



Public Health
England

AN ORTHODONTIC NEEDS ASSESSMENT AND SERVICE REVIEW FOR EAST ANGLIA

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Executive Summary

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. In 2013 the responsibility for commissioning orthodontic services in primary care transferred to the newly created Area Teams of NHS England. At this time most orthodontic contracts were extended to March 2015 to ensure continuity of care for orthodontic patients during this period of change. In March 2014 these existing contracts were extended for two years. The expiration of these contracts in March 2016 gives NHSE East Anglia Area Team the opportunity to review current services and to consider how best to re-commission orthodontics to meet the needs of the population.

Orthodontic treatment means treatment of, or treatment to prevent, malocclusion of the teeth and jaws, and irregularities of the teeth. (*National Health Service (General Dental Services Contracts) Regulations 2005*)¹.

For orthodontic treatment to be ethically acceptable, benefits of treatment must outweigh the risk of adverse consequences of treatment. In general, evidence of benefit is available for individuals with higher levels of orthodontic treatment need. For those who do not fall into these categories, the risk of harm may outweigh potential benefits.

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, 2008/09. This is the most recent survey of 12 year olds. An orthodontic component was included to measure normative and perceived need including clinical and aesthetic need using a modified IOTN score (Index of Orthodontic Treatment Need).

From this survey the number of 12 year old children in East Anglia per year likely to benefit from orthodontic treatment and who think their teeth need straightening and are prepared to undergo treatment, i.e. have a normative and a perceived need is approximately 8,708 per year.

When need and demand are considered together it appears that East Anglia has over-commissioned orthodontic services by just under 10,000 UOAs a year, approximately 450 courses of orthodontic treatment even when children already wearing a brace are included. At an average UOA value of £59.91 this equates to £589,335 a year.

East Anglia Area team currently spends £9,401,488.64 a year on orthodontic services under PDS arrangements (most of which are time limited contracts) and £2,650,161 under GDS arrangements (most of which are non- time limited contracts).

The distribution of orthodontic services across NHSE East Anglia is inequitable. There is apparent overprovision of orthodontic services in Cambridge City, Lowestoft and Yarmouth and poorer or no provision in Wisbech, Kings Lynn, Thetford and parts of Suffolk.

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.

National commissioning guidance *Transitional commissioning of primary care orthodontic services-Single operating model*, Gateway reference 00642 was published in November 2013 and this will inform all future commissioning arrangements locally for orthodontic services.

The opportunities for the commissioning of orthodontic services provided under non-time limited GDS arrangements are limited. However any new PDS contracts which are offered by the NHSE EAAT should have end dates no later than March 2019. This will allow the Area Team the opportunity to review any changes and continue to procure orthodontic services to meet the needs of their population.

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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 expiration of these contracts gives NHSE East Anglia Area team (EAAT) the opportunity to review current services and to consider how best to re-commission orthodontics to meet the needs of the population.

In November 2103 Primary Care Commissioning published Transitional Commissioning of Primary care orthodontic Services –A single operating model Gateway reference 00642. This document outlines a process for commissioning including a quality and value audit framework and any future commissioning of orthodontic services must follow these standard operating policies

It is essential that any new contract supports the delivery of desired EAAT outcomes including the following:

- Meeting the needs of the local population with patients able to achieve timely access to services
- Providing treatments that are evidence-based and comply with contemporary standards such as those of the National Institute for Clinical Excellence (NICE) and the Care Quality Commission (CQC)
- Having effective pathways to support delivery of services so that primary care orthodontic services are receiving appropriate referrals and able to refer on to other services appropriately
- Having mechanisms to recognise high quality performance and support to improve performance where this is required
- Meeting best practice in terms of achieving key Quality, Innovation, Prevention and Productivity (QIPP) objectives for the ATs
- Comply with Transitional Guidance of Primary Care Orthodontics Services- Single Operating Model November 2013 Gateway reference 00642

2. The Clinical Background

2.1 Orthodontics and Orthodontic Treatment

Three authoritative definitions from national bodies are:

Orthodontics is the distinctive branch of dentistry which deals with the development, prevention and correction of irregularities of the teeth, bite and jaw (known as malocclusion). (*General Dental Council*)². Malocclusion is not a disease but the collective term given to natural variations from the “ideal” in the relationship of the teeth and jaws.

“Orthodontics is the branch of dentistry concerned with growth of the face, development of the occlusion, and the correction and prevention of occlusal abnormalities. Orthodontic treatment deals with variations in facial growth and orofacial function, and the effects of occlusal variation on facial appearance and the health and function of the masticatory system” (*Royal College of Surgeons of England*)³.

"Orthodontic treatment" means treatment of, or treatment to prevent, malocclusion of the teeth and jaws, and irregularities of the teeth. (*National Health Service (General Dental Services Contracts) Regulations 2005*)¹

2.2. The claimed benefits of Orthodontic Treatment:

The *British Orthodontic Society* (BOS) is the UK specialist society for orthodontists, established to promote the study and practice of orthodontics, to maintain and improve professional standards in orthodontics, and to encourage research and education in orthodontics. They list treatment benefits⁴ as including:

- Removal of dental crowding (or sometimes closing gaps).
- Alignment of the upper and lower dental arches.
- Correction of the bite of the teeth so that the front teeth meet on closing and the back teeth mesh together
- Reducing the likelihood of damage to prominent teeth
- Enhancing facial aesthetics
- Accommodating impacted, unerupted or displaced teeth
- Preparation for advanced dental treatment, such as crowns, bridges or dental implants
- Reversing the drifting of the teeth in older patients who have suffered from advanced gum disease

2.3. Adverse consequences of orthodontic treatment

Less generally known are areas where orthodontic intervention can cause problems⁵. Elements of orthodontic appliances can cause localised trauma (usually mild and transient, but rarely there can be more severe consequences) or can be swallowed or inhaled. Orthodontic tooth movement has the potential to cause shortening of the tooth roots, usually minimally, but occasionally to a clinically significant degree. Fixed orthodontic appliances, in particular, make oral hygiene measures more difficult. If the teeth are not cleaned effectively when orthodontic appliances are being worn, plaque accumulation initially leads to a reversible decalcification of the teeth, which may leave permanent white patches. If trapped plaque remains beyond this initial stage, teeth become decayed. As a result of reduced access for cleaning an increase in gingival inflammation is common following the placement of fixed braces and marked loss of periodontal attachment and bony support for the teeth can occur when oral hygiene is poor⁶. Traumatic ulceration can also occur and in some circumstances death of the pulp or nerve of the tooth where the appliance is incorrectly adjusted.

Patient cooperation is essential; if not treatment may need to be discontinued part way through a course of treatment. At this point, the dental relationships may be worse than at the outset, and where extractions have been involved, the sacrifice of those (usually healthy) teeth may have produced no overall benefit.

The aim of all orthodontic treatment is to produce a stable relationship between teeth and jaws at the end of treatment phase. Teeth may relapse from the position achieved at the time the appliances are removed, and in the worst cases re-treatment may be needed.

For orthodontic treatment to be ethically acceptable, benefits of treatment must outweigh the risk of adverse consequences of treatment. In general, evidence of benefit is available for individuals with higher levels of orthodontic treatment need (see below). For those who do not fall into these categories, the risk of harm may outweigh potential benefits.

2.4. Orthodontic Treatment Need

Over the years several measures have been devised for assessing the need for, and potential benefit from orthodontic treatment. The most commonly-used and accepted measure of need in the UK, is the Index of Treatment Need (IOTN)⁷. It has two entirely separate components; the Dental Health Component (IOTN DHC) and the Aesthetic Component (IOTN AC). The IOTN DHC relates directly to tooth positions and is an attempt to measure professionally-defined need in an objective way. The IOTN AC on the other hand, focuses on aesthetics and attempts to assess the subjective perception of need, from the perspective of the individual patient.

The Index of Treatment Need Dental Health Component (IOTN DHC) is assessed from a clinical examination of the teeth and jaws, or sometimes from dental models. There are five categories, ranging from one (no treatment need) to five (great need). As the categorisation involves direct measurements of the relationship between teeth, the scoring of IOTN DHC is highly robust and reproducible. There is evidence⁸ that the more severe the orthodontic problem at the onset of treatment, the greater the likelihood that treatment will effect an improvement.

Index of Treatment Need Aesthetic Component (IOTN AC) was devised as a method of recording a person's own judgement of how attractive they consider the look of their teeth to be. This is achieved by selecting the one photograph, from a series of 10 standard (reference) pictures, which they feel most closely equates to their perception of their own appearance. These 10 pictures were chosen and validated as having decreasing attractiveness, in equal steps, and are assigned scores from one (most attractive) to 10.

IOTN AC therefore represents an attempt to numerically quantify an individual's self-rating of attractiveness, but as with any subjectively-rated scale can be criticised for its lack of robustness. Child and Clinician-rated IOTN AC grades of the child's appearance may be very different⁹, as are the dentist and parent/carer ratings¹⁰.

Although many children who rate themselves as having a high level of unattractiveness (on the IOTN AC assessment) will also have a high-scoring clinical

condition on IOTN DHC, that relationship is not a predictable one. Some individuals with a low dental health need (DH score) will have a high personally perceived need for treatment (AC score), and vice versa.

2.5 Eligibility for NHS orthodontic treatment

'High Street' dentists working under NHS General Dental Services arrangements can provide orthodontic services only if they have a specific contractual arrangement (with NHS England Area Team) to provide this type of care¹¹. To ensure that there are good results from treatment, it should be commissioned, to meet local needs, from appropriately trained and experienced dentists¹². Such providers are limited in the overall *number* of NHS patients they can assess and treat by level of their contract with their local PCT (expressed as Units of Orthodontic Activity), and also in the *types* of orthodontic problems they can normally treat (as defined by the national Regulations). These are the *National Health Service (General Dental Services Contracts) Regulations 2005*. In summary, local General Dental Service contracts generally limit the provision of orthodontic treatment to those who:

- are under the age of 18 at the time of assessment;
- and have an IOTN DHC score of 4 or 5 , or an IOTN DHC score of 3 *together with* an IOTN AC score of 6 or above

These Regulations do, though, offer them some clinical discretion to allow the orthodontist to provide treatment (for people under the age of 18) assessed as not having the level of treatment need assessed through IOTN (as above), "because of the exceptional circumstances of the oral and dental condition of the person concerned". The Regulations do permit PCTs to have a contract with orthodontists for assessment and treatment of people over the age of 18, but locally, such assessment and treatment is contract exclusion. The verbatim extract of the relevant part of the *Regulations* is at Annex 1.

2.6 "Exceptional circumstances of the oral and dental condition" likely to result in adverse health impacts

There is limited evidence of major impacts on oral health or general health arising from the some of those treatment benefits stated in Section 2:

2.6.1 Prevention of tooth decay and gum disease

- i. Crowded teeth, or poor alignment of teeth within the upper and lower dental arches have, in the past, been suggested as risk factors for both tooth decay and gum disease, and therefore orthodontic treatment was promoted as a means of improving oral health. Long term clinical studies do not support this view, and BOS itself states that there is little evidence that orthodontic treatment in general confers such a benefit. However they also suggest that there are individual cases where orthodontic treatment clearly has been beneficial, although give no examples.
- ii. Pulpal (the living core of blood vessels and nerves) reactions may cause pain or even tooth 'death' as orthodontic treatment moves teeth. Transient or irreversible damage to pulps may occur.^{13 14 15}

- iii. Tooth surface loss may be caused when orthodontic wires and brackets bring appliances into contact with tooth surfaces and have the potential to cause wear of the enamel surface. This can be further exacerbated if patients have a high intake of carbonated drinks or pure juices.
- iv. Enamel trauma can occur during placement or removal of appliances or when parts of appliances are de-bonded.
- v. Enamel demineralisation is a common complication of orthodontics. The extent of the problem has been assessed as ranging from 2-96%¹⁶. This large variation is due to the different ways decalcification is scored. There is possibility of remineralisation of the lesions, but in some severe cases, cavitation is seen.
- vi. Some degree of root resorption is inevitable with fixed appliance orthodontic treatment with, on average, 1-2 mm of the tip of the root lost. In most cases this will not be clinically significant but some teeth have higher level of risk than others and can be associated with severe resorption^{17 18}

2.6.2 Prevention of damage to prominent front teeth.

- i. The number of damaged incisor teeth at age 15 has fallen in recent years; currently the incidence is about 13 teeth per thousand, the majority being fracture of the tooth enamel only¹⁹. Looking at the child population as a *whole*, the great majority of damaged teeth are those which are not prominent. However, the sub-section of the child population who do have prominent front teeth sustain more damage, when compared with a similar number of children with teeth which are less prominent. Children with upper front teeth which protrude more than 6 mm would be eligible for NHS treatment, as they fall into the high categories of IOTN DHC.
- ii. There is evidence from several studies that the risk of dental injuries increases with^{20 21 22} an increased overjet of more than 5 mm and/or inadequate lip coverage.

2.6.3 Appearance and psychosocial benefits

- i. Appearance is usually the principle factor in the motivation for seeking orthodontic treatment amongst lay people, in the belief that the cosmetic improvement resulting from orthodontic treatment will enhance the social acceptance and self-esteem of the individual.
- ii. A prospective UK multicentre, hospital-based, trial compared psychosocial measures in a group of children who had early orthodontic appliance treatment (at an average age of nine years old), with a control group with a similar problem, but who would have treatment at a later age.²³ At the end of appliance therapy, the early treatment group had better 'self-concept' scores for physical appearance, anxiety, popularity, and happiness and satisfaction. However, in this study there was no comparison with a group from the general population who did not undergo, or wish for orthodontic treatment. The study group actually had higher initial self-concept scores than the general population of their age, confirming findings

elsewhere that patients who desire orthodontic treatment tend to have a relatively high normal range of self-esteem at outset.

- iii. A recent report²⁴ of a major 20 year prospective, longitudinal cohort study found little positive impact on psychological health and quality of life in adulthood in those who had received orthodontic treatment. The observed effect of orthodontic treatment on self-esteem at outcome, was accounted for by self-esteem at baseline.
- iv. Other studies have focussed on patients' perceptions of need and the difference that orthodontic intervention makes to their daily lives, using specifically oral health-related quality of life (QoL) measures. Evidence in this area is generally from weaker, cross-sectional studies, such as the recent paper by Johal et al²⁵, cited by the BOS. This study compared 13-15 year olds with malocclusion traits with a group of 'normal' children. They found that children with malocclusion traits (prominent incisors or spaced teeth), and their carers, reported more oral health related QoL impacts on a questionnaire than did the control group. The principal limitation of this questionnaire is that it does not elicit the specific causes of the impacts recorded. Such impacts can be related to a variety of oral health conditions, and not necessarily the person's malocclusion. Also, as the research subjects were being seen in the orthodontic department of a teaching hospital it may be that they report greater oral health impact in the hope of receiving orthodontic treatment. One study reported that adolescents who had completed orthodontic treatment had a better oral health related quality of life than those who never had treatment²⁶

2.6.4 Temporomandibular (TMJ) joint disorders

- i. The TMJ is the joint between the base of the skull and the mandible (lower jaw). Disorders of these joints are related to a wide range of signs and symptoms, such as clicking, tenderness and pain on chewing or opening the mouth. All the chewing muscles may be affected by the disorder, and pain is often felt away from the joint itself. Theories of causation are complex, and include physical factors such as poor alignment of teeth, and psychosocial factors, such as stress and anxiety. There is a distinct profile of those affected, which increases with age and has a large preponderance of females.
- ii. Treatment options usually begin conservatively, with reassurance and adapting behaviour, followed by a range of active treatments including physiotherapy and the use of splints worn in the mouth to change the biting surfaces of the teeth, and the biting relationship of the jaws. Research on the effect of providing one common type of splint, the Stabilisation Splint, was reviewed in 2004²⁷ and found insufficient evidence for or against its use.
- iii. Orthodontic treatment seems to be neither a major preventive, nor a significant cause of, TMJ disorder. Such treatment may be offered to people with TMJ dysfunction on the hypothesis that if the teeth bite incorrectly - in the form of a malocclusion - this can then apply a restriction to the function of the TMJ (or worse, will predispose it to future pathological deterioration). Therefore by correcting the alignment and arrangement of the teeth, the TMJ will remodel to an

overriding new function, thus treating any established disease processes and allowing normal function to continue for the life of the patient.

