

The impact of restricted access on the need and demand for specialist dental services – A consideration for future needs assessments

Ross Keat and Iain Pretty

Dental Health Unit, University of Manchester, UK

Introduction: The COVID-19 pandemic forced NHS Dental Services to adapt quickly and implement measures which would safeguard essential care provision, whilst mitigating COVID-19 transmission risks. However, these changes impacted on both dental access, and onward referrals for specialist care. **Basic Research Design:** A longitudinal study design is used to offer descriptive analysis of referrals sent across three referral groups (orthodontics, paediatric dentistry, suspected cancers) across three time-matched periods (1st July to 31st December in 2019, 2020 and 2021). Anonymised data, extracted from an electronic referral management system (eRMS), are considered. Number of referrals, reasons for referral, Indices of Multiple Deprivation for each referral are discussed. **Results:** Referrals reduced from 2019 to 2020. Proportionally, the greatest reduction in onward referral was observed amongst individuals from the lowest socioeconomic positions, across all groups. Although mandated to conduct only 62.5% of the 2019 activity, the 2021 referrals exceeded 2019 figures. Proportions referred from the lowest socioeconomic position were still slightly lower across all three groups. **Conclusions:** Referrals from the lowest socioeconomic groups decreased in 2020, followed by a rebound in 2021, despite a reduction in mandated clinical activity. There are potential implications for future oral health needs assessments that should be considered when developing interventions to enhance access for vulnerable populations as we emerge from the COVID-19 pandemic.

Keywords: Dental, Public Health Dentistry, Healthcare Public Health, Referral Management, Specialties, Access

Introduction

Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV2), and the resultant COVID-19 pandemic, resulted in rapidly implemented changes to healthcare, designed to protect both patients and providers. Dentistry was no different, with English National Health services closed between 25/3/20 - 8/6/20. On re-opening, modifications were made to provision, including new infection prevention and control guidance.

Before and throughout the pandemic, NHS dental services continued to be delivered in primary (general dental practice) and secondary (hospital) care. In the UK's National Health Service (NHS), dentists who work in primary care (General Dental Practitioners) provide mandatory services according to the Standard General Dental Services Contract and are trained in skills aligned with the Dental Foundation Training Curriculum (COPDEND, 2015). Specialist clinical treatment is typically provided by clinicians in secondary or primary care settings with the appropriate facilities. Specialists have skills and competencies aligned with their specific specialty training curricula and commissioning guidance, overseen by the General Dental Council. Referrals are made by primary care clinicians when a patient's presenting complaint is deemed to be beyond their scope of practice (Foot *et al.*, 2010).

Some regions also offer treatment beyond the scope and complexity of care typically undertaken by a GDP, via 'Tier 2' services in primary care. The scope and

specifications for such services are outlined in relevant commissioning guides (NHS England, 2015).

NHS primary care dentists use electronic referrals in certain regions to send a referral proforma outlining a patient's complaint to providers offering enhanced clinical services. These referrals are triaged and allocated for treatment, either rejected and sent back to the referring dentist, accepted for treatment by a competent practitioner in primary or secondary care. Electronic referrals are preferred due to their data security, ability to reduce waiting times, and standardization of presentation (Azamar-Alonson *et al.*, 2019).

This study aimed to determine the impact of the first COVID-19 lockdown on onward referrals. Time periods before and after the lockdown are compared. The index of multiple deprivation (IMD) for those referred are considered. Three groups of referrals are explored; orthodontic treatment, paediatric dental treatment and suspected cancers (two-week wait (2ww)).

Methods

This longitudinal study of referrals to three specialties from GDPs via an electronic referral management service compares three periods spanning the COVID-19 pandemic – pre-COVID (1/7/19 – 31/12/19), mid-COVID (1/7/20–31/12/20) and post-COVID (1/7/21–31/12/21).

Data from eRMS include the number of referrals, the reasons for referral, and the patients' IMDs based on their

postcode. For analysis purposes, IMD data are presented in deciles, with the most deprived postcodes scored as 1. All data were sourced from the secondary uses eRMS database where all patient identifiable data were removed before release. The anonymised data required no ethical approval for this investigation.

To be included within the study patients had to be resident in England and the specific eRMS referral management had to be active for the selected specialties for the duration of the study, with their use mandated by the commissioning team. These criteria resulted in the following NHSEI regions being included:

- **Paediatric Dentistry** – Greater Manchester, Cheshire and Merseyside, Lancashire and South Cumbria, Yorkshire and Humber
- **2ww** - Greater Manchester, Cheshire and Merseyside, Yorkshire and Humber, West Midlands
- **Orthodontics** – Greater Manchester, Cheshire and Merseyside, Lancashire and South Cumbria, Yorkshire and Humber, East Anglia, Thames Valley

Due to the size of regions, descriptive analyses are presented in the results.

Results

Overall referral numbers reduced from 2019 to 2020, when 20% of 2019 clinical activity was mandated. Proportionally, the greatest reduction in onward referral is noted amongst individuals from the lowest socioeconomic positions, across all referral groups.

Although mandated to conduct only 62.5% of the 2019 clinical activity, the total 2021 referral numbers exceed 2019 figures. However, proportions referred from the lowest socioeconomic position remain slightly lower across all three referral groups, when compared to 2019.

