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# Orthodontic needs assessment for Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire 2018

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# About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

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# Executive summary

This report provides an assessment of the need and demand for orthodontic services across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire. It describes the normative needs and existing demand for orthodontic treatment, and also matches capacity to estimated need.

Data on need for orthodontic services is necessary to inform long-term decisions on future orthodontic commissioning. Using the most recent available estimates from the Office for National Statistics (ONS) of the 12-year-old population in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire normative and expressed need for orthodontic treatment were calculated using a variety of methods.

Using the current available methods of assessing orthodontic need it is estimated that between **12,263** and **15,097** case starts per annum would need to be commissioned to meet normative need by 2027.

To meet expressed need (the need is the proportion of children recently visiting an NHS dentist) it is estimated that between **8,788** and **10,659** case starts per annum would be required to meet this need by 2027.

In the current orthodontic activity commissioned, across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire, there is capacity for an estimated **14,048** case starts available for 2018/2019 and for any subsequent year.

Primary care orthodontic contracts (including the orthodontic component of mixed contracts) totalled a spend of approximately **£19.7 million**, Of this **£18,113,809** was for PDS contracts and **£1,659,694** was for the orthodontic component of mixed contracts

In 2015/16 **£387,744** was spent on orthodontic activity in hospital services. For 2016/17 this figure was **£241,881**. Using estimates, for 2015/16, the number of cases treated in secondary care was between **164**, and **236**. For 2016/17 the number of cases treated in secondary care was between **102** and **147**.

In 2017 a questionnaire sent out to all orthodontic practices recorded waiting time of between within one week up to one year for both initial assessment and starting treatment.

The maximum waiting time for non-urgent consultant-led treatments in hospital is 18 weeks from the day the appointment is booked through the NHS e-Referral Service, or when the hospital or service receives the referral.

Most patients who are resident in the area are treated within the area they live or within the area covered by Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire.

The number of children treated privately is not known and the number of children who complete orthodontic treatment in hospital services each year is not known, only estimated, either because the information is not available or not collected. The number of children receiving care in hospital services is likely to be small. As a result this service review, if anything, is likely to have overestimated the orthodontic service provision required in NHS primary dental care.

Although the evidence for the benefit of these services for many patients is equivocal NHS England is required under NHS Regulations to commission orthodontic services for patients with an IOTN score of 3/6 ( DHC= 3 and AC =6) and above. In the past NHSE commissioners were able to set an age limit for patients who they considered eligible to receive orthodontic treatment although this was not national policy. NHS regulations make provision for orthodontic treatment for adults under a Band 3 course of treatment.

Malocclusion is unique among oral diseases in that its incidence and prevalence are not related to socioeconomic status. There is, however, evidence that uptake of orthodontic services is higher in less deprived groups, for example, the Children's Dental Health Survey of 2003 found socioeconomic variation in access to orthodontic treatment with levels of unmet need higher in children from deprived schools. This may reflect differences in demand, differences in the availability of orthodontic services and/or variations in access to and referral patterns by GPs. Whatever the cause, it highlights the potential of orthodontic services to increase health inequalities.

## Key considerations for NHS England

NHS England Central Midlands may wish to consider:

- supporting and advising on the collection of detailed analysis of hospital orthodontic services for the area, including a consistent way of reporting orthodontic activity for each trust; This could be done through a CQUIN. This will provide a more accurate data on those undergoing orthodontic treatment in hospitals
- ensuring that primary, care pathway and hospital orthodontic contracts provide value for money and quality in outcomes
- reviewing any data collection undertaken by the Dental Referral Management Centre to ensure that it inform as future commissioning of orthodontic services
- working with orthodontic practices and Orthodontic MCN to agree a process for validating waiting times and ensuring process of prioritisation of cases based on patient need
- supporting further development of managed clinical networks across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire
- reviewing the distribution of services to ensure equitable access across areas particularly areas that currently have limited or no access to local services. Distance, inconvenience and cost should be considered to avoid barriers to care.
- continuing to monitor their local population demographics to assess future need and should be cognisant of population projections locally to predict varying needs.

# 1. Introduction

In April 2006 specialist practitioners, including orthodontists, were transferred to new Personal Dental Services (PDS) agreements which were time limited contracts with a recommended duration of five years. As contracts were awarded only to existing contract holders the majority of service provision is still located where it was at the time of transfer. The expiry of these contracts gives NHSE Central and South Midlands the opportunity to review current services and to consider how best to re-commission orthodontics to meet the needs of the population.

The majority of orthodontic treatments are delivered either under these time-limited Personal Dental Services (PDS) agreements or included within General Dental Service (GDS) contracts for general and orthodontic services which are non time limited. Guidance issued by the Department of Health (DH) in 2010 suggested specific consideration to be taken into account by commissioners prior to making decisions on the future of these service. Most Primary Care Trusts (PCTs), as they then were, extended contracts for up to two years and the agreements ended in 2013. Currently NHS England commissions primary care dental services including orthodontic services via the local office teams.

Although the evidence for the benefit of these services for many patients is equivocal NHS England is required under NHS Regulations to commission orthodontic services for patients with an Index of Orthodontic Need (IOTN) score of 3/6 which is a Dental Health Component (DHC) equal to 3 and an Aesthetic Component (AC) equal to 6 and above. In the past NHS England commissioners were able to set an age limit for patients who they considered eligible to receive orthodontic treatment although this was not national policy. NHS regulations make provision for orthodontic treatment for adults under a Band 3 course of treatment.

Commissioners need to make long-term decisions on the future of these contracts. A key factor in determining the future of orthodontic capacity is an assessment of the level of services to be commissioned to meet the population need. While the distribution of orthodontic services in the area is still mainly based on historical provision that existed prior to the 2006 dental contract, commissioners should be able to better target resources over time, based on needs and to ensure equity of orthodontic service provision.

Currently PDS agreements have been extended to the end of March 2019 by the application of a single tender action waiver that was approved by NHS England. NHS England has previously applied a benchmarking audit to enable the extension of PDS agreements from 2013/14.

This report is an assessment of the need for orthodontic services across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire. It describes the current and projected normative needs together with existing demand for orthodontic services. It provides information on current commissioned and delivered orthodontic activity,

waiting times and examines orthodontic patient flows in and out of the area. The report concludes with an assessment of whether the services commissioned are meeting need.

Over the past 10 years, the cost of orthodontic treatment in general and personal dental services has been estimated to have increased and accounts for about 9.4% of the total primary dental care budget for England. By mapping provision and need it is expected that this needs assessment will help guide commissioners to maintain an equitable and sustainable orthodontic service in across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire.

## 2. Background and available guidance

The current arrangements for the commissioning of specialist orthodontic services in primary care came into operation in April 2006. A number of published documents recommend a range of actions for the then PCTs to establish a more strategic and effective approach to orthodontic commissioning. These documents suggested moving to a sector-wide approach, commissioning orthodontics across primary and secondary care and assessing levels of orthodontic need as the basis for planning appropriate future capacity and developing clinical governance.

Further guidance explored joint commissioning of orthodontics in line with local needs, issues concerning future Units of Orthodontic Activity (UOA) values and benchmarking ratios between assessments and case starts. 'Quality assurance in NHS primary care orthodontics' provided further details of the proposed quality assessments and outcome framework together with compliance required by national regulations.

In September 2015, NHS England published Guides for Commissioning Dental Specialities, one of which was for orthodontics<sup>1</sup>. This document was for commissioners to use to offer a consistent and coherent approach to commissioning orthodontic services, to improve outcomes for patients, ensure highest quality of care in the most appropriate setting, by professionals with the required skills and ensuring value for money.

Key documents related to orthodontic commissioning are:

- Department of Health (2005) guidance 'Primary dental services: commissioning specialist dental services (revised version)' gateway 5865<sup>2</sup>
- Department of Health (2006) 'Strategic commissioning of primary care orthodontic services'. Gateway 7105<sup>3</sup>
- Primary Care Contracting (2006) 'New orthodontic contracts, hints and tips'<sup>4</sup>
- PCC guidance November 2007 'Quality assurance in NHS primary care orthodontics'<sup>5</sup>
- Securing excellence in commissioning NHS dental services<sup>6</sup> 2013
- Transitional commissioning of primary care orthodontic service<sup>7</sup> 2012
- Commissioning Guide for Orthodontics<sup>8</sup>

### 2.1 Delivery of orthodontic activity

General dental practitioners, dentists with enhanced skills and orthodontic specialists, deliver primary care orthodontic services. They are, in some cases, supported by orthodontic therapists. Secondary care orthodontics is delivered by consultants and specialists within hospital settings assisted in some places by trainees. Currently secondary care orthodontists offer advice, training and treat the most complex cases.

# 3. Measuring orthodontic treatment need

## 3.1 Review of literature

The literature on orthodontic need draws a number of conclusions regarding the types of need, who is eligible for orthodontic treatment and what motivates patients to seek orthodontic treatment. The conclusions are summarised below:

- there may be differences between normative and perceived needs for orthodontic treatment
- there may be discrepancies between professionals opinion of orthodontic need and parents' and childrens' opinion of need<sup>91011</sup>
- normative or professionally defined need is usually measured via the Index of Orthodontic Treatment Need or the IOTN
- children classified with an IOTN score of 3/6 (DHC=3 and AC=6) or above are eligible for NHS orthodontic treatment in primary care. Brook and Shaw<sup>12</sup> reported that 39% of the 11-12 year population fell into this category
- cases who have a normative/professionally defined need may not seek treatment, conversely patients who are not defined as having a normative need may still request or have treatment<sup>13</sup>
- to try to factor this into measures for orthodontic treatment need it has been suggested that IOTN should be combined with subjective measure such as Oral Health Related Quality of Life or Index of Complexity, Outcome and Need (ICON)<sup>14</sup>
- children may be more motivated to seek care if they are teased about the appearance of their teeth<sup>15</sup>
- children are less likely to have treatment if there are fewer orthodontists in an area.<sup>16</sup>
- a low dentist-to-patient ratio can be a predictor for increasing need for orthodontic services, as there is an increased dental awareness<sup>17 18</sup>
- orthodontic treatment needs are multifactorial and must take into account motivation, attitude, health risks, costs, duration of treatment and prognosis<sup>19</sup>
- failure rate during orthodontic treatment has been reported as 12-17%, failure is due to patient noncompliance, incorrect diagnosis and incorrect management<sup>18</sup>

## 3.2 Methods of assessing orthodontic treatment needs

There are three main elements to assessing orthodontic treatment need:

- **Normative need** the actual professionally judged need in a population cohort as defined following a clinical examination using a standardised clinical index such as IOTN or benchmark and/or need defined by applying a validated formula (Stephen's formula). This represents the capacity to benefit from healthcare
- **Subjective or perceived need** by the individual
- **Demand, expressed need** that is presented for treatment

Twelve-year-olds are used as the age group to define need, as orthodontic treatment is usually carried out when all permanent teeth have erupted; the amount of orthodontic treatment in the younger and older age groups is low. The average age of starting treatment in the 2003 Child Dental Health survey was 12.7 years<sup>20</sup>.

There are different formulae to assess orthodontic need, a selection of methods are used in this assessment. The methods include:

- Child Dental Health survey method
- Stephen's formulae
- Holmes method
- The NHS dental epidemiology programme survey of 12-year-olds in 2008/09 method

In addition to measuring treatment need, an audit of providers and the services they provide may provide additional invaluable information. This should be done by assessing excellence using a framework that measures quality and value. The location and provision of services should also be reviewed.

### 3.3 Demand or Expressed Need.

In the majority of cases referrals for initial orthodontic assessment will usually be made by a person's general dental practitioner. In order to estimate this demand or expressed need the percentage of children attending the dentist in a given time period is used to estimate the number of children who are likely to represent for orthodontic assessment.

The HSCIC records the percentage of children who attend the dentist in a previous time period, either 12 or 24 months. Table 1 shows children of all ages attending the dentist as a percentage of the resident population in the previous 24 months up to 31st March 2016 and the previous 12 months up to 31st March 2017.

**Table 1: Children of all ages attending the dentist as a percentage of the resident population in the previous 24 months up to 31<sup>st</sup> March 2016 and the previous 12 months up to 31st March 2017**

Local Authority	12 year old mid-year population 2015	%Children accessing NHS dentistry* per LA in previous 24 months to 31 <sup>st</sup> March 2016	%Children accessing NHS dentistry** per LA in previous 12 months to 31 <sup>st</sup> March 2017
Northamptonshire	8235	66.5	56.7
Bedford Borough	1949	66.3	55.9
Central Bedfordshire	3077	74.3	61.2
Luton	2764	64.8	53.5
Milton Keynes	3256	67.0	53.5
Hertfordshire	13287	74.7	62.0
<b>Total</b>	<b>32568</b>	<b>N/A</b>	<b>N/A</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

\*\*Data is from NHS Digital and is percentage of child patients seen in the previous 12 months as a percentage of the population Local Authority

HSCIC has recently changed its parameters from children seen in the last 24 months to children seen in the last 12 months. The most recent data, up to March 2017 is reported for a 12 month period only. For the purposes of this orthodontic needs assessment it has been decided to use percentage of children accessing NHS dentistry per LA in previous 24 months to 31<sup>st</sup> March 2016 as being more representative.

### 3.4 Estimating orthodontic need using the formula based on 2013 National Child Dental Health Survey

The National Child Dental Health Survey (CDHS) 2003 showed that 35% of 12-year-old children in the UK had an IOTN score of 3/8 or above, this was based on the dental health grounds and aesthetic grounds, in combination or individually<sup>21</sup>.