- iv. However, as there is a significant degree of controversy regarding the relationship of TMJ dysfunction and orthodontic treatment, a systematic review of the research literature has recently been commissioned by the Cochrane Collaboration^{27 28}. So far, only the research protocol has been published. This does however provide a useful overview of the uncertainty in the current evidence, both of the appropriateness of orthodontic treatment for TMJ dysfunction, and conversely, the possibility of orthodontic treatment being a causative factor of TMJ dysfunction.

2.6.5 Other functional impairment; speech, mastication and swallowing

- i. It is very probable that such a functional deficit will only be found in people with a high score on IOTN DHC, and so they should not be contractually excluded from receiving orthodontic treatment. Cleft lip and palate, or other less common, but severe orofacial abnormalities, require a multidisciplinary approach and therefore should be treated only within a hospital department linked to an appropriate centre.
- ii. The soft tissues show remarkable adaptation to the changes that may occur during the transition between primary and secondary dentitions. In the main, speech is little affected by malocclusion and correction of an occlusal anomaly has little effect upon abnormal speech. Mitchell says that, if a patient cannot attain contact between the incisors anteriorly this may contribute to the production of a lisp.

2.6.6 Snoring and Obstructive Sleep Apnoea/Hypopnoea Syndrome (OSAHS)

Snoring is caused by a partial closure of the airway during sleep, allowing soft tissues in the upper throat to vibrate noisily. When the airway narrows so much that it closes, a person may stop breathing during sleep for repeated, short, periods. This not only fragments the sleep, leading to daytime drowsiness, but these repeated falls in blood oxygen levels are also linked to cardiovascular problems.

Appliances worn inside the mouth can improve these problems through altering the position of the lower jaw during sleep; Mandibular Advancement Splint (MAS) therapy. Such appliances are provided by some orthodontists in specialist practice or within the hospital services, and by general dentists with suitable additional experience and expertise.

Treatment must follow proper physical examination and diagnosis, supported by limited sleep studies. Behavioural interventions such as obesity management are often required. Clinical Guidelines²⁹ suggest:

- Intra oral devices (MAS) are appropriate therapy for snorers and for patients with mild OSAHS with normal daytime alertness

- Continuous Positive Airway Pressure (CPAP) is the first choice therapy for patients with moderate or severe OSAHS that is sufficiently symptomatic to require intervention, but intraoral devices (MAS) are appropriate alternative therapy such patients who are unable to tolerate CPAP

3. Commissioning principles relating to NHS orthodontic services

The AT approach to commissioning appropriate and effective orthodontic services should follow a set of explicit and agreed principles, such as those suggested below:

3.1 Level and quality of service

- The AT will commission, or have commissioned on its behalf, an appropriate level of NHS orthodontic assessment and treatment services from primary-care based specialist practitioners (which will be the majority of the service), from local consultant-led hospital services and from regional cleft lip and palate centres
- The quality and level of service being provided will be regularly and effectively reviewed by the commissioning NHSE AT through contract monitoring and performance review.
- The AT will ensure that systems are in place to meet continuing needs of patients coming into the area who have already receiving active orthodontic care elsewhere, or who have been identified elsewhere an urgent or high priority case

3.2 Referral pathway

- Except in the case of internal hospital referrals, all referrals for initial orthodontic assessment will usually be made by a person's general dental practitioner (although in exceptional circumstances referral may be made by their medical practitioner).
- The referring practitioner has a duty to understand, and explain to the person they wish to refer (or to their parents as appropriate), the principles behind the application of the Index of Treatment Need which will govern access to orthodontic treatment.
- The referring practitioner should be willing to provide, or arrange for, continuing NHS routine dental care for the foreseeable duration of any orthodontic intervention
- Referrals for orthodontic assessment will be made only in accord with the agreed AT referral protocol(s), initially to a primary-care based orthodontic specialist contracted to provide orthodontic services

- Severe cases e.g. orthognathic surgery and cleft lip and palate may be referred directly to a consultant led service as part of a multidisciplinary team.

To best manage resources, referrals for orthodontic assessment may be channelled through a Referral Management Centre, appropriately supported by specialist orthodontic expertise

3.3 Primary-care based specialist orthodontic care

- Contracts for primary-care based specialist orthodontic care will exclude the provision of treatment for those who are over the age of 18 at the time of assessment, or for people of any age who do not have an IOTN DHC score of 4 or 5, or an IOTN AC score of 3 *together with* an IOTN score of 6 or above; unless it can be demonstrated to the AT that this person has exceptional circumstances of the oral and dental condition which is likely significantly to benefit from orthodontic treatment.
- Access to an NHS primary care-based specialist orthodontic service which is provided within a practice also offering other routine dental care services should not be limited to patients who choose to have routine dental care services at that practice.

3.4 Consultant-led hospital based orthodontic services

- 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.³⁰
- Contracts with consultant-led hospital based orthodontic departments will take account of the needs of any specialist training being undertaken in the department.
- Mandibular Advancement Splints will not form part of the contracts for primary-care based specialist orthodontic practitioners but may be provided within the hospital service, following appropriate specialist diagnosis.

4. Orthodontic need in the United Kingdom

Since the development of the IOTN in the late 1980s,⁷ the assessment of objective orthodontic need has been largely standardised. Table 1 summarises studies that measured the prevalence of malocclusion using the IOTN between 1989 and 2003, in various parts of the world.

4.1 Normative need in the UK

The English studies show 32-33% of 11-12 year olds with an objective need. This finding was not replicated nationally but in some studies, the age of samples was older, suggesting that unmet need, rather than true objective need, was being measured.

There have been other studies that used alternative indices but their results are not directly comparable.

Table 1: Summary of studies of prevalence of malocclusion using the IOTN

| Author | Date | Country | Sample size | Age of children (years) | Percent with definite treatment need* |
|------------------------------------|------|------------------|-------------|-------------------------|---------------------------------------|
| Brooke and Shaw ⁷ | 1989 | England | 333 | 11-12 | 32.7% |
| Holmes ³¹ | 1992 | England | 996 | 12 | 32.0% |
| Otuyemi et al ³² | 1997 | Nigeria | 704 | 12-18 † | 12.6% |
| Breistein and Burden ³³ | 1998 | Northern Ireland | 1,584 | 15-16 | 22.6% |
| Wang et al ³⁴ | 1999 | China | 765 | 12 | 37.0% |
| Chi et al ³⁵ | 2000 | New Zealand | 152 | 13 | 14.0% |
| Abdullah and Rock ³⁶ | 2001 | Malaysia | 5,112 | 12-13 | 30.0% |
| Abu Alhajj et al ³⁷ | 2004 | Jordan | 1,002 | 12-14 | 34.0% |

*Definite need for treatment as defined by the IOTN Dental Health Component Grades 4 and 5 and/or Aesthetic Component Gradings 8-10

† Mean age 14.8 years

The Department of Health recommends that ATs commission orthodontics for children, aged up to 18 years and under at the time of assessment, who are classified with the Index of Orthodontic Need (IOTN) at IOTN DHC levels of 4 and 5 or DHC 3 where there is an AC of 6 and above. By applying this threshold, resources can be targeted effectively to ensure that orthodontic treatment can be accessed by those who are in the greatest need.

The British Orthodontic Society “believes that if treatment has to be rationed then the IOTN is an objective and reliable way for specialists to select those children who will benefit most from treatment and is a fair way to prioritise limited NHS resources.”³⁸

Data from the decennial Children’s Dental Health Surveys which took place every 10 years between 1973 and 2003, show the prevalence of objective need in the UK to be reasonably consistent over the past four decades (although levels were lower in the 1993 sample, in both 12 and 15 year olds). This is set out in Table 2 below.

Table 2: Prevalence of Need for Orthodontic Treatment in the UK Over Time

| | 1973†‡ ³⁹ | 1983† ⁴⁰ | 1993 ⁴¹ | 2003 ⁴² |
|--------------|----------------------|---------------------|--------------------|--------------------|
| 12-year-olds | 37% | 33% | 27% | 35% |
| 15-year-olds | 27% | 25% | 15% | 21% |

* These figures exclude 8% of 12-year-olds and 14% of 15-year-olds currently undergoing treatment and is therefore likely to be an underestimation of objective need. It cannot be assumed however that all those undergoing treatment would have had an objective need as defined by the cut-off point of IOTN DHC Grade 4/5 and/or IOTN AC Grades 8-10.

† The assessment of orthodontic treatment need was not made using the IOTN until 1993. Previous to this an appropriate index was not available therefore the opinion of the examining clinician was used to determine whether or not a need for orthodontic treatment was present.

‡ The 1973 Survey examined only children in England and Wales. Surveys were broadened to cover the whole United Kingdom from 1983.

There were no statistically significant gender differences in objective orthodontic need in the 2003 survey but unmet need was greater in males (24% of 15 year old males) than females (19% of 15 year old females). This tallies with research findings that females have higher levels of subjective need^{43 44 45} and demand more treatment than their male peers.^{46 47 48 49}

Unlike other dental conditions such as dental decay, there is no significant difference between deprived and non- deprived areas and orthodontics does not display a social class gradient.⁵⁰

4.2 Subjective need in the UK

In the Children’s Dental Health Survey of 2003⁵¹, an assessment of subjective need for orthodontics was carried out using a postal questionnaire which collected subjective parental views on the appearance of their children’s teeth. The findings are summarised in Table 3.

Table 3: Parental assessment of dental appearance and presence of definite subjective treatment need*† in the UK, 2003

| Parental assessment | 12 year olds | 15 year olds |
|---------------------------------------|--------------|--------------|
| Child has crooked or protruding teeth | 44% | 28% |
| Child has a definite treatment need | 22% | 12% |

* Definite Subjective Treatment Need is present where assessment by the Aesthetic Component of the IOTN rates the child between gradings 8 and 10

†These figures refer only to children not currently under orthodontic treatment at the time of the survey

It can be seen that parents tend to overestimate the need for orthodontic treatment, relative to the objective view of professionals. Table 4 shows the level of discrepancies between clinician and parental views on the need for orthodontic treatment.

Table 4: Discrepancies between clinician and parent views on the subjective need for orthodontic treatment*

| Parent Assessment | Clinician Assessment | | | |
|-------------------------|-----------------------------------|------------------|---------------------------------|--------|
| | Subjective need present (AC 8-10) | | Subjective need absent (AC 1-7) | |
| | 12 yrs | 15 yrs | 12 yrs | 15 yrs |
| Subjective need present | 52% | 45% [†] | 19% | 11% |
| Subjective need absent | 48% | 55% [†] | 81% | 89% |

Source: Chestnutt I; Pendry L; Harker R. The Orthodontic Condition of Children. Children's Dental Health in the United Kingdom, 2003. London: Office for National Statistics; 2004

*These figures refer only to children not currently under orthodontic treatment at the time of the survey

[†]Low base number of respondent, results are indicative only

4.3 Stephen's formula

Evidence from national surveys and literature suggest that around 33% of 12 year olds have an objective need for orthodontic treatment, so objective need is fairly stable and predictable at around one third of 12 year olds. Subjective need, on the other hand, varies between individuals - even between those with the same level of objective need, and is inconsistent and difficult to predict with accuracy. Evidence suggests that clinicians influence the desire for treatment and that provision of orthodontic services may be supply led^{52 53}.

In spite of the presence of an objective need, the variations seen in subjective need and demand mean that a number of children with objective need will decline treatment. A refined prediction method for estimating orthodontic treatment need, based upon the 12 year old child population, was developed by Stephens⁵⁴. This method involves assessing need from the dental health component (DHC) categories 4 and 5 of the index of orthodontic treatment need (IOTN).

In a typical school population, one third of the children fall into categories 4 and 5. While a number of these cases would decline to have treatment, that number would be offset by a combination of each of the following: a proportion of patients in Dental Health Component (DHC) 3 who would also justify treatment, a number of children who would require interceptive treatment (calculated at 9%) and some adults for whom treatment could be justified (4%).

Therefore a figure of 33.3% of the total 12 year old population was taken as the number of patients needing treatment. This proportion is comparable with the findings of previous Child Dental Health Surveys^{55 56} where 46% of children were

identified as in need of orthodontic treatment but only 35% had received this at age 15 years. Stephens' formula can be expressed as:

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

The Stephens' formula can be modified by taking out the adult factor if treatment is only to be considered in the child population. Table 7 shows the need using Stephen's formula as compared to that estimated from the local 12 year old survey data in 2008/09.

4.4 Inequalities in access

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. Strenuous efforts should be made to ensure equitable access and distribution of resources.

4.5 Failure to complete treatment

It has been shown that failure to complete a course of treatment is related to socio-economic factors, including inconvenience and cost incurred when accessing care.

It is important, therefore, to consider distance, inconvenience and cost when planning provision of orthodontics for patients in more deprived areas.

4.6 Predicting treatment uptake

Treatment uptake varies according to the attitude towards orthodontics and desire for treatment in the individual patient, even among children with a high level of objective need⁵⁷ but subjective perceptions of need have been found to be less potent predictors of service usage than other factors.

Predictors for treatment uptake have been explored in a number of studies. Overall, objective need has been found to be the strongest predictor of treatment uptake, followed by parent's concern⁵⁸, then patient's concern. Patient's gender is also significant as females are more likely to demand treatment than males^{59 60 61 62}

What is clear is that the clinician's assessment plays a major role in determining treatment uptake. Orthodontists therefore need to be aware of how to identify patients with the greatest need and consider those most likely to comply with treatment, so that resources can be used efficiently and clinical outcomes

maximised. If clinicians accept patients on the basis of objective need alone, there is a stronger likelihood of failed appointments and discontinued or abandoned treatments. This increases waiting lists and waiting times and disadvantages patients who could truly benefit from care.

4.7 Prioritising those with greatest need

Not all orthodontic patients benefit equally from treatment and it is important to take account of factors that influence outcomes. Services can then be targeted at those most likely to benefit. A search of the literature showed that, for example:

- Orthodontic treatment does not necessarily eliminate objective need.
- Orthodontic treatment is more effective, in the long term, for more severe cases⁶³; it is difficult to achieve a 'greatly improved result' in cases with a DHC of Grade 3 or below⁶⁴.
- Treatment with full upper and lower fixed appliances is most likely to produce an improvement in objective need (and subjective need) as measured by the IOTN^{65 66 67}.
- In terms of subjective need, evidence is contradictory on whether there will be a benefit from treatment^{68 69 70 71}. In some cases, dissatisfaction with appearance is reduced by orthodontic treatment, while in others it is not^{72 73}. Findings of a large, 20 year cohort study⁶⁸ suggest there to be little objective evidence to suggest that orthodontic treatment produces a measurable psychological health gain. Neither did it have a positive effect on self-esteem.
- Orthodontic treatment is most likely to be effective for 12 year olds who present with an IOTN of 3.6 or above.
- As dentistry, along with the rest of healthcare, becomes more focussed on outcomes, orthodontic clinicians need to ensure they balance considerations of objective need and demand against what is known about clinical outcomes.
- Orthodontics has shown one of the fastest rates of growth in treatment since the late 1990s, with expenditure almost doubling over a five-year period.⁷⁴ Growth in population does not account for this increase, suggesting that it has been supply led.⁷⁵

5. Orthodontic need in East Anglia

From April 2013 the Local Authorities are charged with the responsibility of gathering information on the health needs of the population they serve so that they may provide services to meet the identified need. This responsibility transferred from PCTs. This imperative is described in the Health and Social Care (Community Health and Standards) Act 2003, underpinned by Statutory Instrument 2006 number 185, and is also highlighted in Choosing Health (2004) and Choosing Better Oral Health (2005). In addition, the Water Act (2003) requires that health is now monitored by Local Authorities.

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 Orthodontic Need was used to measure the clinical and aesthetic need for orthodontic intervention based on the Index of Orthodontic Treatment Need.

5.1 Normative need

Children who were not wearing a brace at the time of the study and fell into IOTN DHC 4 or 5 or those classed as IOTN Aesthetic Component (AC) 8, 9 or 10 were regarded as having a clear need for orthodontic intervention

Nationally, approximately a fifth of all 12 year olds fall into each of the five Dental Health Components (DHC) and approximately half of the 12 year old population will be classified as having an IOTN score of 3.6 or above. This is a combined score of DHC and Aesthetic Component (AC) of 3.6. and 4 or 5.