The total number of referrals for paediatric dentistry fell by 40.3% between 2019 and 2020, with a 10.9% increase between 2019 and 2021 (Figure 1). The lowest numbers of referrals were sent in August 2019, July 2020 and December 2021 respectively, with most referrals sent in October 2019 and 2020, and November 2021.

Paediatric dentistry referrals for patients from postcodes associated with the lowest socio-economic position had the largest proportional decrease in referrals between 2019 and 2020, a 2.55% decrease. This recovered by 1.95% in 2021 (Figure 2).

The total number of referrals for 2ww fell by 16.81% between 2019 and 2020, with a 31.46% increase between 2019 and 2021 (Figure 3). Across all three years, the lowest number of referrals were sent in August, with most being sent in November.

2ww referrals for patients from postcodes associated with the lowest socio-economic position had the biggest proportional decrease in overall referrals between 2019 and 2020, a 1.85% decrease. This group recovered by 0.96% in 2021. Referrals from IMD 8 increased in 2020 compared to 2019 (Figure 4).

The total number of referrals for orthodontics fell by 66.1% between 2019 and 2020, with a 9.11% increase between 2019 and 2021 (Figure 5). The least referrals were sent in July 2019, and December 2020 and 2021, with most referrals sent during October in 2019 and 2020, and November in 2021.

Orthodontic referrals for patients from postcodes associated with the lowest socio-economic position, had the biggest decrease in percentage of overall referrals between 2019 and 2020; a 5.27% decrease (Figure 5). This group recovered by 4.57% in 2021. Referrals for patients from the postcodes associated with highest socioeconomic positions had a 4.64% increase in referrals between 2019 and 2020, before falling 4.82% in 2021.

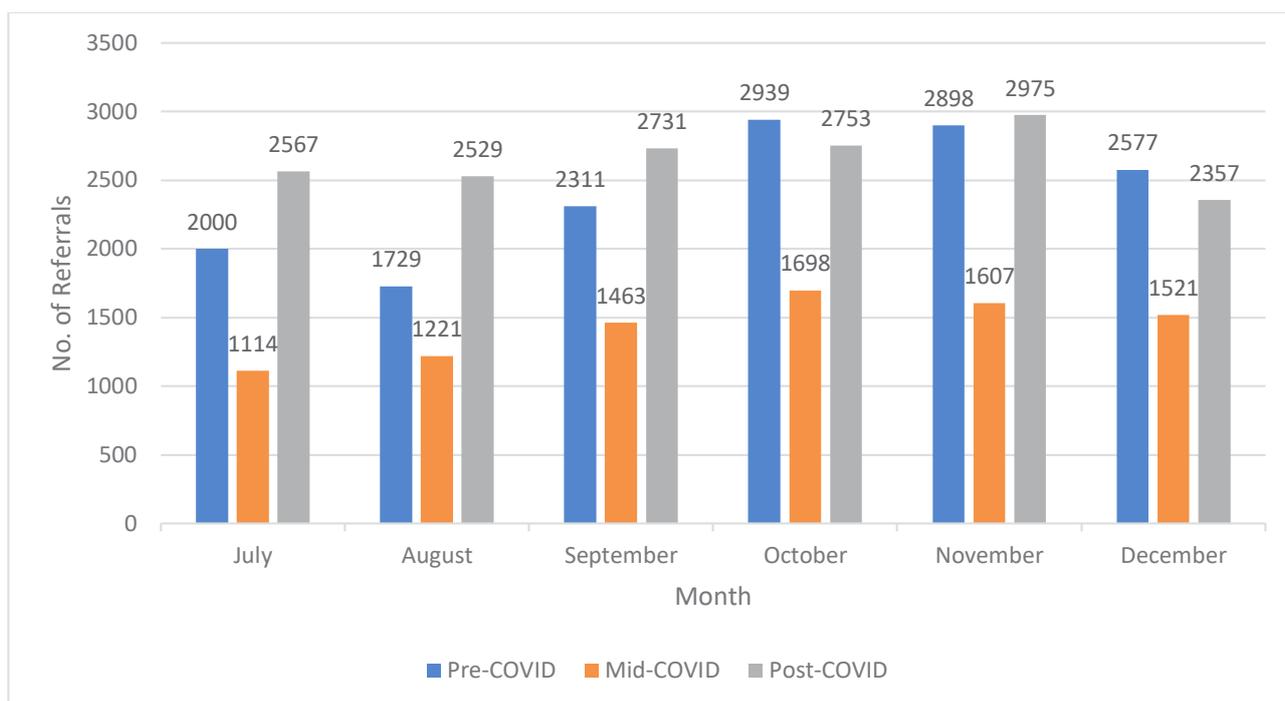


Figure 1. Paediatric Dentistry referrals by month, pre- and post-pandemic.