Regarding parental views, 42% of parents of 12-year-olds with a clinically judged malocclusion felt that their children’s teeth needed straightening on dental health grounds. Fifty-two percent of parents of 12-year-olds felt that their children required orthodontic treatment for aesthetic reasons<sup>22</sup>.

The National Child Dental Health Survey (CDHS) 2013 showed that 37% of 12 year olds in England had unmet need (dental health component or aesthetics 8 – 10). However no account was taken of demand<sup>23</sup>. Table 2 shows: Assessment of need for orthodontic treatment using the assessment from the Child Dental Health Survey (2013)

**Table 2: Assessment of need for orthodontic treatment using the Child Dental Health Survey (2013)**

Local Authority	12 year old mid-year population 2015	Normative Need (37%) of 12 year olds	% Children accessing NHS dentistry* per LA in previous 24 months to 31 <sup>st</sup> March 2016	Expressed need of children accessing NHS dentistry per LA (in previous 24 months to 31 <sup>st</sup> March 2016)
Northamptonshire	8235	3,047	66.5	2,026
Bedford Borough	1949	721	66.3	478
Central Bedfordshire	3077	1138	74.3	846
Luton	2764	1023	64.8	663
Milton Keynes	3256	1205	67.0	807
Hertfordshire	13287	4,916	74.7	3,672
<b>Total</b>	<b>32568</b>	<b>12050</b>	<b>N/A</b>	<b>8,492</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

Table 3 shows the assumption of future need for orthodontic treatment using the assessment from the Child Dental Health Survey (2013) for 2027 projected population

**Table 3: Future assumption of need for orthodontic treatment using the assessment from the Child Dental Health Survey (2013) for 2027 projected population**

Local Authority	12 year old population 2027 (based on 2011 census)	Normative orthodontic need 37% of 12 year old population	% Children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016	Expressed need of children accessing NHS dentistry per LA (in previous 24 months to 31st March 2016)
Northamptonshire	9,779	3,618	66.5	2,406
Bedford Borough	2,385	883	66.3	585
Central Bedfordshire	3,711	1,373	74.3	1,020
Luton	3,289	1217	64.8	789
Milton Keynes	4,122	1,525	67.0	1,022
Hertfordshire	16,808	6,219	74.7	4,646
<b>Total</b>	<b>40,094</b>	<b>14,835</b>	<b>N/A</b>	<b>10,468</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority. ONS subnational population projections local authorities in England.

### 3.5 Estimating orthodontic need using Stephen’s formula

The Stephen’s Formula involves assessing need from the Dental Health Component (DHC) categories 4 and 5 of the index of Orthodontic Treatment Need (IOTN)<sup>24</sup>, and in a typical school population one third of children fall into these categories. Only a proportion of those with a DHC 3 will justify treatment. Using Stephens’ formula, it is assumed that a proportion of those in category 4 and 5 who despite a need for treatment will decline, this offsets those in category 3 that require treatment.

Stephen’s formula includes additional factors for those who require early treatment (interceptive treatment) (9%) and for the treatment of adults (4%). The number of 12 year olds is used, as a proxy for treatment needs.

Stephens' Formula can be expressed as:

$$\frac{12 \text{ year old population}}{3} \times \frac{100 + \text{Interceptive factor (9)} + \text{Adults (4)}}{100} = \frac{12 \text{ year old population}}{3} \times 1.13$$

Table 4 shows the estimate of orthodontic need using the Stephen's formula for 2015.

**Table 4: Estimating orthodontic need using the Stephen's formula for 2015**

Local Authority	12 year old population 2015 (based on 2011 census) <sup>25</sup>	Orthodontic need based on Stephens formula	% Children accessing NHS dentistry* per LA in previous 24 months to 31 <sup>st</sup> March 2016	Orthodontic need based on % children accessing NHS dentistry
Northamptonshire	8235	3102	66.5	2062
Bedford Borough	1949	734	66.3	487
Central Bedfordshire	3077	1159	74.3	861
Luton	2764	1041	64.8	675
Milton Keynes	3256	1226	67.0	821
Hertfordshire	13287	5005	74.7	3739
<b>Total</b>	<b>32568</b>	<b>12267</b>	<b>N/A</b>	<b>8645</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

Table 5 shows the estimate of orthodontic need using the Stephen's formula for 2027

**Table 5: Estimating orthodontic need using the Stephen's formula for 2027**

Local Authority	12 year old population 2027 (based on 2011 census)	Orthodontic need based on Stephens formula	%Children accessing NHS dentistry* per LA in previous 24 months to 31 <sup>st</sup> March 2016	Orthodontic need based on % children accessing NHS dentistry
Northamptonshire	9,779	3,683	66.5	2,449
Bedford Borough	2,385	898	66.3	595
Central Bedfordshire	3,711	1,398	74.3	1,039
Luton	3,289	1,239	64.8	803
Milton Keynes	4,122	1,553	67.0	1,041
Hertfordshire	16,808	6,331	74.7	4,729
<b>Total</b>	<b>40,094</b>	<b>15,097</b>	<b>N/A</b>	<b>10,659</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

### 3.6 Estimating orthodontic need using Holmes method

Holmes<sup>26</sup> estimated that 36.3% of 11-12 year olds had an IOTN DHC=3 and AC= 6 or higher. The results of applying this proportion to the 12 year old population data across the Area can be seen in Table 6.

Table 6 and 7: shows the estimate of orthodontic need using the Holmes method for 2015 and 2027 respectively.

**Table 6: Estimating orthodontic need using the Holmes method for 2015**

Local Authority	12 year old mid-year population 2015	Orthodontic need based on Holmes formula	%Children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016	Orthodontic need based on % children accessing NHS dentistry
Northamptonshire	8235	2981	66.5	1,982
Bedford Borough	1949	706	66.3	468
Central Bedfordshire	3077	1114	74.3	828
Luton	2764	1001	64.8	649
Milton Keynes	3256	1179	67.0	790
Hertfordshire	13287	4810	74.7	3,593
<b>Total</b>	<b>32568</b>	<b>11790</b>	<b>N/A</b>	<b>8,310</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

**Table 7: Estimating orthodontic need using the Holmes method for 2027**

Local Authority	12 year old population 2027 (based on 2011 census)	Orthodontic need based on Holmes formula	%Children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016	Orthodontic need based on % children accessing NHS dentistry
Northamptonshire	9,779	3,550	66.5	2,361
Bedford Borough	2,385	866	66.3	574
Central Bedfordshire	3,711	1,347	74.3	1,001
Luton	3,289	1,194	64.8	774
Milton Keynes	4,122	1,496	67.0	1,002
Hertfordshire	16,808	6,101	74.7	4,557
<b>Total</b>	<b>40,094</b>	<b>14,554</b>	<b>N/A</b>	<b>10,269</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

### 3.7 Estimating clinical and perceived orthodontic need 2016 using the NHS 12-year-old Dental Health Survey 2008/09

The North West Public Health Observatory (NWPHO), in collaboration with the British Association for the Study of Community Dentistry (BASCD) completed an oral health survey of 12 year old children in 2008/09, the most recent for this age group. For the first time an orthodontic component was included to measure normative and perceived need. A Modified Index of Treatment Need was used to measure the clinical and aesthetic need for orthodontic intervention based on the Index of Orthodontic Treatment Need (IOTN)

Tables 8 and 9 show the: estimate of clinical and perceived orthodontic need 2015 and 2027 respectively using the NHS 12-year-old Dental Health Survey 2008/09

**Table 8: Estimating clinical and perceived orthodontic need 2016 using the NHS 12-year-old Dental Health Survey 2008/09<sup>27</sup>**

Local Authority	12 year old population (based on 2011 census)	% of Children examined already wearing a brace	Children currently not wearing a brace		% Total need and demand	Translated to numbers	%Children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016	Number that will access orthodontic treatment
			Need – % of Children with IOTN DHC = 3 or AC = 8,9,10	Need and demand - % of Children with IOTN DHC = 3 or AC = 8,9,10 who think their teeth need straightening and are prepared to wear a brace				
Northamptonshire	8,235	8	34.6	19.8	27.8	2,290	66.5	1,523
Bedford Borough	5026	10.7	29.4	20.0	30.7	1,543	60.3	1,146 (higher figure of 74.3% used)
Central Bedfordshire							74.3	
Luton	2,764	11.6	42.2	18.2	29.8	824	64.8	534
Milton Keynes	3,256	8.9	28.7	20.4	29.3	954	67.0	639
Hertfordshire (West, East and North)	13,287	16.4/16.9	28.3/26.8	16.9/19.8	36.2/33.8	4,810 (higher figure of 36.2% used)	74.7	3,593
<b>Total</b>	<b>32,568</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>10,421</b>		<b>7,435</b>

**Table 9: Estimating clinical and perceived orthodontic need 2027 using the NHS 12-year-old Dental Health Survey 2008/09**

	12 year old 2027 population (based on 2011 census)	% of Children examined already wearing a brace	Children currently not wearing a brace		% Total need and demand	Translated to numbers	%Children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016	Number that will access orthodontic treatment
			Need – % of Children with IOTN DHC = 3 or AC = 8,9,10	Need and demand - % of Children with IOTN DHC = 3 or AC = 8,9,10 who think their teeth need straightening and are prepared to wear a brace				
Northamptonshire	9,779	8	34.6	19.8	27.8	2,119	66.5	1,409
Bedfordshire Borough	6098	10.7	29.4	20.0	30.7	1,872	66.3	1,390/146 (higher figure of 74.3% used)
Central Bedford							74.3	
Luton	3,289	11.6	42.2	18.2	29.8	980	64.8	635
Milton Keynes	4,122	8.9	28.7	20.4	29.3	1,208	67.0	809
Hertfordshire(West , East and North)	16,808	16.4/16.9	26.8/28.8	16.9/19.4	33.8/36.8	6,084	74.7	4,545
<b>Total</b>	<b>40,094</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>12,263</b>	<b>N/A</b>	<b>8,788</b>

### 3. 8 Quantification of orthodontic treatment need

Tables 10 and 11 summarise the different needs calculations for the different methods for Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire for 2015 and 2027 projected population estimates.

**Table 10: Summary of methods of assessing normative and expressed need for the area on population data for 2015**

Summary of normative and expressed need calculations for area		
Method of calculation	Normative clinical need	Expressed clinical need taking account of percentage of child population that has visited NHS dentist in the previous 24 months up to 31 <sup>st</sup> March 2016
Child Dental Health survey (2013) method	12,050	8,492
Stephen's formula	12,267	8,645
Holmes method	11,790	8,310
NHS 12-year-old survey 2008/09	10,421	7,435

**Table 11: Summary of methods of assumptions of normative and expressed need for the area on population data for 2027**

Summary of normative and expressed need calculations for area		
Method of calculation	Normative clinical need	Expressed clinical need taking account of percentage of child population that has visited NHS dentist in the previous 24 months up to 31 <sup>st</sup> March 2016
Child Dental Health survey (2013) method	14,835	10,468
Stephen's formula	15,097	10,659
Holmes method	14,554	10,269
NHS 12-year-old survey 2008/09	12,263	8,788

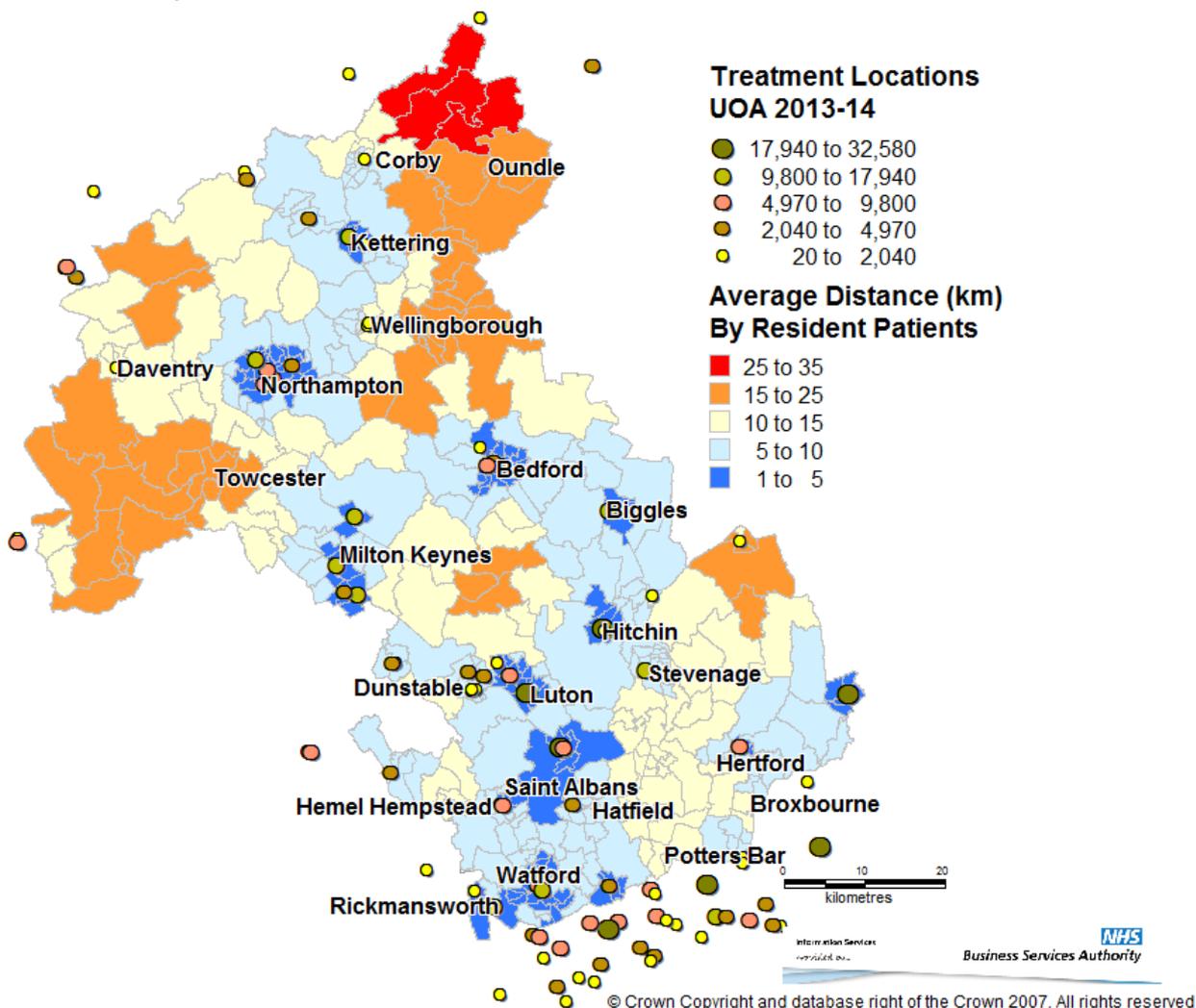
### 3.9 Geography of treatment locations.