Using the Modified Index of Orthodontic Need 34.8% of 12 year olds in Norfolk 33.2.% in Suffolk, 50.3% in Great Yarmouth and Waveney, 29.7% in Cambridgeshire and 44.9% in Peterborough were identified as having a normative need and were not currently wearing an appliance. Table 5 gives more detail.

Table 5: 12 year old children not currently wearing an appliance 2008/09

| Area | 12 year old population (Mid 2008) | Number examined | Need- children with IOTN DHC=4 or 5 or AC=8,9,10 | | Demand- Children who think their teeth need straightening and are prepared to wear a brace | | Need and demand- Children with IOTN DHC=4or 5 or AC=8,9,10 who think their teeth need straightening and are prepared to wear a brace | | Estimated need and demand |
|-----------------------|-----------------------------------|-----------------|--|------------------------|--|------------------------|--|------------------------|---------------------------|
| | | | number | % of children examined | number | % of children examined | number | % of children examined | |
| England | 608,460 | 89,442 | 28,269 | 31.6 | 31,681 | 35.4 | 17,238 | 19.3 | 117,267 |
| E of E SHA | 69,770 | 8,884 | 2,778 | 31.3 | 3,349 | 37.7 | 1,846 | 20.8 | 14,497 |
| Norfolk | 8,452 | 693 | 241 | 34.8 | 271 | 39.1 | 158 | 22.8 | 1,927 |
| Suffolk | 7,400 | 823 | 414 | 50.3 | 286 | 34.8 | 229 | 27.8 | 2,059 |
| GY and W | 2,488 | 404 | 134 | 33.2 | 134 | 33.2 | 82 | 20.3 | 505 |
| Cambridgeshire | 7,071 | 916 | 272 | 29.7 | 362 | 39.5 | 197 | 21.5 | 1,521 |
| Peterborough | 2,047 | 265 | 119 | 44.9 | 107 | 40.4 | 73 | 27.5 | 564 |
| Total for East Anglia | | | | | | | | | 6576 |

Source: NHS Epidemiology Programme for England, Oral Health Survey of 12 year old children 2008/09. Results of Orthodontic Need and Demand in Primary Care Trusts

5.2 Perceived need and demand

Volunteers were asked, through a series of closed questions if they thought that their teeth needed straightening. Those who replied yes were then asked if they would be prepared to have treatment and wear a brace if it were necessary. In relation to subjective need, the survey of 12 year olds in 2008/09 measured both:

- The percentage of children who had a subjective need (thought their teeth needed straightening and were prepared to wear a brace)
- The percentage of children who had both an objective need (professionally defined at appropriate levels of IOTN) and a subjective need
- Perceived need was measured using a questionnaire. The findings from the survey are summarised in Table 5

5.3 Children already wearing an appliance

The 12 year old volunteers in the survey across NHSC and NHSP were asked if they were wearing a brace. If they were, or reported that they had one, they were classed as already being in receipt of orthodontic care and were not involved any further in the measurement of orthodontic need or demand. The findings are summarised in table 6.

These children did not have their IOTN scores measured so it is not known if they met the criteria for normative need i.e. IOTN 3.6 and above and some appliances may have been fitted under private arrangements.

Table 6: Children aged 12 years already wearing a brace 2008/09

| Area | 12 year old population (Mid 2008) | Examined | % Examined | Number already wearing an appliance | % of children examined | Estimated 12 year old population already wearing an appliance |
|------------------------------|-----------------------------------|----------|------------|-------------------------------------|------------------------|---|
| England | 608,460 | 89,442 | 74.1% | 7,105 | 7.9% | 48,334 |
| E of E SHA | 69,770 | 8,884 | 69.1% | 942 | 10.6% | 7,395 |
| Norfolk | 8,452 | 693 | 46.9 | 51 | 7.4 | 622 |
| Suffolk | 7,400 | 823 | 76.3 | 56 | 6.8 | 504 |
| GY and W | 2,488 | 404 | 76.8 | 43 | 10.6 | 265 |
| Cambridgeshire | 7,071 | 916 | 77.6% | 82 | 9.0% | 633 |
| Peterborough | 2,047 | 265 | 73.6% | 14 | 5.3% | 108 |
| Total for East Anglia | | | | | | 2132 |

Source: NHS Epidemiology Programme for England, Oral Health Survey of 12 year old children 2008/09. Results of Orthodontic Need and Demand in Primary Care Trusts

If the co-existence of objective and subjective need is taken as a proxy for the likely numbers of children who may need orthodontic treatment, amongst those who do not already have braces, then the percentages may be converted into numbers of 12 year olds potentially requiring treatment in the Area Team. This is set out in Tables 5 and 7.

When this is added to the number of 12 year old children estimated to be already wearing appliances we have a proxy for the number of 12 year olds each year who are likely to benefit from orthodontic treatment.

Table 7: Numbers of 12 year old children with both a normative and perceived need with those already wearing braces 2008/09

| Area | 12 year-old population (mid 2008) | Estimated need and demand children with IOTN DHC=4 or 5 or AC 8,9,10 who think their teeth need straightening and are prepared to wear a brace | Estimated 12 year old population already wearing an appliance | Need and demand+ those already wearing an appliance (proxy for capacity needed) |
|------------------------------|-----------------------------------|--|---|---|
| England | 608,460 | 117,267 | 48,334 | 165,601 |
| E of E SHA | 69,770 | 14,497 | 7,395 | 21,892 |
| Norfolk | 8,452 | 1,927 | 622 | 2,549 |
| Suffolk | 7,400 | 2,059 | 504 | 2,563 |
| GY and W | 2,488 | 505 | 265 | 770 |
| Cambridgeshire | 7,071 | 1,521 | 633 | 2,154 |
| Peterborough | 2,047 | 564 | 108 | 672 |
| Total for East Anglia | | | | 8,708 |

Source: NHS Epidemiology Programme for England, Oral Health Survey of 12 year old children 2008/09. Results of Orthodontic Need and Demand in Primary Care Trusts

The number of 12 year old children per year likely to benefit from orthodontic, including those already wearing a brace treatment is approximately 2,549 in Norfolk, 2,563 in Suffolk, 770 in Great Yarmouth and Waveney, 2,154 in Cambridgeshire and 672 in Peterborough. This is a total of approximately **8,708** children a year based on

2008 mid- year population estimates and the assessment of need and demand using data from the 2008/09 National Epidemiological Programme.

Population changes for 12 year olds living in East Anglia 2008-2012

The advice from *Transitional commissioning of primary care orthodontic services- single operating model* is that the 2008 mid- year population estimates for 12 year olds should be used to assess current need and demand for orthodontic treatment. The reason for this is that need and demand was assessed for orthodontic treatment in 12 years olds was measured at this time as part of the NHS National Epidemiology Programme for England Oral Health Survey of 12 year old children 2008/09.

In 2008 the mid- year population estimate of 12 year olds was 27, 458 for East Anglia. The most recent estimates, 2012, reported 8th August 2013, indicate that the population of 12 year olds has fallen by just over 1000 to 26,351 as shown in Table 8.

Table 8: Mid- year population estimates for 12 year olds 2008 and 2012

| Area | 12 year old population. Mid- year estimate 2008 | 12 year old population. Mid- year estimate 2012 |
|----------------|---|---|
| Norfolk | 8,452 | 8,919 (including 1,063 from GY) |
| Suffolk | 7,400 | 8,420 (including 1,286 from Waveney) |
| GY and W | 2,488 | (2,349) |
| Cambridgeshire | 7,071 | 6,749 |
| Peterborough | 2,047 | 2,263 |
| Total | 27,458 | 26,351 |

Source: Office for National Statistics, mid- year population estimates 2008 and 2012 (reported 8th August 2013)

Table 9: Interim 2011-based subnational population projections, 2011 to 2021 for all persons aged 12 years

| Local authority area | Year | | | | | | |
|------------------------|---------|---------|------------------|-----|---------|------------------|-----|
| | 2011 | 2016 | | | 2021 | | |
| | Num | Num | Change 2011-2016 | | Num | Change 2011-2021 | |
| | | | Num (+/-) | % | | Num (+/-) | % |
| Cambridgeshire | 7,035 | 6,933 | -102 | -1% | 7,909 | 874 | 12% |
| Norfolk | 9,283 | 8,748 | -535 | -6% | 9,965 | 682 | 7% |
| Peterborough | 2,236 | 2,251 | 15 | 1% | 2,582 | 346 | 15% |
| Suffolk | 8,410 | 8,399 | -11 | 0% | 9,143 | 733 | 9% |
| Total - C,N,P,S | 26,964 | 26,331 | -633 | -2% | 29,599 | 2,635 | 10% |
| England | 617,326 | 599,704 | -17,622 | -3% | 664,725 | 47,399 | 8% |

Source: <http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Subnational+Population+Projections#tab-data-tables> - downloaded 10/04/14

Table 9 shows the population projections for the 12 year old population. This is expected to fall by two per cent by 2016 and increase by ten per cent by 2021. The highest increase is expected in Cambridgeshire, twelve per cent, and Peterborough, fifteen per cent, and this may be related to new housing developments.

6. Orthodontic Service provision in East Anglia

In East Anglia NHS orthodontic treatment is provided in both primary and secondary care. In primary care, there are specialist practices on the high street suitable for the vast majority of patients. Some GPs also provide non-specialist orthodontic services under GDS arrangements Orthodontics may also be provided by salaried dental services for a very small group of patients who have 'special care needs'. Hospital services in secondary care are consultant-led and intended for more complex cases that may benefit from a multi-disciplinary approach. A Referral Management Service (RMS) for orthodontic referrals operating in Norfolk and Suffolk was decommissioned in 2013. This offered patient choice and helped make patient aware of different waiting times for treatment in different practices. It may have a role to play in limiting multiple referrals and also referrals of children under the age of 10 years when this is not considered appropriate. There has never been an RMS for the Cambridgeshire and Peterborough area. There are different ways of managing referrals and any new commissioning arrangements would need to consider these various options.

6.1 Distribution of Specialist and Non specialist Orthodontic Services in Primary Care in East Anglia

Specialist high street practices provide assessment and advice for patients referred from general dental practitioners and provide the full range of orthodontic treatment for patients that meet the national IOTN thresholds. The location of the practices is set out in table 10.

Table 10: Location of orthodontic practices and number of UOAs commissioned

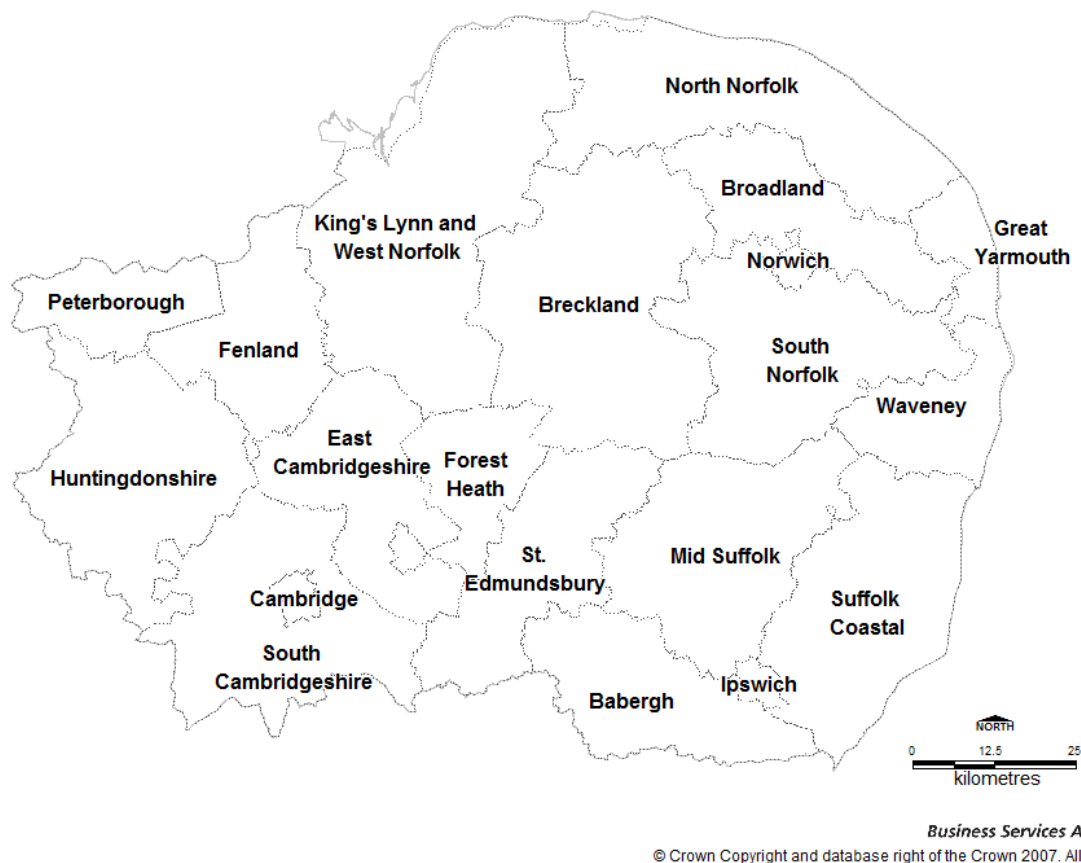
| Area | 12 year old population (mid-year 2008 estimates) | 12 year old population (mid-year estimate 2012) | Number of orthodontic PDS contracts | Number of GDS contracts with UOA activity | Number of UOAs in PDS contracts April 2013-March 2014 | Number of UOAs in GDS contracts April 2013-March 2014 | Total UOAs April 2013-March 2014 |
|----------------|--|---|-------------------------------------|---|---|---|----------------------------------|
| Norfolk | 8452 | 8,919 (including 1,063 from GY) | 5 | 10 | 38,779 | 11,488 | 50,267 |
| Suffolk | 7,400 | 8,420 (including 1,286 from Waveney) | 9 | 10 | 25,304 | 20,048 | 45,352 |
| GY and Waveney | 2,488 | (2,349) | 2 | 9 | 11,466 | 11,148 | 22,614 |
| Cambridgeshire | 7,071 | 6,749 | 13 | 1 | 66,504 | 420 | 66,924 |
| Peterborough | 2,047 | 2,263 | 2 | 0 | 16,255 | 0 | 16,255 |
| Total | 27,458 | 26,351 | 31 | 30 | 158,308 | 43,104 | 201,412 |

Source: Office for National Statistics 2012 mid year population estimates reported August 2013. NHSE EAAT contract data January 2014

6.2 Geographical distribution of orthodontic practices in East Anglia

The following maps show the distribution of orthodontic services across East Anglia. Map 1 shows the geographical area by local authorities.

