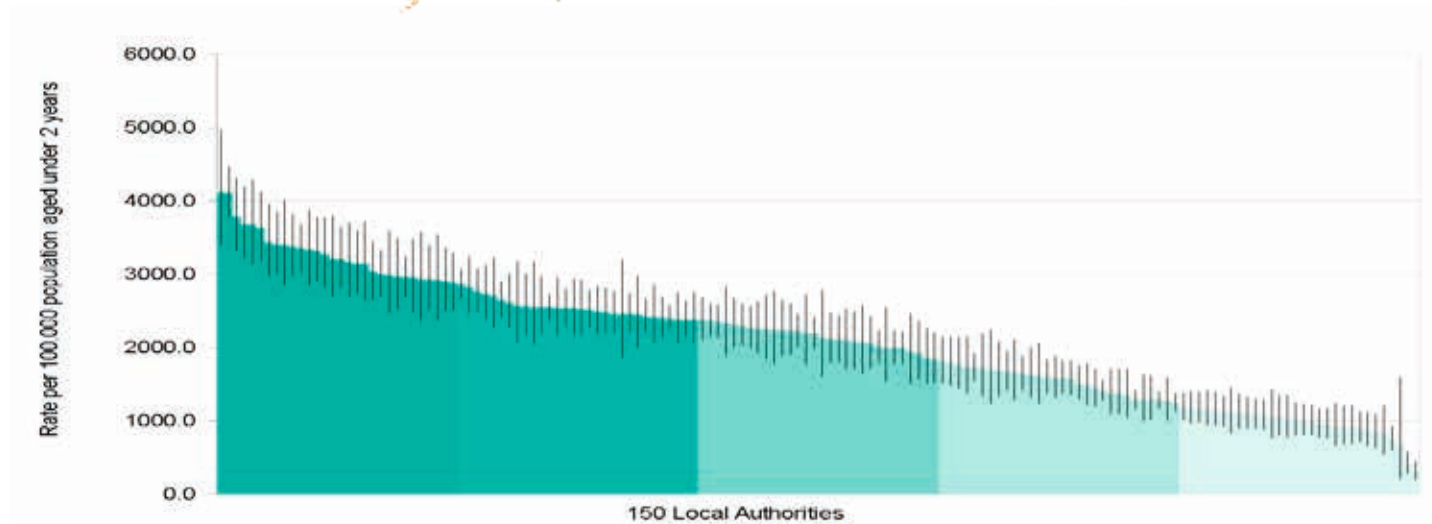
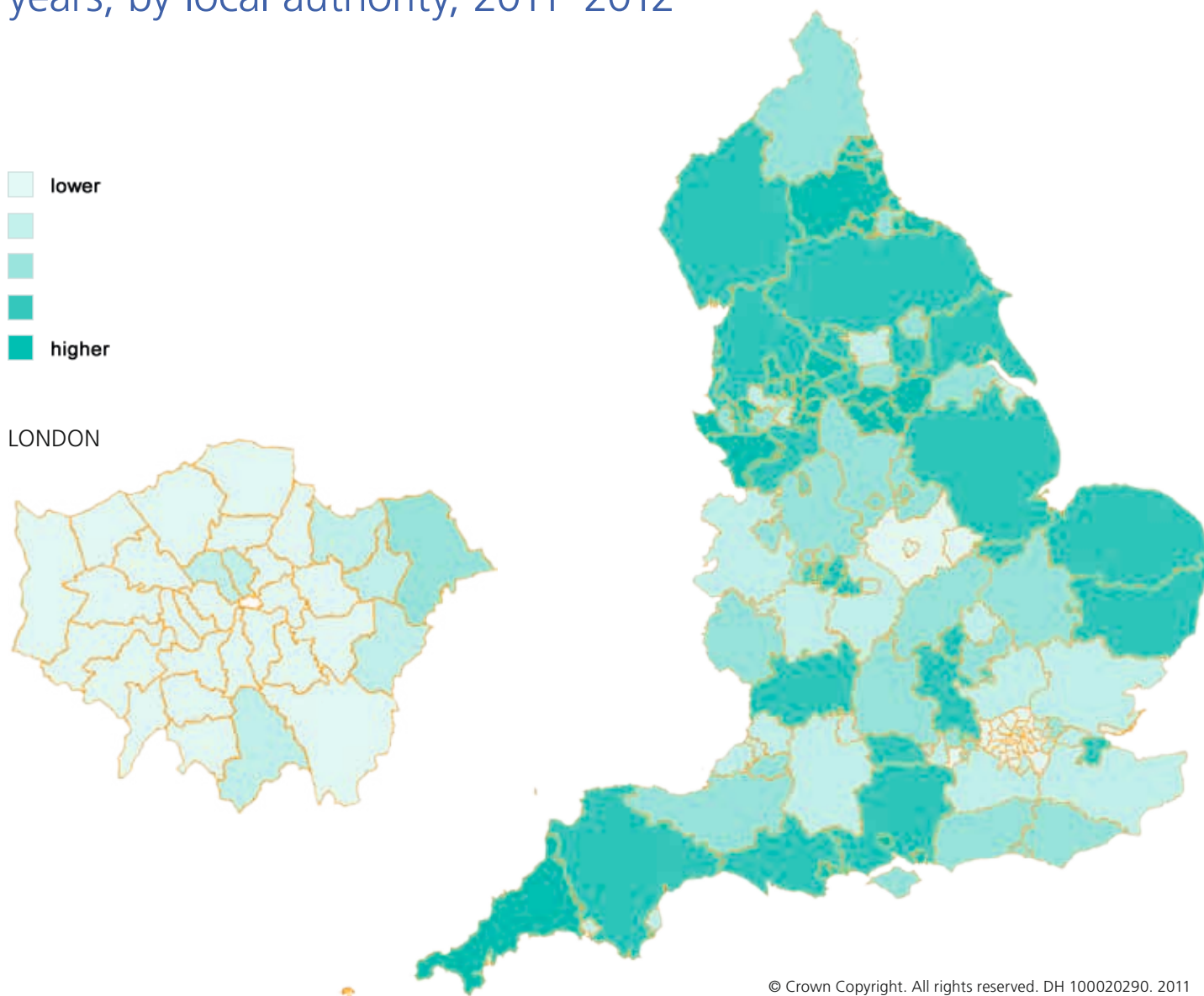
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# Healthcare for acutely ill children

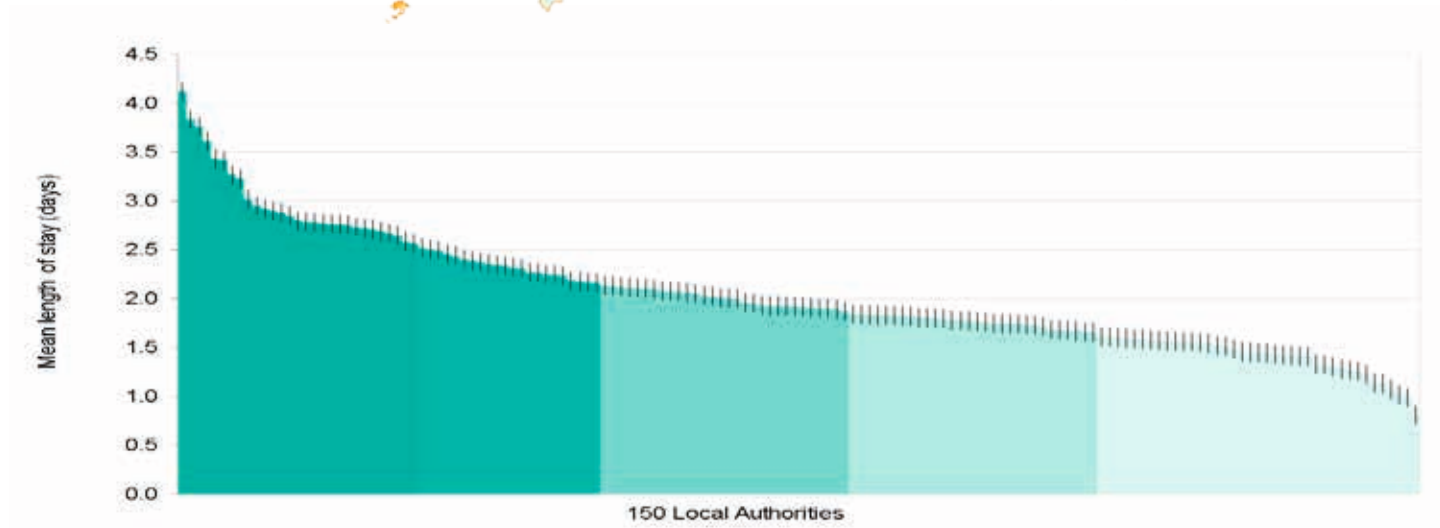
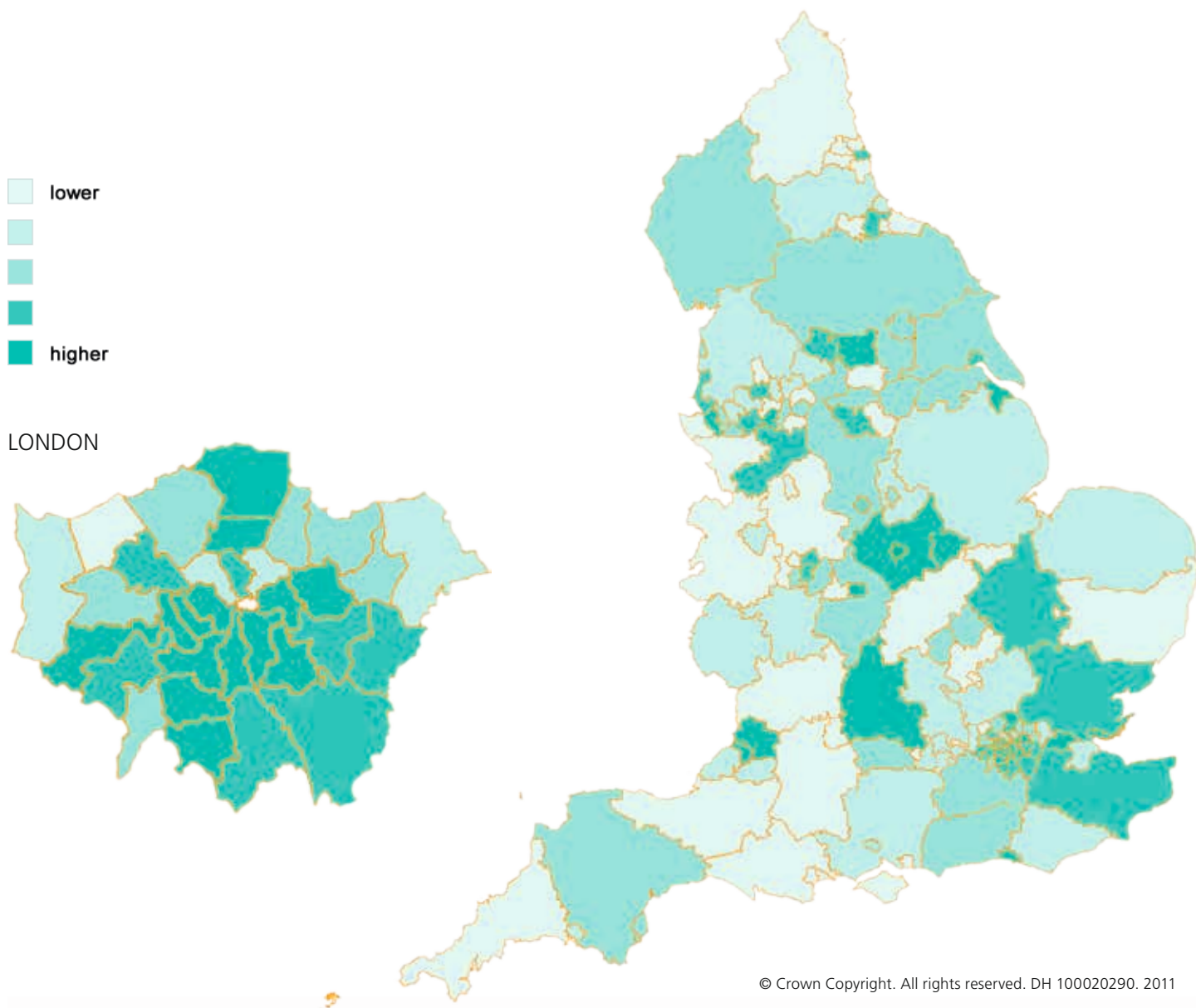


A: Bronchiolitis

**Map 39** Bronchiolitis: Hospital admission rate: Directly standardised rate of emergency admissions with bronchiolitis in children aged under 2 years, per 100,000 children aged under 2 years, by local authority, 2011–2012



**Map 40** Bronchiolitis: Duration of hospital stay: Mean length of stay (days) for bronchiolitis in children aged under 2 years, by local authority, 2011–2012



## Context

Bronchiolitis is a viral respiratory infection of the lower airways, predominantly affecting infants under the age of 1 year but occasionally infants up to the age of 2 years. In industrialised countries, 1% to 3% of all infants are admitted to hospital as a result of bronchiolitis.<sup>1</sup> Human respiratory syncytial virus (RSV) is the most common cause of bronchiolitis in infants and RSV is the single most common cause of hospital admissions in infancy.<sup>2</sup> Globally, RSV is the most common cause of childhood acute and severe lower respiratory tract infections and a cause of substantial mortality.<sup>3</sup> There is currently no available human vaccine against RSV but, due to the burden of the disease, its development is a priority for the World Health Organization.<sup>4</sup>

Although the majority of children with bronchiolitis do not require admission to hospital, those that do will often require feeding therapy and/or supplemental oxygen therapy. Prolonged hospital admission of young children disrupts family life and affects the wellbeing of the child and their family, including the financial impact of time off work.

The incidence of bronchiolitis tends to be seasonal: most cases in England occur in the winter, with a typical epidemic peak that places an additional stress on resources at a time of year when hospital services already experience high levels of demand. Unnecessarily prolonged inpatient stays squander this resource.

Both of these indicators were included in the Atlas of Variation in Healthcare for Children and Young People (2012).

## Magnitude of variation

### Map 39: Bronchiolitis – Hospital admission rate

For local authorities in England, the rate of emergency admissions in persons aged under 2 years with bronchiolitis, per 100,000 children aged 2 years and under, ranged from 306.9 to 4,124.7 (greater than 13-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 843.3 to 3,627.2 and the variation is greater than four-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2008 to 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 689 to 3,826, and the variation was six-fold.

1 Leader S, Kohlase K (2002). Respiratory syncytial virus-coded pediatric hospitalizations, 1997 to 1999. *Pediatric Infectious Disease Journal* 21: 629–632.

2 Deshpande SA, Northern V (2003). The clinical and health economic burden of respiratory syncytial virus disease among children under 2 years of age in a defined geographical area. *Archives of Diseases in Childhood* 88:1065–1069.

3 Nair H et al. (2010). Global burden of acute lower respiratory infections due to respiratory syncytial virus in young children: a systematic review and meta-analysis *Lancet* 375:1545–1555.