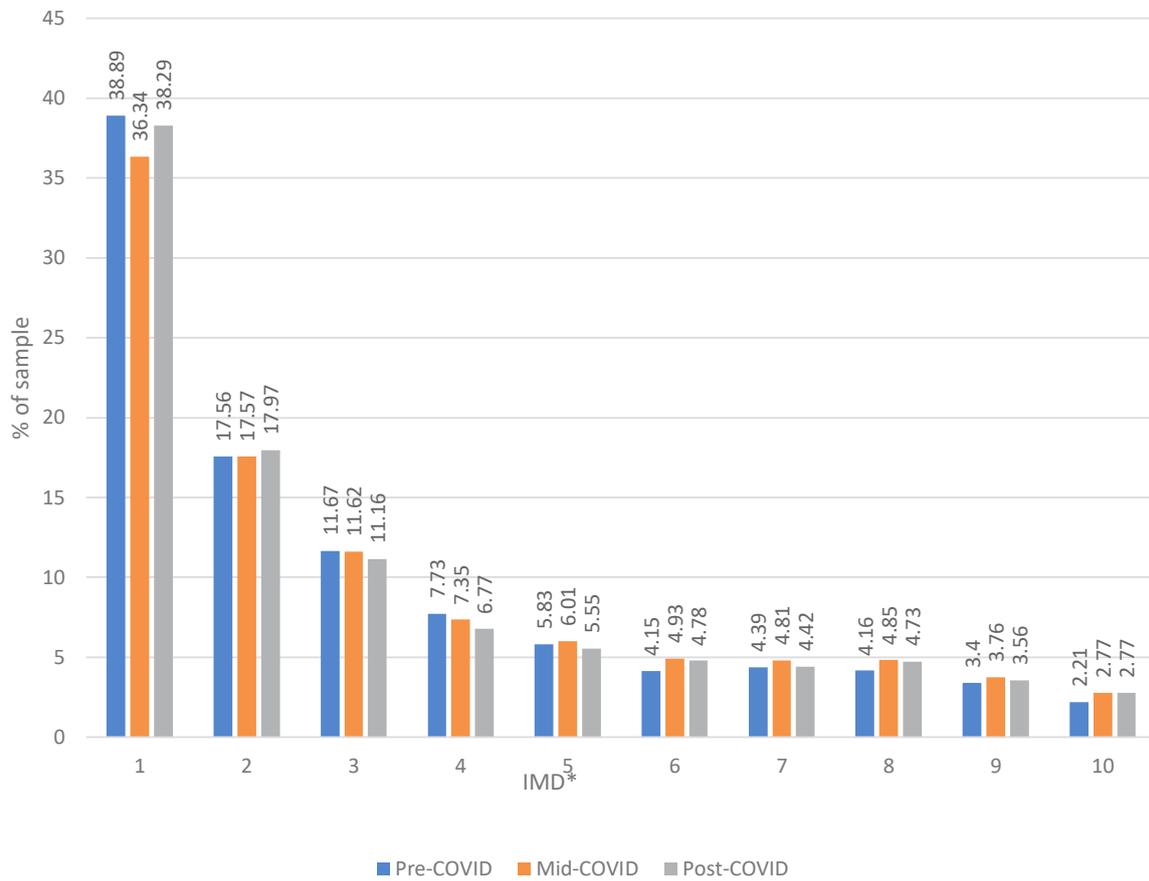


Figure 2. Paediatric Dentistry referrals pre-, during and post-pandemic by IMD decile.

*IMD = Index of multiple deprivation. 1 is most deprived.

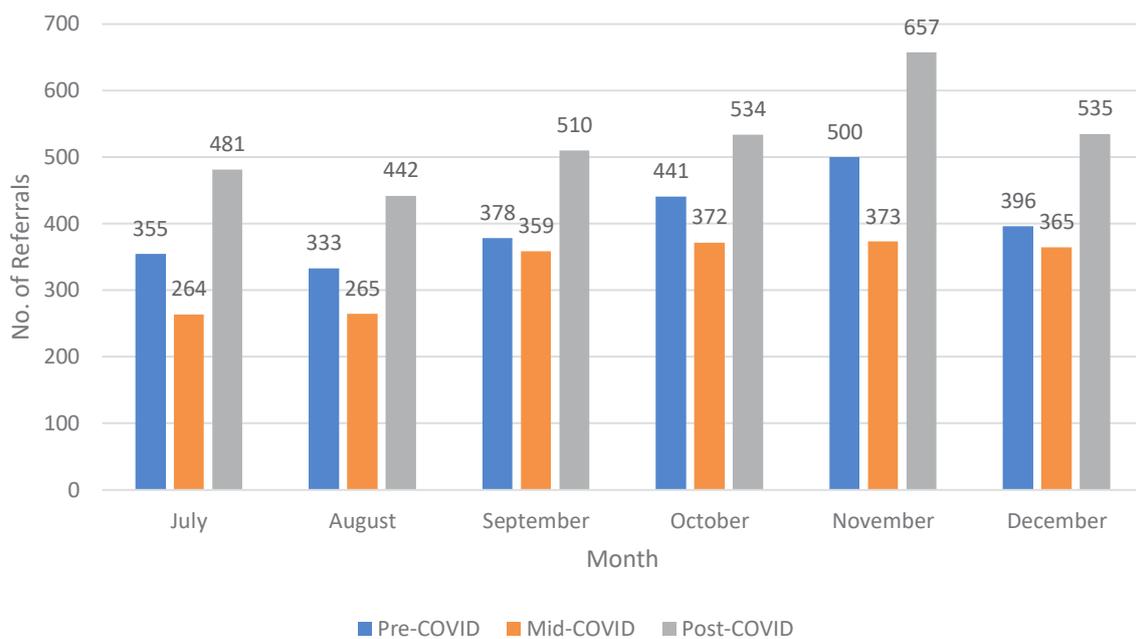


Figure 3. Two week wait referrals by month, pre-, mid- and post- pandemic.