The geographical pattern of treatment locations can help assess the appropriateness of dental commissioning, especially when combined with other data such as population and resident patient rates.

Treatment location is the address where orthodontic treatment took place. Treatment locations were selected for a 12 month period for contracts located in the analysed area. The reasoning behind selecting treatment locations rather than practice locations is that for some contracts these locations can be different, therefore treatment locations reflect best where patients actually receive dental treatment. Data based on 12 months to March 2014.

Map 1 below shows treatment locations overlaid onto average distance travelled at ward level. The aim is to show the appropriateness of dental commissioning in relation to areas where patients travel furthest. Those locations with the highest levels are shown with the larger symbols on the map and main towns are shown for geographical reference.

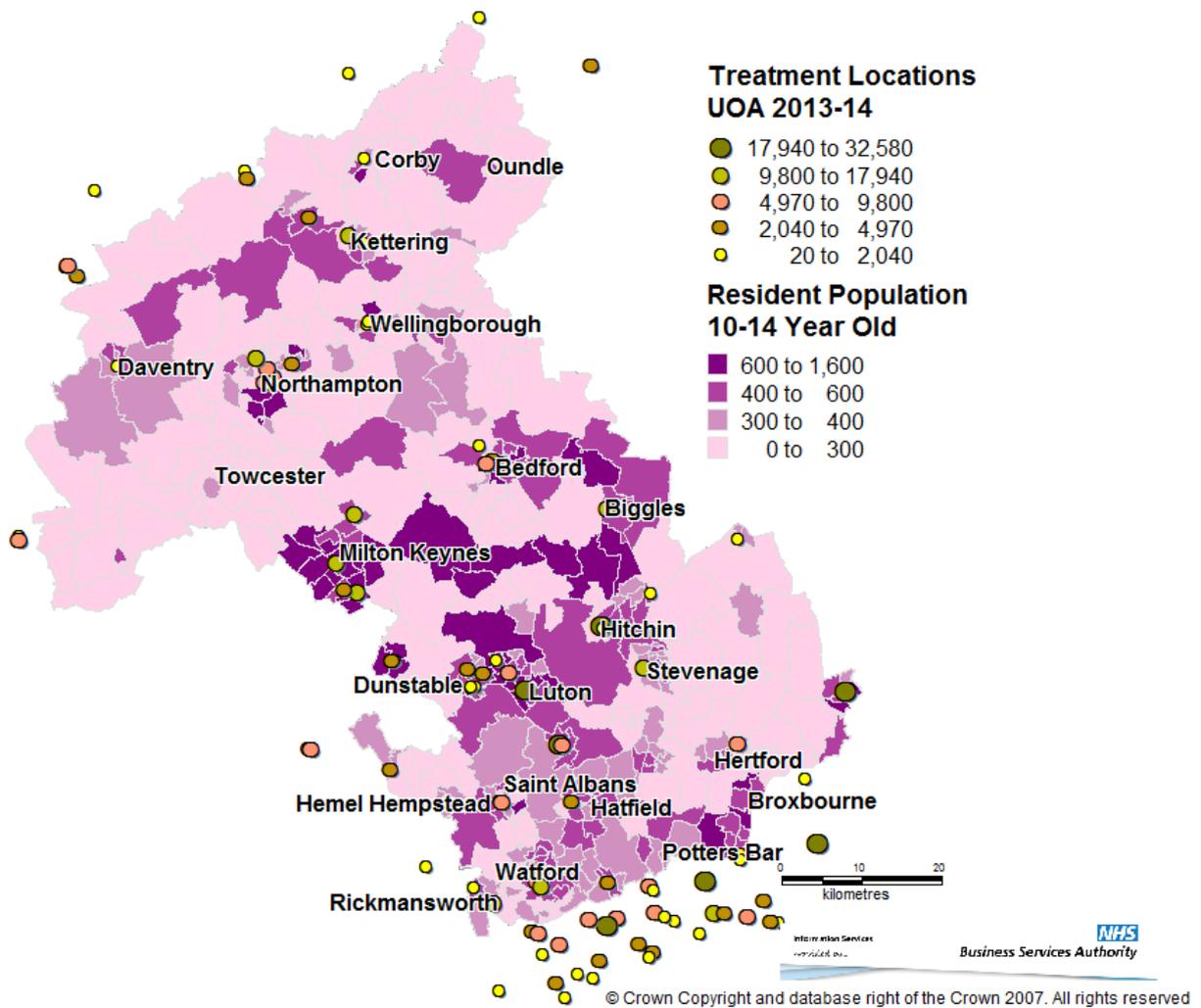
**Map 1: Delivered UOA Treatment Locations (12 months to March 2014) & Average Distance Travelled by of resident patients attending NHS orthodontist (24 months to March 2014)**



Source: NHS BSA

Map 2 below shows treatment locations overlaid onto ward level population for 10-14 year olds (source: 2012: population and household estimates for Wards in England and Wales, ONS). The aim is to show the appropriateness of dental commissioning in relation to the key population group for orthodontic activity.

**Map 2: Delivered UOA Treatment Locations (12 months to March 2014) & 10-14 Year Old Population**



Source: NHS BSA

### 3.10 Population growth

Table 12 shows the population projections for 12 year olds living in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire, up to 2027. These projections are based on the most recent available data 2011 census data.

**Table 12: Population projections for 12 year olds 2018, 2022 and 2027 based on 2011 population data**

Local Authority	12 year old population projections by year				
	2018	% pop increase	2022	% pop increase	2027
Corby	926	17.6	1089	0.3	1092
Daventry	994	1.8	1012	-3.3	979
East Northamptonshire	1228	0.8	1238	-5.6	1169
Kettering	1272	11.9	1424	-5.2	1350
Northampton	2851	10.2	3141	-3.5	3031
South Northamptonshire	1082	9.5	1185	-3.3	1146
Wellingborough	967	7.5	1040	-2.7	1012
<b>Total Northamptonshire</b>	<b>9320</b>	<b>8.7</b>	<b>10129</b>	<b>-3.5</b>	<b>9779</b>
<b>Bedford Borough</b>	<b>2151</b>	<b>11.4</b>	<b>2396</b>	<b>-0.5</b>	<b>2385</b>
<b>Central Bedfordshire</b>	<b>3494</b>	<b>4.9</b>	<b>3665</b>	<b>1.3</b>	<b>3711</b>
<b>Luton</b>	<b>2980</b>	<b>7.9</b>	<b>3215</b>	<b>2.3</b>	<b>3289</b>
<b>Milton Keynes</b>	<b>3767</b>	<b>13.0</b>	<b>4256</b>	<b>-3.1</b>	<b>4122</b>
Broxbourne	1206	8.9	1313	0.6	1321
Dacorum	1854	19.3	2211	-4.3	2117
East Hertfordshire	1899	11.7	2122	-1.6	2088
Hertsmere	1375	10.8	1524	-0.3	1519
North Hertfordshire	1570	16.1	1822	-0.7	1809
St Albans	2070	10.8	2293	0.1	2295
Stevenage	1021	16.1	1185	-1.5	1167
Three Rivers	1222	9.9	1343	0.5	1350
Watford	1290	16.0	1497	4.4	1563
Welwyn Hatfield	1387	12.2	1556	1.5	1579
<b>Total Hertfordshire</b>	<b>14894</b>	<b>13.24</b>	<b>16866</b>	<b>-0.3</b>	<b>16808</b>

Source: ONS Subnational population projections local authorities in England 2011

### 3.11 Other factors to consider in estimating orthodontic treatment need.

Orthodontic services are mainly provided on a referral basis from General Dental Practitioner after assessment. On 31st March 2016 an estimated 66.5% of children in Northamptonshire 66.3% of children in Bedford Borough, 74.3% in Central Bedfordshire, 64.8% in Luton, 67.0% in Milton Keynes and 74.7 in Hertfordshire visited an NHS dentist in the previous 24 months. On 31st March 2017 these figures were 56.7% of children in Northamptonshire 55.9% of children in Bedford Borough, 61.2% in Central Bedfordshire, 53.5% in Luton, 53.5% in Milton Keynes and 62.0% in Hertfordshire over the previous 12 months.

Therefore, not all children will be assessed and referred for orthodontic care if required. In addition, those attending may not perceive a need for treatment even if clinically indicated. Children who are referred for orthodontic treatment should be dentally fit, free from active decay and have good oral hygiene. Across the area on average, 43.3% of 12 year old children in East Northamptonshire, 26.6% in South Northamptonshire, 24.4% in North Hertfordshire, 16.2% in East Hertfordshire, 30.4% in Bedford 29.0% in Central Bedfordshire and 31.4% in Luton have active and untreated tooth decay<sup>28</sup>.

## 4. Understanding orthodontic service provision

### 4.1 Primary care orthodontic services

In Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes, and Hertfordshire, there are 50 NHS primary care orthodontic contracts open. Thirteen of these are General Dental Services (GDS) mixed orthodontic contracts and 37 are Personal Dental Services (PDS) agreements limited to the provision of orthodontics. Primary care orthodontic contracts (including the orthodontic component of mixed contracts) totalled a spend of approximately £19.7 million, of this £18,113,809 was for PDS contracts and £1,659,694 was for the orthodontic component of mixed contracts

There were a total of 308,113 Units of Orthodontic Activity ( UOAs) contracted across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes, and Hertfordshire in 2016/17 in the primary care sector as shown in tables 13 and 14 below.

**Table 13: Recurrent UOAs contracted in PDS contracts up to 2019**

Local Authority	Number of contracts PDS only	Number of UOAs	PDS Contract Value £
Northamptonshire	6	41,847	2,724,437
Bedford Borough	2	16,515	1,099,087
Central Bedfordshire	3	19,409	1,225,228
Luton	2	21,844	1,307,548
Milton Keynes	3	26,040	1,674,463
Hertfordshire	21	156,616	10,082,845
<b>Total</b>	<b>37</b>	<b>282,271</b>	<b>18,113,609</b>

Source: NHS BSA

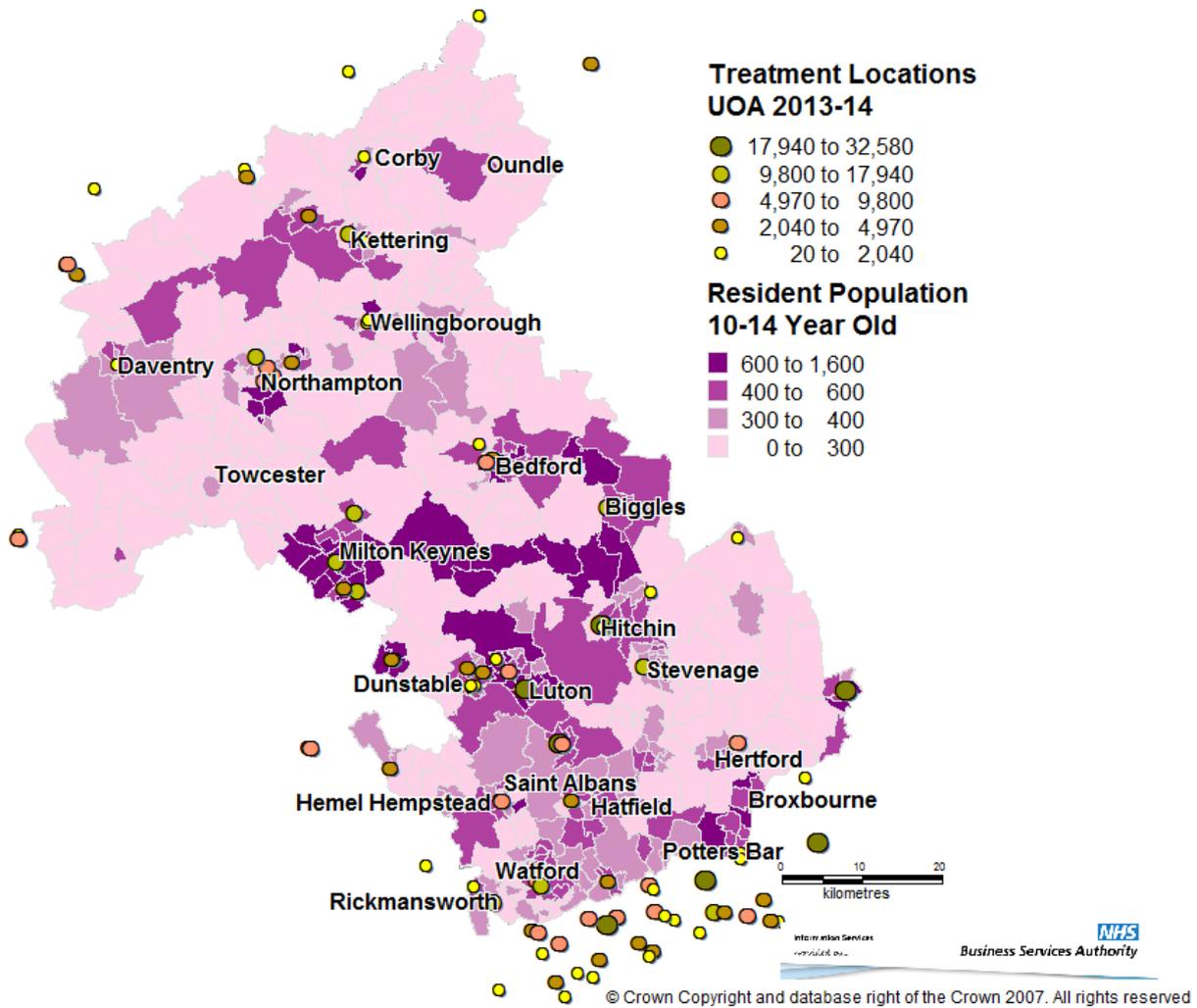
**Table 14. Recurrent UOAs contracted in GDS contracts up to 2019**