4 [www.who.int/vaccine\\_research/IVR\\_AC\\_Web\\_2011.pdf](http://www.who.int/vaccine_research/IVR_AC_Web_2011.pdf).

### Map 40: Bronchiolitis – Duration of hospital stay

For local authorities in England, the mean length of stay for bronchiolitis in children aged under 2 years ranged from 0.8 to 4.1 days (five-fold variation). When the five local authorities with the highest lengths of stay and the five local authorities with the lowest lengths of stay are excluded, the range is 1.1 to 3.4 days and the variation is three-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2008 to 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 1.3 to 3.3 days, and the variation was 2.6-fold.

Variations in admissions for children with bronchiolitis may reflect epidemiological factors including:

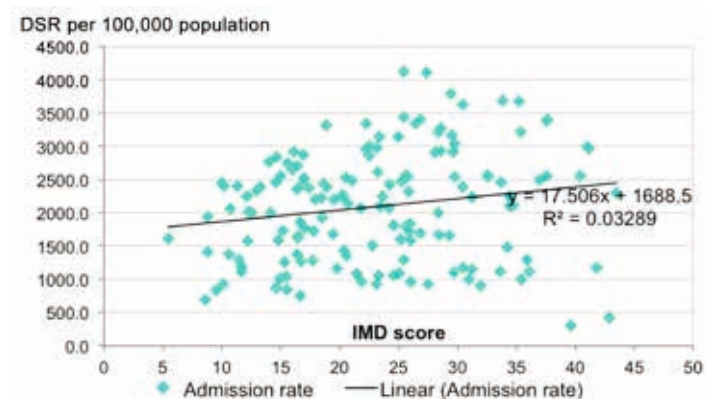
- socio-economic deprivation
- maternal tobacco smoking during pregnancy
- household tobacco-smoking status.<sup>5</sup>

There is a positive correlation between the number of admissions for bronchiolitis and socio-economic deprivation, but the relationship in these data is weak (Figure 5A.1). There is no simple relationship between deprivation and duration of stay either, an observation supported by findings in the published literature with respect to socio-economic deprivation, severity of illness and duration of admission.<sup>5</sup>

The degree of variation observed cannot be attributed purely to variation in socio-economic deprivation. Admission rate and duration of admission is partly a function of the severity of illness; it could also be related to local differences in:

- the management and assessment of children with bronchiolitis in the emergency department
- thresholds for admission and discharge from hospital
- quality of primary, community and social care support available to families during the infant's recovery period.

**Figure 5A.1 Correlation between rate of admission for bronchiolitis and deprivation, by local authority, 2011–2012 (High IMD score indicates more deprived area)**



5 Semple MG, Taylor-Robinson DC, Lane S, Smyth RL (2011). Household Tobacco Smoke and Admission Weight Predict Severe Bronchiolitis in Infants Independent of Deprivation: Prospective Cohort Study. *PLoS ONE* 2011; 6(7): e22425. doi:10.1371/journal.pone.0022425.

Hospital admission rates should not be assessed in isolation.<sup>6</sup> Areas which have higher admission rates are likely to have shorter mean duration of stay, and vice versa, because a cautious approach to admission criteria setting is likely to result in greater numbers of admissions of less severely affected infants, who will be less likely to require a prolonged admission. This negative correlation is borne out by our data (see Figure 5A.2).

Therapies for bronchiolitis are mainly supportive, involving:

- nasogastric tube feeding
- supplemental oxygen
- in severe cases, mechanical ventilator support.

Despite evidence-based national guidance,<sup>7</sup> there are differences in the use of these treatments, particularly the criteria for starting and stopping supplemental oxygen, as well as variation in the clinical criteria for discharge for children with bronchiolitis.<sup>8</sup> Differences in discharge could also reflect:

- general discharge processes for all children in the local department, hospital or provider unit
- level of support available in the local community.

A family's capacity to care for a recovering infant at home may influence a clinician's decision whether to discharge a child with bronchiolitis. The level of support available locally from the extended family, community health and social services may account for some of the variation observed. For selected patients, brief admission to short-stay observation units in combination with home oxygen therapy can be a

safe means to reduce the burden to families and services of prolonged hospitalisation.<sup>9</sup>

## Options for action

Local clinicians, in particular, emergency department practitioners and paediatricians can act to reduce variation by applying:

- evidence-based guidance for the assessment of children with respiratory illness
- clear admission criteria for children presenting with bronchiolitis, based on national evidence-based guidelines supplemented by frequent reviews of the most recent literature.

To identify factors responsible for variations in the duration of admission for bronchiolitis in the local population, commissioners and providers can investigate differences in:

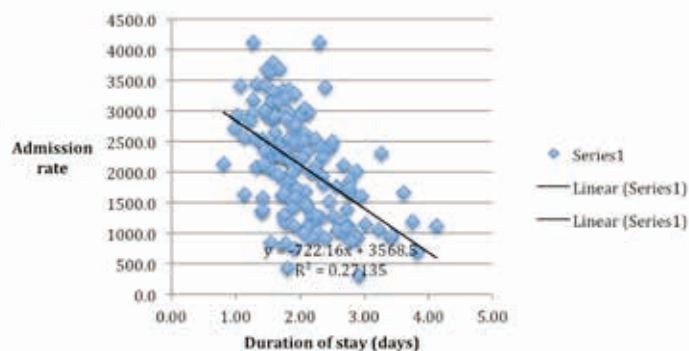
- clinical management of bronchiolitis
- wider hospital processes and patient flows.

Introduction of a clinical care pathway has been shown to reduce variation in treatment of bronchiolitis and to significantly reduce duration of admission.<sup>10</sup>

Commissioners can act to ensure that vulnerable children and families have access to adequate community-based support regarding recovery after discharge.

Clinicians, supported by commissioners, can target at-risk children (such as those with pre-existing lung disease or significant congenital heart disease) to ensure they receive seasonal prophylaxis with monthly injections of monoclonal antibody against RSV in accordance with Department of Health guidance (see 'Resources' later in this section). Mechanisms are required not only to deliver treatment to those who present themselves to healthcare services, but to identify and contact pro-actively the families of at-risk children to ensure that the children are protected.

**Figure 5A.2 Correlation between rate of admission for bronchiolitis in children aged under 2 years and duration of stay, by local authority, 2011–2012**



6 Shahnaz A, Parker RA, Wills S, Ross Rossell RI. (2013). Assessing efficient patient care – should length of stay be calculated independently of local admission rates? *Arch Dis Child*. In press.

7 Scottish Intercollegiate Guidelines Network (SIGN) (2006). Bronchiolitis in children. A national clinical guideline. Available from: <http://www.sign.ac.uk/pdf/sign91.pdf>.

8 Cunningham S, McMurray A (2011). Observational study of two oxygen saturation targets for discharge in bronchiolitis. *Archives of Diseases in Childhood* (2011). doi:10.1136/adc.2010.

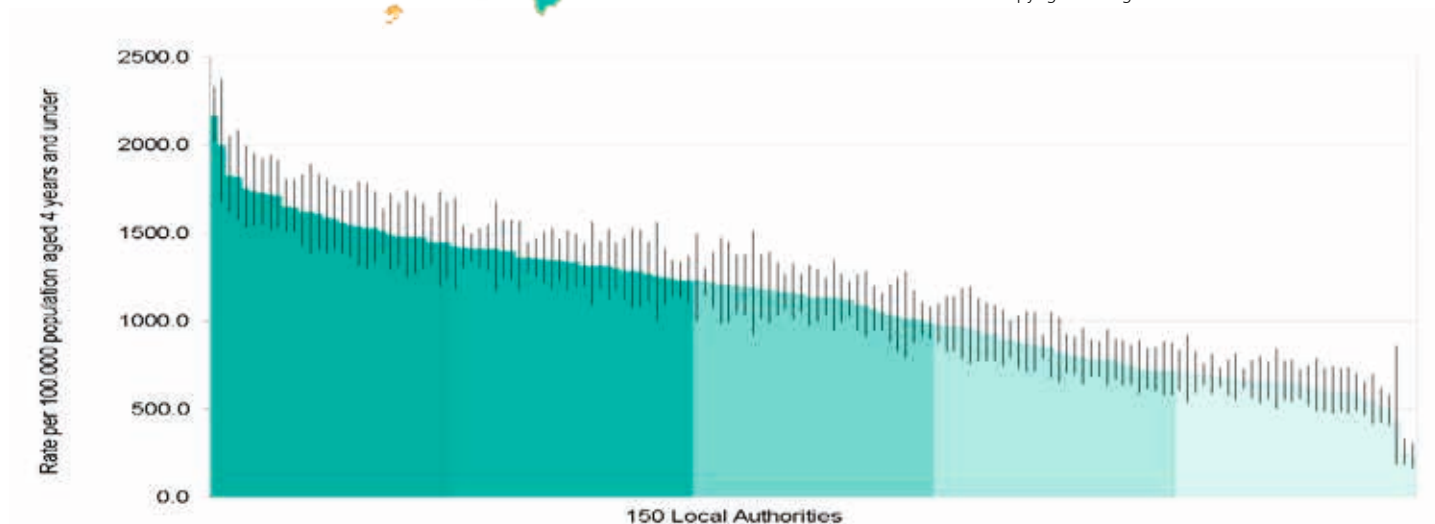
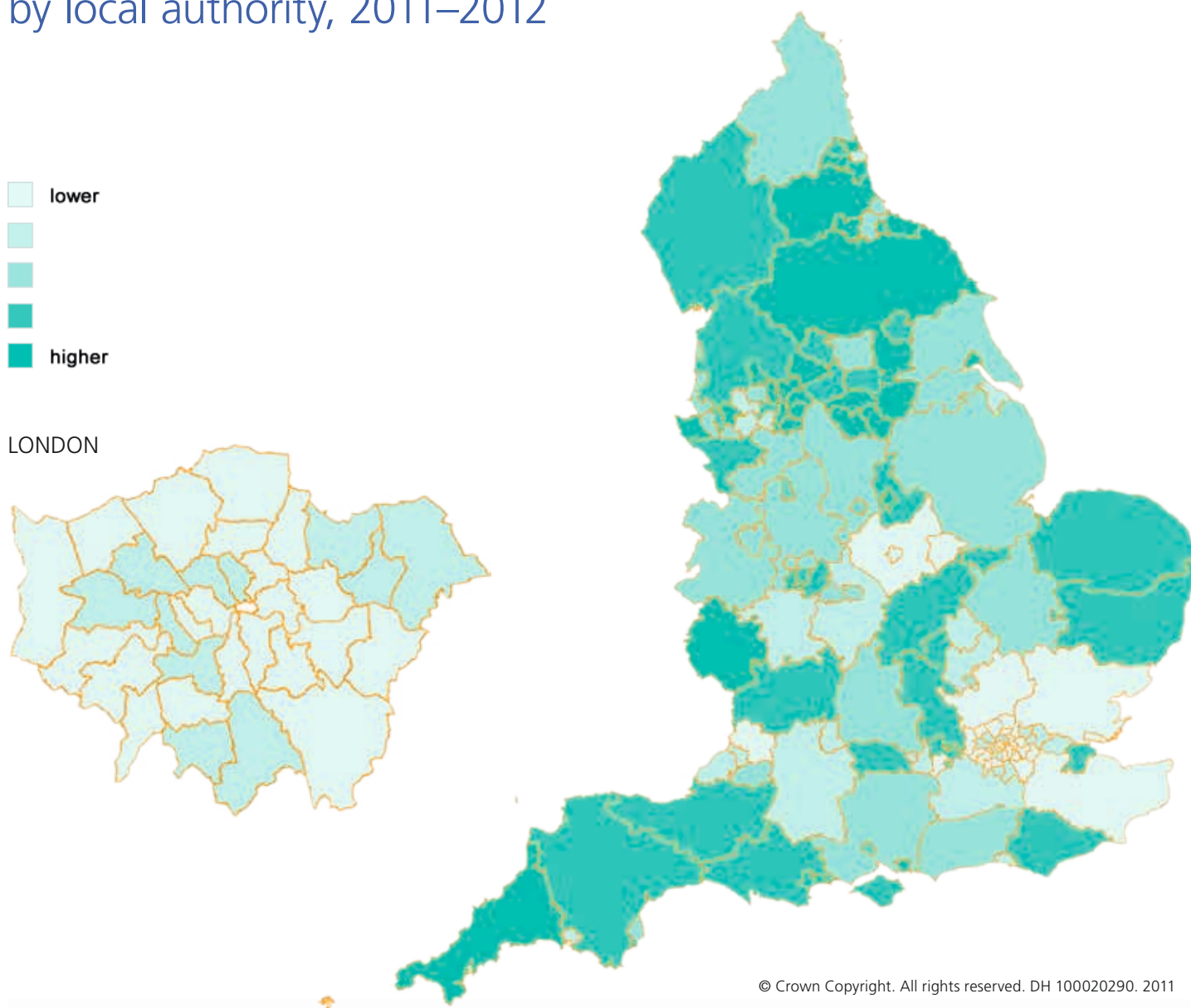
9 Sandweiss DR, Mundorff MB, Hill T et al. (2013). Decreasing Hospital Length of Stay for Bronchiolitis by Using an Observation Unit and Home Oxygen Therapy. *JAMA Pediatr*. 167(5): 422–428.

10 Walker C, Danby S, Turner S (2011). Impact of a bronchiolitis clinical care pathway on treatment and hospital stay. *Eur J Paed* doi: 10.1007/s00431-011-1653-9.



