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# The Dilemma of Commissioning: The Isle of Wight Orthodontic Managed Clinical Network: a 3-year Review Part 2: Referral Outcomes

**Abstract:** The key objective of creating the Isle of Wight orthodontic service managed clinical network (IOWOS MCN) was to create an integrated service measuring the referral and outcome data to inform future commissioning and service re-organization. Data were collected as part of a central referral triage process and were analysed from 2006 to 2009. The theoretical orthodontic need was assessed in the IOW population and compared to other methods of assessing need reported in the literature. The IOWOS referral outcomes were then compared to the expected theoretical outcomes. The referral outcomes were described and discussed in the first part of this two-part series. This second part provides an insight into some of the complexities of commissioning orthodontic care by reference to the referral outcome data.

**Clinical Relevance:** There was a high level of appropriate referral for orthodontic treatment within the IOWOS MCN but the method of calculating orthodontic need is complex.

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The development of the Isle of Wight orthodontic service managed clinical network (IOWOS MCN)<sup>1,2</sup> has allowed collection of referral and outcome data to inform future commissioning and service re-organization. Prior to 2006, there was no integrated data and access to orthodontic services was poor and commissioning of services had no evidence base. The current justification for orthodontic treatment is complex and the method of calculation

heterogeneous.<sup>3–6</sup> This review analysed outcome data for the IOWOS from 1st July 2006 to 30th June 2009.

## Outcome data

Referrals were from a potential NHS list of 62 primary care dentists, secondary care including oral and maxillofacial surgeons and other medical specialties, and a few referrals from general medical practitioners and a few transfer cases from the UK mainland.<sup>2</sup>

The Index of Orthodontic Treatment Need (IOTN) is used locally as part of the triage process. Patients eligible for treatment in the permanent dentition fall within the IOTN categories 5, 4 and 3/SCAN 6–10.<sup>7</sup> In addition, there are some patients in the mixed dentition requiring interceptive orthodontic treatment and a limited number of adult patients where the use of IOTN would be inappropriate. For the patient referral data analysed, 1155 (41%) of the 2801 patients triaged were considered in need of treatment and

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were designated for immediate treatment or placed on the central waiting list; 1101 (39%) were placed on review (Table 1). Patients placed on review were deemed to be in need of future orthodontic treatment which would be delayed because they were awaiting further dental development, had other dental health problems, needed preliminary extractions, or needed dento-alveolar surgery, or required an orthognathic or restorative opinion. A total of 545 (19%) were discharged for a combination of reasons, including:

- Those eligible through IOTN classification but who declined treatment;
- Those who failed to attend;
- Those who were unlikely to be ready for treatment for more than 2 years; or
- Those who were of low priority (<IOTN

3/SCAN 6–10 or an adult).

A total of 278 (9.9%) patients were referred for multidisciplinary team care. Multidisciplinary cases included hypodontia, orthognathic surgery, dento-alveolar surgery and complex restorative care.

### Patient pathway after referral

The data provides useful information on the proportion of patients placed on the central waiting list for treatment, placed on review or discharged during the study period. The 11–18 year-old cohort was analysed in more detail as these patients were deemed to be at the most appropriate age for treatment. In an ideal world, all patients referred would be in a treatment need category, be ready

to treat and want treatment. However, there will always be a proportion of patients who refuse treatment, have dental health issues or do not fall into the appropriate IOTN category. This reflects the need for further education of referring dentists to ensure timely referrals and decrease the number of patients placed on review. The reasons for the discharge rate requires further investigation because there are some categories, such as <IOTN 3/SCAN 6 that could be reduced with more appropriate referral patterns. Holmes<sup>6</sup> found that 5.3% of the school population did not need treatment and 25.5% fell into IOTN 2 or aesthetic component (AC) 3 or less. In a referred sample, the expectation is that this section of the population would not initially be referred.

The increase in the discharge figure for 2008–2009 needs to be considered further as this does not make the best use of resources and suggests an increase in inappropriate or unnecessary referrals. However, this irregular pattern in the IOW data was identified as a localized case of inappropriate referral. The data needs to be monitored for a longer period of time to establish whether or not a pattern emerges with which to inform commissioning and target training.

### A comparison of orthodontic demand with theoretical need in the referred sample of the IOWOS MCN

The theoretical need on the IOW was calculated by applying previous theories (Table 2).