Local Authority	Number of GDS contracts With UOAs	Number of UOAs	GDS UOA Contract Value ( £)
Northamptonshire	7	17,218	1,114,351
Bedford Borough	0	0	0
Central Bedfordshire	4	2,451	161,474
Luton	3	7,076	383,868
Milton Keynes	0	0	0
Hertfordshire	0	0	0
<b>Total</b>	<b>14</b>	<b>26,745</b>	<b>1,659,694</b>

Source: NHS BSA

Map 3 shows the treatment locations and the size of the contracts. The shading represents the population of 10-14-year-olds at ward level.

**Map 3: Delivered UOA Treatment Locations (12 months to March 2014) & 10-14 Year Old Population**



Source: NHS BSA

## 4.2 Orthodontic care pathways in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes, and Hertfordshire

Except in the case of internal hospital referrals all referrals for initial orthodontic assessment are usually made by a person's general dental practitioner (although in exceptional circumstances referral may be made by their medical practitioner). These referrals are generally to a specialist orthodontist. Severe cases e.g. patients with cleft lip and palate or those requiring orthognathic surgery may be referred directly, or via a specialist orthodontist, to the consultant led service as part of a multidisciplinary team. Thirteen general dental practitioners provide orthodontic treatment for their own patients under General Dental Services arrangements and may accept referrals from other practices.

## 4.3 Hospital orthodontic services (Secondary Care)

Access to the consultant-led hospital-based orthodontic service would usually be through an onward referral from NHS or private sector primary-care based specialist orthodontic practitioners although there is the facility for GDPs to make direct referrals as well. Such referrals will be limited to difficult, refractory or complex cases (including those requiring a multispecialty approach) which are beyond the normal experience and expertise of a primary-care based specialist orthodontic practitioner. Although such cases will generally have high IOTN DHC scores, as IOTN is not a measure of treatment complexity, it is not, in itself, a valid commissioning tool for hospital services.

The care provided within the secondary care setting includes the assessment and treatment of:

- cleft lip and palate patients;
- patients with cranio-facial abnormalities;
- patients requiring multi-disciplinary care;
- patients with special care needs where these require additional skill of a consultant;
- treatment planning or treatment for patients who have been referred from orthodontic specialists due to complex care needs.
- Cases required for specialist training

Information on secondary care orthodontic services is limited. Contract data only records the number of first and subsequent visits and gives no information on the number of patients treated each year in secondary care. Going forward service specifications for these services could include the requirement for regular data collection.

At present most postgraduate orthodontic training takes place in secondary care in a hospital setting. Trainees must treat a certain number of cases to allow them to meet their training requirements.

There are seven hospital trust providers in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes, and Hertfordshire. They are Bedford Hospital NHS Trust, Luton and Dunstable NHS Foundation Trust, Milton Keynes NHS Foundation Trust, Kettering General NHS Foundation Trust, Northampton General Hospital NHS Trust, West Hertfordshire Hospital NHS Trust and East and North Hertfordshire Hospital NHS Trust.

A small number of patients will be treated in hospitals outside the area including London, Cambridgeshire and Buckinghamshire.

#### 4.4 Secondary Care activity and expenditure

Table 15 shows the orthodontic activity referrals from dental services by provider for years 2015/16 and 2016/2017.

**Table 15: Orthodontic Activity Referrals from Dental services by Provider**

	2015/16	2016/17	Grand Total
<b>Local</b>			
<b>Northampton General Hospital NHS Trust</b>	<b>1,103</b>	<b>1,117</b>	<b>2,220</b>
First Appt	199	193	392
Follow Up	247	205	452
OPP	657	719	1,376
<b>Kettering General Hospital NHS Foundation Trust</b>	<b>1,260</b>	<b>1,206</b>	<b>2,466</b>
First Appt	508	455	963
Follow Up	452	443	895
OPP	300	308	608
<b>Milton Keynes University Hospital NHS Foundation Trust</b>	<b>1,137</b>	<b>1,125</b>	<b>2,262</b>
First Appt	315	316	631
Follow Up	310	237	547
OPP	512	572	1,084
<b>Luton and Dunstable University Hospital NHS Foundation Trust</b>	<b>1,260</b>	<b>1,422</b>	<b>2,682</b>
First Appt	274	289	563
Follow Up	148	227	375
OPP	838	906	1,744
<b>Bedford Hospital NHS Trust</b>	<b>316</b>	<b>293</b>	<b>609</b>
First Appt	77	92	169
Follow Up	54	45	99
OPP	185	156	341
<b>East and North Hertfordshire NHS Trust</b>	<b>673</b>	<b>696</b>	<b>1,369</b>
First Appt	176	175	351
Follow Up	305	247	552
OPP	192	274	466

<b>West Hertfordshire Hospitals NHS Trust</b>	<b>763</b>	<b>723</b>	<b>1,486</b>
First Appt	252	199	451
Follow Up	222	211	433
OPP	289	313	602
<b>Out of Area Trust</b>	<b>1,431</b>	<b>1,462</b>	<b>2,893</b>
<b>Grand Total</b>	<b>7,943</b>	<b>8,044</b>	<b>15,987</b>

Source: NHS England – Midlands & East (Central Midlands)

Table 16 shows the orthodontic activity by Clinical Commissioning Group (CCG) and provider for years 2015/16 and 2016/17.

**Table 16 Orthodontic Activity By CCG & Provider**

	2015/16	2016/17	Grand Total
<b>03V: NHS Corby CCG</b>	<b>1,003</b>	<b>959</b>	<b>1,962</b>
<b>Local</b>			
Kettering General Hospital NHS Foundation Trust	987	922	1,909
Northampton General Hospital NHS Trust	5	13	18
<b>Out of Area Trust</b>	<b>11</b>	<b>24</b>	<b>35</b>
<b>04G: NHS Nene CCG</b>	<b>6,646</b>	<b>6,536</b>	<b>13,182</b>
<b>Local</b>			
Northampton General Hospital NHS Trust	3,985	3,930	7,915
Kettering General Hospital NHS Foundation Trust	2,095	2,071	4,166
Milton Keynes University Hospital NHS Foundation Trust	186	177	363
Luton and Dunstable University Hospital NHS Foundation Trust	9	18	27
Bedford Hospital NHS Trust	11	9	20
<b>Out of Area Trust</b>	<b>360</b>	<b>331</b>	<b>691</b>
<b>04F: NHS Milton Keynes CCG</b>	<b>3,684</b>	<b>3,617</b>	<b>7,301</b>
<b>Local</b>			
Milton Keynes University Hospital NHS Foundation Trust	3,311	3,242	6,553
Luton and Dunstable University Hospital NHS Foundation Trust	74	82	156
Northampton General Hospital NHS Trust	60	82	142
Bedford Hospital NHS Trust	16	22	38
Kettering General Hospital NHS Foundation Trust	1	3	4
<b>Out of Area Trust</b>	<b>222</b>	<b>186</b>	<b>408</b>
<b>06F: NHS Bedfordshire CCG</b>	<b>3,369</b>	<b>3,429</b>	<b>6,798</b>
<b>Local</b>			
Luton and Dunstable University Hospital NHS Foundation Trust	1,645	1,610	3,255
Bedford Hospital NHS Trust	963	958	1,921
Milton Keynes University Hospital NHS Foundation Trust	203	220	423
East and North Hertfordshire NHS Trust	88	125	213

Northampton General Hospital NHS Trust	17	14	31
West Hertfordshire Hospitals NHS Trust	15	11	26
Kettering General Hospital NHS Foundation Trust	3	5	8
<b>Out of Area Trust</b>	<b>435</b>	<b>486</b>	<b>921</b>
<b>06P: NHS Luton CCG</b>	<b>1,887</b>	<b>2,047</b>	<b>3,934</b>
<b>Local</b>			
Luton and Dunstable University Hospital NHS Foundation Trust	1,733	1,876	3,609
East and North Hertfordshire NHS Trust	8	18	26
Bedford Hospital NHS Trust	3		3
West Hertfordshire Hospitals NHS Trust		1	1
Milton Keynes University Hospital NHS Foundation Trust	1		1
<b>Out of Area Trust</b>	<b>142</b>	<b>152</b>	<b>294</b>
<b>06K: NHS East and North Hertfordshire CCG</b>	<b>4,709</b>	<b>5,206</b>	<b>9,915</b>
<b>Local</b>			
East and North Hertfordshire NHS Trust	1,661	1,817	3,478
Luton and Dunstable University Hospital NHS Foundation Trust	397	418	815
West Hertfordshire Hospitals NHS Trust	87	64	151
Bedford Hospital NHS Trust	2	1	3
Milton Keynes University Hospital NHS Foundation Trust		1	1
<b>Out of Area Trust</b>	<b>2,562</b>	<b>2,905</b>	<b>5,467</b>
<b>06N: NHS Herts Valleys CCG</b>	<b>5,662</b>	<b>5,892</b>	<b>11,554</b>
<b>Local</b>			
West Hertfordshire Hospitals NHS Trust	2,628	2,637	5,265
Luton and Dunstable University Hospital NHS Foundation Trust	881	993	1,874
East and North Hertfordshire NHS Trust	184	171	355
Milton Keynes University Hospital NHS Foundation Trust	9	10	19
Bedford Hospital NHS Trust	1		1
<b>Out of Area Trust</b>	<b>1,959</b>	<b>2,081</b>	<b>4,040</b>
<b>Grand Total</b>	<b>26,960</b>	<b>27,686</b>	<b>54,646</b>

Source: NHS England – Midlands & East (Central Midlands)

Table 17 shows the expenditure on orthodontic activity per CCG by year for years 2015/16 and 2016/17

**Table 17 Orthodontic Activity By CCG**

	2015/16 £	2016/17 £	Grand Total £
<b>03V: NHS Corby CCG</b>	<b>113,678</b>	<b>106,914</b>	<b>220,592</b>
<b>Local</b>			
Kettering General Hospital NHS Foundation Trust	111,837	102,748	214,585
Northampton General Hospital NHS Trust	545	1,659	2,204
<b>Out of Area Trust</b>	<b>1,296</b>	<b>2,508</b>	<b>3,804</b>