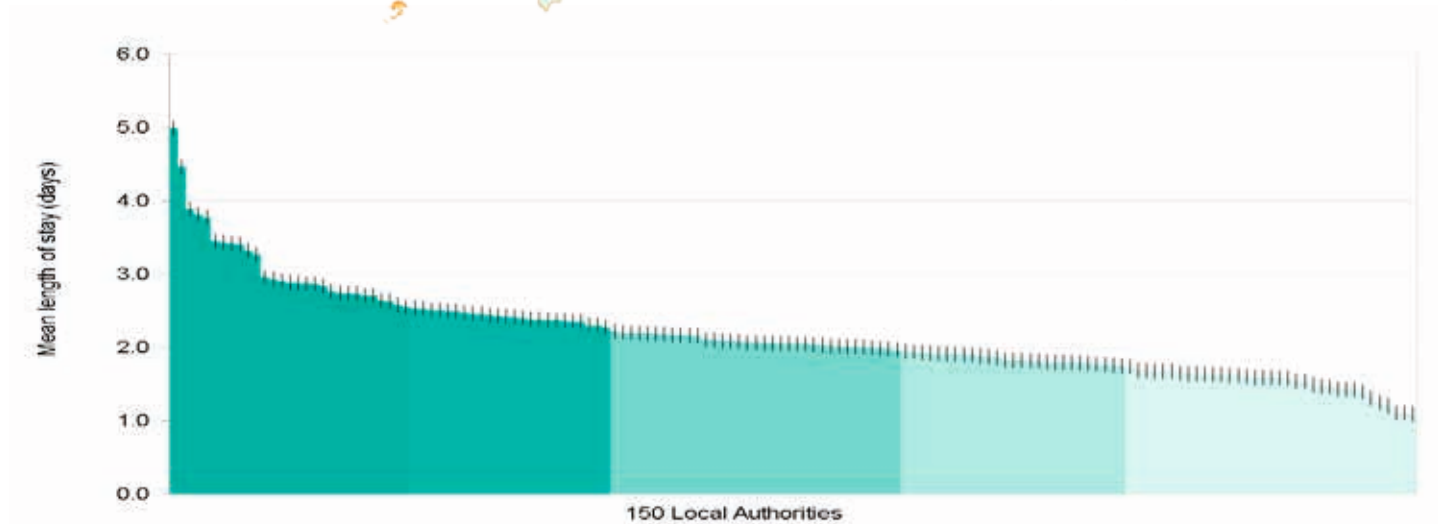
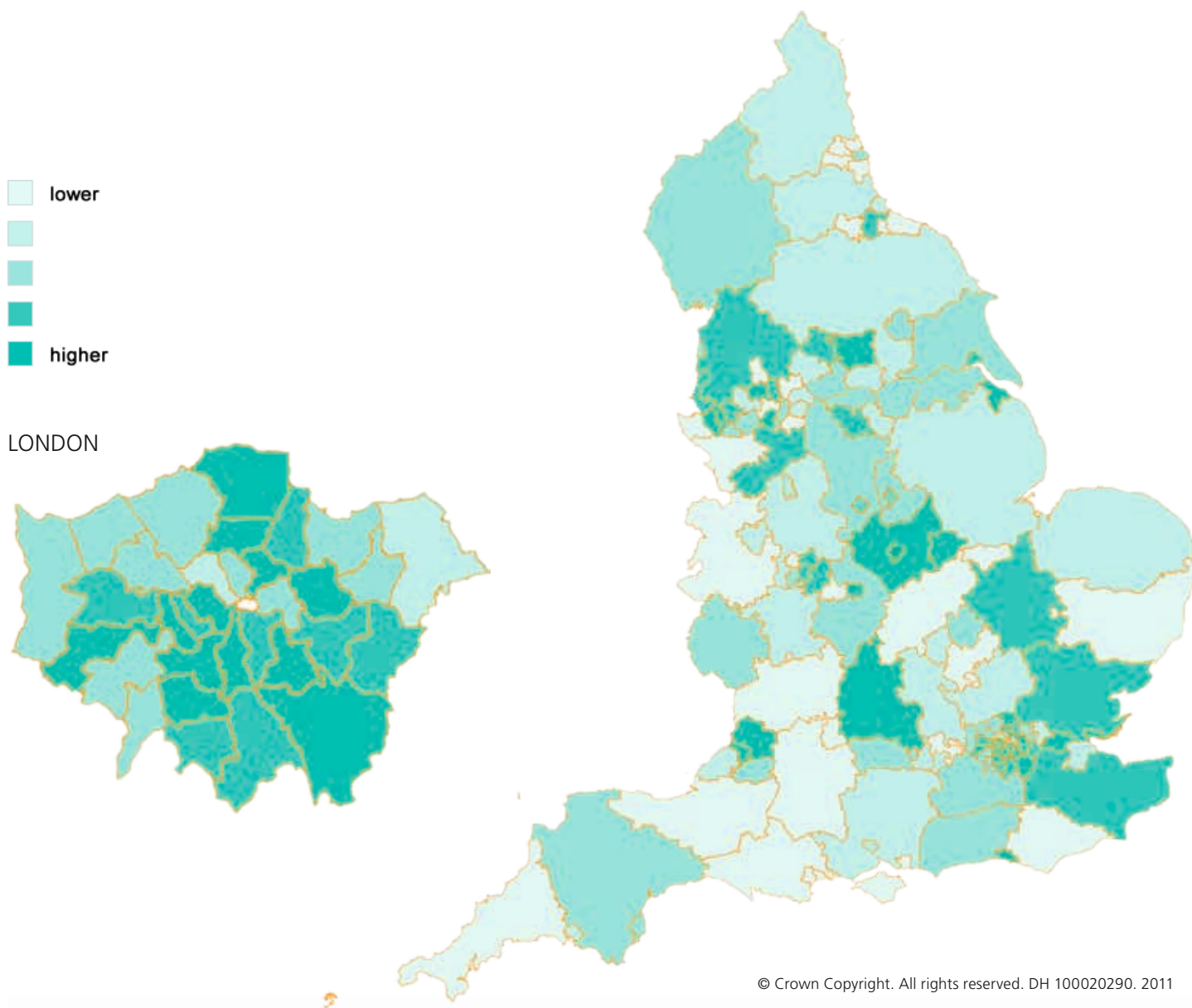
## B: Lower respiratory tract infections (LRTIs)

**Map 41** LRTIs: Hospital admission rate: Directly standardised rate of emergency admissions with LRTIs in children aged 4 years and under, per 100,000 children aged 4 years and under, by local authority, 2011–2012





**Map 42** LRTIs: Duration of hospital stay: Mean length of stay (days) for LRTIs in children aged 4 years and under, by local authority, 2011–2012



### Context

LRTIs are a very common cause for admission to hospital in children, particularly in infancy and early childhood. They include bronchiolitis in infants, bronchopneumonia and pneumonia, of both viral and bacterial origin.

Rates of emergency admission for LRTIs reflect a number of factors, such as socio-economic deprivation and pre-existing health status. Breastfeeding is known to be protective, while tobacco smoke exposure increases the risk.

For acutely ill children, admission rate should be analysed alongside duration of stay. An inappropriate reduction in admission rate may manifest itself as a longer than expected duration of stay (as children who stay are more unwell), and vice versa.

'Emergency admissions for children with LRTIs' is included in the NHS Outcomes Framework 2013/14.

### Magnitude of variation

#### Map 41: LRTIs – Hospital admission rate

For local authorities in England, the rate of emergency admissions in persons aged 4 years and under with LRTIs, per 100,000 children aged 4 years and under, ranged from 230.6 to 2,168.7 (9.4-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 546.5 to 1,741.9, and the variation is greater than three-fold.

#### Map 42: LRTIs – Duration of hospital stay

For local authorities in England, the mean length of stay for LRTIs in children aged 4 years and under ranged from 1.1 to 5.0 days (4.5-fold variation). When the five local authorities with the highest lengths of stay and the five local authorities with the lowest lengths of stay are excluded, the range is 1.3 to 3.5 days and the variation is 2.6-fold.

In these data, there is no simple correlation between LRTI admission rate and socio-economic deprivation. Other factors may influence the early course of an LRTI, which subsequently changes the risk of admission, for instance:

- differences in health-seeking behaviours for children with LRTIs or their families
- early, accurate diagnosis
- timely, appropriate and effective treatment in the community
- differences in clinical practice, including threshold for intervention and choice of therapy
- timely and appropriate referral to secondary care.

It may also reflect differences in secondary care, in terms of treatment threshold, choice of therapy and in admission thresholds.

### Options for action

Commissioners can work together with clinicians in primary and secondary care to improve the early treatment and recognition of LRTIs in primary care. By reducing unplanned admissions to hospital, this will reduce the burden on unplanned secondary care services, as well as improving health outcomes and wellbeing for children and families.

Hospital clinicians, in particular emergency department practitioners and paediatricians, can act to reduce variations by applying

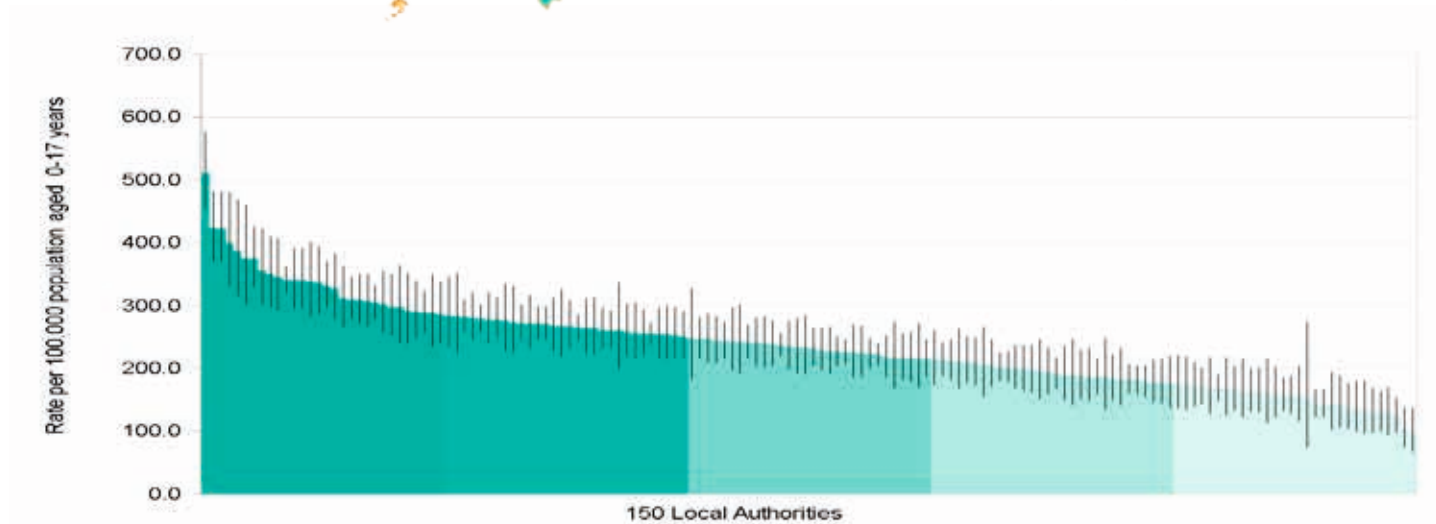
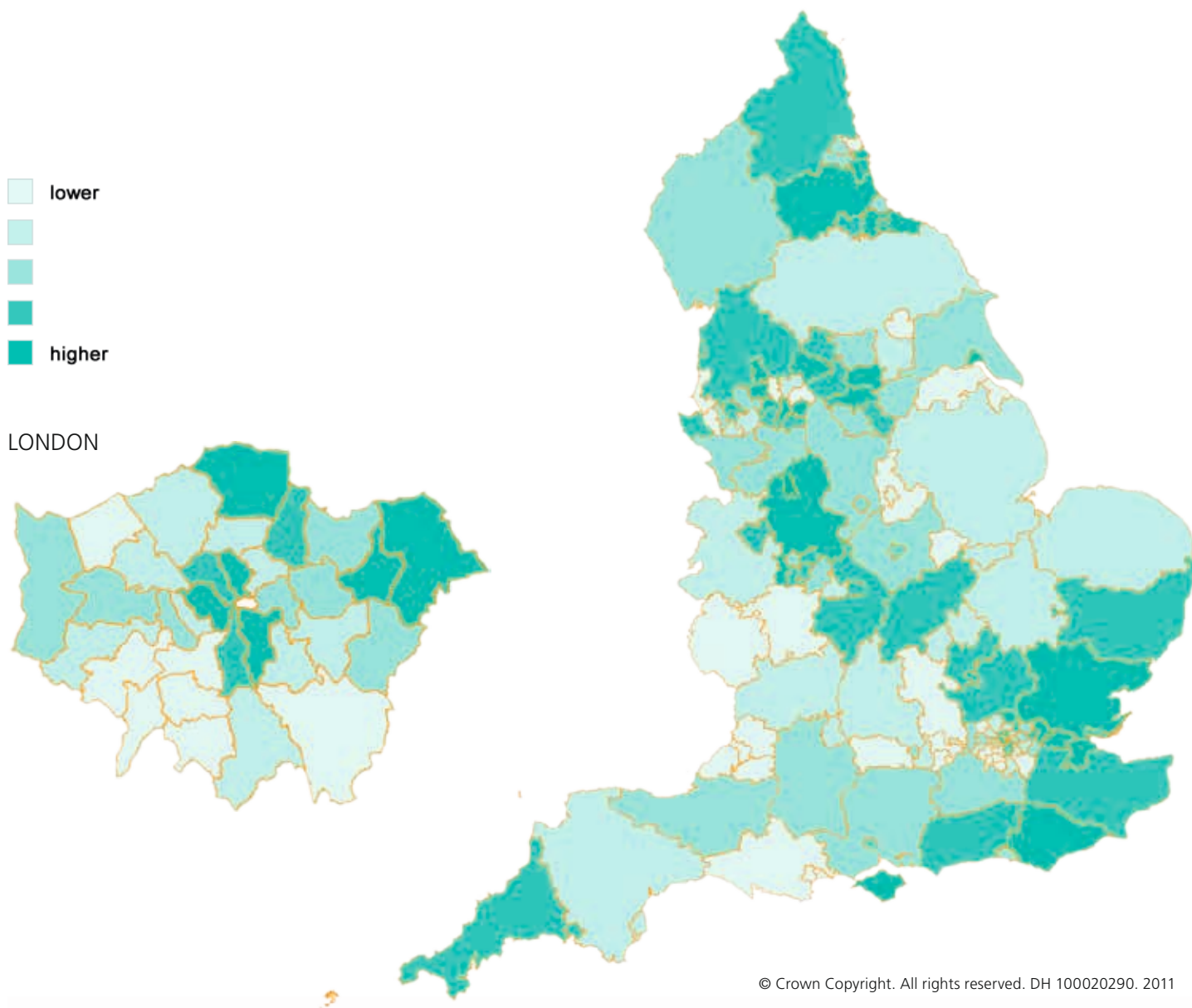
- evidence-based guidance for the assessment of children with respiratory illness and
- clear admission criteria for children presenting with LRTIs, based on national evidence-based guidelines supplemented by frequent reviews of the most recent literature.