Map1: Geographical Area (Local Authorities)



6.3 Deprivation and orthodontic services in East Anglia

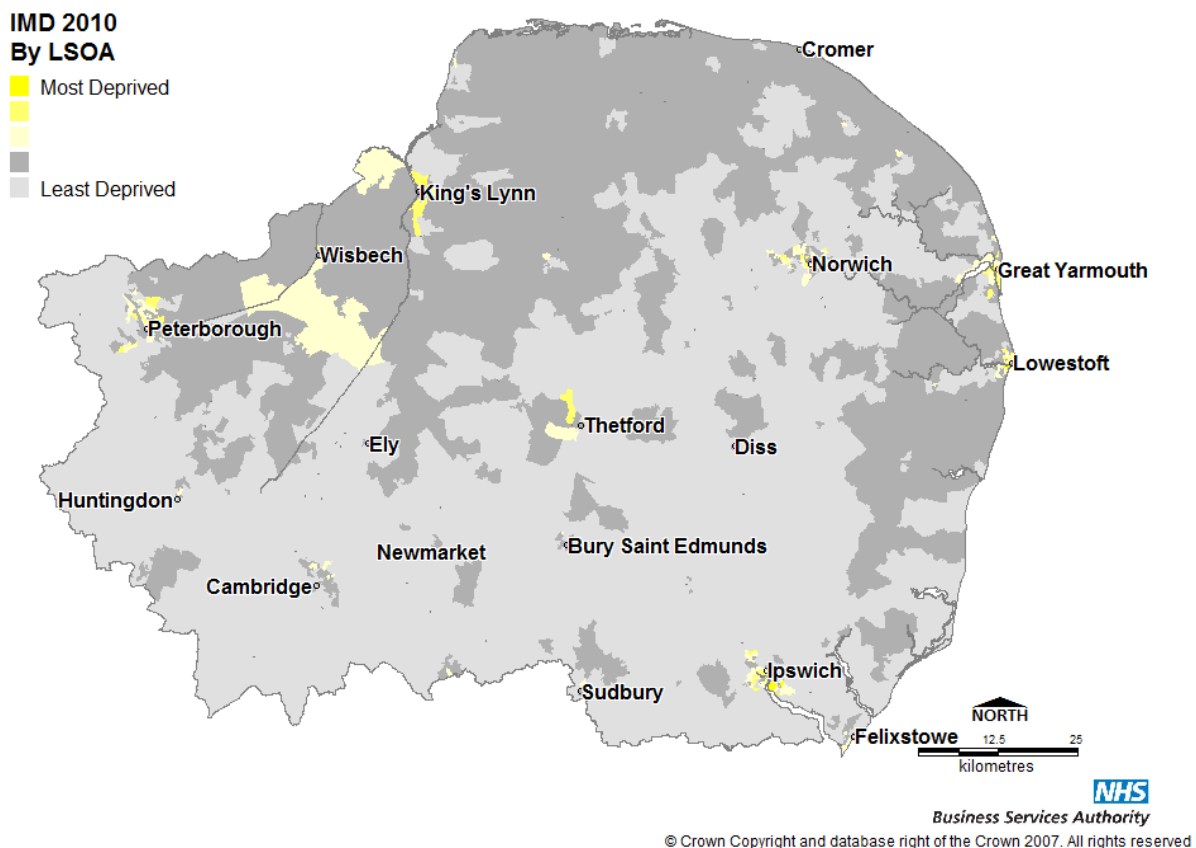
Map 2 shows the level of deprivation by super output area. Those areas shaded yellow have the highest overall IMD score, relative to the area as a whole, and therefore can be classed as the most deprived. Main towns are shown for geographical reference. Unlike other oral health conditions orthodontic need, as classified using IOTN is not linked to deprivation. Access to general dental services and uptake of services is linked to deprivation with the most deprived sectors of the population least likely to access services. In addition the most deprived sectors of the population experience the worst oral health with higher levels on dental decay, higher periodontal disease and higher levels of unmet need. Most children access orthodontic services by referral from their general dental practitioner and children will only be accepted for orthodontic treatment with good oral health. Children from more deprived backgrounds are less likely to attend for regular dental care and consequently are less likely to be referred for orthodontic treatment. Poor oral health

and untreated dental decay will make it more unlikely that they will be accepted for orthodontic care.

The most deprived areas in East Anglia are around Kings Lynn, Great Yarmouth, Lowestoft, Norwich, Thetford, Ipswich, Peterborough, Wisbech and Fenland. Kings Lynn, Wisbech and Thetford have very limited or no orthodontic provision.

Historically, and prior to 2006, dentists were able to set up NHS dental practices where they chose and consequently most dental and orthodontic practices were sited in more affluent and less deprived areas. This allowed practices to attract private as well as NHS patients. Since 2006 new commissioning arrangements have enabled PCTs, and subsequently Area Teams, to commission orthodontic services to meet need rather than based on historical provision. Where this historical only based provision remains there is the potential for orthodontic services to increase rather than decrease health inequalities and equitable access and distribution of resources should be a priority.

Map 2: IMD 2010 by Lower Super Output Area



6.4 Treatment Location

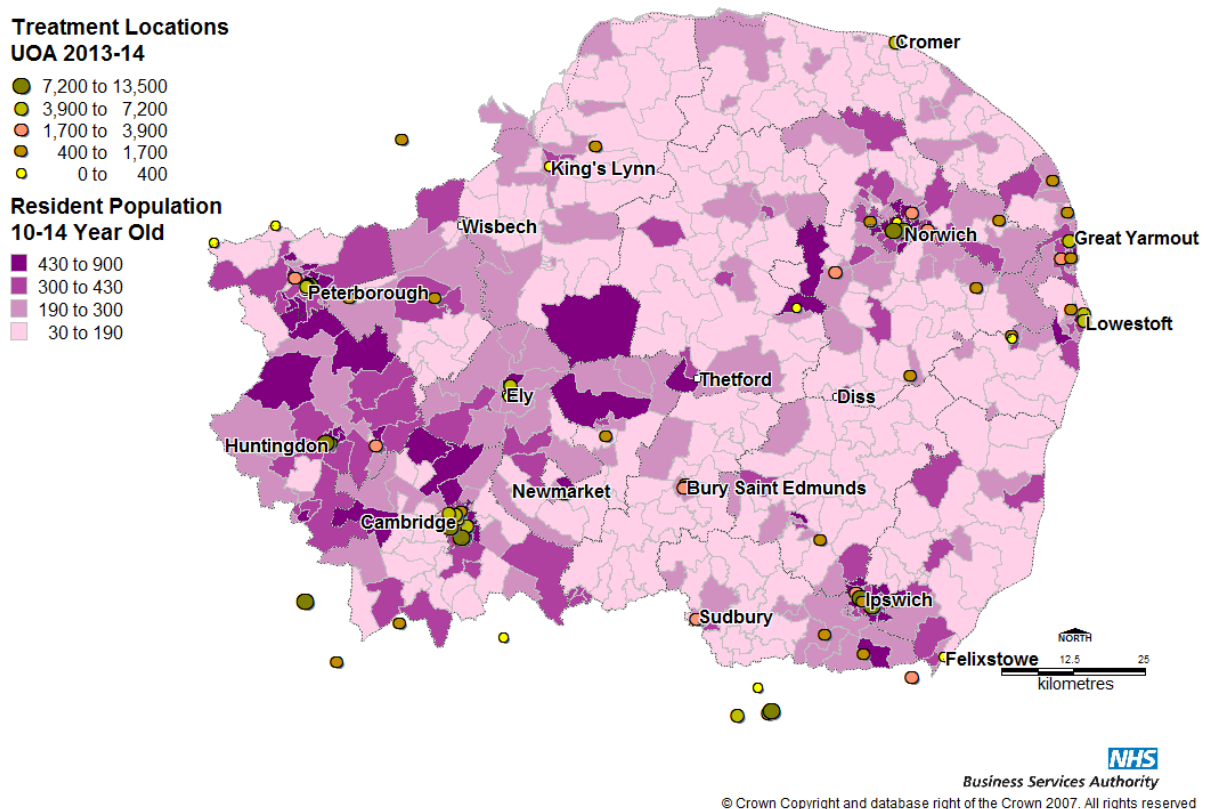
The geographical pattern of treatment locations can help assess the effectiveness of dental commissioning, especially when combined with other data such as population and resident patient rates.

Treatment location is the address where the 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 to where patients actually receive dental treatment. Data based on 12 months to March 2014.

The map below, Map 3, shows treatment locations in the area with 25 or more UOA in the analysed period. Those locations with the highest levels are shown with the larger symbols on the map and main towns are shown for geographical reference. This is overlaid onto ward population for 10-14 year olds (Source 2011 Census: population and household estimates for Wards and Output Areas in England and Wales ONS). This aims to show the effectiveness of dental commissioning in relation to the key population group for orthodontic activity.

Map 3: Delivered UOA Treatment locations (12 months to March 2014) and 10-14 year old population



Although most of the orthodontic services are located close to areas with higher numbers of 10-14 year olds there are gaps around Thetford, Ely, Wisbech and Kings Lynn which are also the areas of highest deprivation.

Since March 2013 service provision has been increased in Peterborough and service provision in Cambridge City has been decreased by twenty per cent. Some new services were also provided in Ely but parts of Fenland such as Chatteris and Wisbech still have no local access to NHS orthodontic services.

Until March 2013 NHS orthodontic services were available in Felixstowe. The nearest provider is now likely to be in Ipswich. Services in Watton have also been discontinued.

Across Suffolk and Norfolk most orthodontic services are provided in the larger towns and cities such as Ipswich, Norwich, Bury St Edmunds, Lowestoft and Great Yarmouth and better road and public transport links may make these services more accessible.

6.5 Resident patients attending NHS orthodontists (24 months to March 2014)

Map 4 shows the total resident population attending an NHS orthodontist, 24 months to March 2014. Areas where there are high concentrations of 10-14 year olds, for example between Thetford and Ely and Wisbech never the less show low levels of the population attending for NHS orthodontic treatment. This may be linked to the availability of local services. Places such as Norwich, Great Yarmouth and Cambridge have higher numbers of the population attending for NHS orthodontic treatment and again this may be linked to the better availability of local services. Peterborough has higher levels of 10-14 year olds in the population and this is reflected in higher numbers attending for NHS orthodontic treatment.

Map 4: Total resident patients attending NHS orthodontists (24 months to March 2014)

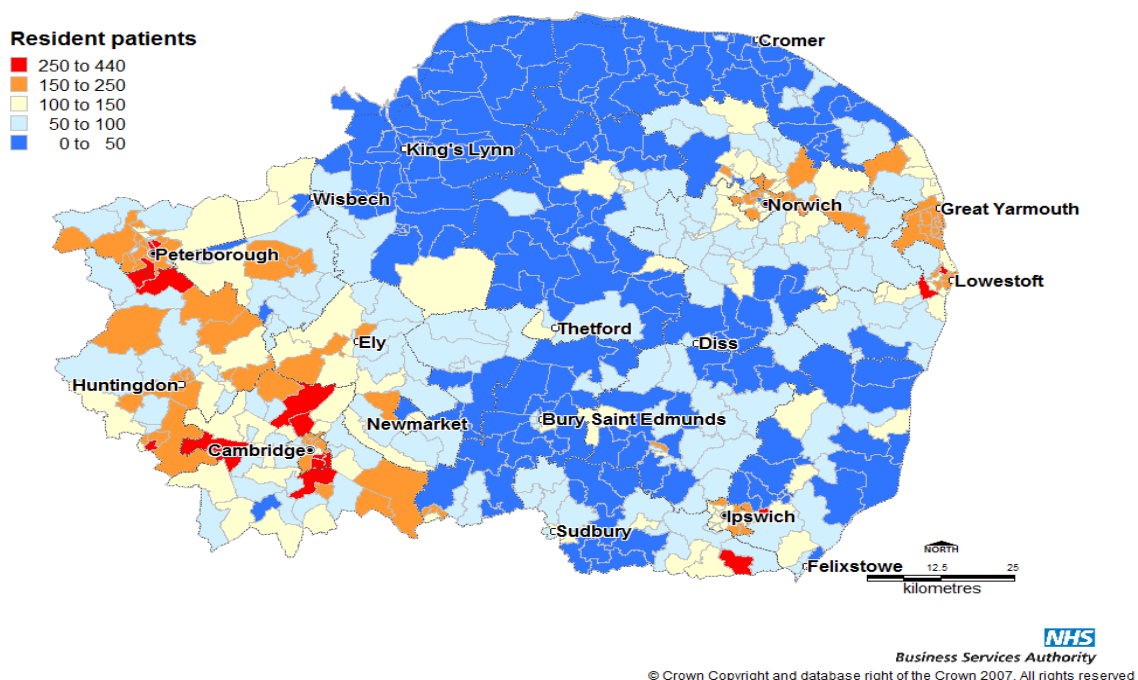
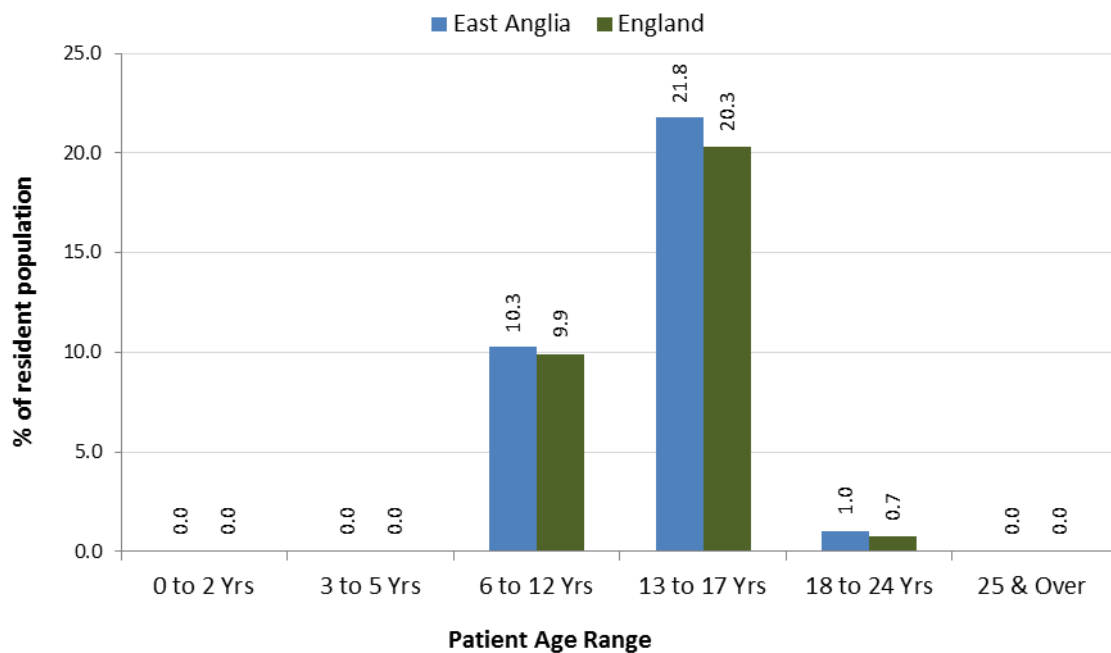


Figure 1 below shows the percentage of residents who attended an NHS orthodontist for the area as a whole and compared to England by age group in order to highlight any variances from the national rates.

An important aspect of the effectiveness of dental commissioning is the ability of patients to obtain orthodontic treatment when they need it. Measuring the number of patients seen as a proportion of the resident population, in particular among certain age groups, can be used to assess access. This can be affected by a number of factors including the amount of orthodontic provision in the area, deprivation and patient choice. A low rate may not solely be due to a lack of provision and patients may elect for private treatment for example to give them more choice of availability of appointment times.

Figure 1: % residents attending NHS orthodontist (24 months to March 2014)



As would be expected younger age groups have the highest levels of orthodontic access. Figures 2 and 3 below show the rates for each local authority area for the 6-12 and 13-17 age groups in order to assess geographical differences within the overall area.