<b>04G: NHS Nene CCG</b>	<b>732,454</b>	<b>724,837</b>	<b>1,457,291</b>
<b>Local</b>			
Northampton General Hospital NHS Trust	441,372	439,038	880,410
Kettering General Hospital NHS Foundation Trust	228,180	223,885	452,066
Milton Keynes University Hospital NHS Foundation Trust	20,733	20,324	41,057
Bedford Hospital NHS Trust	1,290	1,084	2,374
Luton and Dunstable University Hospital NHS Foundation Trust	1,026	2,048	3,074
<b>Out of Area Trust</b>	<b>39,852</b>	<b>38,458</b>	<b>78,310</b>
<b>04F: NHS Milton Keynes CCG</b>	<b>425,690</b>	<b>419,713</b>	<b>845,402</b>
<b>Local</b>			
Milton Keynes University Hospital NHS Foundation Trust	381,605	376,491	758,096
Luton and Dunstable University Hospital NHS Foundation Trust	8,710	9,471	18,181
Northampton General Hospital NHS Trust	6,668	9,596	16,264
Bedford Hospital NHS Trust	1,858	1,581	3,439
Kettering General Hospital NHS Foundation Trust	164	164	329
<b>Out of Area Trust</b>	<b>26,683</b>	<b>22,410</b>	<b>49,093</b>
<b>06F: NHS Bedfordshire CCG</b>	<b>391,029</b>	<b>397,637</b>	<b>788,666</b>
<b>Local</b>			
Luton and Dunstable University Hospital NHS Foundation Trust	195,452	190,108	385,559
Bedford Hospital NHS Trust	109,989	105,416	215,405
Milton Keynes University Hospital NHS Foundation Trust	23,558	25,942	49,499
East and North Hertfordshire NHS Trust	9,711	15,105	24,816
Northampton General Hospital NHS Trust	1,817	1,438	3,254
West Hertfordshire Hospitals NHS Trust	1,737	1,326	3,064
Kettering General Hospital NHS Foundation Trust	310	664	974
<b>Out of Area Trust</b>	<b>48,455</b>	<b>57,638</b>	<b>106,093</b>
<b>06P: NHS Luton CCG</b>	<b>225,772</b>	<b>245,533</b>	<b>471,304</b>
<b>Local</b>			
Luton and Dunstable University Hospital NHS Foundation Trust	206,183	223,091	429,273
East and North Hertfordshire NHS Trust	977	2,023	3,001
Bedford Hospital NHS Trust	330		330
Milton Keynes University Hospital NHS Foundation Trust	76		76
West Hertfordshire Hospitals NHS Trust		183	183
<b>Out of Area Trust</b>	<b>18,205</b>	<b>20,236</b>	<b>38,442</b>
<b>06K: NHS East and North Hertfordshire CCG</b>	<b>511,665</b>	<b>636,669</b>	<b>1,148,333</b>
<b>Local</b>			
East and North Hertfordshire NHS Trust	178,952	207,879	386,831
Luton and Dunstable University Hospital NHS Foundation Trust	46,958	51,123	98,081
West Hertfordshire Hospitals NHS Trust	10,677	7,777	18,455
Bedford Hospital NHS Trust	290	170	459
Milton Keynes University Hospital NHS Foundation Trust		112	112
<b>Out of Area Trust</b>	<b>274,788</b>	<b>369,608</b>	<b>644,395</b>
<b>06N: NHS Herts Valleys CCG</b>	<b>643,245</b>	<b>704,002</b>	<b>1,347,247</b>
<b>Local</b>			
West Hertfordshire Hospitals NHS Trust	308,067	305,490	613,557
Luton and Dunstable University Hospital NHS Foundation Trust	105,093	118,059	223,152

East and North Hertfordshire NHS Trust	20,352	20,086	40,437
Milton Keynes University Hospital NHS Foundation Trust	997	1,172	2,169
Bedford Hospital NHS Trust	170		170
<b>Out of Area Trust</b>	<b>208,567</b>	<b>259,194</b>	<b>467,761</b>
<b>Grand Total</b>	<b>3,043,532</b>	<b>3,235,304</b>	<b>6,278,836</b>

Source: NHS England – Midlands & East (Central Midlands)

#### 4.5 Estimate of hospital service cost per case and numbers treated

It should be stated this report does not yet include actual numbers of orthodontic cases treated in hospital services but an estimate.

Hospital dental services are commissioned for the resident population who may seek treatment at any provider trust, with a recharge back to the host NHS England on Payment by Results (PbR) tariff. Hospital tariffs for orthodontic treatment in secondary care are set at national level. The estimates used in this document are based on first attendance and follow up attendance for multi-professional, however some cases will be charged on a single professional lower tariff price too therefore this estimate has also been calculated.

Orthodontic cases take approximately 18 months to treat. The cost estimates for this work are based on the following number of appointments:

1<sup>st</sup> appointment

6 weekly appointments over 18 months (78 weeks / 6 = 13) 13 x follow up appointments

2 repair visits (2 follow ups)

1 visit to fit retainers (1 follow up)

3 visits for supervised retention (3 follow up visits)

In summary each hospital case has been costed as 1 first appointment plus 19 follow up appointments. If national tariff for multi-disciplinary is used for first appointment and follow up attendances then a course of treatment would cost £2,360. If national tariffs for single professional for first attendance and follow up attendance, the cost per case would be £1,637.

Using this calculation, for 2015/16 the number of cases treated in hospital using all multi-disciplinary tariff would be 164, and if using single professional tariff would be 236.

Using this calculation, for 2016/17 the number of cases in hospital using all multi-disciplinary tariff would be 102, and if using single professional tariff would be 147.

## 4.6 Estimating capacity

Tables 11 and 12 show that there are 26,745 UOA within general contracts (GDS) and 282,271 within orthodontic only (PDS) contracts. This gives a total of 309,016 UOAs commissioned in primary care. To estimate the number of case starts that would be available per year with the current capacity the Commissioning Guide for Orthodontics suggests dividing the total number of UOAs commissioned by 21. This would give a figure of 14,715 case starts per year. A more realistic estimate may be obtained by allowing 22 UOAs per case. This takes account of UOAs needed for assessments only. In this case an estimate of 14,048 case starts are available each year. For the purposes of this document 22 UOAs will be used for all calculations of service provision or estimates of orthodontic need.

GDS contracts are non time limited. The number of UOAs commissioned within these contracts will need to be considered when new orthodontic service are commissioned under PDS arrangements from April 2019.

## 4.7 Workforce

There is no information available about the local orthodontic workforce. The General Dental Council Specialist List for orthodontics may provide an estimate. However it gives no information about where these specialists may be working, the number of whole time equivalents (WTE) and whether they are employed in NHS primary or secondary care or private practice.

An orthodontic workforce survey in 2005 identified that 38% of the orthodontic workforce, of approximately 440 orthodontists intended to retire before 2015 and there will be a potential shortfall of between 60 and 110 by 2015<sup>29</sup>

To maintain the current workforce, 40 new specialists a year would need to be trained and this would still lead to numbers per head of population below ratios in the rest of Europe.

## 4.8 Training needs

Future orthodontic contracts should take into account these training needs if the workforce is to be maintained. The training of specialist orthodontists is the responsibility of Health Education England (HEE) nationally. Training for both secondary care and primary care practitioners currently takes place in a secondary care setting. While this is entirely appropriate for the more extended, five year, training programme for future orthodontic consultants training of specialist primary care orthodontic providers, currently a three year programme, has the potential to be undertaken elsewhere for example in accredited specialist practices. Any change in training arrangements would need to be agreed nationally. At present some

secondary care training sites requires a number of suitable patients to provide this training experience for the trainees at different stages of their training programme. In the early stages of training these may be relatively simple cases which, under normal circumstances, do not meet the acceptance criteria for secondary care services, i.e. patients needing complex or multidisciplinary care. The NHSE will need to make provision for this training need when commissioning secondary care orthodontic services.

For referral pathways to work well the right patients should be referred to the most appropriate service at the right time. The availability of suitable training for general dental practitioners may support this process and help improve quality for patients. For a number of reasons it may not be particularly appropriate for GPs to be trained to use the IOTN assessment tool and there may be risks associated with adopting this route. However the provision of local courses such as making a good orthodontic referral together with the use of the British Orthodontic Society guidance on orthodontic referrals would help improve the quality and timeliness of referrals.

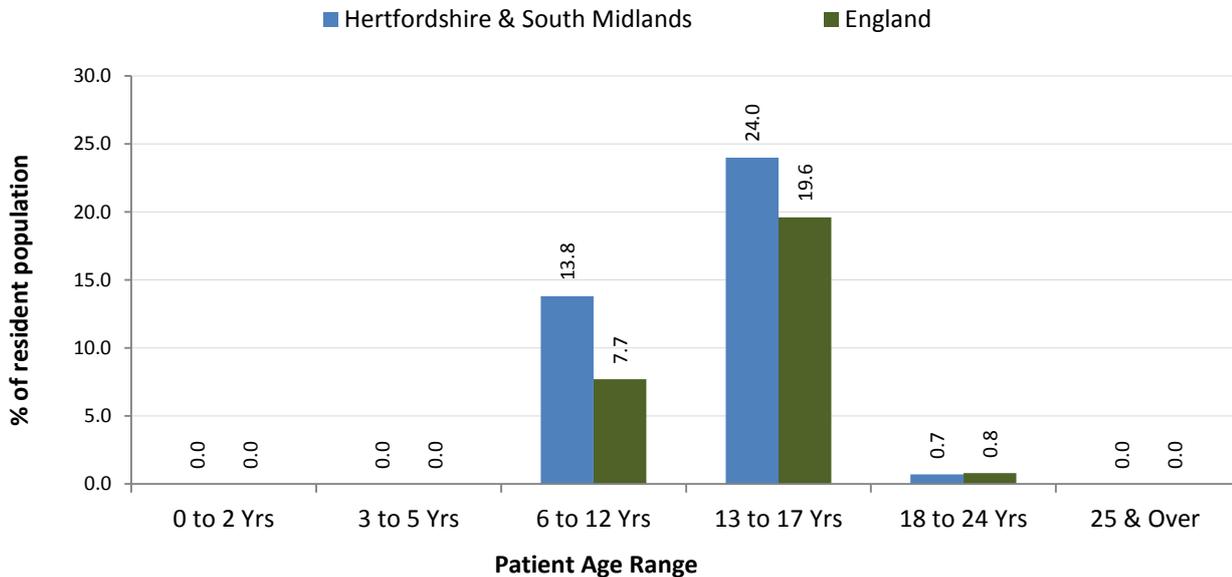
Increasingly skill mix is becoming important to help meet the demand for services without increasing the cost. Orthodontic therapists have a role to play in the provision of orthodontic services and any future training programmes and commissioning of services should be flexible enough to take account of this.

#### 4.9 Assessments and treatments in primary care

The majority of residents attending an NHS orthodontist in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire are aged between 6 and 17 years.

The graph below, figure 1, shows the percentage of residents who attended an orthodontic dentist for the area as a whole and compared to England by age group in order to highlight any variance from national rates.

**Figure 1; Graph to show percentage of residents attending NHS orthodontist (24 months to March 2016)**



Source NHS BSA

Figure 2 demonstrates the proportion of assessments with the subsequent decision to start treatment. A high proportion of assessments with a decision to provide treatment are arguably more efficient than a high proportion of assessments that are not. A low proportion may indicate poor value for money where assessment is not being translated into treatment. This information should be considered in conjunction with local knowledge. The outcome is shown as a proportion of all assessments in the analysed period based on patient's residence. The patient's residence is determined by the postcode recorded in the personal details section of each FP170 submitted. Data has been extracted for 12 months up to March 2014. As some practices do not submit FP170 for orthodontic assessments the data in figure 1 may not be accurate.

**Figure 2: Percentage of assessments that were 'assess and fit appliance' (12 months to March 2016) (Source NHSBSA)**

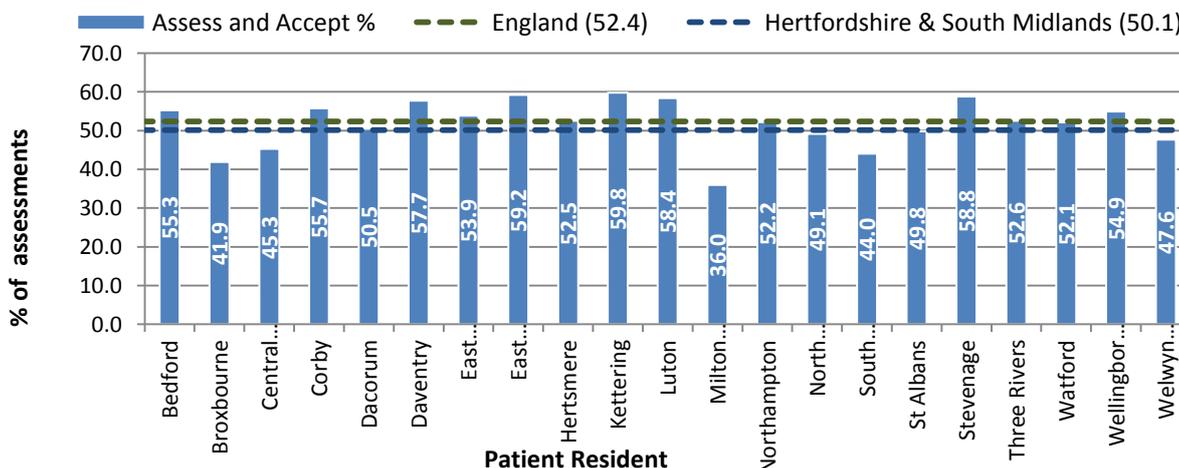
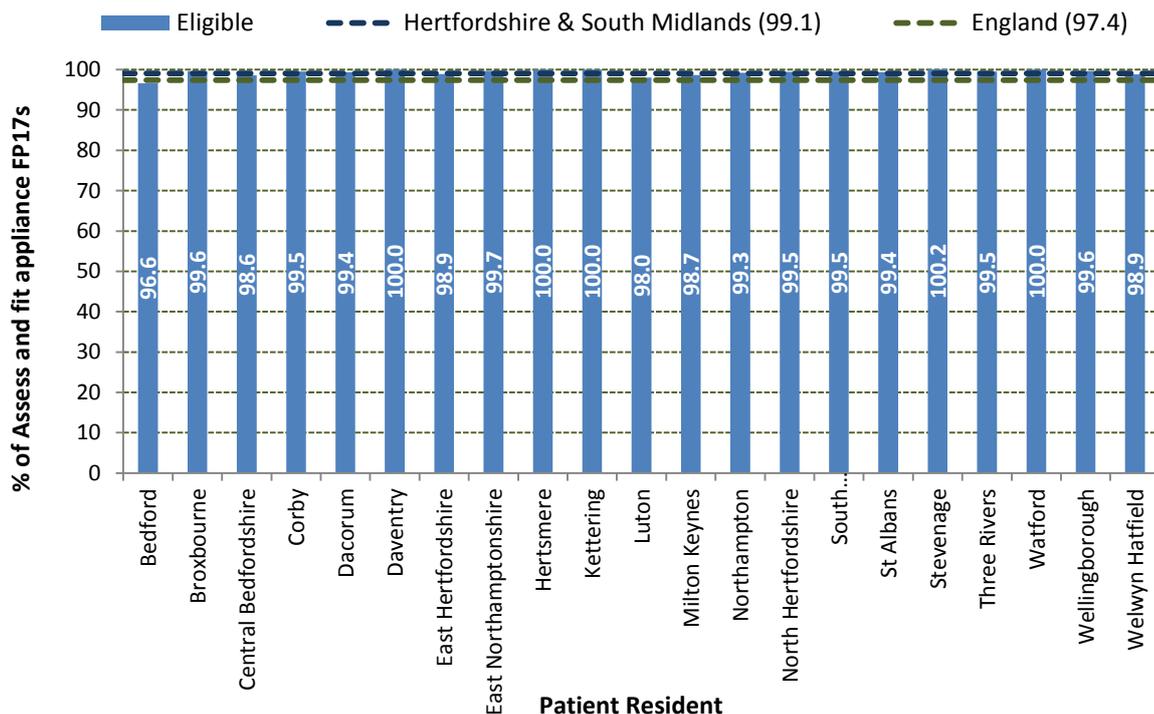


Figure 3 is an indicator of the eligibility of cases accepted for treatment using the IOTN assessment. A low percentage indicates that not all cases accepted were eligible for treatment using IOTN method of assessing need.