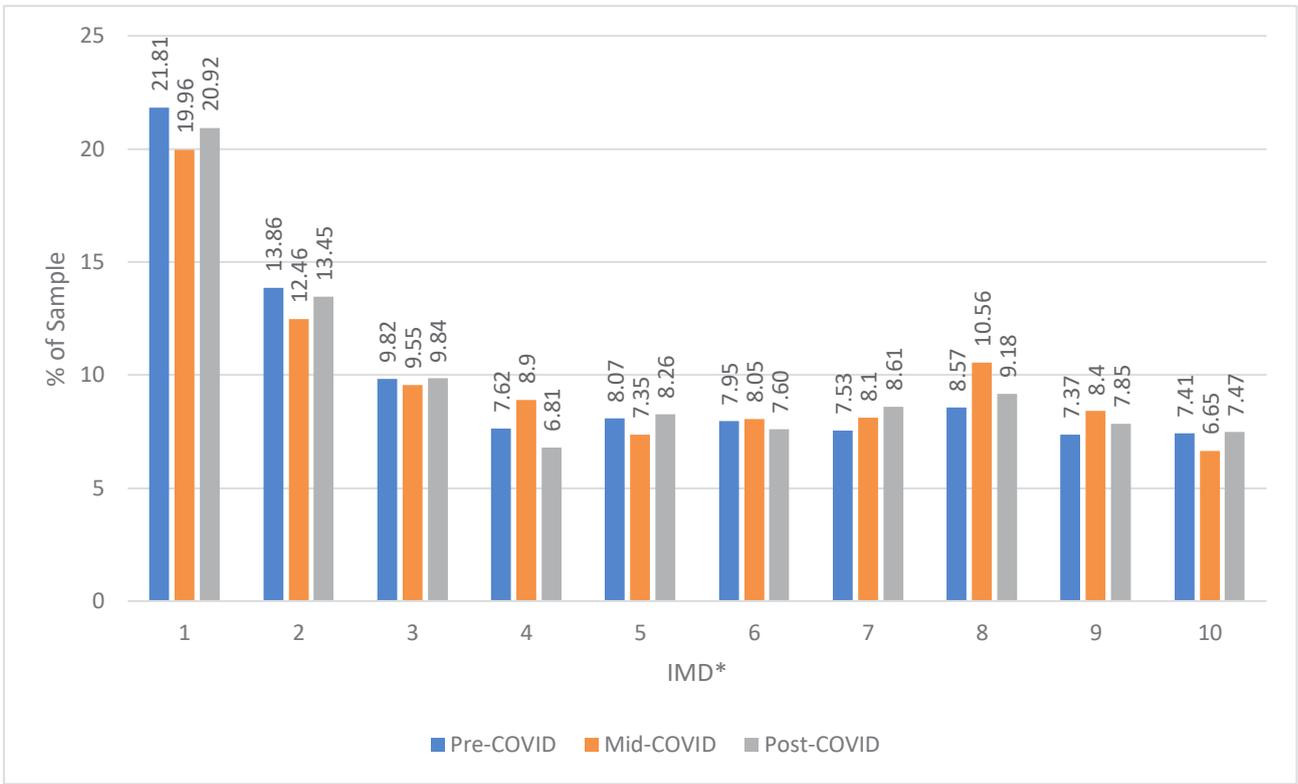


Figure 4. Two week wait referrals pre-, mid- and post-pandemic by IMD decile.

*IMD = Index of multiple deprivation. 1 is most deprived.