Figure 2: % 6-12 year old residents attending NHS orthodontist (24 months to March 2014)

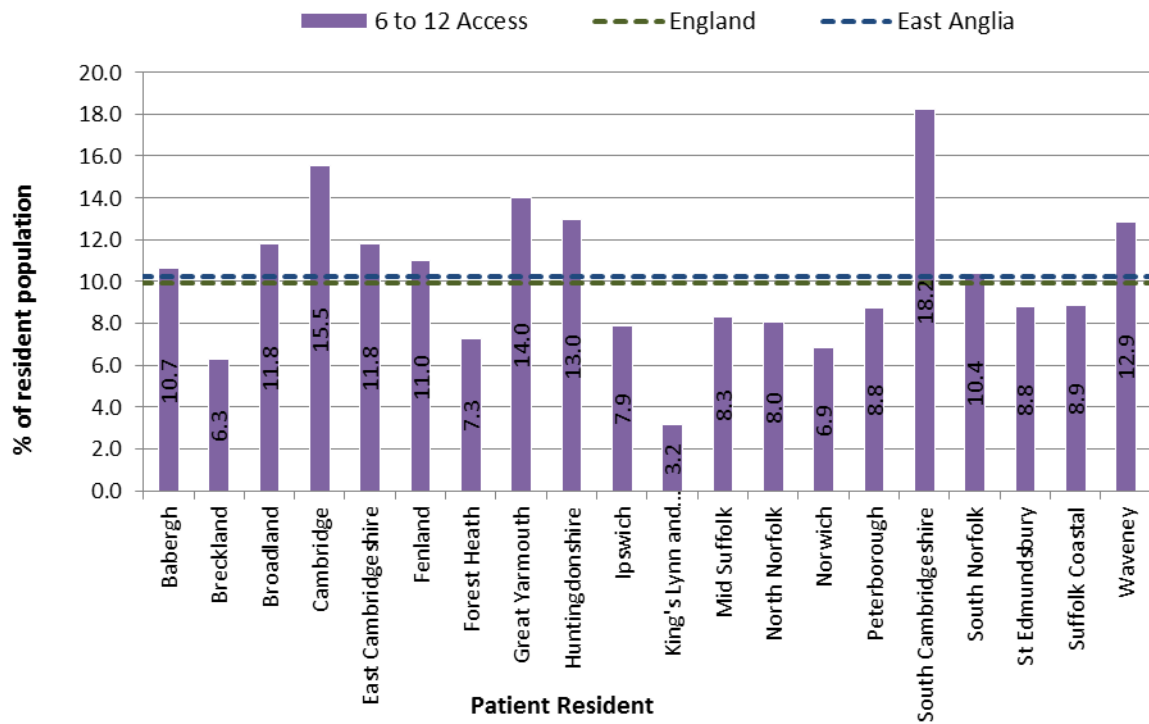


Figure 3: % 13-17 year old residents attending NHS orthodontist (24 months to March 2014)

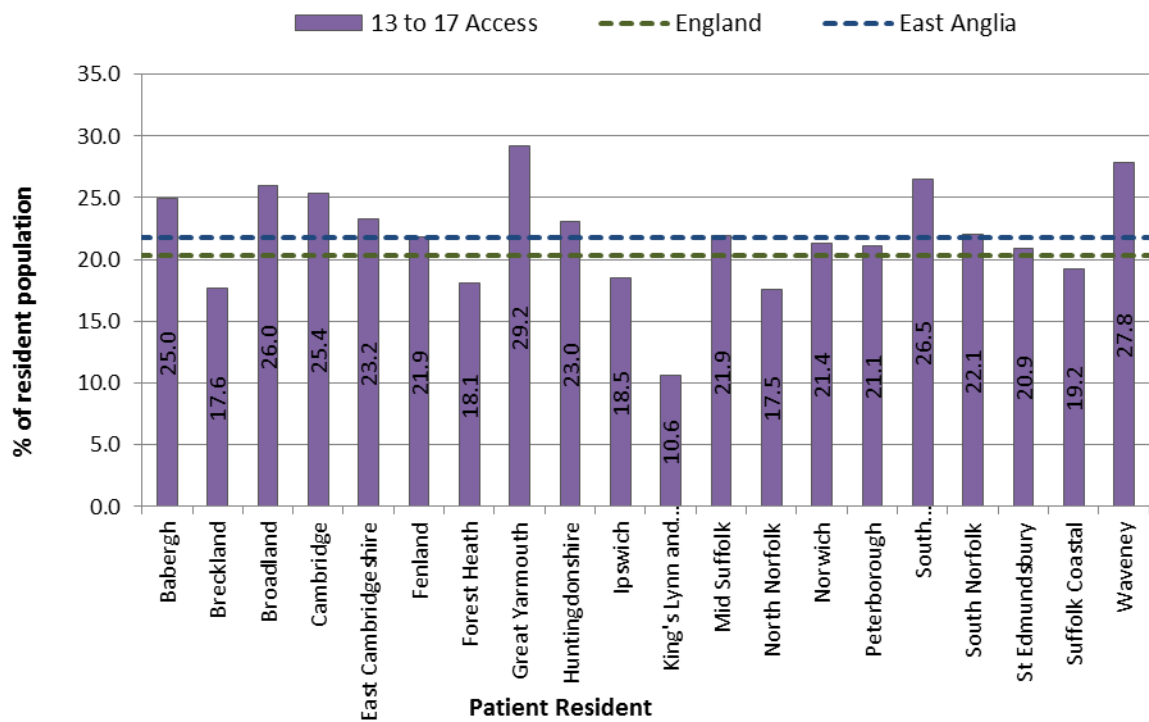
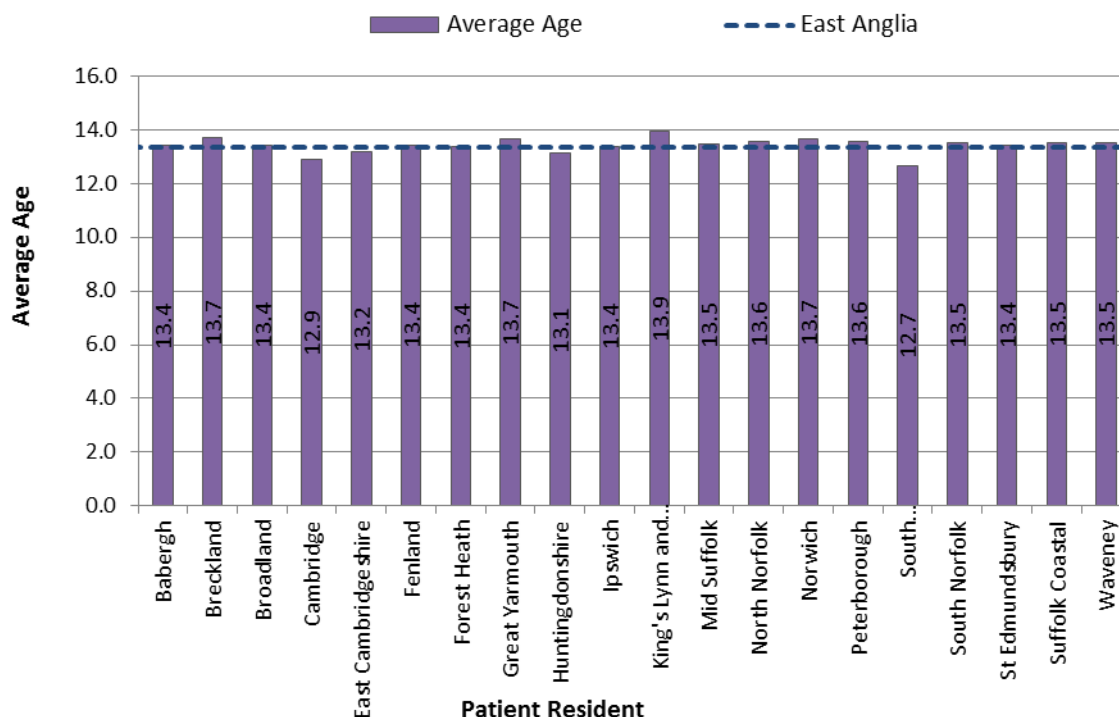


Figure 4 below shows average age for patients by resident area, based on the age at date of acceptance as recorded on the FP170.

Figure 4: Average age of resident patients attending NHS orthodontist (24 months to March 2014)



Areas such as Kings Lynn, North Norfolk, Breckland and Forest Heath appear to have a much lower percentage average population attending an NHS orthodontist than the average for East Anglia and England. Cambridge, Great Yarmouth, Waveney and South Cambridgeshire have a much higher average than East Anglia and England.

The average age of patients attending for NHS orthodontic treatment is 13.4 years. This suggests that patients are seen in a timely manner and are being assessed and treated when the permanent dentition has erupted and malocclusions become evident.

6.6 Distance travelled by patients

The distance travelled to a dentist can be seen as an indicator of need and effectiveness of dental commissioning. A high average distance could reflect a lack of provision in certain, though there are of course other factors that would need to be considered such as patient choice such as ease of travel and locations of large towns nearby. It would be expected that the average distances travelled to orthodontic dentists would be greater than for general dentistry due to lower levels of orthodontic provision.

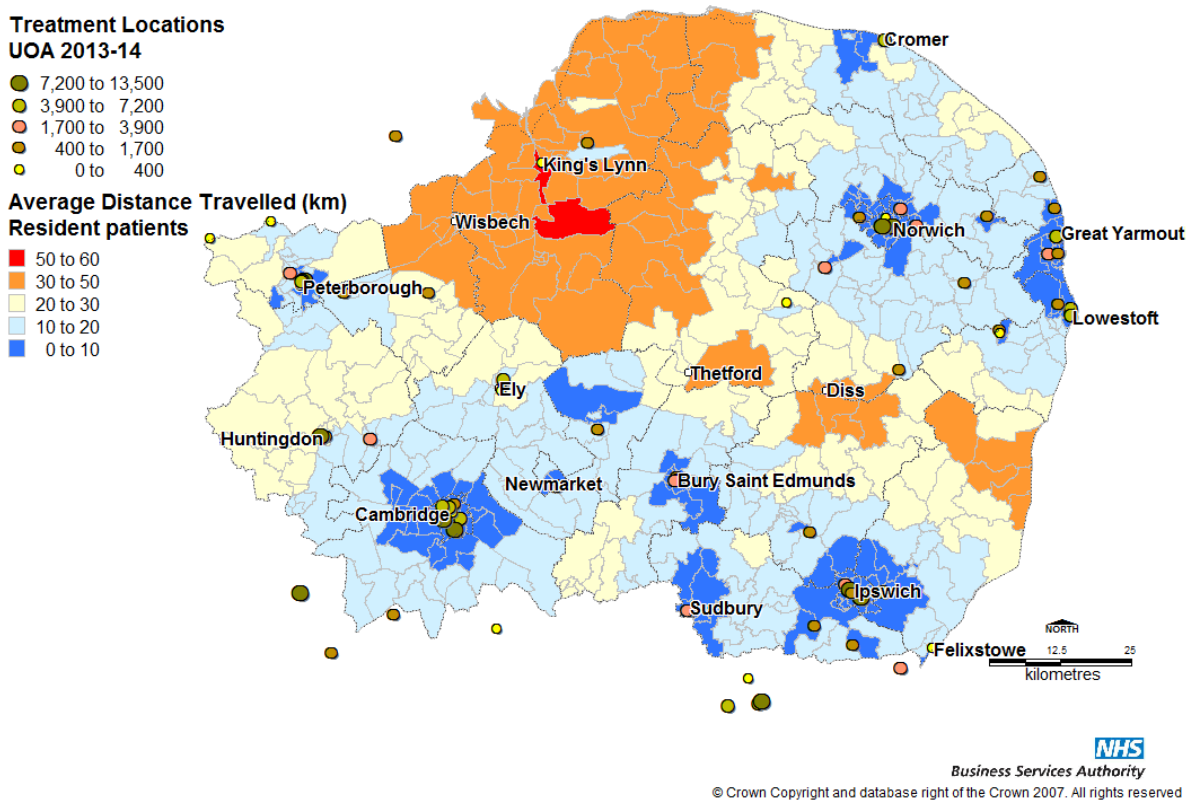
Distance travelled is calculated by measuring a straight line between the home postcode of a patient and contract location. The patient postcode is based on the home postcode recorded in the personal details section of each FP17O submitted, therefore is dependent on this information being included and accurate in the records. The contract location is based on the principal [practice location as entered

on the NHSBSA Payments ON Line (POL) system by commissioners. Data based on 24 months to March 2014.

The map below, Map 5, shows the average distance travelled (km) of orthodontic patients resident in each ward¹ in the analysed area over a 24 month period. This is calculated by measuring a straight line between the home postcode and contract location.

Those wards shaded red have the highest average distance, those shaded blue the lowest. Main towns and cities are included as a geographical reference.

Map 5: Delivered UOA treatment locations (12 months to March 2014) and average distance travelled by resident patients attending an NHS orthodontist (24 months to March 2014)



Patients living around Kings Lynn, Wisbech, Thetford, and Diss travel the furthest to access NHS orthodontic services, from between 30 and 60 km as the crow flies. The actual distance travelled is likely to be much further particularly in rural areas where the road systems are more limited. Also public transport is likely to be less available and more infrequent and this will impact on a patient's ability to access services. Patients living in Great Yarmouth, Waveney, Cambridge and Ipswich on average travel between 0 and 10 km to access NHS orthodontic services. Public transport is also likely to be better in the major towns and cities.

¹ 2011 Electoral Wards (ONS)

6.7 Patient Flow

Patient Flow In details where the patients treated in an area reside. Significant numbers of patients from outside an area can limit access to services for residents.

Patient Flow Out highlights where the patients living within an area have received their dental treatment. Significant numbers of patients travelling outside may be an indication of poor quality or a lack of services in an area.

Patient flow in: Resident health body area for patients treated at a contract in the Area Team, determined by the postcode recorded in the personal details section of each FP17. If a patient postcode is not included on the FP17 then the patients' residency is classed as "unknown" and has been excluded from the tables below.

Patient flow out: Contract health body area for patients living in the Area Team determined by the postcode recorded in the personal details section of each FP17. A patient may be counted more than once where more than one FP17 is received with a different postcode and/or surname for the same person.

Table 11 below shows "Flow In" signified by the proportion of child patients that attended a dentist in the area and were resident either in that same area, a neighbouring AT, a non-neighbouring area (other) or where the postcode information contained in the FP17 was insufficient to assign a resident area (unknown). "Flow Out" shows the proportion of child patients resident in an area that attended a dentist either in the same area, a neighbouring AT, or a non-neighbouring area (other). The numbers for patients resident in the area are the same for flow in and out but the totals from which a percentage is calculated can differ.

Table 11: Flow In and Out % of Ortho Patients 2013/14

| Flow In | | Flow Out | |
|-----------------|--------------------------------------|-----------------|---------------------------------------|
| AT of Residency | % of Patients Treated in East Anglia | AT of Treatment | % of Patients Resident in East Anglia |
| Same | 96.8 | Same | 95.6 |
| Neighbour | 3.1 | Neighbour | 4.2 |
| Other | 0.1 | Other | 0.2 |

Table 12 below shows the highest proportion of total patients outside East Anglia. In terms of "flow in" this relates to the areas where patients live who received treatment at a contract in East Anglia; for flow out this is the areas where patients living in East Anglia received treatment.

Table 12: Flow In and Out Ortho Patients 2013/14 most common areas

| Flow In | | Flow Out | |
|-----------------|--------------------------------------|-----------------|---------------------------------------|
| AT of Residency | % of Patients Treated in East Anglia | AT of Treatment | % of Patients Resident in East Anglia |

| | |
|--------------------------------------|------|
| East Anglia | 96.8 |
| Essex | 1.4 |
| Leicestershire and Lincolnshire | 1.2 |
| Hertfordshire and the South Midlands | 0.5 |
| Birmingham and The Black Country | 0.0 |

| | |
|--------------------------------------|------|
| East Anglia | 95.6 |
| Hertfordshire and the South Midlands | 3.1 |
| Essex | 0.7 |
| Leicestershire and Lincolnshire | 0.4 |
| Surrey and Sussex | 0.0 |

7.0 Cost of Orthodontic Services

In total East Anglia Area team spends **£9,401,488.64** commissioning orthodontic services under PDS arrangements and **£2,650.161** in GDS contracts annually

7.1 Cost of discontinued and abandoned care

Not all patients who start orthodontic treatment complete it. As well as the potential for damage to their oral health that may be associated with this for example the removal of sound teeth leaving spacing, increased risk of dental decay and periodontal disease there is a financial cost to the organisation. For example on average 6.0 % of cases in NHS Cambridgeshire were terminated when treatment was abandoned or discontinued and for NHS Peterborough the figure is 4.6%. The figure is highest in Great Yarmouth and Waveney, 9.7% of cases were abandoned or discontinued. For example this equates to 2,193 UOAs approximately £ 131,416 per year in Great Yarmouth and Waveney and 4,015 UOAs, approximately £240,568 in Cambridgeshire alone. This compares to East of England and England figures of 7.8% and 9.2% respectively.

7.2 Need compared to commissioned UOAs

Table 13 compares the number of commissioned UOAs in primary care in 2011/2012 compared with the need and need and demand estimated by the BASCD Survey of 12 year olds carried out in 2010/11

Table 13: Need compared to commissioned UOAs in primary care

| PCT | Estimated numbers of 12 year olds already wearing a brace | Number of 12 year olds estimated to have an orthodontic need. IOTN DHC=1 or AC=8,9,10 (population of 12 year olds x % need) | Number of 12 year olds estimated to have orthodontic need and demand (BASCD) and are prepared to wear a brace | Number of UOAs commissioned in April 2103-March 2014 | Number of UOAs required to meet need (assume 22 UOAs per patient) Including those already wearing a brace | Number of UOAs required to meet need and demand and are prepared to wear a brace (assume 22 UOAs per patient) including those already wearing a brace |
|---------|---|---|---|--|---|---|
| Norfolk | 622 | 2,941 (34.8% of 12 year old) | 1927 | 50,267 | 78386 | 56,078 |

| | | | | | | |
|----------------|-----|--|------|----------------|--------|----------------|
| | | population | | | | |
| Suffolk | 504 | 3,722 (50.3% of 12 year old population) | 2059 | 45,352 | 92972 | 56,386 |
| GY and W | 265 | 826 (33.2% of 12 year old population) | 505 | 22,614 | 24,002 | 16,940 |
| Cambridgeshire | 633 | 2,100 (29.4% of 12 year old population) | 1521 | 66,925 | 60,126 | 47,388 |
| Peterborough | 108 | 919 (44.9% of 12 year old population) | 564 | 16,255 | 22,594 | 14,784 |
| Total | | | | 201,413 | | 191,576 |

Source: NHS Epidemiology Programme for England, Oral Health Survey of 12 year old children 2008/09. Results of Orthodontic Need and Demand in Primary Care Trusts

When need and demand are considered together it appears that orthodontic services are over commissioned in Cambridgeshire, Peterborough and Great Yarmouth and Waveney and under commissioned in Suffolk and Norfolk.