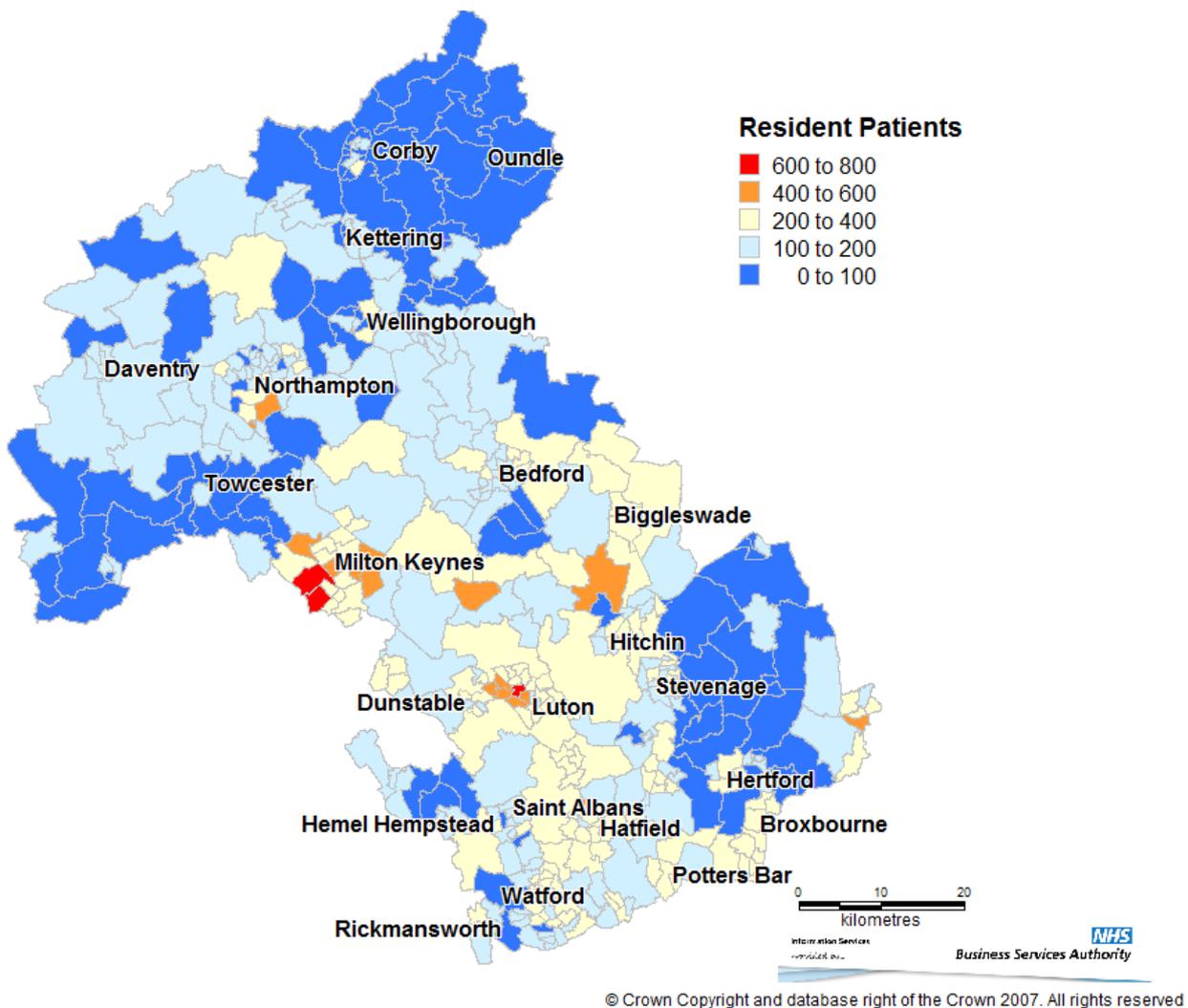
**Figure 3: Percentage of assess and fit appliance FP17s where the IOTN was eligible (12 months to March 2016) (Source NHSBSA)**



#### 4.10 Resident population attending a dentist (primary care orthodontic services)

Map 4 demonstrates the number of patients visiting an NHS orthodontist; the red and orange areas are an indicator of more patients accessing service therefore greater demand. The map shows that the highest areas of demand are around Milton Keynes, Luton, Northampton and Hitchin.

**Map 4: Total resident patients attending NHS orthodontist (24 months to March 2014)  
(Source NHSBSA)**

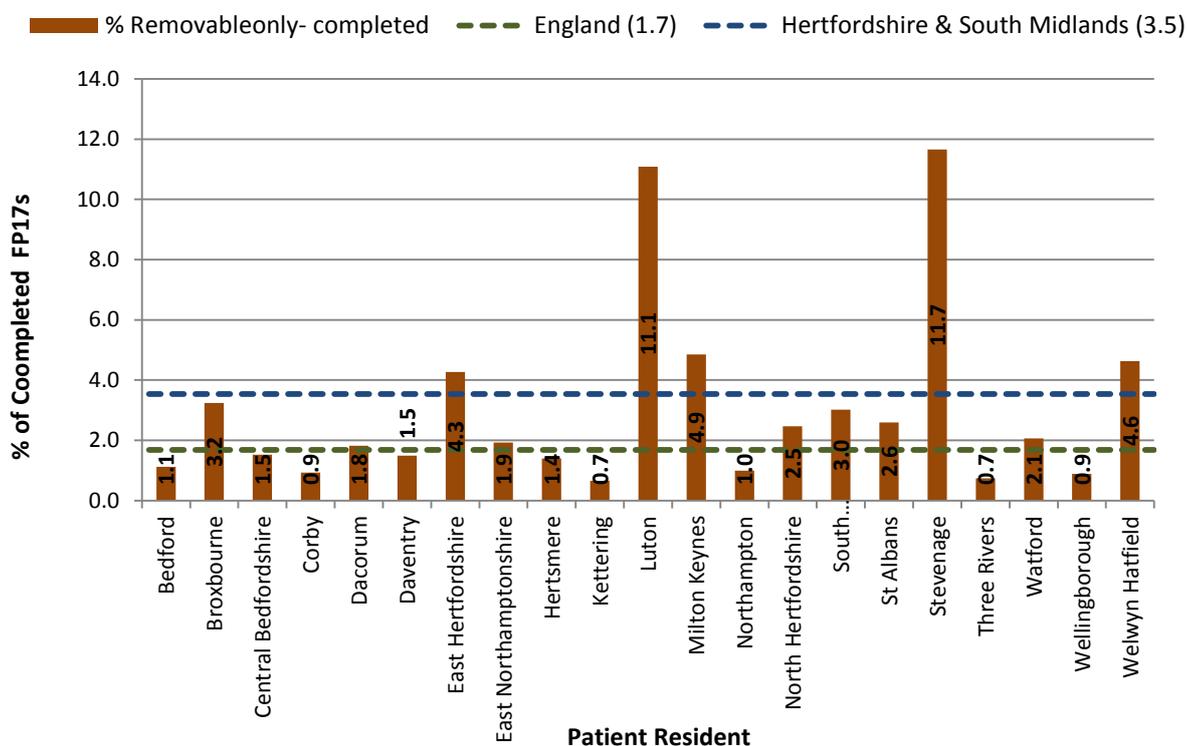


Source: NHS BSA

#### 4. 11 Treatment

Figure 4 demonstrates the percentage of courses of treatment carried out with removable appliances only. It is widely accepted that optimal orthodontic results are seldom obtained by using removable orthodontic appliances alone. A high proportion may represent poor technique, reduced efficiency and effectiveness and suboptimal outcomes for patients.

**Figure 4: Percentage completed treatment with removal appliance only (12 months up to March 2016) (Source NHSBSA)**



#### 4. 12 Patient feedback

The NHS Dental Services sends out patient satisfaction surveys to a random sample of case starts within one month of the date of the reported start. From January 2016 to December 2017 4,195 questionnaires were sent out to patients receiving orthodontic treatment in Hertfordshire and the South Midlands. A total of 979 were completed, a response rate of 23.3%.

The majority of respondents (95.6%) received NHS treatment; a small proportion (0.8%) received a combination of NHS and private treatment. This gives an indication of private treatment levels but only for those who have also received NHS orthodontic treatment.

The satisfaction questionnaire survey shows that of the 979 patients that responded, the majority of patients (94.6%) were completely or fairly satisfied with their orthodontic treatment as shown in Table 18. As the survey is sent within a month of reported start of orthodontic treatment, the results only relates to the beginning of orthodontic treatment.

**Table 18: Patients satisfaction with dental treatment (Source NHSBSA)**

Patient's satisfaction with dentistry received	Percentage (%)
Completely satisfied	76.8
Fairly satisfied	17.8
Fairly dissatisfied	2.8
Very dissatisfied	1.7
No response	0.8

#### 4.13 Stakeholder engagement

The Local Dental Network (LDN) and the orthodontic Managed Clinical Network (MCN) have an important role to play in the commissioning of orthodontic services. There is on-going engagement with the Orthodontic MCN and the LDN which includes representation from stakeholders including the Local Dental Committees, Local Authority, Health Education England and Healthwatch.

#### 4.14 Summary of funding for primary and secondary care

In Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire primary care orthodontic contracts (including the orthodontic component of mixed contracts) totalled a spend of approximately £19.7 million, Of this £18,113,809 was for PDS contracts and £1,659,694 was for the orthodontic component of mixed contracts.

In 2015/16 £387,744 was spent on orthodontic activity delivered in a hospital setting.. For 2016/17 this figure was £241,881

#### 4.15 Ethnicity

In April 2010 a change was made requiring mandatory completion of the ethnicity marker on the FP17. This information can be used to analyse FP17 data by ethnicity category, so that commissioners can see if all ethnicity categories are being seen by dentists. Therefore gaps in provision to certain ethnicity groups can be identified, and the appropriate services then commissioned.

As stated on the Patient Declaration part of an FP17. "What is your ethnic group?". The patient can enter their ethnic group, but if they are not prepared to, cross the patient declined box.

Figure 5 below shows the proportion of courses of treatment (FP17s) where ethnicity is recorded (i.e. the ethnicity group has been filled in or the patient declined) and the percentage where an ethnicity is included (i.e. the ethnicity group has been filled in; this excludes those where the patient declined). These proportions are shown based on the patient local authority i.e. where a patient is resident in Hertfordshire and the South Midlands, based on home postcode as entered on FP17.

**Figure 5: % FP17s where Ethnicity Recorded or Included in 2013/14**

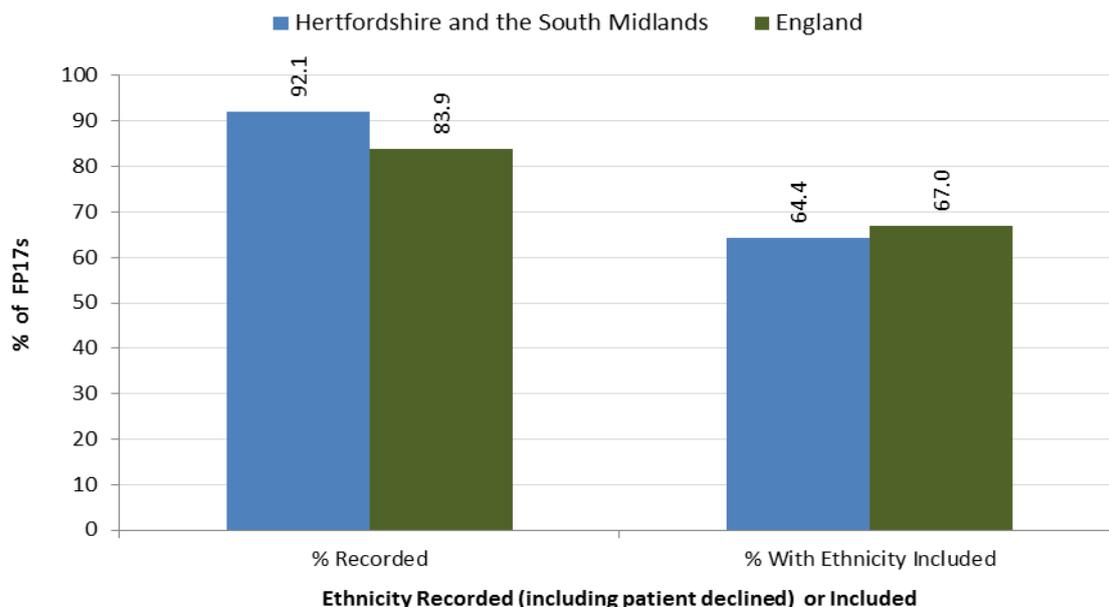


Table 19 below shows the breakdown of ethnicity recorded on courses of treatment (FP17s) in Hertfordshire and the South Midlands, where ethnicity is recorded (i.e. the ethnicity group has been filled in or the patient declined) and the % where an ethnicity included (i.e. the ethnicity group has been filled in; this excludes those where the patient declined).