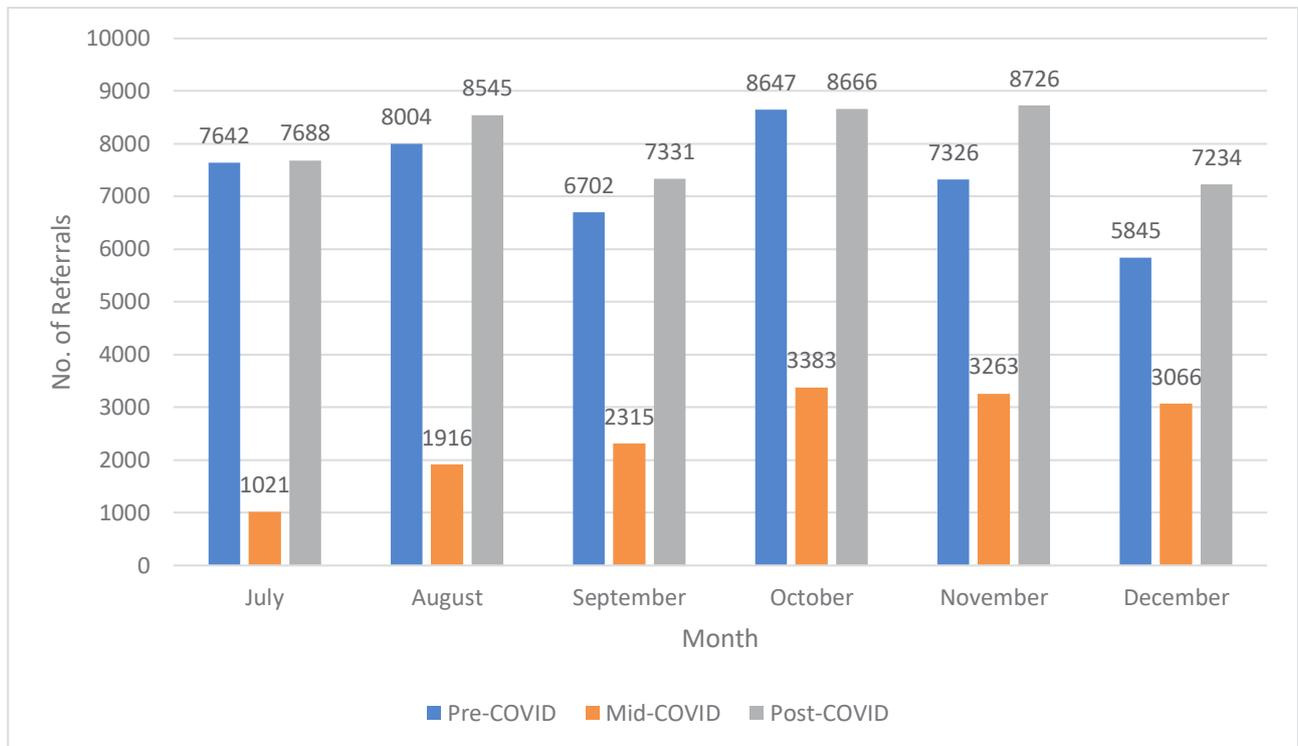


Figure 5. Orthodontic referrals by month, pre-, mid- and post- pandemic.

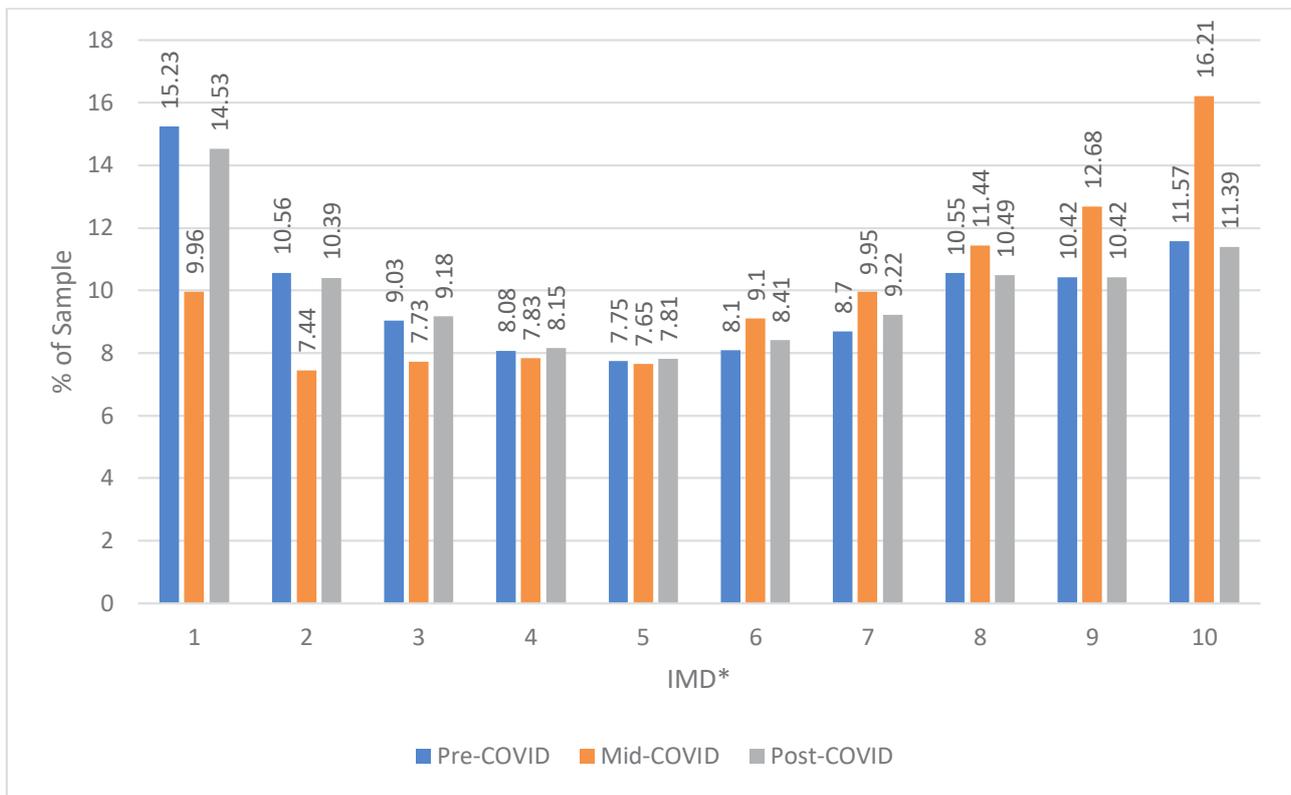


Figure 6. Orthodontic referrals by IMD, pre-, mid- and post-pandemic.