The children wearing braces did not have their IOTN scores measured so it is not known if they met the criteria for normative need. Some of these appliances may have been fitted under private rather than NHS arrangements. Overall and using a proxy of 22 UOAs per child East Anglia Area Team has over-commissioned orthodontic services by 9837 UOAs per year. At an average price of £59.91 per UOA the cost of these over commissioned services is approximately £589,335 per year.

8.0 Waiting times for orthodontic treatment

In primary care there are no national targets for waiting times for orthodontic care. However in 2010 the East of England SHA set a target of an 18 week wait for orthodontic care. There is no rationale for this target.

Malocclusion is a variation from normal not a disease and orthodontic services are mainly involved in achieving aesthetic improvements rather treating a health problem. Orthodontics normalises dentofacial function and appearance rather than curing a disease. Occlusion can vary over time with growth and a diagnosis consequently may change. This combined with the aesthetic component can lead to unlimited demand for assessment from patients and parents. The fact that this is a biological phenomenon and not a disease can also mean that treatment can be protracted and unpredictable and because of this managing patient flow and prioritisation is better done by an orthodontist than managed by an imposed waiting list target.

There is no powerful evidence for health gain in orthodontics and equally for many patients there is no clinical dis-benefit in longer waiting times and treatment outcomes are not adversely affected. It is almost impossible, therefore, to establish a waiting list in the same way that might be possible for treatment of a disease or health related problem.

Orthodontics is a demand led service and historical long waiting times have led to a growth of the private sector and a complex mixed economy.

Under existing contractual arrangements orthodontists are not required to meet 18 week wait targets or manage waiting lists although there will be opportunities to negotiate changes when the current contracts expire in 2013.

In East Anglia waiting times for both assessment and treatment starts are generally low and are summarised in Table 14.

Table 14: Waiting times for orthodontic assessment and treatment in East Anglia

| Area | Number of Orthodontic Practices | Maximum waiting time from referral to assessment | Maximum waiting time for treatment | Outliers |
|----------------|---------------------------------|--|------------------------------------|--|
| Norfolk | 5 PDS 10 GDS | 6 months more normally 4/5 weeks | Max 6 months | Kings Lynn assessed within 6 weeks, wait for treatment start 18 months |
| Suffolk | 9 PDS 10 GDS | Maximum 3 months | Maximum 6 months | Outlier in Bury 6 months. Outlier in Stowmarket who wishes to convert UDAs to UOAs to reduce waiting times |
| GY and W | 2 PDS 9 GDS | Max 6 weeks | Max 6 weeks | 1 outlier 18 months to treatment start |
| Cambridgeshire | 13 PDS 1 GDS | Max 8 weeks | 16 weeks to 6 months | |
| Peterborough | 2 PDS | Max 6 months | Max 6 months | |

9.0 Quality of services

The Dental Services Division of the Business Services Authority (DSD, BSA) record a range of information collected from orthodontic contracts including some which are known as quality indicators. These include recording the percentages of patients who were:

- assessed and had an appliance fitted,
- assessed and refused treatment,
- assessed and reviewed.
- abandoned or discontinued for treatment
- treated only with removable appliances
- sampled for a patient questionnaire survey
- PAR scoring

9.1 Assessments

Assessment of orthodontic cases is defined in both GDS and PDS regulations as: “a clinical examination of the patient, including the taking of such radiographs, colour photographs and models as are required in order to determine what orthodontic treatment (if any) is to be provided to the patient”. The initial assessment is an essential part of the orthodontic treatment process; at this point, the orthodontist should be able to assess whether it is appropriate to start treatment, refuse or if it or wait until further dental / skeletal growth has occurred. When a patient undergoes an assessment, it can be reported as one of three outcomes:

- Assess and fit appliance: where the patient has been assessed and treatment is commenced.
- Assess and refuse: where the patient has been assessed and a decision is made that the patient is ineligible or unsuitable for a course of NHS-funded orthodontic treatment
- Assess and review: where the patient has been assessed and a decision is made that NHS treatment is indicated, but the patient is not ready to start.

The number of each type of assessment outcome is shown as a proportion of all assessments in the analysed period based on patients' residence. The patient's residence is determined by the postcode recorded in the personal details section of each FP17 submitted. Data has been extracted for the 12 months up to March 2014.

Figure 5 below shows the proportion of assessments where the patient has been assessed and treatment is commenced. A high proportion of assessments with a decision to provide treatment is 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.

Figure 5: % of Assessments that were Assess and fit appliance (12 months to March 2014)

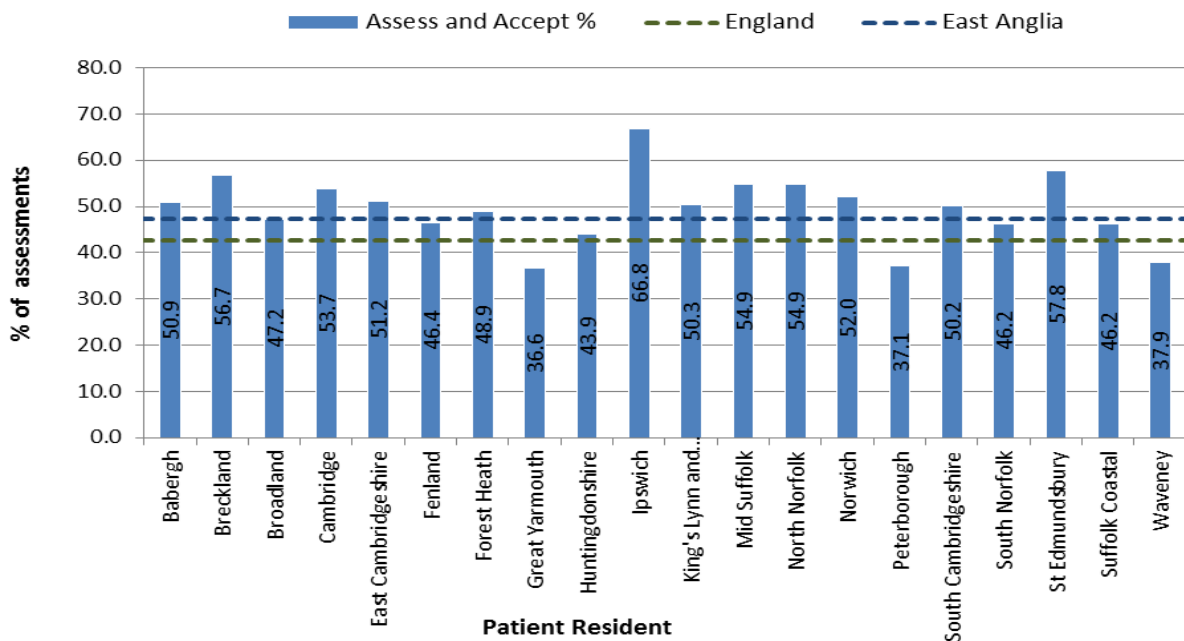


Figure 6 below shows the proportion of assessments where the patient has been assessed and a decision is made that the patient is ineligible or unsuitable for a course of NHS-funded orthodontic treatment. A high percentage of assess and refuse could indicate inappropriate referrals and perhaps an absence of effective referral guidelines. A very low percentage on the other hand may indicate adherence to rigorous and appropriate referral criteria or may reflect that patients who are unsuitable or ineligible, are being treated rather than refused.

Figure 6: % of Assessments that were Assess and refuse (12 months to March 2014)

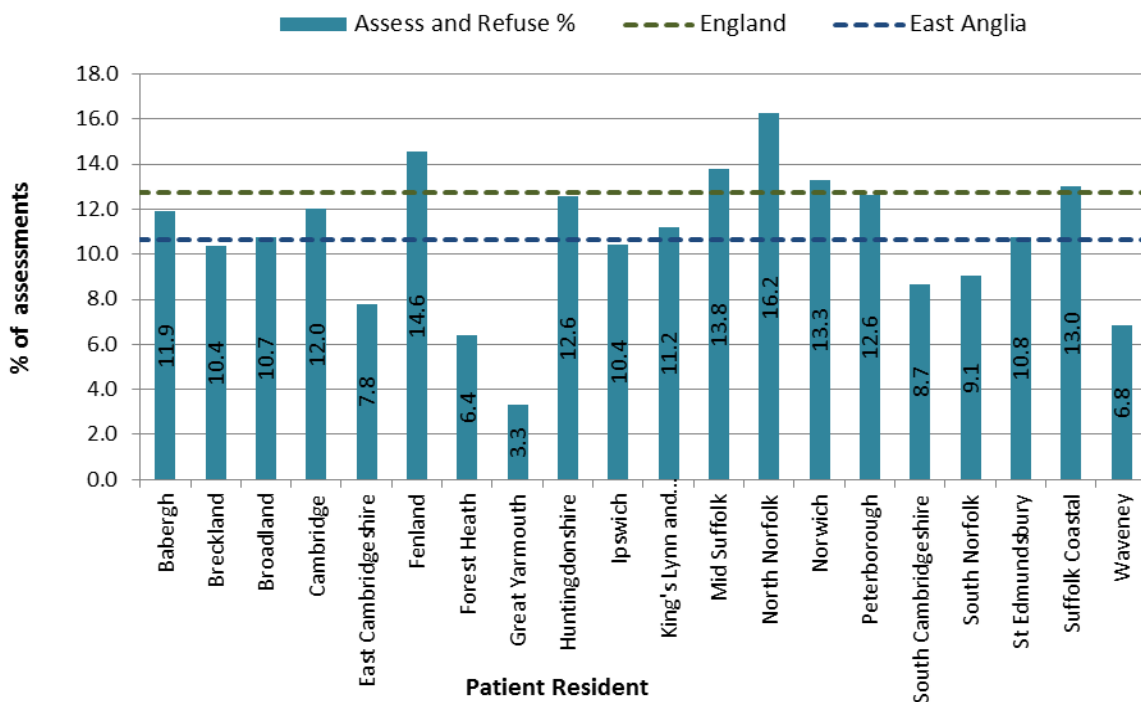
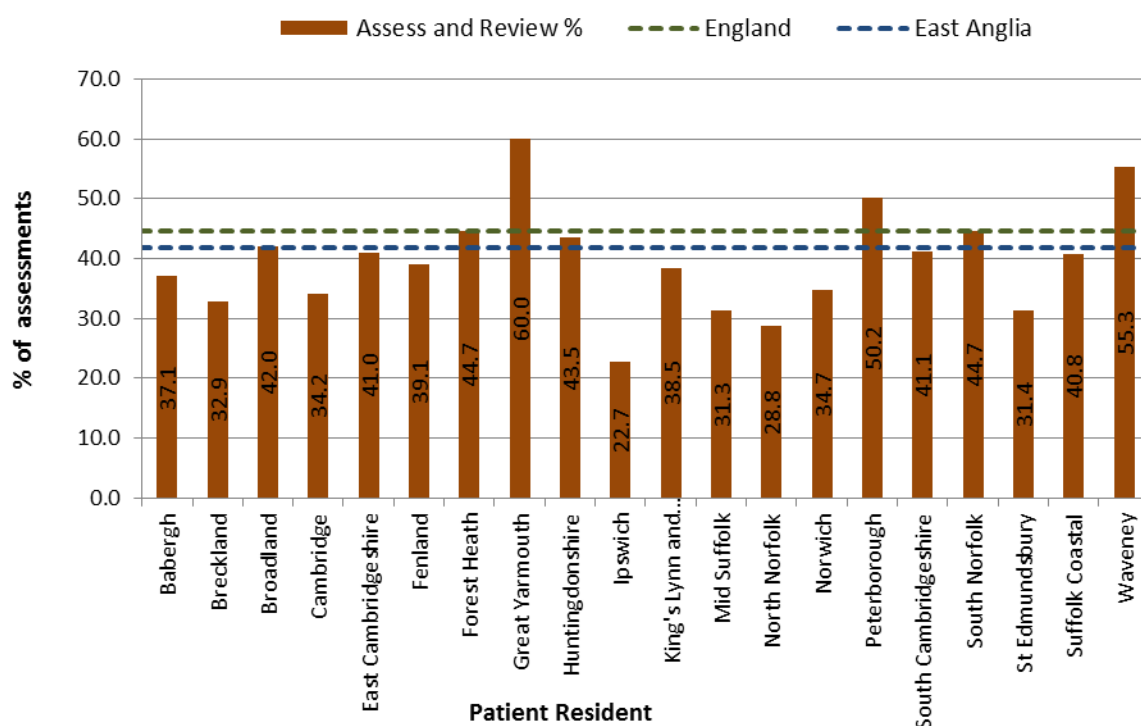


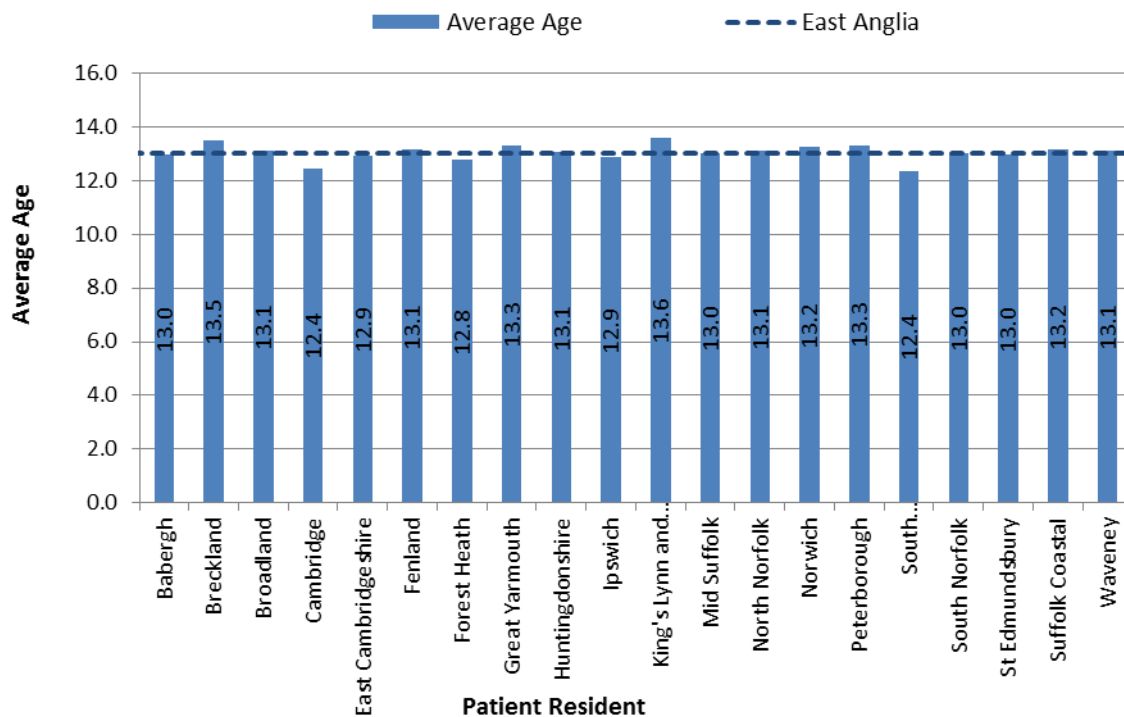
Figure 7 below shows the proportion of assessments where the patient has been assessed and a decision is made that NHS treatment is indicated, but the patient is not ready to start. A high percentage of “assess and review” claims potentially represent poor value for money. It may indicate acceptance of patients who are too young or simply the repeated submission of “assess and review” claims for patients without a clear clinical justification. Some providers may be more popular than others, receiving a greater number of referrals and others may operate a policy whereby they strive to see all new patients within a certain timeframe; some may provide a useful service to the local dental community by giving expert opinion before returning the patients to the referring practitioner for treatment. These could all result in an increased proportion of assess and reviews.