### Resources

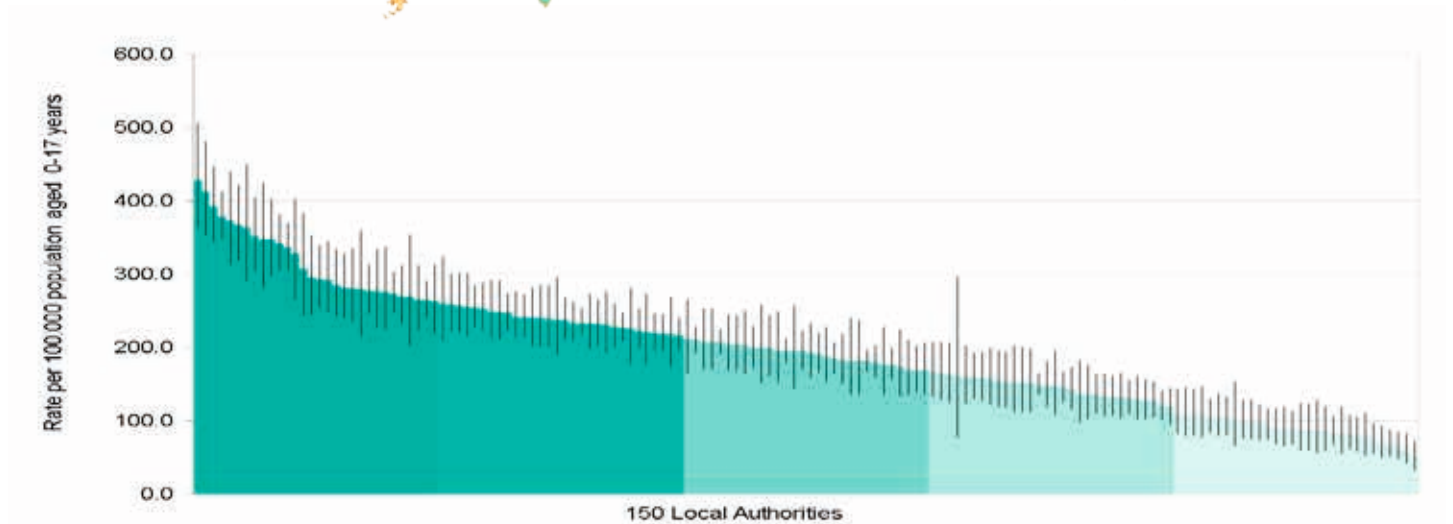
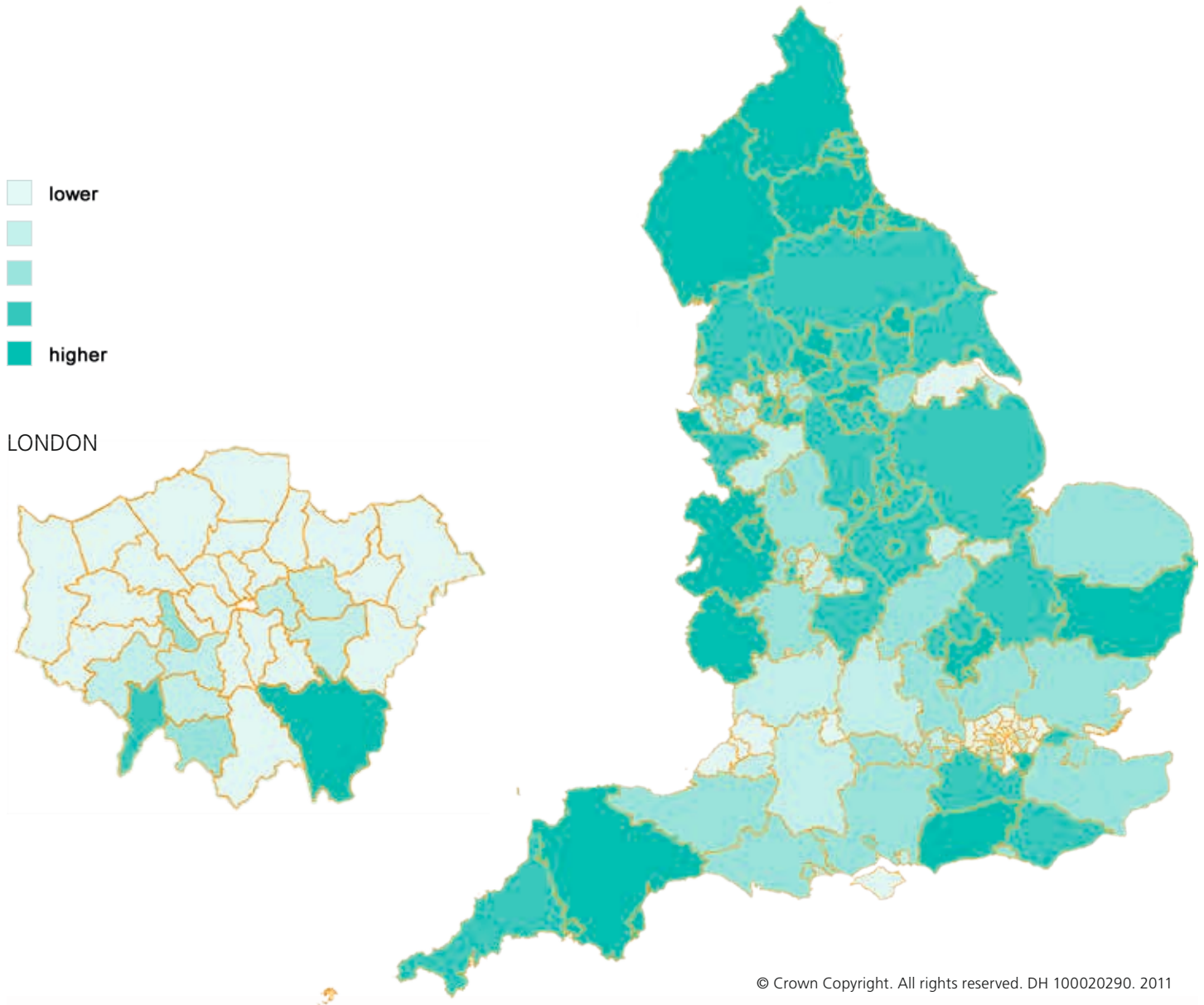
- British Thoracic Society (2011). Guidelines for the management of community acquired pneumonia in children: update 2011 ([www.brit-thoracic.org.uk/Portals/0/Guidelines/Pneumonia/CAP%20children%20October%202011.pdf](http://www.brit-thoracic.org.uk/Portals/0/Guidelines/Pneumonia/CAP%20children%20October%202011.pdf)).
- NICE guideline CG69 (2008). Respiratory tract infections – antibiotic prescribing: Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care (<http://guidance.nice.org.uk/CG69/>).

C: Ear, nose and throat surgery

**Map 43** Tonsillectomy: Directly standardised rate of elective tonsillectomy in children aged 0–17 years, per 100,000 children aged 0–17 years, by local authority, 2011–2012



**Map 44** Aural ventilation tube insertion: Directly standardised rate of aural ventilation tube (grommet) insertion in children aged 0–17 years, per 100,000 children aged 0–17 years, by local authority, 2011–2012





## Context

The commonest indications for childhood tonsillectomy are recurrent tonsillitis and sleep-related breathing disorders (SRBD), including obstructive sleep apnoea (OSA).

While there is national evidence-based guidance for tonsillectomy for the treatment of recurrent tonsillitis (see 'Resources' later in this section), no such guidance exists for the appropriate threshold for surgical intervention for SRBD. SRBD and OSA form a spectrum of conditions where upper airway obstruction during sleep produces poor sleep quality, daytime fatigue, poor school performance and, in severe cases, serious disorders of cardiopulmonary function. Treatment for SRBD currently accounts for about 25% of tonsillectomies (combined with adenoidectomy) for children in England.

Over-use of tonsillectomy places increased demand on limited resources and can lead to unnecessary complications for those children in whom active monitoring might be a more appropriate strategy. However, failure to intervene for children who fulfill the treatment criteria may be just as harmful, affecting the quality of life of the child and their family, as well as incurring increased costs from repeat attendances, antibiotic prescriptions and hospital admissions, as well as loss of parental income.

Aural ventilation tubes are predominantly used to treat otitis media with effusion (OME), which is a build-up of fluid in the middle ear resulting in hearing loss. Approximately 80% of children suffer an episode before the age of 5 years. The majority of cases are self-limiting, with recovery of hearing loss. No treatment other than active monitoring has proved effective during the early stages of the condition.

For children with bilateral OME in whom there is no resolution over a three-month period, with a specified level of hearing impairment, surgical treatment by inserting an aural ventilation tube (grommet) is effective, and recommended by National Institute for Health and Care Excellence guidelines.

Both of these indicators were included in the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

## Magnitude of variation

### Map 43: Tonsillectomy

For local authorities in England, the directly standardised rate of elective tonsillectomy in children aged 0–17 years, per 100,000 children aged 0–17 years, ranged from 98.5 to 512.2 (greater than five-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 129.7 to 376.1, and the variation is 2.9-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2008 to 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 145.1 to 423.7, and the variation was also 2.9-fold.

### Map 44: Aural ventilation tube insertion

For local authorities in England, the directly standardised rate of aural ventilation tube (grommet) insertion in children aged 0–17 years, per 100,000 children aged 0–17 years, ranged from 50.3 to 429.2 (8.5-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 73.9 to 368.1 and the variation is five-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2008 to 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 92 to 424, and the variation was 4.6-fold.

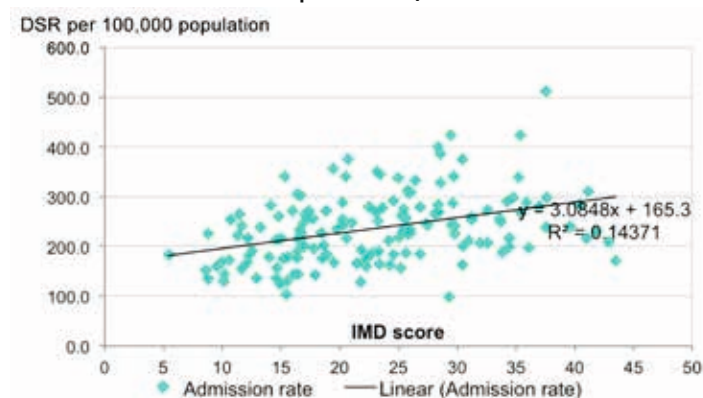
In contrast to the historical view that childhood tonsillectomy is an operation undertaken on children of higher socio-economic status, area deprivation appears to be associated with higher rates of tonsillectomy (Figure 5C.1).

In comparison with 2007–2008 to 2009–2010 data, current rates of tonsillectomy appear to show a reduction in rates of tonsillectomy for each area, without a change in the degree of variation among areas. Of course, it would be unwise to directly compare previous rates aggregated by primary care trusts with these local authority rates. However, as an overall distribution, the results should be broadly comparable on a nationwide level.

The historical overuse of tonsillectomy in children has had a high profile and remains problematic in selected areas and populations. Some variation may be due to differences in thresholds for OSA and SRBD, for which evidence-based clinical and functional thresholds for surgical intervention are still lacking.

Conversely, there is also a danger that, in some areas, children who may benefit from the procedure are now unable to obtain access to it. There are clinically proven benefits for selected children and, barring exceptional individual cases, it would be equally inappropriate to withhold treatment as it is to provide it unnecessarily. The data here appear to show a shift of the curve towards lower rates of tonsillectomy nationally. Although it remains impossible to say with any certainty what the 'optimal rate' for tonsillectomy in children

**Figure 5C.1 Correlation between elective admission rate for tonsillectomy and deprivation, by local authority, 2011–2012 (High IMD score indicates more deprived area)**





## Section 5: Healthcare for acutely ill children

might be, this overall reduction should trigger commissioners to investigate whether this reflects a reduction only in unwarranted variation in tonsillectomy rates.

The data for aural ventilation tube insertion show a similar shift in the overall distribution towards lower rates of surgery, with the degree of variation across the country being also largely unchanged. Over the past decade, emphasis has been placed on the clinical and financial sequelae of unnecessary surgical intervention for OME, often justifiably so. However, the consequences of failing to intervene in a child with persistent OME are:

- prolonged hearing impairment
- social, developmental and language delays
- harmful effects on educational progress.

The degree of variation observed shows much work still needs to be done to ensure that quality and value are maximised for this intervention.

### Options for action

Commissioners can use national guidelines (see 'Resources' later in this section) when commissioning services to ensure equity of access for clinically justified interventions, while reducing unnecessary interventions that divert resource from those who fulfill clinical criteria.

As no national evidence-based clinical guidance currently exists for the thresholds for tonsillectomy for SRBD, commissioners and clinicians can use jointly agreed local criteria, which should be:

- based on best available evidence
- outcome as well as process based
- benchmarked against the agreements made with other local commissioning bodies to ensure equity of access and high-quality outcomes.

There is an urgent need to define evidence-based clinical and functional thresholds for surgical intervention in OSA based on high-quality research. In the interim, commissioners can investigate what proportion of the activity in local rates of tonsillectomy is attributable to recurrent tonsillitis and OSA in order to identify whether there is inappropriate over or under-activity for each of the indications, and thereby enable interventions to be targeted accordingly.

Commissioners and clinicians can jointly investigate the reduction in rates of tonsillectomy and aural ventilation tube insertion in order to ensure that this reduction is warranted (due to reducing unnecessary and low-value interventions), rather than under-provision that will result in unmet need and, in the long term, poor outcomes for children.

### Resources

Scottish Intercollegiate Guidelines Network (2010). Management of sore throat and indications for tonsillectomy. A national clinical guideline ([www.sign.ac.uk/guidelines/fulltext/117/index.html](http://www.sign.ac.uk/guidelines/fulltext/117/index.html)).

NICE Guidance (2008). Surgical management of children with otitis media with effusion (OME). Clinical guidelines, CG60 (<http://guidance.nice.org.uk/CG60>).

NHS Right Care, in conjunction with the Royal College of Surgeons and ENT-UK, has produced:

- a value-based commissioning guide for tonsillectomy ([www.rcseng.ac.uk/providers-commissioners/docs/rcseng-ent-uk-commissioning-guide-tonsillectomy-out-for-consultation-17-may-14-june-2013](http://www.rcseng.ac.uk/providers-commissioners/docs/rcseng-ent-uk-commissioning-guide-tonsillectomy-out-for-consultation-17-may-14-june-2013))
- the Procedures Explorer Tool, a supporting commissioning tool for clinical commissioning groups which highlights local and regional variation for each surgical procedure ([www.rcseng.ac.uk/providers-commissioners/nscc/data-tools](http://www.rcseng.ac.uk/providers-commissioners/nscc/data-tools)).