*IMD = Index of multiple deprivation. 1 is most deprived.

Discussion

Paediatric dentistry and 2ww referrals in England can be viewed as predominantly need driven. From our data, it seems that those receiving onward referral in these patient groups are typically from a lower socioeconomic position. Research demonstrates that adults and children in these groups seek problem-oriented care for more severe pain or advanced disease (Bernstein *et al.*, 2021; Wang *et al.*, 2015). Conversely, orthodontic services have been hypothesised as being demand-driven, as seeking access can be motivated by aesthetic concerns of others, which is sometimes not perceived by the individual themselves (Mandall, 2000; Jawad *et al.*, 2015).

When examining the referral practices of GDPs, it is crucial to take into account broader factors that may influence their approach. One such factor is the varying clinical skills and competencies of referring clinicians, as well as their differing levels of acceptance and proficiency in utilizing digital technologies to facilitate referrals. Additionally, there may be some reluctance among older providers to adopt innovative digital technologies, which could impact the efficacy of referral practices (van der Zande *et al.* 2015). Although it has been shown that digital technologies are extremely beneficial for clinicians, and patient outcomes, (i.e. there are abundant usage opportunities), some clinicians may lack mental, material or skills access to certain technologies (Wu *et al.*, 2012; Van Dijk & Hacker, 2003).

Dentists may vary in their self-perceived skill to provide certain treatments, so that some GDPs may refer patients who do not require specialist treatment,

(i.e. the presenting complaint is within the scope of practice outlined by the DFT Curriculum). Others may have additional training and feel confident in providing treatment beyond their expected scope of practice (Keat *et al.*, 2015). As these data include all referrals, including those rejected, they still consider those who were able to access primary care.

One notable confounder which should be addressed is that black and minority ethnic groups were disproportionately affected by the pandemic, including accessing care (Phiri *et al.*, 2021). All regions included for analysis here are less ethnically diverse than the total English population, all with a recorded 'white British' population of greater than 82.79%. This confounder should therefore not cause a large impact on our findings. Additionally, it is well recognised that deprivation impacts negatively on healthcare access and associated outcomes (Oates & Firth, 2020). Regions included in this study spanned a diverse geography and deprivation, broadly aligned to the English average.

During the analysed months, in 2019, practices were expected to reach 100% of their contracted activity. Due to the COVID-19 pandemic, in 2020, this was 20%; in 2021, this was 62.5%. It may be that referrals in 2020 were sent due to scarcity of infection prevention and control materials, a telemedicine approach and reduced access (i.e. lower complexity referrals were sent as dentists were unable to see and treat simple issues). In 2021, there is increased access comparatively, and less strain related to scarcity of materials, meaning dental teams would be more capable of undertaking treatment (Hoernke *et al.*, 2021). The results show that reduced

availability of care during the COVID-19 seems to have impacted on specialist referrals for those from the most deprived groups, with this inequity partially resolving as access has increased.

There are notably few paediatric dentistry referrals in August 2019 and 2021. This may be due to children being away from home during the summer school holidays; the proportionally higher number in August 2020 could be due to pandemic travel restrictions when going on holiday was not possible. Families at home were more able to access dental care with their usual provider.

The proportion of referrals from postcodes with the lowest socio-economic positions decreased while those from the highest positions increased during the pandemic. However, with the resumption of services in 2021, a recovery in referral rates was observed. Thus, the pandemic may have exacerbated pre-existing disparities. Such widening of healthcare inequalities due to COVID-19 has been reported, but there are few documented examples within the paediatric dentistry literature (Bambra *et al.*, 2020).

Substantial, unexpressed, normative need may exist for paediatric dentistry. The greatest need for specialist care is in the lowest socio-economic groups, making the fall in referrals in IMD 1 during the initial stages of recovery a cause for concern (Da Fonseca, 2012). Although a return to pre-COVID referrals occurred in 2021, this is when dental practices were only contracted to undertake 62.5% activity. Therefore, it is reasonable to assume there are still children with need, unable to access specialist referral.

Whereas other referrals may be rejected by the secondary care provider if insufficient data are given by the referrer, 2ww referrals cannot be rejected. The intention is to ensure that patients are not harmed by a clinician's referral practice.

Referral numbers fell for lower socio-economic postcodes pre-COVID to mid-COVID. This is shown to be 1.85% lower as a percentage of total referrals in 2020, when compared to 2019. There is a return to pre-COVID levels post-COVID, rebounding by 0.96% in IMD 1. Interestingly, it is not the postcodes with the highest socio-economic position (IMD 10) which had the largest increase in referral rates in 2020. Referral of patients from IMD 8 increased in absolute numbers and as a proportion of total referrals. IMD 8 referrals remained elevated in 2021, contributing to 9.18% of all referrals. When we consider that oral cancer is associated with lower socioeconomic status, these changes may also demonstrate a widening of healthcare inequalities due to the pandemic (Ravaghi *et al.*, 2020). In 2021, these changes to clinical practice were beginning to return to those of 'pre-COVID', which may explain the similarities of IMD breakdown between 2019 and 2021.