**Table 19: Breakdown of ethnicity recorded on Ortho FP17s 2013/14**

Ethnicity	Total FP17s	% Recorded	% With Ethnicity Included
White British	24,492	51.5	56.0
Patient declined	13,190	27.8	30.1
Indian	1,211	2.5	2.8
Pakistani	1,094	2.3	2.5
Other White Background	769	1.6	1.8
Black African	470	1.0	1.1
Other mixed background	360	0.8	0.8
Bangladeshi	359	0.8	0.8
Any other ethnic group	318	0.7	0.7
White & Black Caribbean	268	0.6	0.6
Other Asian Background	237	0.5	0.5

Black Caribbean	218	0.5	0.5
White and Asian	210	0.4	0.5
White and Black African	205	0.4	0.5
Chinese	143	0.3	0.3
White Irish	129	0.3	0.3
Other Black background	94	0.2	0.2
Unspecified	3,749	7.9	-

## 5. Matching need to capacity

In this document an assumption has been made that each case start requires 22 UOAs to complete treatment (i.e. including two assessments to one course of treatment commenced)<sup>30</sup>. Therefore in order to estimate whether the current commissioned capacity in primary care orthodontic services is meeting need the current contracted UOA activity was divided by 22.

Using this method there are an estimated **14,048** case starts available per year across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire.

Table 20 below shows the current number of UOAs commissioned, by upper tier Local Authority; both under GDS and PDS contracts and an estimate of the number of case starts this would allow 2018/19

**Table 20: number of UOAs commissioned in GDS and PDS contracts by LA 2018/2019**

Local Authority	Number of UOAs in GDS contracts	Number of UOAs in PDS contracts	Total number of UOAs	Estimated number of case starts available UOAs/22
Northamptonshire	17,218	41,847	59,065	2,685
Bedford Borough	0	16,515	16,515	751
Central Bedfordshire	2,451	19,409	21,860	994
Luton	7,076	21,844	28,920	1,315
Milton Keynes	0	26,040	26,040	1,184
Hertfordshire	0	156,616	156,616	7,119
<b>Total</b>	<b>26,745</b>	<b>282,271</b>	<b>309,016</b>	<b>14,048</b>

Source: NHSE

A range of methods are available to calculate normative and perceived and expressed need for orthodontic treatment in a population of 12 year olds. These methods have been described and used in the document to estimate this need across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire.

Stephen's Formula gave the highest estimate of need in a population of 12 year olds using population projections for 2027. The BASCD national dental survey of 12 year olds 2008/2009 gave the lowest estimate using population projections for 2027.

Tables 21 and 22 below together give the range of estimates of the number of case starts that may be required to meet the orthodontist needs, both normative and expressed for the local population.

Table 21 below uses the Stephen's Formula to estimate the number of case starts that would be required to meet the orthodontic needs, both normative and expressed of the 12 year old population using 2027 population projections.

**Table 21: Estimate of number of case starts, using Stephen's Formula, required to meet normative and expressed need for orthodontic treatment by LA using population projection for 2027**

Local Authority	Normative need (number of case starts)	% children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016 (number of case starts)
Northamptonshire	3,683	2,449
Bedford Borough	898	595
Central Bedfordshire	1,398	1,039
Luton	1,239	803
Milton Keynes	1,553	1,041
Hertfordshire	6,331	4,729
<b>Total</b>	<b>15,097</b>	<b>10,659</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

Table 22 uses the BASCD Child Dental Health Survey of 12 year olds 2008/2009 to estimate the number of case starts that would be required to meet the orthodontic needs, both normative and expressed of the 12 year old population using 2027 population projections.

**Table 22: Estimate of number of case starts, using Child Dental Health Survey 2008/2009 data, required to meet normative and expressed need for orthodontic treatment by LA using population projection for 2027**

Local Authority	Normative need (number of case starts)	% children accessing NHS dentistry* per LA in previous 24 months to 31st March 2016(number of case starts)
Northamptonshire	2,119	
Bedford Borough	1,872	1,390
Central Bedfordshire		
Luton	980	635

Milton Keynes	1,208	809
Hertfordshire	6,084	4,545
Total	<b>12,263</b>	<b>8,788</b>

\* Data is from NHS Digital and is percentage of child patients seen in the previous 24 months as a percentage of the population Local Authority

In the current orthodontic activity commissioned, across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire. There is capacity for an estimated **14,048** case starts available for 2018/2019 and for any subsequent year.

Using the current available methods of assessing orthodontic need it is estimated that between **12,263** and **15,097** case starts would need to be commissioned to meet normative by 2027.

To meet expressed need (% of children currently accessing an NHS dentist) it is estimated that between **8,788** and **10,659** case starts would be required to meet this need by 2027

Other factors affecting supply, demand and uptake of orthodontic services include:

- NHS hospital orthodontic provision
- an unqualified private market
- modifying factors such as, groups with lower perceived need and cases with unstable dental caries considered inappropriate for commencement of orthodontic care

## 5.1 Uncertainty in estimation of orthodontic treatment need, demand and supply.

Planning assumptions about the type, location and quantity of orthodontic services face a lack of precision and there is underlying uncertainty about the extent of this unavoidable inaccuracy.

### Need

Some estimates of need are based on the use of the Index of Treatment Need (Dental Health Component). Although this is a robust measure, underpinned by direct measurements of dental arches or models, there is some measurement variability associated with the changes in the developing permanent dentition at different ages.

The professionally-determined estimate of 'need' embodied in IOTN (DHC) categories 4 and 5 was established as the threshold for NHS treatment on the basis that these higher categories represent both the greatest variation from an ideal occlusion and the most likely to produce the greatest improvement following treatment. However, unlike the majority of clinical interventions, orthodontic procedures do not address a diagnosable disease process. A persons perceived (felt) need for the benefits of orthodontic intervention is subjectively determined, as a consequence of personal and broader societal factors. The perceived need

for good-looking teeth is of increasing importance to young people. This rapid secular change creates uncertainty in planning assumptions.

## Demand

The number seeking referral for orthodontic treatment (demand) will inevitably increase as the level of perceived need rises in a population. This applies across all age groups. There is uncertainty how rapidly this future increasing demand will manifest itself and impact on planning assumptions based on either historical levels of supply or the established modelling formulae outlined in Section 3.

There are barriers which impact on whether perceived need translates into demand, such as whether a young person or their family has ready access to a dental practice to initiate a referral or is prepared to commit to the appointments required for orthodontic appliance treatment. Some of these barriers are related to the location of primary care and orthodontic providers in more rural areas.

Commissioning which rightly seeks to address this inequity through establishing new treatment locations then creates uncertainty around how much additional demand is created by remove such geographical barriers to access.

## Supply

It is necessary for a person to be seen in primary dental care before an assessment can be made of the likely benefit of an orthodontic referral. The availability of primary dental care for the proportion of the population with a specific felt need, their actual attendance, the number failing to reach and appropriate level of oral health for intervention, and the willingness of the dentist to initiate a referral are not measured.

Each element lends uncertainty to the planning assumptions. Practices providing orthodontic services may offer care under NHS or private contractual arrangements. The extent to which private orthodontic care meets overall population demand is unknown, and will vary from place to place dependent on the local availability of private provision.

There is shifting uncertainty at the margin of private and NHS-commissioned care in practices offering both. The majority of patients are referred from NHS primary care practices but may choose treatment under private contract if there are benefits (such as choice of appointments or shorter waiting time) in doing so. With the later example the rate of new NHS case starts may vary across the year influencing the choice of private care as an expedient when NHS waiting times lengthen.

Understanding the number of completed cases from overall contract values is uncertain, as it depends on assumptions relating to number of UOAs and the number of retreatments needed or undertaken cannot be quantified from the existing NHS GDS datasets.

Hospital orthodontic activity is recorded and reported in various ways consistent with national datasets (such as overall number of outpatient attendances) but does not provide direct measures of activity (such as number of new referrals and casemix) or outputs such as number of completed cases. Estimates of outputs based on available routine NHS datasets will have intrinsic uncertainty.

### Population estimates

The number of the local population in the cohort most likely to be at the appropriate age for substantive orthodontic intervention (with appliance therapy) underpins all the methods for estimating the level of service required.

The Office for National Statistics provides annual population estimates and projections for population changes for future years based on 2011 census data. Uncertainty in these estimates is recognised and reported by ONS.

Planning assumptions which attempt to relate the resident populations of small geographical areas to orthodontic services provided within those areas carry a high level of uncertainty than assumptions for larger areas. This is because the unknown impact of cross boundary patient flows is likely to be greater.

## 6. Deprivation and orthodontic need

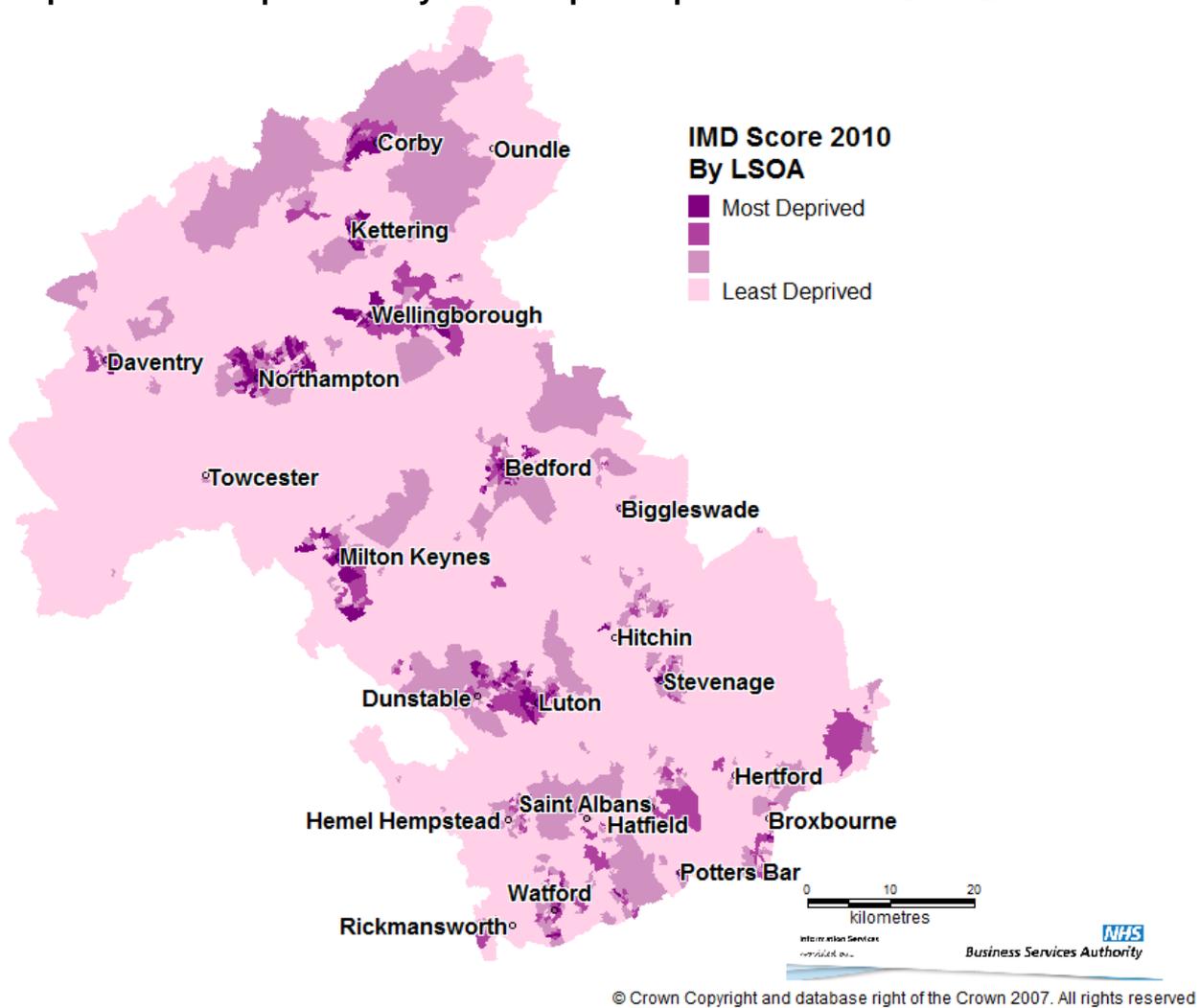
Malocclusion is unique among oral diseases in that its incidence and prevalence are not related to socioeconomic status. There is, however, evidence that uptake of orthodontic services is higher in less deprived groups and socioeconomic variation in access to orthodontic treatment with levels of unmet need higher in children from deprived schools. This may reflect differences in demand, differences in the availability of orthodontic services and/or variations in access to and referral patterns by GPs. Whatever the cause, it highlights the potential of orthodontic services to increase health inequalities.