Stephens<sup>4</sup> used a refined prediction method based upon the 12-year-old population to estimate need in the population, known as the ‘Stephens’ formula. This Stephens’ formula predicted the theoretical need

Referral period	Age group	Referral pathway			
		Immediate treatment or central waiting list	Review	Discharge	Total
2006 - 2007	All ages	420	370	157	947
	<11yrs	45	118	51	214
	11–18yrs	369	238	92	699
	19yrs+	6	14	14	34
2007–2008	All ages	494	358	166	1018
	<11yrs	25	98	43	166
	11–18yrs	468	248	101	817
	19yrs+	1	12	22	35
2008–2009	All ages	241	373	222	836
	<11yrs	25	110	42	177
	11–18yrs	211	253	137	601
	19yrs+	5	10	43	58

Table 1. Referral and outcome data, 2006–2009.

Date	Need cited by Todd and Dodd 1983–1985 <sup>5</sup> (by no. of patients)	Need cited by Holmes 1992 <sup>6</sup> (by no. of patients)	Need cited by Stephens 1992 <sup>4</sup> (by no. of patients)	Need cited in Child Dental Health Survey 2003 <sup>3</sup> (by no. of patients)	Need found in total referred population to IOWOS (Need = Total number on waiting list plus number placed on review 11–18 years)
2006–2007	788	622	645	737	420+238=658
2007–2008	771	608	631	720	494+248=742
2008–2009	749	591	613	700	241+253=494
Average	769	607	630	719	631

Table 2. Summary of theoretical orthodontic need applied to the 12-year-old IOW population and the demand measured from IOWOS central data.

<p><b>STEPHENS' FORMULA</b> = <math>\frac{12 \text{ YEAR-OLD POPULATION} \times 100}{3} + \frac{\text{INTERCEPTIVE FACTOR} + \text{ADULT FACTOR}}{100}</math></p> <p>(Interceptive factor = 9 Adult factor = 4)</p>
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**Figure 1.** Stephens' formula calculation.

compared to the actual need found in the referred population. The formula includes an interceptive factor and an adult factor (Figure 1). Interceptive treatment is treatment provided before the permanent dentition is established and adult treatment is provided for patients aged 19 and over for functional or significant psychosocial benefit.

The Stephens' formula is a theoretical formula derived from General Dental Service (GDS) data collected in 1986/87 and, at that time, it could be postulated that the interceptive factor was greater, and certainly adult orthodontic care was more prevalent, on the NHS than from 2006 to 2009. However, there has been a marked increase in the provision of children's orthodontic care over the last 20 years and, in 2006, provision in the NHS was optimized in England. Contractual restrictions on adult treatment and the fact that, for several years, more children have received orthodontic treatment may have changed the weighting of the interceptive and adult factors in the Stephens' equation. However, this may have been offset by the increase in the number of 12-year-olds receiving treatment since the formula was derived and this, in turn, is linked to the increase in the IOW population over the last 10 years.

If the Stephens' formula is applied to the IOW 12-year-old population, the mean number of patients per year for the study period deemed in theoretical need of treatment would be 630 (Table 2).

### Assessment of need in the IOW referred population

For the referred population, the number of patients placed on the waiting list aged from 6 to >18 years was 1155. This included an interceptive factor and an adult factor. In addition, if those patients placed on review aged 11–18 years who have potential need are added (739), the mean annual value

for the period of the study was 631, matching closely the theoretical need.

Therefore, from an analysis of the IOW data for the study period, the theoretical population need matches the actual clinical need in the referred sample when using the Stephens' formula. In commissioning services, the Stephens' formula has provided the most accurate prediction of need when compared to actual outcomes for the referred population. PCTs need to be aware of what evidence base they use to determine orthodontic need and what age groups they are prepared to accept for treatment.

The prediction of orthodontic need, based on historical figures made in an IOW PCT draft report in August 2006,<sup>9</sup> is lower than the theoretical need cited in the literature and lower than the actual orthodontic need recorded from the IOWOS MCN data. The report suggests that the need was based on 533 patients requiring treatment each year. The PCT figures were based on general medical practitioner registrations not census population data. Stephens was cited in their equation, but only the need in the 12-year-old population and not as part of his complete formula. This inaccurate prediction highlights the dilemma faced by PCTs in calculating orthodontic need without a complete dataset and a clinical input to help interpret their findings.

### Conclusion

The referral and outcome data from the IOWOS MCN were analysed retrospectively. The data were integrated and the outcomes included both primary and secondary care data. Many theories of orthodontic need in a population have been presented and researched. This review, based on a unique and evolving MCN, determined the current demand that presented for treatment to IOWOS for the first

three years of the dental contract. The nearest theoretical formula to match the IOWOS outcomes was described by the Stephens' formula.

Further prioritization of orthodontic services must be evidence based and the data from the IOWOS clearly demonstrate the current orthodontic demand on the IOW, although analysis of additional data should better inform the planning of oral and maxillofacial surgery and specialist restorative input into orthodontic care. It is hoped that the experiences from the evolving IOWOS will provide an insight into the current dilemma of commissioning orthodontic services in the United Kingdom.

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