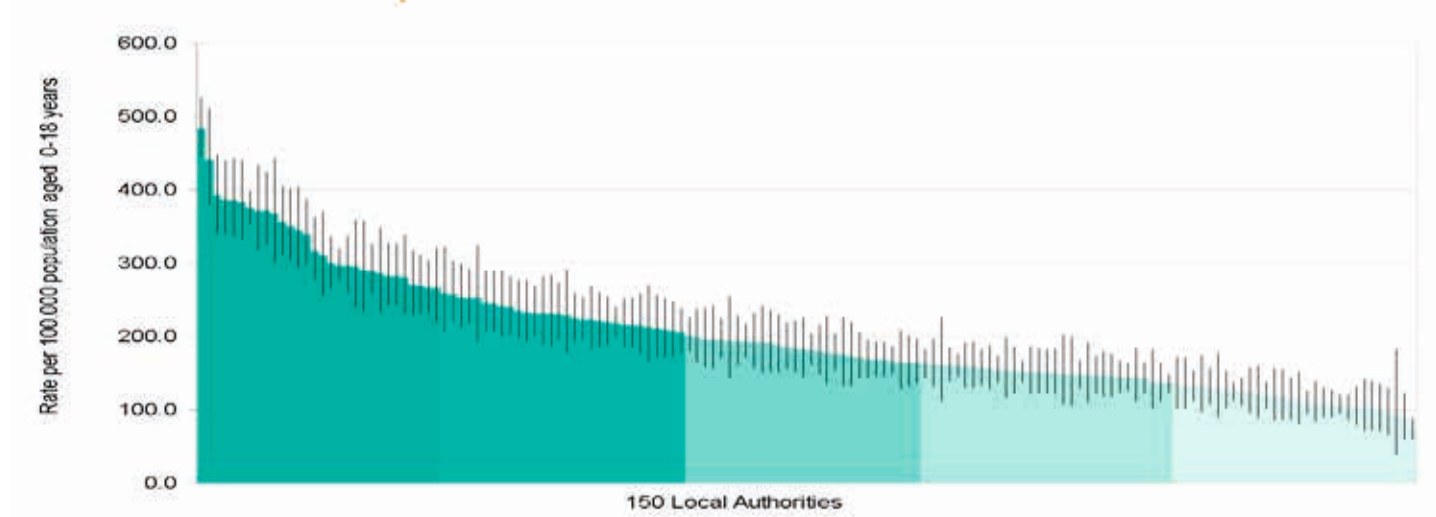
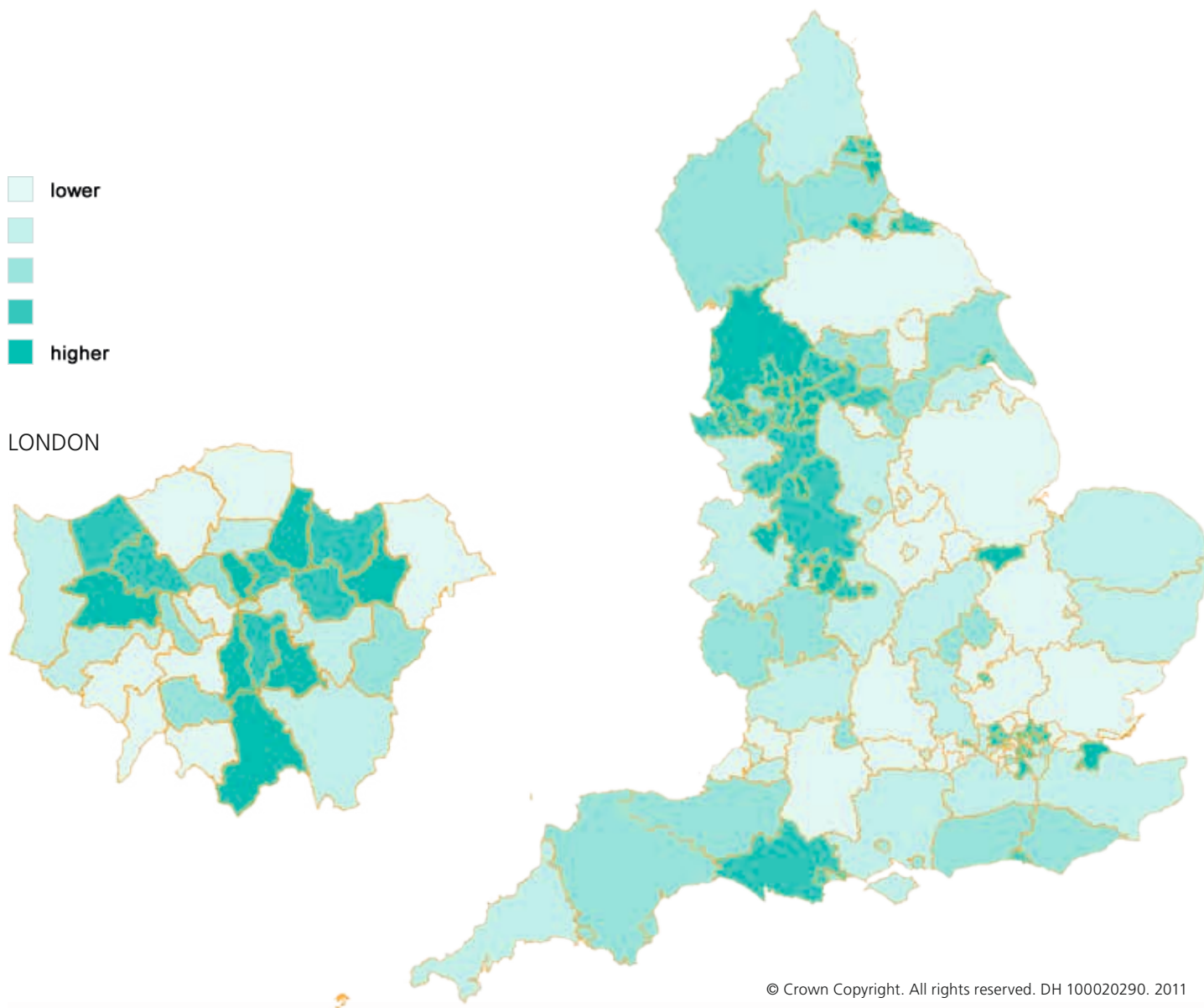
Section 6:

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# Children with long-term conditions

## A: Asthma

**Map 45** Asthma: Directly standardised emergency admission rate for children with asthma, per 100,000 population aged 0–18 years, by local authority, 2011–2012



## Context

Asthma is the commonest long-term medical condition in childhood. Emergency admissions should be avoided whenever possible.

'Unplanned hospitalisation for asthma, diabetes and epilepsy in under 19s' is included in the NHS Outcomes Framework 2013/14.

This indicator was included in the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

## Magnitude of variation

**Map 45:** For local authorities in England, the emergency admission rate for children with asthma, per 100,000 population aged 0–18 years, ranged from 73.4 to 484.4 (6.6-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 102.2 to 384.1, and the variation is almost four-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2009–2010) demonstrated in the NHS Atlas of Variation in Healthcare for Children and Young People (2012) was 97.6 to 468.5, and the variation was nearly five-fold. For 2008–2009, after exclusions, the variation was almost four-fold.<sup>1</sup>

Variation in the rate of emergency admission may be due to a variety of reasons:

- suboptimal symptom management and secondary prevention in the community
- suboptimal emergency care in the accident and emergency department
- differences in admission criteria among paediatric clinicians.

The reduction in the magnitude of variation compared to previous years is to be welcomed, reflecting greater equity in asthma services. However, one cannot draw firm conclusions based on these data as the geographical and population units of analysis have changed from primary care trusts to local authorities. Moreover, any apparent reduction in variation does not appear to be accompanied by an overall reduction in admission rates.

## Options for action

Commissioners can use the Disease Management Information Toolkit (see 'Resources' later in this section) to identify unwarranted variation in the local management of long-term conditions such as asthma.

A management pathway for asthma would help to reduce unwarranted variation.

The British Thoracic Society/Scottish Intercollegiate Guidelines Network (BTS/SIGN) guideline on management of asthma (see 'Resources' later in this section) suggests that every child with asthma should have an Asthma Care Plan.

Commissioners and clinicians could consider ensuring that the BTS/SIGN guideline forms the basis of local clinical asthma pathways for which they are responsible, and to support implementation of up-to-date evidence on best practice, such as omalizumab for severe persistent allergic asthma.<sup>2</sup>

As the causes of asthma are multifactorial, action to reduce emergency admission requires a whole pathway approach, including public health, primary and secondary care. Parental education and school medication management are also vital aspects of the overall care of the child with asthma.

## Resources

Disease Management Information Toolkit (<http://atlas.chimat.org.uk/IAS/dmit> or <http://datagateway.phe.org.uk/>).

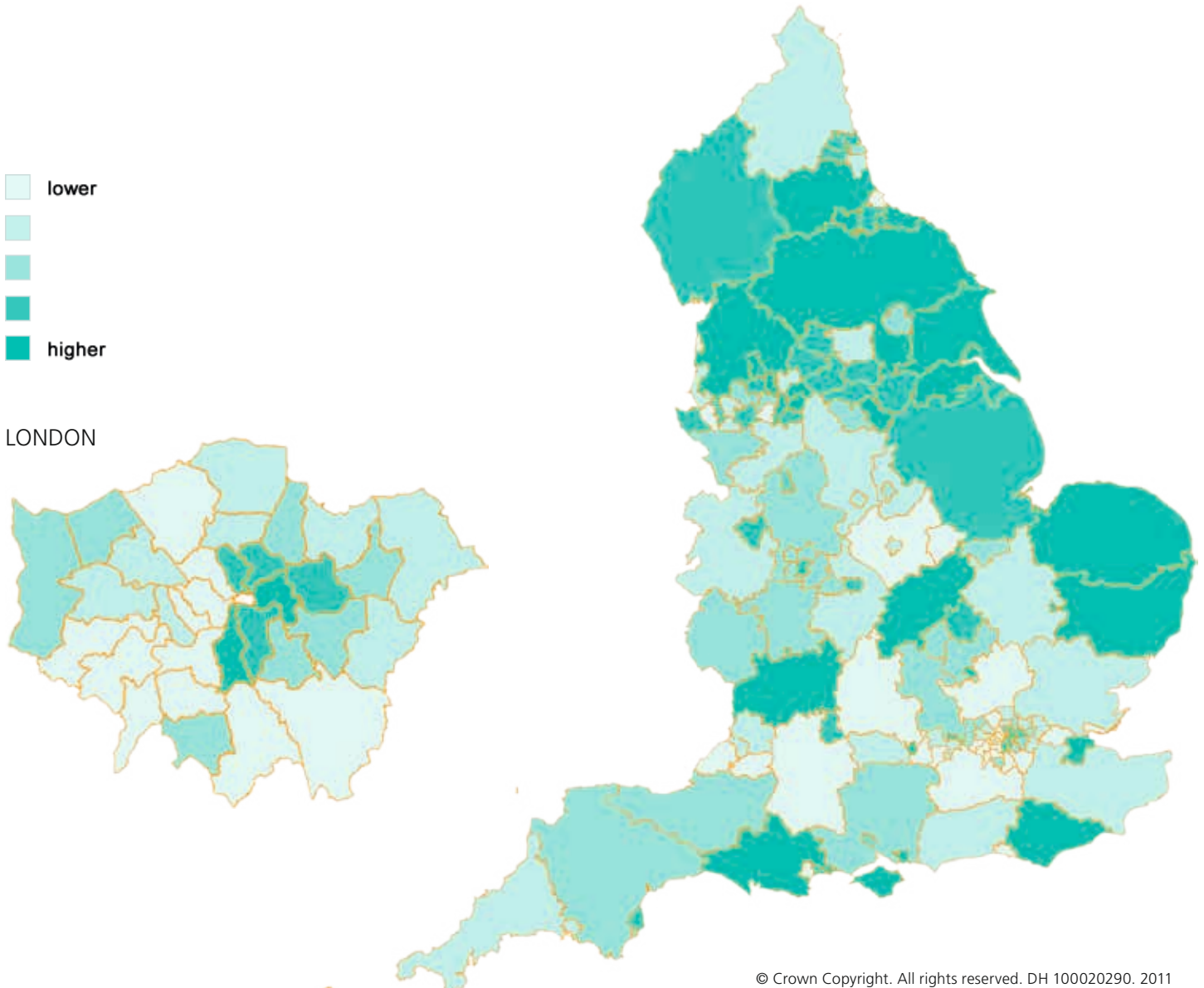
BTS/SIGN (2011). British Guideline on the Management of Asthma. May 2008; revised May 2011 ([www.brit-thoracic.org.uk/guidelines/asthma-guidelines.aspx](http://www.brit-thoracic.org.uk/guidelines/asthma-guidelines.aspx)).

1 NHS Atlas of Variation in Healthcare 2010. Map 17. Available at: [www.rightcare.nhs.uk/index.php/atlas/atlas-of-variation-2010/](http://www.rightcare.nhs.uk/index.php/atlas/atlas-of-variation-2010/).

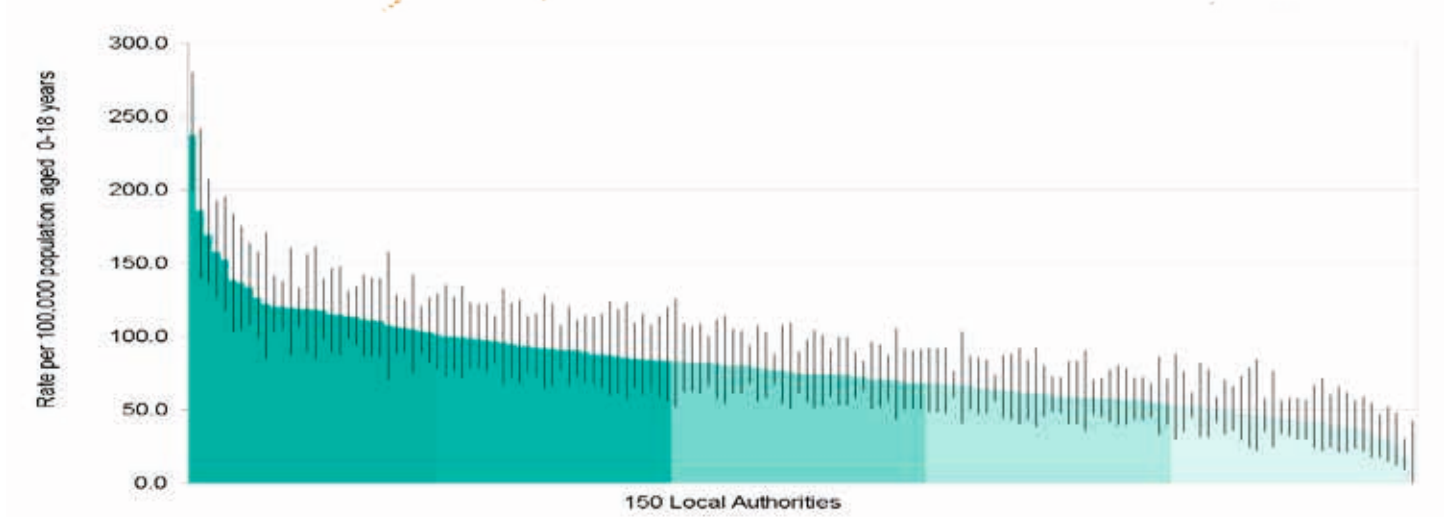
2 NICE Technology Appraisal 278: Omalizumab for treating severe persistent allergic asthma. 2013. Available from: <http://publications.nice.org.uk/omalizumab-for-treating-severe-persistent-allergic-asthma-review-of-technology-appraisal-guidance-ta278>.