Patient understanding of oral cancers and pre-cancerous oral lesions is generally poor, meaning few will demand an onward referral as there is often a misunderstanding of potential severity (Gerstein *et al.*, 2008). This means oral cancers are often detected and diagnosed, late, with associated poor health outcomes (Rogers *et al.*, 2011). This situation is exacerbated for lower socio-economic groups who may have more fatalistic approaches to their health, and poorer health literacy (Stormacq *et al.*, 2019).

The large increase in orthodontic referrals in October, November and December, and the proportionally low numbers in July and August of 2020 could be related to the changing perception of the urgency of orthodontic treatment during the initial phases of COVID-19 recovery, therefore seeking less care. Additionally, providers would be prioritising other issues, in line with relevant standard operating procedures (Office of Chief Dental Officer England, 2020).

In 2019, 15.23% of all referrals sent were for those with IMD 1; this was the single largest group. However, this fell to 9.96% in 2020, making IMD 1 the fourth most referred group based on IMD. This recovered to 14.53% in 2021, making IMD 1 the single largest group again. IMD 10 was the second most referred group in 2019, with 11.57% of all referrals sent from this group. In 2020, this group received 16.21% of all referrals made for orthodontics over the six months analysed. The most referrals were sent from this cohort. In 2021, IMD 10 returned to the second largest cohort. This gives evidence that COVID-19 may have caused inequities in access to referrals to orthodontic services, with groups from lower socio-economic positions disproportionately affected in the formative stages of recovery by changes to dental practice, caused by COVID-19.

There is already literature which may indicate that orthodontic demand does not always align with orthodontic need (Alhajja, 2004). Indeed, the drop of referrals for orthodontic treatment would indicate a generalised shift in the perception of need but, mid-COVID, the remaining demand seemingly shifted towards IMD 10 from IMD 1. As services have begun to recover, with 2021 activity operating at 62.5% of 2019, referral volumes have already returned to levels similar to pre-COVID, despite the reduced requirement of clinical activity.

These data were sourced from a specific referral management system (eRMS) and hence are restricted to those regions where this service is commissioned. There may also be 'hidden' referrals from practitioners who have not engaged with the e-referral system, or those from other primary care sources (e.g. general medical practitioners) not captured by eRMS. We also do not know the overall numbers of individuals accessing dental practices. These restrictions impact on the external validity of the data. However, the use of electronic referrals is mandated by commissioners in the regions, meaning an extremely high number of referrals, if not all, will be sent on the eRMS system. There are also some limitations with descriptive analyses. The size of the actual population is unknown, making it difficult to identify whether the sample is sufficient. The study also offers no insight into the appropriateness of referrals, nor of their complexity based on commissioning guidance. It may be beneficial to analyse those which were sent, and subsequently rejected, to comment on whether there were patterns in complexity of referrals linked to deprivation.

In conclusion, the COVID-19 pandemic may have exacerbated inequities in access to specialist dental care. Lower socioeconomic groups seemingly faced disproportionate restrictions due to an exacerbation of systemic barriers in navigating healthcare structures. Orthodontic and paediatric dentistry referrals were seemingly most impacted by these inequities. Here, referrals are driven by

caregivers, who may place different priorities on health-care need and demand for their dependants (Nicholson *et al.*, 2020). Two-week-wait referrals were impacted least, but there is still evidence that groups from the lowest socioeconomic positions were disproportionately impacted by changes to access. Many individuals, disproportionately from lower socioeconomic positions, may not yet have been able to access to specialist NHS dental services. This unexpressed need should be considered in all future oral health needs assessments and may require a greater supply of specialist care.