Figure 7: % of Assessments that were Assess and review (12 months to March 2014)



Assess and fit appliance are where the patient has been assessed and treatment is commenced. Figure 8 below shows the average age over the analysed period for patients where treatment was started.

Figure 8: Average age of Assess and fit appliance patients (12 months to March 2014)



Patients accepted for treatment should have a clear clinical justification. The Index of Orthodontic Treatment Need (IOTN) recorded on the FP17 is shown to assess this issue.

IOTN 3 (ineligible) FP17s have an aesthetic component in the range 1-5. IOTN 3 (eligible) FP17s have an aesthetic component in the range of 6-10 (inclusive). In some cases, the IOTN is not recorded. Figure 9 shows the proportion of assess and fit appliance FP17s where the IOTN was eligible; a score of 4-5 or IOTN 3 (eligible) with an aesthetic component in the range of 6-10 (inclusive).

Figure 9: % of assess and fit appliance FP17s where the IOTN was eligible

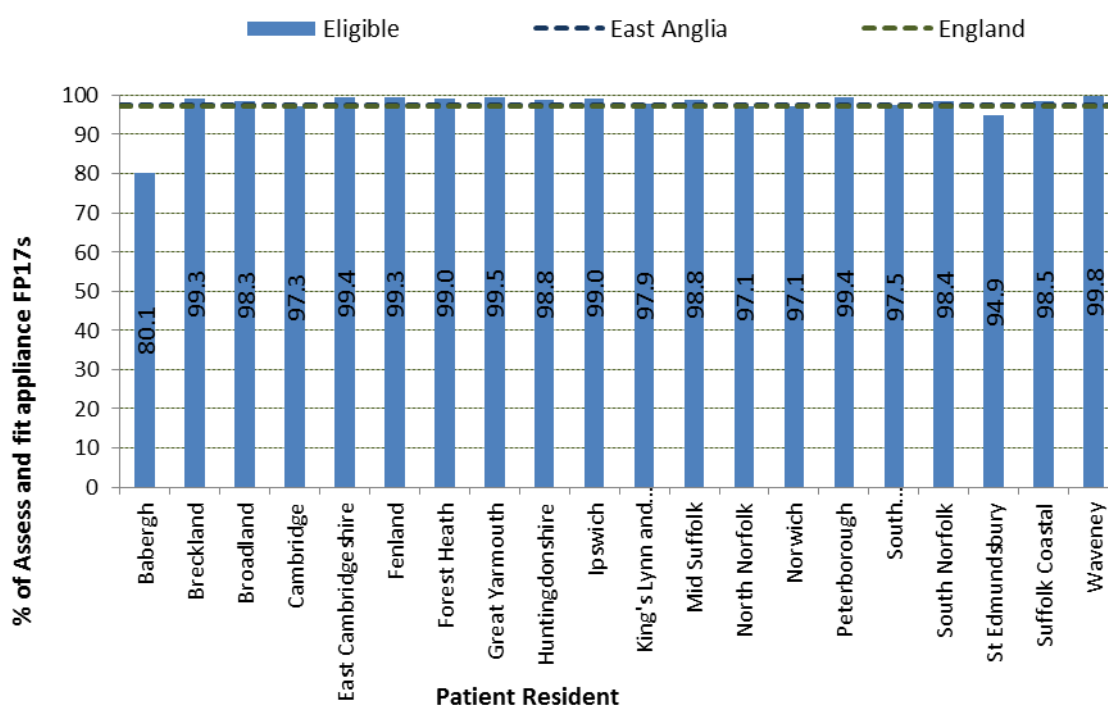


Table 15 below shows the % of Assess and fit appliance FP17s by IOTN Score.

Table 15: % of Assess and fit appliance FP17s by IOTN Score

| Patient Resident | IOTN | | | | | | |
|------------------------------|------|-----|----------------|--------------|------|------|---------|
| | 1 | 2 | 3 (Ineligible) | 3 (Eligible) | 4 | 5 | Missing |
| Babergh | 0.0 | 0.0 | 0.0 | 2.4 | 62.4 | 15.3 | 19.9 |
| Breckland | 0.0 | 0.0 | 0.0 | 6.0 | 78.0 | 15.3 | 0.8 |
| Broadland | 0.0 | 0.0 | 0.0 | 6.2 | 76.1 | 16.0 | 1.7 |
| Cambridge | 0.0 | 0.2 | 0.0 | 6.6 | 71.9 | 18.7 | 2.5 |
| East Cambridgeshire | 0.0 | 0.0 | 0.0 | 11.0 | 69.3 | 19.1 | 0.6 |
| Fenland | 0.0 | 0.2 | 0.2 | 9.2 | 74.1 | 16.0 | 0.2 |
| Forest Heath | 0.0 | 0.5 | 0.0 | 4.0 | 80.9 | 14.1 | 0.5 |
| Great Yarmouth | 0.0 | 0.5 | 0.0 | 2.3 | 83.8 | 13.4 | 0.0 |
| Huntingdonshire | 0.0 | 0.1 | 0.5 | 8.6 | 73.5 | 16.7 | 0.6 |
| Ipswich | 0.2 | 0.0 | 0.2 | 5.2 | 67.4 | 26.4 | 0.6 |
| King's Lynn and West Norfolk | 0.0 | 0.0 | 0.0 | 5.1 | 77.4 | 15.4 | 2.1 |
| Mid Suffolk | 0.0 | 0.0 | 0.3 | 4.7 | 67.4 | 26.7 | 0.9 |
| North Norfolk | 0.0 | 0.4 | 0.4 | 4.6 | 70.0 | 22.5 | 2.1 |
| Norwich | 0.0 | 0.0 | 0.3 | 8.5 | 74.7 | 13.8 | 2.7 |
| Peterborough | 0.0 | 0.1 | 0.0 | 8.0 | 75.6 | 15.7 | 0.5 |
| South | 0.0 | 0.1 | 0.1 | 10.3 | 71.6 | 15.5 | 2.3 |

| | | | | | | | |
|-----------------|-----|-----|------|-----|------|------|-----|
| Cambridgeshire | | | | | | | |
| South Norfolk | 0.0 | 0.0 | 0.0 | 7.6 | 78.6 | 12.2 | 1.6 |
| St Edmundsbury | 0.0 | 0.2 | 1.2 | 7.2 | 67.1 | 20.5 | 3.7 |
| Suffolk Coastal | 0.0 | 0.7 | 0.2 | 4.4 | 77.9 | 16.2 | 0.5 |
| Waveney | 0.0 | 0.0 | -0.2 | 3.7 | 78.5 | 17.6 | 0.4 |
| East Anglia | 0.0 | 2.1 | 0.2 | 6.7 | 73.7 | 17.1 | 2.1 |
| England | 0.1 | 0.1 | 0.1 | 5.1 | 75.6 | 16.6 | 2.5 |

9.2 Treatment Concluded

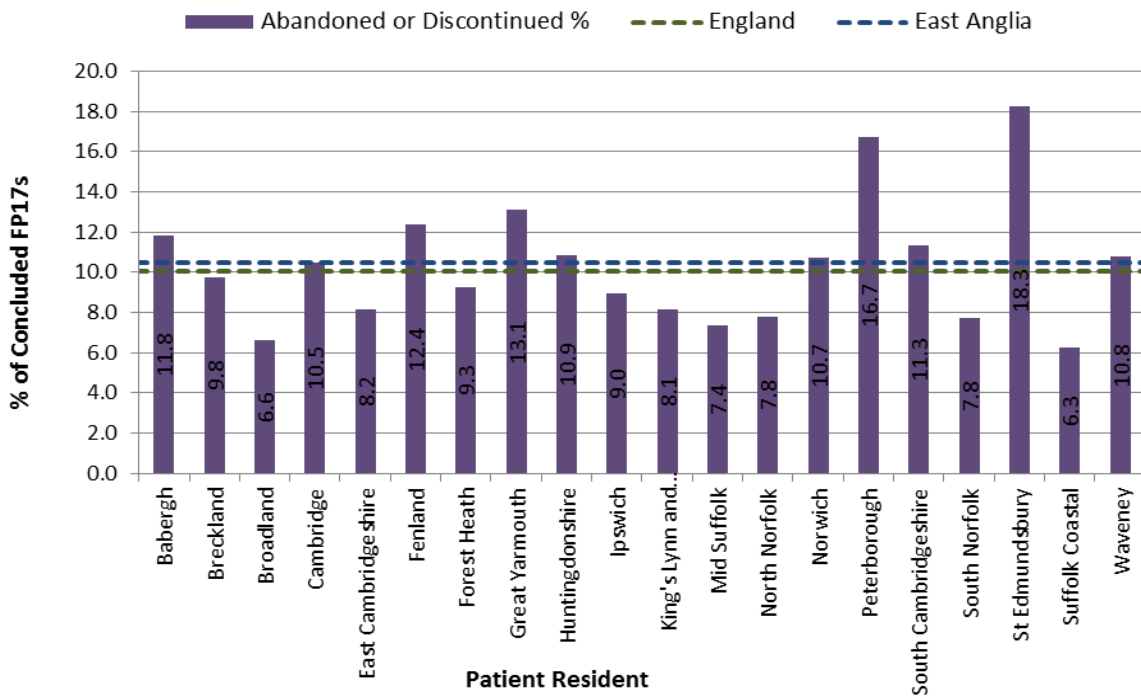
When a patient undergoes orthodontic treatment, there is an expectation that the treatment should be carried out efficiently and effectively, and that the patient should benefit from that treatment. The outcome for each course of treatment commenced should be reported, whether completed, abandoned or discontinued.

- “Concluded” describes the collective outcomes that can occur after a course of treatment has been started. This includes “completed” as well as those courses of treatment that were discontinued or abandoned.
- “Completed” refers to the situation where all of the orthodontic treatment described in the treatment plan has been delivered. This definition aligns with that in both the NHS (General Dental Services Contract) Regulations 2005 and the NHS (Personal Dental Services Agreements) Regulations 2005.
- “Discontinued” refers to the termination of treatment where the performer decides, for whatever reason, it is in the patient’s best interest to cease treatment.
- “Abandoned” refers to the termination of treatment where the patient requests it.

The number of concluded outcomes is shown as a proportion of all concluded outcomes in the analysed period based on patients’ residence. The patient’s residence is determined by the postcode recorded in the personal details section of each FP17 submitted. Data has been extracted for the 12 months up to March 2014. Please note that UOAs are allocated at the start of a course of treatment; therefore, there is no financial incentive to submit completions as a consequence the true number of concluded courses of treatment may not be reflected in the data.

Figure 10 below shows the proportion of concluded courses of treatment that were abandoned or discontinued. Treatment which is terminated (either abandoned or discontinued) represents a waste of resources and suggests poor outcomes for the patient. There will always be occasions where cases are discontinued or abandoned due to patients moving, having health issues or being unable to comply with the treatment programme. High levels of abandoned or discontinued treatment may indicate poor case selection, an attempt to hide poorly treated cases or an attempt to maximise UOA allocation in the pre-motivated knowledge that treatment will be abandoned.

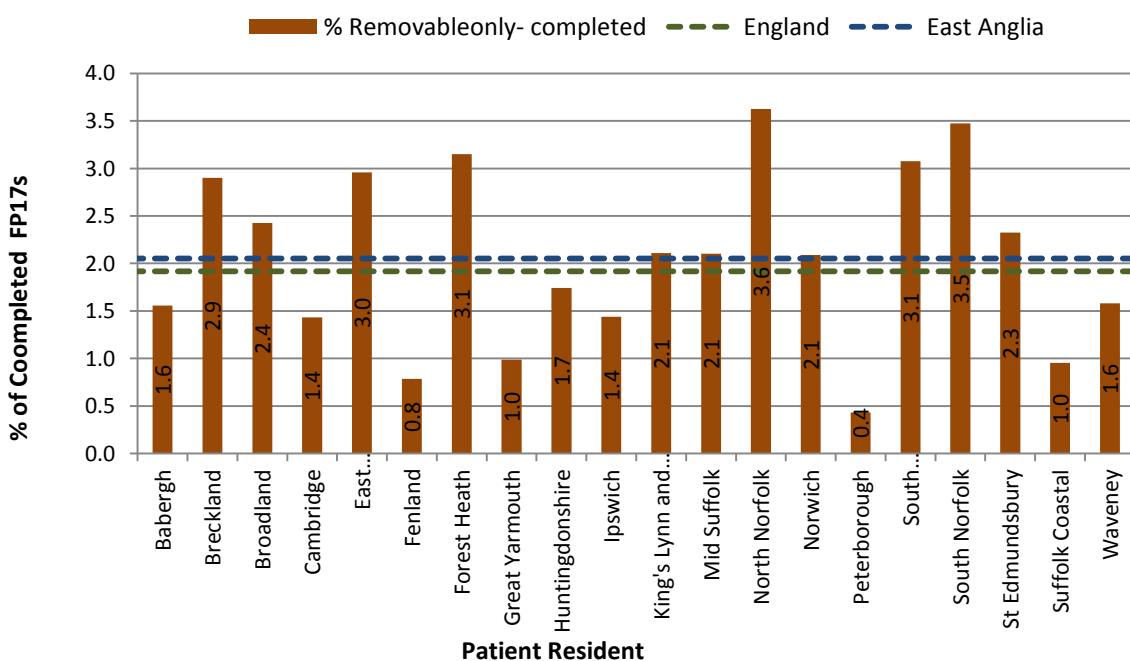
Figure 10: % of Concluded Treatment that was terminated (either abandoned or discontinued)



9.3 Removable Appliances

Figure 11 below shows the proportion of completed courses of treatment reported as using 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 11: % completed treatment with removable appliances only



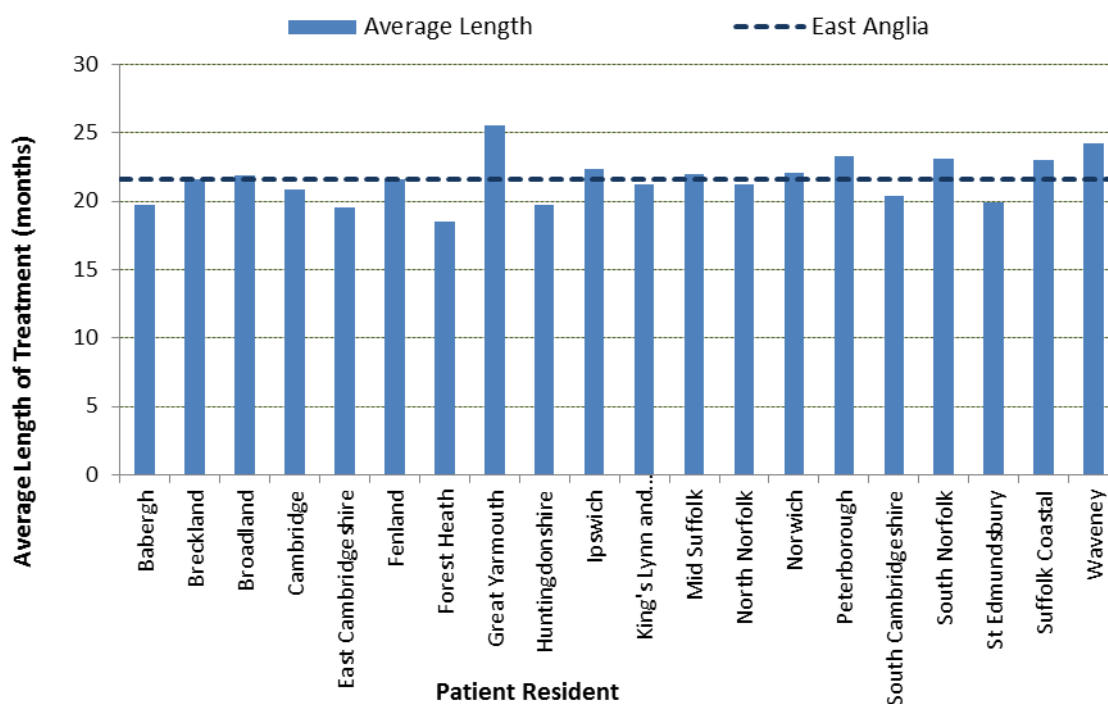
9.4 Length of Concluded Treatment

Orthodontics is a lengthy course of treatment, therefore to assess the length of time treatment takes it is important to analyse treatments over several years.