B: Epilepsy

**Map 46** Epilepsy: Emergency admission rate: Directly standardised rate of emergency admissions for children with epilepsy, per aged 0–17 years, by local authority, 2011–2012

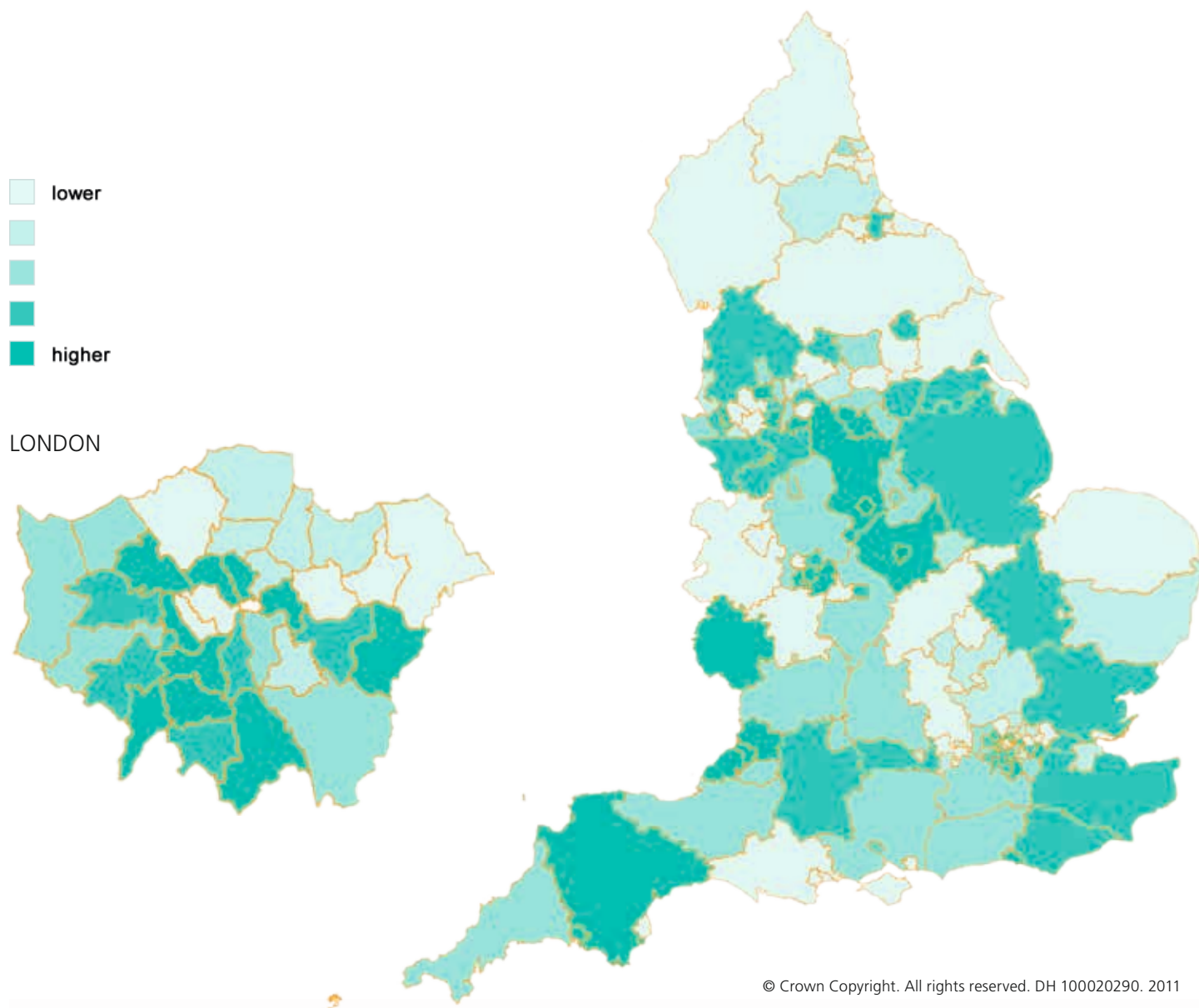


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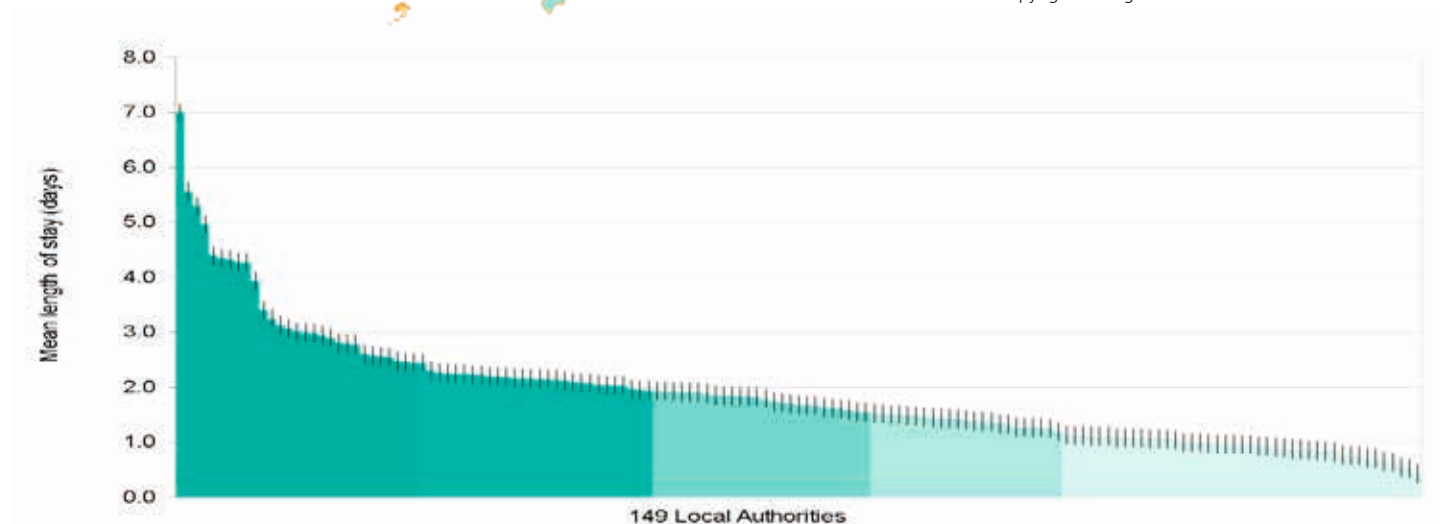




**Map 47** Epilepsy: Duration of hospital stay: Mean length of emergency inpatient stay (days) for children with epilepsy aged 0–18 years, by local authority, 2011–2012



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### Context

Epilepsy is common in children, affecting approximately 48,000 in England. Epilepsy is not a single diagnosis; it is, more accurately, the epilepsies – encompassing a range of disorders of varying complexity and diagnostic difficulty. Complex co-morbidities are also more common in childhood than in adult epilepsy.

Frequent or prolonged hospital admissions for children with epilepsy disrupt their education and family life, thereby affecting their wellbeing and that of their families.

In a review of health economic analyses of the cost of care in childhood epilepsy, unnecessary hospital admission was one of the most expensive aspects of epilepsy care.<sup>1</sup> The cost of caring for children in whom the control of epilepsy is poor is greater than twice that involved in caring for children in whom seizure control is good. The increased expenditure is due to greater costs of both medication and hospital admissions.

From 2013–2014, the Department of Health will implement a best practice tariff for secondary paediatric epilepsy via the Payment by Results system. Criteria for a high-quality service that attracts the tariff will include:

- named lead paediatrician for epilepsy
- access to local epilepsy specialist nurse
- planned network-based pathways for children requiring tertiary support
- epilepsy care plans for affected children, including planned transition pathways for young people with epilepsy
- participation in national audit (via the 'Epilepsy 12' audit – see 'Resources' later in this section).

Both of the above indicators were included in the NHS Atlas of Variation in Healthcare for Children and Young People (2012).

'Unplanned hospitalisation for asthma, diabetes and epilepsy in under 19s' is included in the NHS Outcomes Framework 2013/14.

### Magnitude of variation

#### Map 46: Epilepsy – Emergency admission rate

For local authorities in England, the directly standardised rate of emergency admissions for children with epilepsy, per population aged 0–18 years, ranged from 18 to 237.4 (greater than 13-fold variation). When the five local authorities with the highest rates and the five local authorities with the lowest rates are excluded, the range is 37.2 to 139.1 and the variation is 3.7-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2008 to 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 30.8 to 133.7, and the variation was over four-fold.

#### Map 47: Epilepsy – Duration of hospital stay

For local authorities in England, the mean length of emergency inpatient stay (days) for children with epilepsy aged 0–18 years ranged from 0.4 to 7.0 days (greater than 17-fold variation). When the five local authorities with the greatest lengths of stay and the five local authorities with the lowest lengths of stay are excluded, the range is 0.7 to 4.3 days, and the variation is greater than six-fold.

By comparison, after removing outliers in a similar way, the range (by primary care trust in 2007–2008 to 2009–2010) demonstrated in the Atlas of Variation in Healthcare for Children and Young People (2012) was 0.8 to 2.8 days, and the variation was 3.5-fold.

Epilepsy is more common in deprived populations. However, as the higher prevalence rate in socio-economically deprived populations is only about one-quarter greater than the mean rate, deprivation alone cannot explain this degree of variation.

Variations in emergency admission rates for children with epilepsy can reflect:

- effectiveness of ongoing seizure control
- emergency management of acute seizures
- differences in the admission criteria of local departments.

The occurrence of seizures in childhood epilepsy can be unpredictable. For a few children, long-term seizure control can be very difficult. These children, who may also have other neurodevelopmental problems and physical disability, could influence the number and duration of emergency admissions in certain local authorities. However, as the numbers are small, it is unlikely to account for the degree of variation observed.

Variation is also seen in the prevalence of epilepsy and the proportion of children diagnosed with epilepsy who do not have the disease. Epilepsy can be difficult to diagnose in children. In the absence of referral guidance and specialist expertise within a managed network setting, children with equivocal clinical presentations can be misdiagnosed.<sup>2</sup>

While admission rates for epilepsy appear relatively stable over time, the increasing variation in duration of stay in 2011–2012 compared with previous years is of concern, particularly as it appears to reflect a shift towards greater overall lengths of stay.

The reasons for unwarranted variation could be generic to hospital patient-flow processes and experienced in common with many other conditions, for example:

1 Beghi E et al. (2005). A review of the costs of managing childhood epilepsy. *Pharmacoeconomics* 23: 27–45.

2 Uldall P, Alving J, Hansen LK, Kibæk, Buchholt J (2006). The misdiagnosis of epilepsy in children admitted to a tertiary epilepsy centre with paroxysmal events. *Archives of Disease in Childhood* 91: 219–221.

- differences in criteria for admission
- delays in investigations
- availability of health professionals for inpatient consultations
- sub-optimal discharge processes.

Differences in the level of community-based support may also contribute to a delay in discharge, affecting the confidence of both families and clinicians to discharge the child at an appropriate time.

## Options for action

Commissioners may want to consider the benefits of commissioning the following interventions for children with epilepsy:

- First-seizure services to streamline investigation and diagnosis where possible.
- Integrated care pathways, including the development of personal management plans for children and their families.
- Specialist nurses in the epilepsy service, whose roles could include co-ordination of care pathway, family support, population education and liaison with primary care and education services.
- Enhanced links with social care and education, including medication policies in schools.
- Specific services to aid the transition of children with epilepsy from paediatric to adult epilepsy services.

A managed network model of delivering epilepsy care can help to improve seizure control in many children with epilepsy and rationalise clinical decision making about the need for admission.

## Resources

The National Institute for Health and Care Excellence (NICE) has produced both clinical guidance and quality standards for the management of epilepsy in children:

- Quality Standards: NICE (2013). The epilepsies in children and young people. Quality Standard QS27 (<http://guidance.nice.org.uk/QS27>).
- Guidance: NICE (2012). The epilepsies. The diagnosis and management of the epilepsies in adults and children in primary and secondary care. Clinical guidelines, CG137 (<http://guidance.nice.org.uk/CG137>).
- Commissioning guide (2013). Diagnosis and management of the epilepsies in adults, children and young people. (<http://www.nice.org.uk/guidance/CMG47>).

Epilepsy Best Practice Tariff  
([www.isb.nhs.uk/documents/isb-0028/amd-17-2012/0028172012guid.](http://www.isb.nhs.uk/documents/isb-0028/amd-17-2012/0028172012guid.))

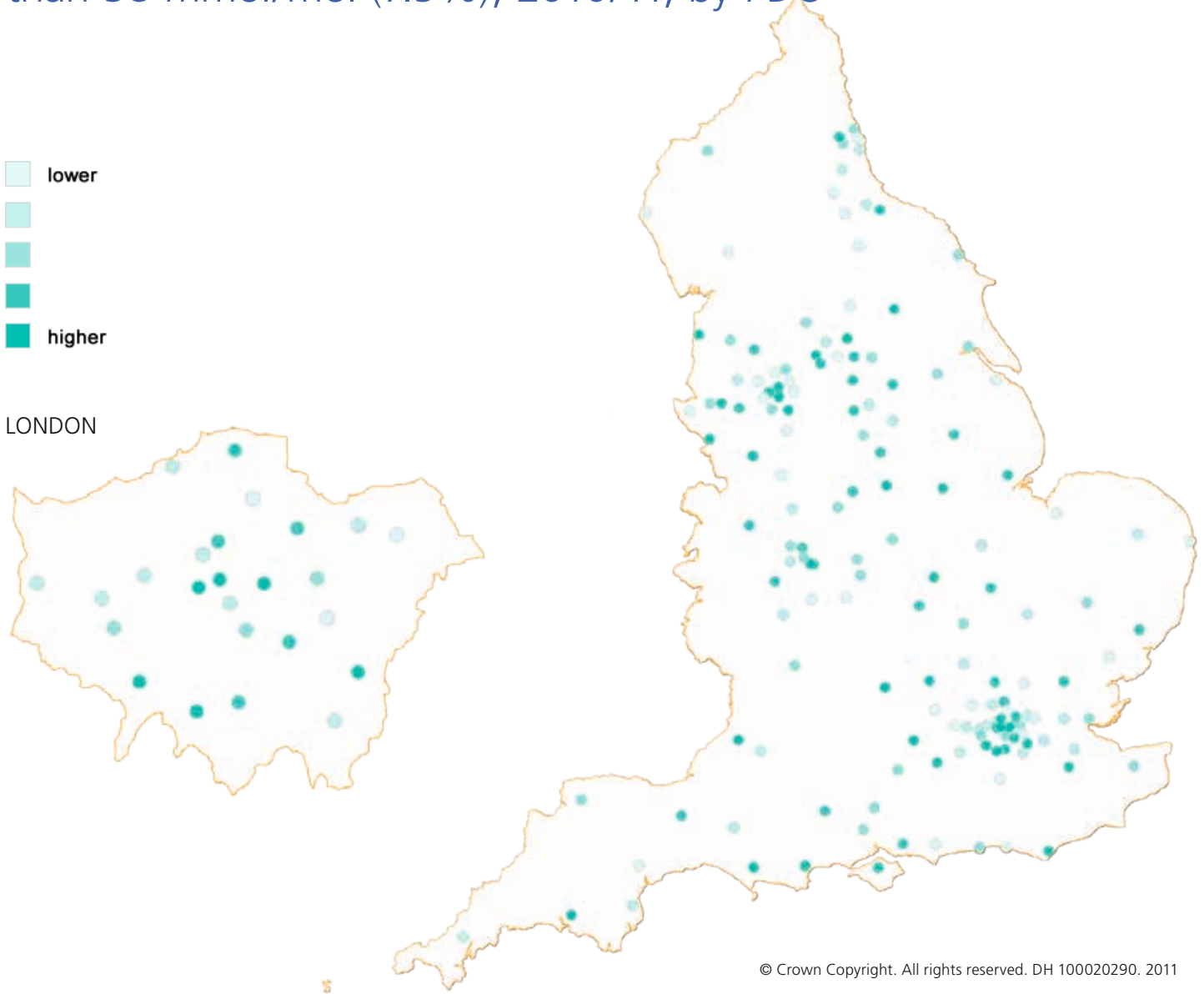
Epilepsy 12 is a national audit of childhood epilepsy, monitoring performance of units against 12 key quality standards: 99% of eligible units have signed up. National and individual provider reports from Round 1 are available here: [www.rcpch.ac.uk/child-health/standards-care/clinical-audit-and-quality-improvement/epilepsy12-national-audit/results](http://www.rcpch.ac.uk/child-health/standards-care/clinical-audit-and-quality-improvement/epilepsy12-national-audit/results).