The national child dental health survey (2003)<sup>31</sup> examined orthodontic treatment need among 12 to 15-year-olds and found that there was effectively no difference between children from deprived and less deprived areas in terms of need. However, another study analysing data on service use showed that children in less deprived areas were more likely to use orthodontic services compared to children in more deprived areas. The authors suggest that there are many possible reasons for a difference in uptake in areas such as attendance patterns of the child and parent, service provision, personal choice and personal health care priorities but acknowledge that the survey was not detailed enough to provide reasons for possible links between deprivation and orthodontic uptake<sup>32</sup>.

In the 2013 Child Dental Health Survey<sup>33</sup>, the findings suggest that children from more deprived backgrounds may not be receiving orthodontic treatment compared to children from less deprived areas.

Map 5 below shows level of deprivation by lower super output area. Those areas shaded purple have the highest overall IMD score, relative to the area as a whole, and therefore can be classed as the most deprived. It must be stressed that this level of deprivation is relative to the particular area analysed. Main towns are included for geographical reference.

**Map 5: level of deprivation by lower super output area March 2013/2014**



Source: NHSBSA

## 7. Patient flows

The majority of residents in the area receive their treatment in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire. Some patients may find it more convenient to be treated near their schools or where their parents work and this may account for some of the variation.

Table 23 shows patient flows by locality.

**Table 23: Patient flows by locality**

	Sum of Number of Patients Treated
<b>CM - Central Locality</b>	
NHS Corby CCG	232
NHS East Leicestershire and Rutland CCG	112
NHS Leicester City CCG	3
NHS Nene CCG	6,928
NHS West Leicestershire CCG	6
<b>CM - North Locality</b>	
NHS Lincolnshire East CCG	2
NHS Lincolnshire West CCG	229
NHS North Lincolnshire CCG	69
NHS South Lincolnshire CCG	4
NHS South West Lincolnshire CCG	2
<b>CM - South Locality</b>	
NHS Bedfordshire CCG	3,327
NHS East and North Hertfordshire CCG	4,578
NHS Herts Valleys CCG	4,448
NHS Luton CCG	1,945
NHS Milton Keynes CCG	1,893
<b>London</b>	<b>479</b>
<b>North</b>	<b>865</b>
<b>South</b>	<b>1,737</b>
<b>#N/A</b>	<b>6,222</b>
<b>East of England (Midlands &amp; East)</b>	<b>2,227</b>
<b>North Midlands (Midlands &amp; East)</b>	<b>254</b>
<b>West Midlands (Midlands &amp; East)</b>	<b>178</b>
<b>Grand Total</b>	<b>35,740</b>

## 8. Waiting times

In primary care waiting time data for orthodontics is difficult to determine because there is no agreed methodology for assessing waiting times.

A national orthodontic UK survey<sup>34</sup> reported that waiting times for the commencement of treatment was 24 weeks.

In England, under the NHS Constitution, patients 'have the right to access certain services commissioned by NHS bodies within maximum waiting times, or for the NHS to take all reasonable steps to offer a range of suitable alternative providers if this is not possible'.

The maximum waiting time for non-urgent consultant-led treatments is 18 weeks from the day the appointment is booked through the NHS e-Referral Service, or when the hospital or service receives the referral letter.

In 2017 a questionnaire was sent out to all orthodontic providers in Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire. Fifty practice were contacted and a total of 31 (62%) responded.

The results to the question about waiting times from referral to assessment and from assessment to treatment start are shown in tables 24 and 25 below.

**Table 24: Waiting times in weeks from referral to assessment**

Waiting time in weeks between referral to assessment	0	1-5	6-10	10-15	16-20	20-52	Not accepting patients
Number of practices	1	10	11	3	1	3	2

**Table 25: Waiting time in weeks from assessment to treatment**

Waiting time in weeks between assessment and treatment	0	1-5	6-10	10-15	16-20	20-52	>52	Not accepting patients
Number of practices	1	11	9	5	0	5	2	0

## 9. Quality and outcome measures

An orthodontic quality and outcome tool enables the measurement of quality using a number of indicators under the headings delivery, assessment, treatment and outcomes.

The Delivery indicator measures the percentage of UOAs delivered against the contract. This tends to be a self-monitoring indicator since underperformance of less than 96% results in a financial clawback.

The Assessment indicator shows the ratios between assessments and acceptance for treatment and how this can be interpreted to show whether value for money is being achieved, whether referral criteria are clear and being adhered to and if patients are being referred for assessment and advice rather than treatment. It is important to note that patients maintain the right to seek a specialist opinion by referral despite their IOTN score. Unfortunately previous benchmarking and KPI measures have skewed these ratios to the extent that some practices do not claim for all the assessments they undertake in order to maintain an “acceptable” ratio.

The Treatment indicator measures the percentage of cases that are seen through to completion compared to case starts. This is only useful in a mature contract where there should be a similar number of each. A low completion rate may be a reporting issue or could mask cases that have been abandoned or discontinued.

Outcomes are measured by Peer Assessment Rating (PAR) scoring cases started and completed. This indicator shows only whether the expected percentage of cases have been audited and not the extent to which treatment has been successful. The outcome indicators may also show whether case selection is appropriate or if there are high levels of abandoned or discontinued treatments, for which there may be a number of reasons.

Most of the indicators require interpretation, further investigation of flagged performance and understanding of the individual contracts before conclusions can be made about the relative quality of services provided by the contractors.

Table 26 below shows a summary of the Dental Assurance Framework orthodontic report across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire and how the area compares as a whole to the rest of England.

Area compared to England (red worse performing, green better performing than national level)

Delivery		England	AT	Within Expected Levels
UOA Delivered	% of Contracted UOA Delivered (Year to Date)	96.6	91.5	
Assessment		England	AT	
Assessments by category	% of assessments that are Assess and fit appliance	60.0	68.0	
Assessments by category	% of assessments that are Assess and refuse	11.4	9.1	
Assessments by category	% of assessments that are Assess and review	28.6	22.9	
Age at assessment	% of reported assessments and review where patient is 9 years old or under	11.2	17.9	
Treatment		England	AT	
Cases reported complete as a function assess and fit appliance	Ratio of reported <b>concluded</b> (completed, abandoned or discontinued) courses of treatment to reported assess and fit appliance.	0.9	0.8	
Type of appliance used	% of <b>concluded</b> * (completed, abandoned or discontinued) courses of treatment reported as using removable appliances only. * currently only using completed	1.3	1.9	
Outcomes		England	AT	
UOAs reported per completed case	Ratio of the number of UOAs reported per reported <b>completed</b> case (not including abandoned or discontinued cases)	27.0	27.7	
Reported PAR Scoring: actual versus expected	% of contracts <b>meeting</b> their expected reporting of PAR scores	73.6	75.4	
Abandoned or discontinued care	% of <b>concluded</b> (completed, abandoned or discontinued) courses of treatment where treatment is reported as abandoned or discontinued	6.8	6.4	

**Table 26: Dental Orthodontic Assurance Framework**

## 9.1 Patient reported outcome and experience measures (PROMs and PREMs)

The NHS commissioning guide<sup>35</sup> includes details on patient reported outcome measures. These measures are useful indicators for service benchmarking. These data should include centrally collected data via national surveys and data that can be collected locally which should be triangulated. It is also important to consider the respondents, as this should be representative of the patient groups treated.

NHS services are required to implement the 'friend and family' test<sup>36</sup>; however this may not be relevant for orthodontic services, due to the nature of the treatment and patient need.

PROMs that may be measured include the pain status for a patient, if they are in pain, whether the patient is able to speak and eat comfortably and if the patient is happy with the appearance of their teeth. The final suggested outcome measure is relevant for orthodontic services and could be used at the start and end of treatment.

An experience measure that is specific to orthodontics reports on whether the patient was able to book an appointment with their NHS orthodontist at a suitable time for them.

Other patients may value other aspects of the service more than the ability to book an appointment; these include having time to discuss their treatment plan, feeling valued and the communication and attitudes of the dental care professionals at their NHS orthodontist.

To demonstrate learning, providers could show how they have evaluated and responded to feedback.

## 9.2 Peer assessment rating (PAR) scoring

The PAR index is a standardised tool for the objective assessment of orthodontic cases using pre and post treatment study models. A score greater than 70% improvement is a high standard of treatment, less than 50% is a poor standard of treatment and less than 30% shows that a malocclusion has not been improved by treatment. It has been shown that PAR scoring could also be used to measure orthodontic treatment need although it was not designed for this purpose<sup>37</sup>.

## 9.3 Data collection

One quality issue is around FP17O forms being submitted with the clinical data set completed. The BSA found that in 2014/2015, 5% of case starts and 14% of completions were submitted without the clinical data set completed and that during 2015/2016, 5.7% of case starts and 12.9% of completions were submitted without the data set completed. This is matter of concern.

## 10. Referral management centres

The patient referral system works on market forces and historical choice of provider by the referring dental practitioner. This can lead to acceptance of unnecessary referrals, which may be inappropriate or ill timed multiple referrals, uneven waiting times and uneven distribution of service availability for patients.

The Department of Health and several published papers recommend that central referral management arrangements should be put into place to receive and direct patients to care. These arrangements need to monitor whether referral protocols have been followed.

Appropriate referrals can then be directed to the most appropriate service, whether in primary or secondary care. This will prevent multiple referrals of the same patient and thus multiple assessments.

Where referral management processes are not in place, commissioners should ensure that the numbers of patient assessments per case start are kept under review so that resources are not disproportionately directed to multiple assessments on the same patient.

Referral letters should include details of motivation of the patient to have orthodontic treatment, caries levels and oral hygiene status. In a review of referral letters to one hospital many referrers did not include full details of the medical history, IOTN score, motivation, oral hygiene status and caries status<sup>38</sup>.

One disadvantage of a RMS is that the direct clinical relationship between the referring practitioner and the orthodontic provider may be lost.

As part of an orthodontic referral pathway a Referral Management Service to cover Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire has been commissioned to commence in April 2018.

# 11. Managed clinical networks

Managed clinical networks (MCNs) should ensure that the highest standard of orthodontic care is provided by the local primary and secondary care workforce and co-ordinating the local provision of orthodontic care in conjunction with commissioners.

They would therefore be made up of orthodontists in general and community dental services, the hospital services, referring practitioners, commissioners and the consultants in dental public health. The British Orthodontic Society (BOS) recommends that orthodontic managed clinical networks are established to ensure the efficient and effective provision of orthodontic care in any given geographical area<sup>39</sup>.

An orthodontic MCN has been set up across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire MCNs can be instrumental in overseeing agreed care pathways, taking forward discussions and issues relating to referral management, and developing further quality of outcome measures such as PAR scoring.

MCNs will be crucial in the implementation of the new orthodontic commissioning guide. MCNs for orthodontics will allow clinicians to influence the design of services working with patients and commissioners.

## 12. Conclusions and key considerations

### 12.1 Conclusions

In 2016/ 2017 Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire a total of **£20,015,184** was spent on orthodontic care. Of this **£18,113.609** was spent on commissioning UOAs from PDS contracts, **£1,659,694** in GDS contracts and **£241,881** on orthodontic activity in secondary care.

In the current orthodontic activity commissioned, across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire there is capacity for an estimated **14,048** case starts available for 2018/2019 and for any subsequent year. Using the current available methods of assessing orthodontic need it is estimated that between **12,263** and **15,097** case starts would need to be commissioned each year to meet normative by 2027.

To meet expressed need (percentage of children currently visiting an NHS dentist) it is estimated that between **8,788** and **10,659** case starts would be required each year to meet this need by 2027.

In 2015/16 £387,744 was spent on orthodontic activity in secondary care. For 2016/17 this figure was £241,881. Using estimates, for 2015/16, the number of cases treated in secondary care was between 164, and 236. For 2016/17 the number of cases treated in secondary care was between 102 and 147.

The number of children treated privately is not known and the number of children who complete orthodontic treatment in hospital dental services each year is not known, only estimated, either because the information is not available or not collected. The number of children receiving care in hospital dental services is likely to be small. As a result this service review, if anything, is likely to have overestimated the orthodontic service provision required in NHS primary dental care.

Although the evidence for the benefit of these services for many patients is equivocal NHS England is required under NHS Regulations to commission orthodontic services for patients with an IOTN score of 3/6 ( DHC= 3 and AC =6) and above. In the past NHSE DCOs were able to set an age limit for patients who they considered eligible to receive orthodontic treatment although this was not national policy. NHS regulations make provision for orthodontic treatment for adults under a Band 3 course of treatment.

## Key considerations for NHS England

NHS England Central Midlands may wish to consider:

- supporting and advising on the collection of detailed analysis of hospital orthodontic services for the area, including a consistent way of reporting orthodontic activity for each trust; this could be done through a CQUIN. This will provide a more accurate data on those undergoing orthodontic treatment in hospitals
- ensuring that primary, care pathway and hospital orthodontic contracts provide value for money and quality in outcomes
- reviewing any data collection undertaken by the Dental Referral Management Centre to ensure that it informs future commissioning of orthodontic services
- working with orthodontic practices and the Orthodontic Managed Clinical Network to agree a process for validating waiting times and ensuring process of prioritisation of cases based on patient need
- supporting further development of Managed Clinical Networks across Northamptonshire, Bedford Borough, Central Bedfordshire, Luton, Milton Keynes and Hertfordshire
- reviewing the distribution of services to ensure equitable access across areas particularly areas that currently have limited or no access to local services. Distance, inconvenience and cost should be considered to avoid barriers to care.
- continuing to monitor their local population demographics to assess future need and should be cognisant of population projections locally to predict varying needs.

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