Concluded treatment was analysed for all courses of treatment with an acceptance date of 1st April 2009 onwards. The number of days between start and completion is then measured with an average length of time calculated. Please note this is based on concluded treatment therefore includes completed as well as those courses of treatment that were discontinued or abandoned. By their nature discontinued or abandoned treatments are shorter than treatments that run their full course, therefore high levels of discontinued or abandoned can skew the average length downwards.

Figure 12 below shows the average length of time in months for concluded courses of orthodontic treatment.

Figure 12: Average Length (months) of Concluded Treatment



9.5 PAR scoring

PAR index is accepted by the British Orthodontic Society and the Department of Health as a useful tool to assess the standard of orthodontic treatment for an individual provider. The FP17(O) has a tick box to indicate if the case has received a PAR Assessment.

It is a requirement of the NHS orthodontic contract for all orthodontists to monitor treatment outcomes for 20 cases plus 10% of the remainder of their caseload every year using PAR.

Self- assessment of treatment outcomes may be subject to bias.

PAR measures the pre-treatment and the post-treatment study models of patients that have received orthodontics using a PAR ruler. The difference between the scores is the PAR improvement due to the treatment.

It is primarily designed to look at the results of a group of patients, rather than an individual patient, as there are always a small number of patients where the index does not really represent the result obtained.

For a practitioner to show high standards the proportion of cases falling in the worse or no different category should be negligible (less than 5%) and the mean reduction in PAR score should be high. An improvement of greater than 70% represents a high standard of treatment, less than 50% shows an overall poor standard of treatment.

Table 16 shows the percentage of completed treatments indicating that PAR score was taken across the Area Team

Table 16: Orthodontic Vital Signs June 2013 Quality Indicators

| Indicator | | Norfolk | Suffolk | GY and W | Cambs | P'boro | AT December 2013 | SHA | England |
|---|------|---------|---------|----------|-------|--------|------------------|------|---------|
| % of completed treatments indicating that PAR score was taken | 39.1 | 65.9 | 75.3 | 55.1 | 97.7 | 65.5 | 53.5 | 44.7 | |
| % of patients satisfied with treatment | 92.3 | 96.3 | 100.0 | 90.0 | 100.0 | 97.6 | 96.4 | 96.5 | |

Source: NHS Dental Services. Vital Signs Orthodontic at a Glance Report. June 2013

9.6 Patient Satisfaction

Patient satisfaction with treatment is assessed using postal questionnaires and across East Anglia patient satisfaction appears to be high. Table 17 shows the patient of patients sampled who report that they are satisfied with their orthodontic treatment.

Table 17: Orthodontic Vital Signs June 2013 Quality Indicators

| Indicator | Norfolk | Suffolk | GY and W | Cambs | P'boro | AT December 2013 | SHA | England |
|--|---------|---------|----------|-------|--------|------------------|------|---------|
| % of patients satisfied with treatment | 92.3 | 96.3 | 100.0 | 90.0 | 100.00 | 97.6 | 96.4 | 96.5 |

Source: NHS Dental Services. Vital Signs Orthodontic at a Glance Report. June 2013

9.7 Quality Indicators

Quality indicators used by the DPD are more concerned with the individual contract holder's performance. Quality indicators on a population basis should include the following, as described by Maxwell⁷⁶ These Dimensions of quality are listed below:

- **Effectiveness** such as PAR rating and rate of removable appliances per 100 fixed appliances as dual arch fixed appliances are generally considered more effective than removable appliances
- **Efficiency** such as cost per case and number of abandoned or discontinued cases
- **Acceptability** for example as measured by patient complaints
- **Access** – how easy are services to access either by location or for example availability of appointment times
- **Equity** for example IOTN criteria for all, though some private provision restricts access on cost level

Quality domains for patients are patient safety, patient satisfaction and patient experience.⁷⁷

10.0 Secondary care orthodontic services

These services are provided from hospitals across East Anglia. This is consultant led care providing treatment for patients with more complex needs generally but not always those with an IOTN score of four and five and an assessment and treatment planning service by referral. IOTN score is not necessarily related to the complexity of the treatment. Many of these patients will require a multidisciplinary approach involving orthodontics, maxillofacial surgery, specialist paedodontics, plastic surgery, speech therapy and restorative care.

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.

Information on secondary care orthodontic services is limited and at present NHSE EAT has information from April 2013 only making analysis of trends difficult. In addition 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. This could be used to inform future commissioning of these services. An example of the type of data collection that could be commissioned is attached at **Annex 2**

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

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⁽⁷⁵⁾

The British Orthodontic Society is currently undertaking a workforce survey so these figures may be updated.

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.

Future orthodontic contracts should take into account these training needs if the workforce is to be maintained.

10.1 Cost of secondary care orthodontic services

The hospital tariff system does not allow direct comparability with the cost of orthodontic care provided in primary care. A tariff is applied for first and subsequent visits as well as for such items as taking an impression or fitting an appliance. It is not possible, using this system, to assess how many patients complete a course of orthodontic treatment in secondary care each year or the cost of each of those courses of treatment. Table 18 outlines the costs of various procedures

Table 18: Coding and pricing: Orthodontics/restorative dentistry at hospital – 2014 tariffs

| Code | Outpatient price | Daycare/spell |
|-----------------------------------|------------------|---------------|
| CZ32 Fitting or insertion | | |
| Under 19 | £183 | £865 |
| 19+ | £183 | 820 |
| CZ33 Restoration/procedure | | |
| Under 19 | | £520 |
| 19+ | | £242 |
| CZ34 Procedures | | |

| | | |
|---|------|--------------|
| Under 19 19+ | £183 | £521 £124 |
| CZ35 Adjustment of device Under 19 19+ | | £103 £102 |
| CZ38 Impression Under 19 19+ | | £111 £120 |

11.0 Referral Management Centres

A Referral Management Centre, in place to manage orthodontic referrals across Norfolk and Suffolk was discontinued in 2013. RMS have not been used across the rest of East Anglia to manage orthodontic referrals. There are advantages and disadvantages in using this system.

The advantages are:

- Good data collection is possible for example the number of referrals.
- Clinical triage may reduce the onward referral of in- appropriate referrals for example early referrals.
- Patient can be made aware of a choice of services including information about waiting times.
- It may reduce the number of un-necessary assessment and review appointments.
- May give early detection of any provider issues.

However there are disadvantages and some of these issues may be dealt with in other ways.

- Data collection for example number of referrals, assess and reviews etc. can be improved through contract monitoring.
- Clinical triage provided by a specialist practitioner is expensive, it may delay the referral pathway if the patient has to attend for an assessment visit and the accepting practitioner, who provides the treatment, may not agree with the diagnosis and treatment plan. This is unlikely to reduce the overall cost of the service.
- Information is regularly collected by the AT about waiting times at different practices and this information can be made available to GDPs
- The referring dentist should discuss the treatment options with the patient and this discussion can include waiting times and choice of provider.
- Contract monitoring will identify practitioners with higher than average rates of, for example, assess and review and can be addressed on an exceptions basis in discussion with the service provider.

There are opportunities now for the Area Team to achieve a consistency of approach to the management of orthodontic referrals across East Anglia.

12.0 Future Training Needs

The training of specialist orthodontists is the responsibility of Health Education England (HEE) nationally and the Local Education and Training Board (LETB) locally formerly known as deaneries, 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 site requires a number of suitable patients to provide this training experience for the trainees at different stages of their training programme. Training has not been undertaken at Peterborough City Hospital since October 2012. 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 AT 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.

13.0 Discussion and Conclusions

Overall there appears to be over provision of orthodontic services across East Anglia by approximately 450 cases a year.

The distribution of orthodontic services across NHS East Anglia is inequitable. There is apparent over provision in Cambridge City, Great Yarmouth and Waveney and under provision around Kings Lynn Thetford and Fenland particularly Wisbech.

Current population data suggests that the number of 12 year olds has fallen by about 1000 since the epidemiological surveys were carried out in 2009 as described in the Office for National Statistics survey data. However by 2021 it is expected that the 12 year old population across East Anglia will rise by ten per cent. Most of this increase will be in Peterborough, fifteen per cent and Cambridgeshire, twelve per cent.

The number of children treated privately is not known and the number of children who complete orthodontic treatment in secondary care each year is not known either because the information is not available. The number of children receiving care in secondary care 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.

In total East Anglia Area Team spends **£9,401,488.64** annually on orthodontic services commissioned through PDS contracts most of which, but not all, are time limited. East Anglia Area Team spends a further **£2,650,161** annually on orthodontic services commissioned through non time limited GDS contracts. This is a total of **£12,051,649** annually

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, AC =6) and above. In the past PCTs 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.

East Anglia Area Team has extended orthodontic contracts to March 2016 to ensure continuity of service provision in the short term. With PDS orthodontic contracts coming to an end the Area Team has the opportunity to review the commissioning of these services to better meet the needs of the population.

14.0 Recommendations

- East Anglia Area should continue to review the level of orthodontic service provision across the county to ensure that the needs of the local population are met with patients able to achieve timely access to services.
- East Anglia Area Team should review the distribution of services to ensure equitable access across the area particularly areas that currently have limited or no access to local services such as Kings Lynn, Thetford and Wisbech. Distance, inconvenience and cost should be considered to avoid barriers to care.
- Only treatments that are evidence-based and comply with contemporary standards such as those of the National Institute for Clinical Excellence (NICE) and the Care Quality Commission (CQC) should be provided.
- Local Authorities should continue to contribute to the National Dental Epidemiology Programme so that the population needs can be benchmarked locally and nationally.
- East Anglia AT should continue to monitor their local population demographics to assess future need, and should be cognisant of population projections locally to predict varying needs.

- The dental Local Professional Network should have a lead role in the commissioning of future orthodontic services. The LPN should work closely with other stakeholders including Local Authorities, Clinical Commissioning Groups, service providers and patient groups such as Healthwatch
- To ensure best quality care, commissioners should consider holding contracts with providers who are on the orthodontic specialist list or who have a named specialist working for them.
- Orthodontic services provided by specialist and non- specialist providers should be subject to the same quality indicators as part of the contracting process
- Any new contracts should include mechanisms to recognise high quality performance and support to improve performance where this is required.
- To this end Annex 3: Quality and Value Audit Framework from *Transitional commissioning of primary care orthodontic services-single operating model November 2013 Gateway reference 00642* should be followed
- Any new contracts should meet best practice in terms of achieving key Quality, Innovation, Prevention and Productivity (QIPP) objectives for the Area Team
- Access to primary care services is essential for referral on to a specialist services so commissioners should first ensure that children have access to GDS services.
- Malocclusion is not an acute condition requiring relief, and specialist care including orthodontics should only be provided where patients have access to routine dental services and a stable oral environment.
- Orthodontic treatment can only be justified where the patient has been informed of risks as well as benefits and has therefore made an informed decision about whether or not to proceed. This should be recorded in the notes or a 'patient's agreement'.
- Orthognathic treatment cannot be initiated until growth of the jaws has ceased, therefore, arrangements should be put in place locally to allow treatment for those adults who may require this type of treatment.
- Orthodontic practices in primary care should continue to restrict care to under the age of 18 years unless specifically commissioned by the Area Team
- Effective pathways should be in place to support delivery of services so that primary care orthodontic services are receiving appropriate referrals and able to refer on to other services appropriately.
- Patient pathways should follow any national guidance, currently expected in April 2015
- To help GPs refer appropriately there should be support through training and education to understand what constitutes an appropriate referral.

- New performers and providers should be made aware of referral pathways and systems.
- There should be consideration of training requirements for succession planning particularly in the secondary care setting and in skill mix.
- The LETB should ensure that courses are available regarding training and calibration of PAR scoring for orthodontists and good referral practices for GDPs.
- Further research should be undertaken to investigate:
 - a. Barriers to orthodontic care including distance travelled and travelling time.
 - b. The provision of secondary care orthodontic services.

ANNEX ONE

Extract from the National Health Service (General Dental Services Contracts) Regulations) 2005⁽³⁾:

SCHEDULE 1
Regulation 15

ADDITIONAL SERVICES

PART 2 ORTHODONTIC SERVICES

Patients to whom orthodontic services may be provided

4.—

- (1) A contract that includes the provision of orthodontic services shall specify that orthodontic services may be provided to:
 - (a) only persons who are under the age of 18 at the time of the case assessment;
 - (b) only persons who have attained or are over the age of 18 years at the time of the case assessment; or
 - (c) persons falling within paragraph (a) or (b).
- (2) Where a contract specifies the matters referred to in sub-paragraph (1)(b) or (1)(c), it shall in addition specify the circumstances in which orthodontic services may be provided to a person over the age of 18 years at the time of a case assessment.
- (3) Subject to sub-paragraph (4), the contractor shall only provide orthodontic treatment to a person who is assessed by the contractor following a case assessment as having a treatment need in:
 - (a) grade 4 or 5 of the Dental Health Component of the Index of Orthodontic Treatment Need; or
 - (b) grade 3 of the Dental Health Component of that Index with an Aesthetic Component of 6 or above, unless the contractor is of the opinion, and has reasonable grounds for its opinion, that orthodontic treatment should be provided to a person who does not have such a treatment need by virtue of the exceptional circumstances of the dental and oral condition of the person concerned.

- (4) In a case where a person does not have a treatment need but the contractor has reasonable grounds for its opinion that orthodontic treatment should be provided to that person because of the exceptional circumstances of the dental and oral condition of that person, such treatment as is referred to in sub-paragraph (3) may be provided.

ANNEX 2

HOSPITAL ORTHODONTIC ACTIVITY

ANNUAL

| | From GDP | From GMP | From Hosp Cons | from Other | TOTAL |
|---|----------|----------|----------------|------------|-------|
| No of new patients seen for first assessment | | | | | |

Of these:

| | | | | | |
|---|--|--|--|--|--|
| No of patients discharged after first assessment | | | | | |
|---|--|--|--|--|--|

No of patients put on list for review after initial assessment

No of patients to active treatment list after initial assessment

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |

No of (previously seen) patients seen for further review

Of these:

Number Discharged

No of patients put on list for further review

No of patients put on active treatment list

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |

Active Treatment - Under 18 years at start of treatment

Solely Orthodontic speciality cases

| | IOTN DHC 3 | IOTN DHC 4 | IOTN DHC 5 | TOTAL |
|--|------------|------------|------------|-------|
| Number of (active treatment) starts | | | | |
| Number of treatment completions | | | | |

Multispecialty

| | With OMFS | With Restorative | With other specialty | TOTAL |
|--|-----------|------------------|----------------------|-------|
| Number of (active treatment) starts | | | | |
| Number of treatment completions | | | | |

Active Treatment-Over 18 years at start of treatment

Solely Orthodontic specialty cases

Number of (active treatment) starts
Number of treatment completions

| IOTN DHC 3 | IOTN DHC 4 | IOTN DHC 5 | TOTAL |
|------------|------------|------------|-------|
| | | | |
| | | | |

Multispecialty

Number of (active treatment) starts
Number of treatment completions

| With OMFS | With Restorative | With other specialty | TOTAL |
|-----------|------------------|----------------------|-------|
| | | | |
| | | | |

Active Treatment - Operator
Number of (active treatment) starts

| Consultant | Sp. Registrar | Associate Specialist | Staff Grade | Gen Dent Practit. | TOTAL |
|------------|---------------|----------------------|-------------|-------------------|-------|
| | | | | | |

QUARTERLY

Number waiting for first assessment
Number waiting for further (follow up) review

| at 31st Dec | at 31st March | at 30th June | at 30th Sept |
|-------------|---------------|--------------|--------------|
| | | | |
| | | | |

Number waiting for treatment start (consultant)
Number waiting for treatment start (Staff; non-consultant grade)
Number waiting for treatment start (Training grade)

| | | | |
|-------|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |
| TOTAL | | | |

? Length of time waiting of interest

Glossary for orthodontic needs assessment and service review

| | |
|--|--------------------------------------|
| PDS | Personal Dental Services |
| GDS | General Dental Services |
| NWPHO | North West Public Health Observatory |
| BOS | British Orthodontic Society |
| IOTN | Index of Orthodontic Treatment Need |
| DHC | Dental Health Component |
| AC | Aesthetic Component |
| TMJ | Temporomandibular Joint |
| PCT | Primary Care Trust |
| NHSE EA AT | NHS England East Anglia Area Team |
| QoL | Quality of Life |
| ONS | Office for National Statistics |
| PAR | Peer Assessment Rating |
| Orthognathic Surgery of the mouth and jaws | |

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