The British Paediatric Neurology Association runs courses in the UK for health professionals involved in the management of children with epilepsy. These courses help to ensure a consistent clinical approach to the diagnosis and management of epilepsy in children ([www.bpna.org.uk/pet/](http://www.bpna.org.uk/pet/)).

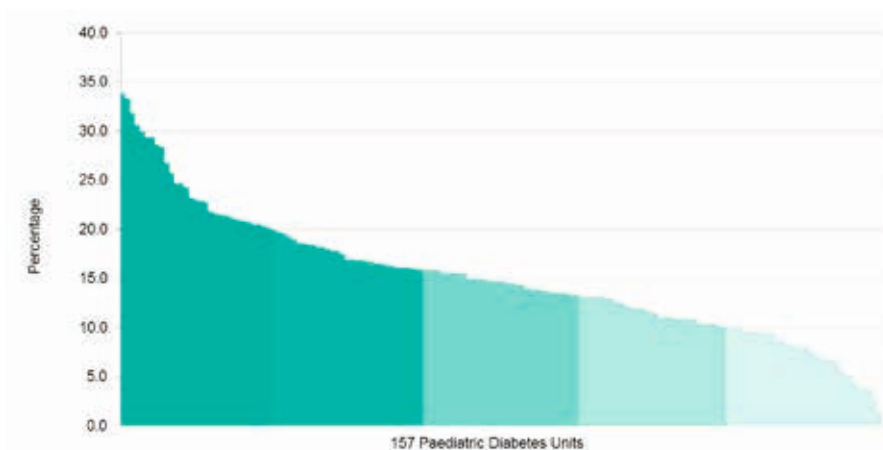
Patient education and support is available from national and local services ([www.epilepsy.org.uk/info](http://www.epilepsy.org.uk/info)).

C: Diabetes

**Map 48** Diabetes: Percentage of children and young people aged 0-24 years with diabetes cared for in a Paediatric Diabetes Unit (PDU) whose most recent HbA1c measurement was less than 58 mmol/mol (7.5%), 2010/11, by PDU



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## Context

Ongoing good blood glucose control in children and young people with diabetes reduces the risk of developing complications in the longer term. Glycated haemoglobin (HbA1c) is an indicator of average blood glucose control over the previous 10-12 weeks. In national and international guidance, an HbA1c of less than 58 mmol/mol (7.5%) is recommended for children with diabetes.<sup>1,2</sup>

The data presented here are taken from the National Paediatric Diabetes Audit (NPDA).<sup>3</sup> Specialist Paediatric Diabetes Units (PDUs) in England and Wales have been submitting process and outcome data to the NPDA since 2003/4. In 2010/11, 97% of PDUs in England and Wales submitted data to the NPDA. This gave data on approximately 24,000 children and young people who were under the care of a Consultant Paediatrician at the time of the data collection. The majority had Type 1 diabetes (97%), with the greatest numbers in the 10-14 year age group.

In 2010/11, only 5.8% of children and young people with diabetes in England and Wales received all eight NICE-recommended care processes.<sup>3</sup> Since April 2012, paediatric diabetes care in England has been subject to a Best Practice Tariff, whereby providers receive the maximum tariff for managing children and young people with diabetes only if they are compliant with 13 best practice standards – of which submission of audit data to NPDA is one. (See “Resources”)

A related indicator on paediatric diabetes – “Percentage of children aged 0-15 years with Type 1 diabetes whose most recent HbA1c measurement was 10.0% (86 mmol/mol) or less” was included in the Atlas of Variation in Health Care for Children and Young People 2012.

## Magnitude of variation

**Map 48:** For PDUs in England, the percentage of children and young people aged 0-24 years with Type 1 diabetes whose most recent HbA1c measurement was less than 58 mmol/mol (7.5%) ranged from 0% – 33.8% (over 33-fold variation). When the five PDUs with the highest percentages and the five PDUs with the lowest percentages are excluded, the range is 3.9% - 29.4% and the variation is 7.5-fold.

Overall, only 15.7% of all children and young people with diabetes in the NPDA (England and Wales) had an HbA1c value below the recommended target level of 58 mmol/mol.<sup>3</sup> In Germany and Austria, the equivalent statistic is 34% of children and young people.<sup>4</sup>

## Options for action

Every commissioned diabetes service could provide a continuum of care from hospital to the community for children and young people with diabetes including those in transition to young adult services. This care could be delivered by a specialist paediatric multidisciplinary team (MDT), including consultant paediatricians with expertise in children and young people with diabetes, paediatric diabetes specialist nurses and educators, paediatric diabetes dietitians, psychologists with an interest in diabetes, social workers, pharmacists and play therapists.

Providers can ensure that services are staffed by adequate numbers of skilled, experienced paediatric multidisciplinary teams, under clear clinical leadership, facilitated by managed clinical networks.

Commissioners can consider reviewing minimum service specifications to ensure they are in line with current Best Practice Tariff Guidance, NICE guidance and Department of Health policy on service configuration.<sup>5</sup> Local, regional and national peer review of diabetes services can promote best practice, and help to assess performance and improve outcomes.

Commissioners and providers could collaborate to deliver age-appropriate and validated self-management education programmes, individually tailored for each child and young person, their family and school. Standardised, accredited specialist training could be provided for all healthcare professionals involved in the care of children and young people with diabetes.

## Resources

- NICE Guidance (2004) Diagnosis and management of type 1 diabetes in children, young people and adults (CG15). [Update ongoing] <http://guidance.nice.org.uk/CG15>
- NICE pathway for managing diabetes (including in children and young people) <http://pathways.nice.org.uk/pathways/diabetes>
- Paediatric Diabetes Best Practice Tariff. More information, including service standards, available here: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/214902/PbR-Guidance-2013-14.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/214902/PbR-Guidance-2013-14.pdf)
- RCPCH National Paediatric Diabetes Audit [www.rcpch.ac.uk/national-paediatric-diabetes-audit-npda](http://www.rcpch.ac.uk/national-paediatric-diabetes-audit-npda)
- SWEET project e.V. ([www.sweet-project.eu](http://www.sweet-project.eu)): an international collaboration of paediatric diabetes services working to improve care through benchmarking clinical outcomes, comparing services and best practice, and sharing standards, guidance, models of education and research.
- International Society for Pediatric and Adolescent Diabetes (ISPAD) (2009) ISPAD clinical practice consensus guidelines. [www.ispad.org/FileCenter.html?CategoryID=5](http://www.ispad.org/FileCenter.html?CategoryID=5)

1 NICE (2004) Diagnosis and management of type 1 diabetes in children, young people and adults (CG15). <http://guidance.nice.org.uk/CG15>

2 ISPAD (2009) ISPAD Clinical Practice Consensus Guidelines. *Pediatric Diabetes* 10: Suppl 12. [www.ispad.org/FileCenter.html?CategoryID=5](http://www.ispad.org/FileCenter.html?CategoryID=5)

3 Royal College of Paediatrics and Child Health (2012). National Paediatric Diabetes Audit Report 2010-11. [www.rcpch.ac.uk/system/files/protected/page/NPDA%20Annual%20Report\\_25%2009%2012%20for%20web.pdf](http://www.rcpch.ac.uk/system/files/protected/page/NPDA%20Annual%20Report_25%2009%2012%20for%20web.pdf)

4 [www.hqip.org.uk/national-paediatric-diabetes-auditreport-2012](http://www.hqip.org.uk/national-paediatric-diabetes-auditreport-2012)

5 Department of Health (2007) Making every young person with diabetes matter. [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_073674](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_073674)



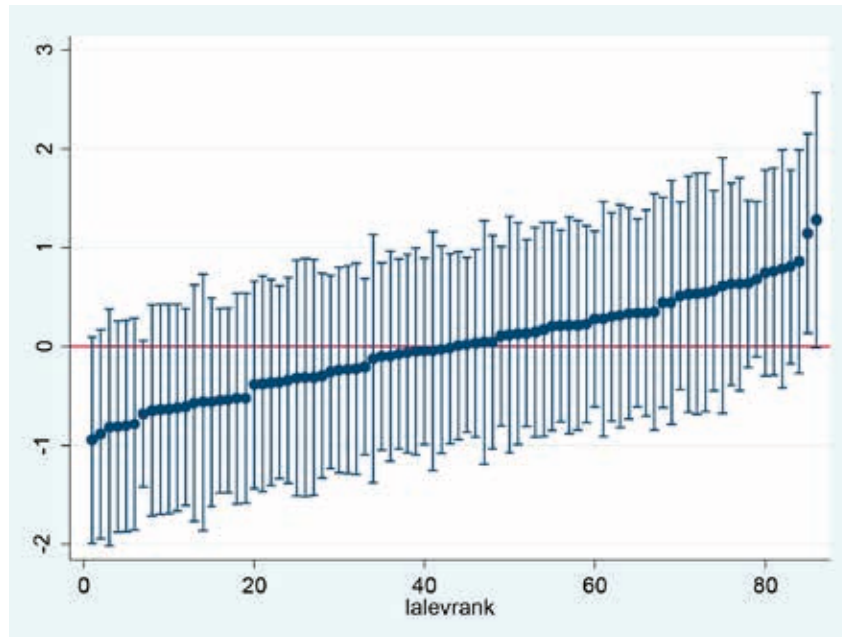
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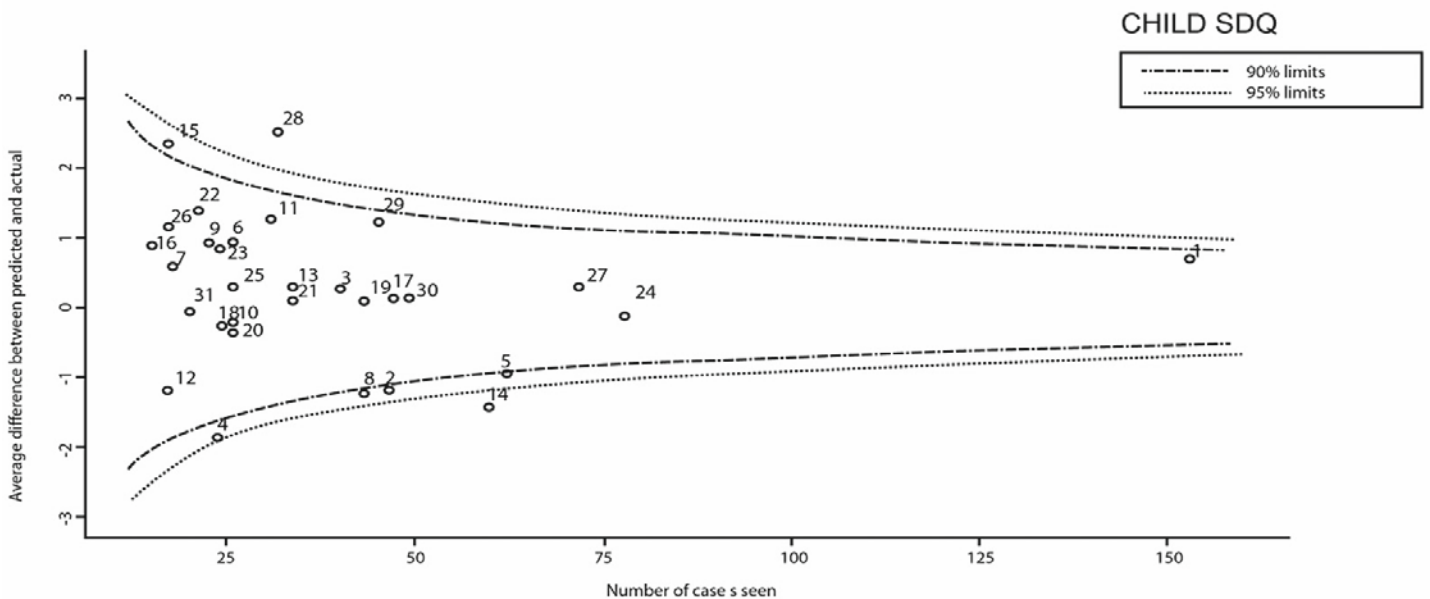
# Child mental health

A: Mental health problems – prevalence and outcomes

**Indicator 49** Mental health – prevalence of problems: Variation in community prevalence of mental health disorders for 11–13 year olds in secondary schools, by local authority, 2009–2011 (controlling for known risk factors)



**Indicator 50** Mental health – specialist service outcomes: Variation in change in mental health disorders following contact with Specialist Services for 11–18 year olds accessing Child and Adolescent Mental Health Services (CAMHS), by CAMHS units, 2008–12



## Context

In the UK, 10% of 5–16 year olds have a diagnosable mental problem.<sup>1</sup> There are higher rates of disorder among adolescents compared with children and 40% of young people experience at least one mental disorder by the age of 16.<sup>2</sup>

The prevalence of mental health problems is associated with key risk factors including poverty, special educational needs, poor housing and trauma.<sup>3</sup> Thus variation in prevalence is correlated with indices of deprivation, vulnerability and adverse life circumstances (as illustrated in Table 7A.1), leading to variation in mental health disorders across the country following patterns of deprivation.

**Table 7A.1 Prevalence of mental health disorders in children from higher-risk groups (adapted and reproduced with permission)<sup>4</sup>**

Group	Expected prevalence of mental disorders
Looked-after children	45%
Children with special educational needs requiring statutory assessment	44%
Children with learning disability	36%
Children absent from school more than 15 days in previous term	17% with emotional disorder 14% with conduct disorder 11% with hyperkinetic disorder
Children from households with no working parent	20%
Children from families receiving disability benefits	24%
Children from families where the household reference person is in routine occupational group (such as unskilled manual workers)	15%
Children of parents with no educational qualifications	17%
Children living in 'hard-pressed' areas	15%
Children from household with weekly income <£100	16%
11–16 year olds from household with weekly income <£200	20%
Children in stepfamilies	14%
Children from lone parent families	16%

The long-term consequences of mental health disorders in childhood, if not effectively treated, can include poorer academic achievement, unemployment, premature morbidity and long-term physical and mental problems in adulthood.<sup>5</sup> Up to 50% of lifetime mental illness (excluding dementia) arises by age 14, and 75% by the mid-20s.<sup>6</sup>

1 Green H et al. (2005). *Mental health of children and young people in Great Britain*, 2004. Basingstoke: Palgrave Macmillan.

2 Jaffee SR et al. (2005). Cumulative prevalence of psychiatric disorder in youths. *Journal of the American Academy of Child and Adolescent Psychiatry*, 44(5), 406–407. doi: S0890-8567(09)61499-4 [pii] 10.1097/01.chi.0000155317.38265.61.

3 Rutter M, Stevenson J (2008). Using Epidemiology to Plan Services: A Conceptual Approach. In M. Rutter et al. (Eds.), *Rutter's Child and Adolescent Psychiatry* (5th ed., pp. 71–80). Malden, Oxford and Carlton: Blackwell.