References

- Alhajja, E.S.J.A. (2004): Orthodontic treatment need and demand in 12-14-year-old north Jordanian school children. *European Journal of Orthodontics* **26**, 261–263.
- Azamar-Alonso, A., Costa, A.P., Huebner, L.A. and Tarride, J.E. (2019): Electronic referral systems in health care: A scoping review. *ClinicoEconomics and Outcomes Research* **11**, 325–333.
- Bambra, C., Riordan, R., Ford, J. and Matthews, F. (2020): The COVID-19 pandemic and health inequalities. *Journal of Epidemiology and Community Health* **74**, 964–968.
- Bernstein, D.N., Merchan, N., Fear, K., Rubery, P.T. and Mesfin, A. (2021): Greater Socioeconomic Disadvantage Is Associated with Worse Symptom Severity at Initial Presentation in Patients Seeking Care for Lumbar Disc Herniation. *Spine* **46**, 464–471.
- COPDEND (2015): *Dental Foundation Training Curriculum 2015 Committee of Postgraduate Dental Deans and Directors (COPDEND) UK*. Available at: [https://www.google.com/search?client=safari&rls=en&q=Dental+Foundation+Training+Curriculum+2015+Committee+of+Postgraduate+Dental+Deans+and+Directors+\(COPDEND\)+UK&ie=UTF-8&oe=UTF-8](https://www.google.com/search?client=safari&rls=en&q=Dental+Foundation+Training+Curriculum+2015+Committee+of+Postgraduate+Dental+Deans+and+Directors+(COPDEND)+UK&ie=UTF-8&oe=UTF-8) (Accessed 19 December 2019).
- van Dijk, J. and Hacker, K. (2003): The Digital Divide as a Complex and Dynamic Phenomenon. *Information Society* **19**, 315–326.
- Da Fonseca, M.A. (2012): The effects of poverty on childrens development and oral health. *Pediatric Dentistry* **34**, 32–38.
- Foot, C., Naylor, C. and Imison, C. (2010): *The quality of GP diagnosis and referral*. Available at: http://amapro.isabelhealthcare.com/pdf/Kings_Fund_Diagnosis_and_Referral_2010.pdf (Accessed 16 July 2021).
- Gerstein, H.C., Miller, M.E., Byington, R.P., Goff, D.C., Bigger, J.T., Buse, J.B., Cushman, W.C., Genuth, S., Ismail-Beigi, F., Grimm, R.H., Probstfield, J.L., Simons-Morton, D.G., Friedewald, W.T., Gotto, A.M., Bailey, K., Gohdes, D., Haffner, S., Hiss, R., Jamerson, K., et al. (2008): Effects of Intensive Glucose Lowering in Type 2 Diabetes. *New England Journal of Medicine* **358**, 2545–2559.
- Hoemke, K., Djellouli, N., Andrews, L., Lewis-Jackson, S., Manby, L., Martin, S., Vanderslott, S. and Vindrola-Padros, C. (2021): Frontline healthcare workers experiences with personal protective equipment during the COVID-19 pandemic in the UK: A rapid qualitative appraisal. *BMJ Open* **11**, e046199.
- Jawad, Z., Bates, C. and Hodge, T. (2015): Who needs orthodontic treatment? Who gets it? And who wants it? *British Dental Journal* **218**, 99–103.
- Keat, R.M., Sheik, S.A., Thomas, M., Albuquerque, R. and Hill, K. (2018): A cross-sectional study of confidence in minor surgical skills amongst junior dentists. *European Journal of Dental Education* **22**, e379–e385.
- Mandall, N. (2000): Perceived aesthetic impact of malocclusion and oral self-perceptions in 14-15-year-old Asian and Caucasian children in Greater Manchester. *The European Journal of Orthodontics* **22**, 175–183.
- Nicholson, E., McDonnell, T., De Brún, A., Barrett, M., Bury, G., Collins, C., Hensey, C. and McAuliffe, E. (2020) ‘Factors that influence family and parental preferences and decision making for unscheduled paediatric healthcare-systematic review’, *BMC Health Services Research*, **20**, 1–23.
- NHS England (2015): *Guides for commissioning dental specialties-Orthodontics*. Available at: <https://www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2015/09/guid-comms-orthodontics.pdf> (Accessed 23 April 2021).
- Oates, L.L. and Firth, N. (2020): Deprivation, access and outcomes in health psychology treatment. *Mental Health Review Journal* **25**, 139–151.
- Office of Chief Dental Officer England (2020): *Standard operating procedure. Transition to recovery*. Available from: <https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/06/C0575-dental-transition-to-recovery-SOP-4June.pdf> (Accessed 8 December 2020).
- Phiri, P., Delanerolle, G., Al-Sudani, A. and Rathod, S. (2021): COVID-19 and black, Asian, and minority ethnic communities: A complex relationship without just cause. *JMIR Public Health and Surveillance* **7**, e22581.
- Ravaghi, V., Durkan, C., Jones, K., Girdler, R., Mair-Jenkins, J., Davies, G., Wilcox, D., Dermont, M., White, S., Dailey, Y. and Morris, A.J. (2020): Area-level deprivation and oral cancer in England 2012–2016. *Cancer Epidemiology* **69**, 101840.
- Rogers, S.N., Vedpathak, S. V. and Lowe, D. (2011): Reasons for delayed presentation in oral and oropharyngeal cancer: The patients perspective. *British Journal of Oral and Maxillofacial Surgery* **49**, 349–353.
- Stormacq, C., Van Den Broucke, S. and Wosinski, J. (2019): Does health literacy mediate the relationship between socioeconomic status and health disparities? Integrative review. *Health Promotion International* **34**, E1–E17.
- Wang, L., Haberland, C., Thurm, C., Bhattacharya, J., Park, K.T. and Abe, T. (2015): Health Outcomes in US Children with Abdominal Pain at Major Emergency Departments Associated with Race and Socioeconomic Status. *PLOS ONE* **10**, e0132758.
- Wu, R.C., Tran, K., Lo, V., OLeary, K.J., Morra, D., Quan, S.D. and Perrier, L. (2012): Effects of clinical communication interventions in hospitals: A systematic review of information and communication technology adoptions for improved communication between clinicians. *International Journal of Medical Informatics* **81**, 723–732.
- van der Zande, M.M., Gorter, R.C., Aartman, I.H.A. and Wismeijer, D. (2015): Adoption and Use of Digital Technologies among General Dental Practitioners in the Netherlands. *PLOS ONE* **10**, e0120725.