4 Joint Commissioning Panel for Mental Health (2013). *Guidance for commissioning public mental health services*. Updated July 2013. Available from: [www.jcpmh.info/resource/guidance-for-commissioning-public-mental-health-services/](http://www.jcpmh.info/resource/guidance-for-commissioning-public-mental-health-services/).

5 Belfer ML (2008). Child and adolescent mental disorders: the magnitude of the problem across the globe. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 49(3), 226–236. doi: 10.1111/j.1469-7610.2007.01855.x JCPP1855 [pii].

6 Kessler RC et al. (2007). Age of onset of mental disorders: a review of recent literature. *Current Opinion in Psychiatry*, 20(4), 359–364. doi: 10.1097/YCO.0b013e32816ebc8c; 00001504-200707000-00010 [pii].

## Section 7: Child mental health

The estimated annual cost to the UK economy of mental disorders is £105 billion, in contrast with obesity (£16 billion a year) and cardiovascular disease (£31 billion).

Only around 25% of children with clinical mental health disorders receive help from specialist CAMHS within 3 years in the UK.<sup>1</sup> Access may be most limited for the most deprived and needy groups.<sup>2</sup>

In this section we consider variation across England in child mental health problems in the community and change after receiving specialist help, in terms of self-reported emotional and behavioural difficulties. We focus here on child self-reporting only. However, it should be noted that there are differences in parent, child and clinician reporting, and ideally a combination of all three should be used when considering variation in populations.<sup>3</sup>

Development of a new survey to support measurement of outcomes for children with mental health problems was recommended in the report of the Children and Young People's Health Outcomes Forum (2012).

### Magnitude of variation

#### **Indicator 49: Mental health – prevalence of problems: Variation in community prevalence of mental health disorders for 11–13 year olds in secondary schools, by local authority, 2009–2011 (controlling for known risk factors)**

No nationally collected returns are routinely aggregated for community level prevalence of diagnosable mental health disorders. Though there are important national surveys, these have not set out to consider regional variance.<sup>4</sup>

Research suggests that, once known factors as outlined above are controlled for, there appears to be little variation across areas. In community settings, school-level variation in mental health difficulties – controlling for known risk factors – has been found to be below 5%.<sup>5</sup>

Below, we present prevalence data collected in 2009 from a large study of mental health of children in schools<sup>6</sup> to consider levels of variation across local authorities, controlling for known risk factors. These data were collected from 22,730 adolescents from 86 local authorities. The measure used is the child self-report Strengths and Difficulties Questionnaire (SDQ).<sup>7</sup> The SDQ is a widely used measure of symptomology, distress and impact, and has been validated in general community as well as clinical populations.

Prior to accounting for known socio-demographic risk factors and variation accounted for by schools, local authorities account for 3% of the variation in mental health scores. After taking into account gender, socio-economic status and school level variation, 1.5% of the variation is accounted for by local authorities.

Indicator 49 illustrates the spread of residual variance scores across local authorities (i.e. the variability in scores not explained by gender, socio-economic status or school at the local authority level) with their confidence intervals.

Although the spread of scores seems large, all the confidence intervals (but one) are in contact with the horizontal line, which indicates that they are not significantly different from one another and that the variations seen are most likely to be due to chance.

1 Ford T, Hamilton H, Meltzer H, & Goodman R. (2007). Child Mental Health is Everybody's Business: The Prevalence of Contact with Public Sector Services by Type of Disorder Among British School Children in a Three-Year Period. *Child and Adolescent Mental Health*, 12(1), 13–20.

2 Champion J, Bhugra D, Bailey S, Marmot M. (2013). Inequality and mental disorder: opportunities for action. *Lancet* 382: 183–4.

3 Verhulst FC, Van der Ende J. (2008). Using rating scales in a clinical context. In M. Rutter, D. Bishop, D. S. Pine et al. (Eds.), *Rutter's Child and Adolescent Psychiatry* (5th ed., pp. 289–298). Malden, Oxford and Carlton: Blackwell.

4 Green H et al. (2004). Mental health of children and young people in Great Britain. Available from: [www.esds.ac.uk/doc/5269/mrdoc/pdf/5269technicalreport.pdf](http://www.esds.ac.uk/doc/5269/mrdoc/pdf/5269technicalreport.pdf).

5 Hale D et al. (2013). School-level variation in health outcomes in adolescence: analysis of three longitudinal studies in England. *Prevention Science*. doi: 10.1007/s11121-013-0414-6.

6 Wolpert M et al. (2011). Me and My school: Findings from the National Evaluation of Targeted Mental Health in Schools 2008-2011. Research Report DFE-RR177. London: Department for Education.

7 Goodman R. (1997). The Strengths and Difficulties Questionnaire: a research note. *J Child Psychol Psychiatry*, 38(5), 581–586.

**Indicator 50: Mental health – specialist service outcomes: Variation in change in mental health disorders following contact with Specialist Services for 11–18 year olds accessing CAMHS, by CAMHS units, 2008–12**

There is as yet no mandated return of data related to outcomes of treatment offered in all CAMHS, though a number of national initiatives are in train (e.g. CYP IAPT – see: [www.iapt.nhs.uk/cyp-iapt/](http://www.iapt.nhs.uk/cyp-iapt/)). For some years now, however, services across the UK have voluntarily come together as part of a learning collaboration to collect outcome data, particularly from the perspective of service users, as part of the CAMHS Outcomes Research Consortium (CORC) – see: [www.corc.uk.net](http://www.corc.uk.net).<sup>8</sup>

CORC is a practice-research network of around half of all CAMHS teams, primarily outpatient teams seeing children with moderate to severe difficulties, including both statutory and voluntary providers. CORC aggregates outcome data and allows members of the collaboration to consider variation between their service outcomes and those of others.

Risk-adjusted outcome data (with clinical risk score based on clinician-rated severity of symptoms at outset) from 194 cases aged 9–18 years from 31 CAMHS units (collected 2008–2012) from the CORC database are presented, as a funnel plot. It shows risk-adjusted change in child mental disorder scores aggregated over a unit. For each mental health unit, the difference between predicted and observed outcomes (y-axis) is plotted against the number of cases seen (x-axis). Plots such as these are recommended for use across healthcare to identify teams outside of the confidence intervals as warranting a closer investigation of potential reasons for differences in service performance.<sup>9</sup> Figure 7A.2 suggests that no more units fall outside the 95% confidence interval than might occur by chance based on child self-report data.

## Options for action

### Early intervention to improve life chances:

Early intervention and commissioning of mental health provision in schools and clinics, which have been shown in some studies to improve outcomes and life chances for children and young people into adulthood, may be an opportunity for commissioners to prevent and reduce mental health disorders in adulthood.

### Funding for data collection to consider unwarranted variation:

Greater support for services to collect routine data will allow appropriate analysis and meaningful interpretation of variance in outcomes in collaboration with commissioners, in particular to ensure adequate IT. It is estimated that at least 3–5% of a commissioning budget should be allocated to support data collection and handling.<sup>10</sup>

### Data quality and adjustment:

Unadjusted variation between areas or services in relation to child mental health disorders is likely to be the result of known correlation with risk factors and/or chance variation in data rather than substantive differences in practice. For commissioners, unadjusted variation data can be useful to inform service planning and resource allocation. However, for analysing performance and outcomes of services, we would encourage using risk-adjusted funnel plots, followed by triangulation of data with other sources. This should reduce the risk of over-interpretation of difference on the one hand, and the tendency to explain away differences as due to measurement error on the other.<sup>15</sup>

### Collaboration between commissioners to promote child mental health:

Health and wellbeing boards bring a real opportunity for collaborative commissioning across agencies (in particular health, education and social care) to address all aspects that contribute to and maintain mental health disorders in children, with a particular focus on those groups most in need.

8 Wolpert M et al. (2012). Patient-reported outcomes in child and adolescent mental health services (CAMHS): use of idiographic and standardized measures. *Journal of Mental Health*, 21(2), 165–173. doi: 10.3109/09638237.2012.664304.

9 Spiegelhalter DJ (2005). Funnel plots for comparing institutional performance. *Stat Med*, 24(8), 1185–1202. doi: 10.1002/sim.1970.

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# Glossary of essential terms

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## Introduction

Much of the disagreement that occurs during the commissioning or management of services arises because different people use the same term but have a different understanding of its meaning. This glossary is provided in order to help develop a shared or common language. If there is a clear, short and memorable definition from the literature, this has been cited and presented in italics; where definitions in the literature are overly long, Right Care has composed and provided a short definition.

## Appropriate

*A procedure is termed appropriate if its benefits sufficiently outweigh its risks to make it worth performing.*

**Source:** Kahan JP et al. (1994). Measuring the necessity of medical procedures. *Medical Care* 32: 352–365.

## Confidence intervals

*Confidence intervals give the range within which the true size of a treatment effect (which is never precisely known) lies, with a given degree of certainty (usually 95% or 99%).*

**Source:** Evans I, Thornton H, Chalmers I (2006). Testing Treatments. *Better Research for Better Healthcare*. The British Library.

## Costs

Costs are not only financial. Costs may be measured as the time used, the carbon produced or the benefit that would be obtained if the resources were used for another group of patients (i.e. the opportunity cost).

## Effective care

*The extent to which an intervention, procedure regimen or service produces a beneficial outcome under ideal circumstances (e.g. in a randomised controlled trial)*

**Source:** Canadian Agency for Drugs and Technologies in Health (2009). *Optimal Therapy Report: Cost effectiveness of blood glucose test strips in the management of adult patients with diabetes mellitus*. Volume 3, Issue 3.

## Efficiency

See also Productivity

*Efficiency can be defined as maximising wellbeing at the least cost to society.*

**Source:** Mitton C, Donaldson C (2004). *Priority setting toolkit. A guide to the use of economics in healthcare decision making*. BMJ Publishing Group.

## Equity

Equity is a subjective judgement of unfairness.

## Health

*Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.*

**Source:** Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 1946. The definition has not been amended since 1948 ([www.who.int/suggestions/faq/en/index.html](http://www.who.int/suggestions/faq/en/index.html)).

## Inequality

Inequality is defined as objectively measured differences in health status, healthcare access and outcome.

## Input, output and outcome

Input is a term used by economists to define the resources used, such as the number of hospital beds, to produce the output, such as the number of patients admitted per bed per year.

The economists' terminology is different from the language utilised in quality assurance, in which the terms structure, process and outcome are used. Input equates to structure and process, i.e. the number of beds and the number of admissions per bed, respectively. However, the outcome is distinct from the output. Outcome includes some measure of the effect that the process has had on the patients, for example, the number of patients who were discharged to their own home.

## Integrated care

*Clinical integration, where care by professionals and providers to patients is integrated into a single or coherent process within and/or across professions such as through use of shared guidelines and protocols.*

**Source:** Kodner DL, Spreeuwenberg C (2002). Integrated care: meaning, logic, applications and implications – a discussion paper. *International Journal of Integrated Care* 2: 1–6.

## Mean (average)

The mean is the sum of values (e.g. size of populations) divided by the number of values (e.g. number of populations in the sample).

## Network

If a system is a set of activities with a common set of objectives, the network is the set of organisations and individuals that deliver the systems.

## Outcome, see Input

## Output, see Input

## Population medicine

Population medicine is a style of clinical practice in which the clinician is focused not only on the individual patients referred but also on the whole population in need.

## Preference-sensitive care

*'Elective', or 'preference-sensitive' care, interventions for which there is more than one option and where the outcomes will differ according to the option used because patients delegate decision making to doctors, physician opinion rather than patient preference often determines which treatment patients receive. I argue that this can result in a serious but commonly overlooked medical error: operating on the wrong patients – on those who, were they fully informed, would not have wanted the operation they received.*

**Source:** Wennberg JE (2010). *Tracking Medicine. A Researcher's Quest to Understand Health Care*. Oxford University Press.

## Preference-sensitive treatment decisions

*Preference-sensitive treatment decisions involve making value trade-offs between benefits and harms that should depend on informed patient choice.*

**Source:** O'Connor AM et al (2007) Toward the 'Tipping Point': Decision aids and informed patient choice. *Health Affairs* 26: 716–725.

## Productivity

See also Efficiency

Productivity is the relationship between inputs and outputs, such as the number of operations per theatre per year; efficiency is the relationship between outcomes and inputs, such as the number of successful operations per theatre per year.

## Quality

*The degree to which a service meets pre-set standards of goodness.*

**Source:** Donabedian A, personal communication.

## Range

The range is the difference between the highest and lowest value in the sample. The range provides a crude measure of the spread of the data.

## Safety

*Patient safety can, at its simplest, be defined as: The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare ... the reduction of harm should be the primary aim of patient safety, not the elimination of error.*

**Source:** Vincent C (2006). *Patient Safety*. Churchill Livingstone.

## Shared decision-making

*In a shared decision, a healthcare provider communicates to the patient personalised information about the options, outcomes, probabilities and scientific uncertainties of available treatment options, and the patient communicates his or her values and the relative importance he or she places on benefits and harms.*

**Source:** Wennberg JE (2010). *Tracking Medicine. A Researcher's Quest to Understand Health Care*. Oxford University Press.

## Standard deviation

See also Variance

The standard deviation is a measure of spread and is the square root of the variance.

## Supply-sensitive care

*It differs in fundamental ways from both effective care and preference-sensitive care. Supply-sensitive care is not about a specific treatment per se; rather, it is about the frequency with which everyday medical care is used in treating patients with acute and chronic illnesses. Remedying variation in*

*supply-sensitive care requires coming to terms with the 'more care is better' assumption. Are physician services and hospitals in high-cost, high-use regions overused?*

**Source:** Wennberg JE (2010). *Tracking Medicine. A Researcher's Quest to Understand Health Care*. Oxford University Press.

## System

A set of activities with a common set of objectives, with an annual report.

## Unwarranted variation

*Variation in the utilisation of healthcare services that cannot be explained by variation in patient illness or patient preferences.*

**Source:** Wennberg JE (2010). *Tracking Medicine. A Researcher's Quest to Understand Health Care*. Oxford University Press.

## Value

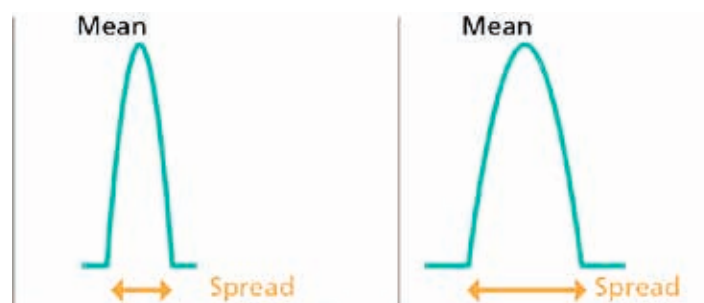
*... value is expressed as what we gain relative to what we give up – the benefit relative to the cost.*

**Source:** Institute of Medicine of the National Academies (2008). *Learning Healthcare System Concepts v. 2008. The Roundtable on Evidence-Based Medicine, Institute of Medicine. Annual Report.*

## Variance

See also Range

The variance is another measure of spread, which describes how far the values in the sample lie away from the mean value. It is the average of the squared differences from the mean and is a better measure of spread than the range.



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