Title: Trends and inequalities in realised access to NHS primary care dental services in England before, during and throughout recovery from the COVID-19 pandemic.

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Keywords

Dental Services, Access, Health Service Utilization, Primary Care, COVID-19, Geographic, Socioeconomic Factors, Inequalities

Key Points

- This paper presents data regarding trends in realised access to NHS primary dental care services in relation to the COVID-19 pandemic in England.
- It describes levels of realised access up until the first half of 2022 and thus throughout a key period of service recovery following significant pandemic-related restrictions. It shows the re-emergence of pre-pandemic patterns of geographic and deprivation-based inequalities in realised access.
- The data generated from this work are to be used to inform local commissioning of dental services. To support this, the data has been uploaded onto an online Geographic Information Systems (GIS) Dental Commissioning tool available to dental commissioning and dental public health teams across England.

Abstract

Introduction The COVID-19 pandemic triggered unprecedented disruption to NHS dental services in England. This work describes changes in realised access to NHS primary care dental services between 2019 and 2022, with a particular focus on geographic and deprivation-based inequalities.

Methods Data from the NHS Business Services Authority and Office for National Statistics were combined to calculate the proportion of resident populations utilising NHS primary care dental services. These data were compared over multiple six-monthly time periods between 2019 and 2022, across several levels of geography and by quintiles of area-level deprivation.

Results The proportion of the England population utilising services fell substantially after the start of the COVID-19 pandemic, recovering to 75-80% of pre-pandemic levels in the first half of 2022. Substantial geographic variation was observed in the pre-pandemic time points and re-emerged as the recovery period progressed. Deprivation-based inequalities in service use were persistently present, although these were consistently greater in child than adult populations. While inequalities for children increased in the initial post-pandemic period, this pattern returned almost to pre-pandemic levels by 2022.

Conclusions: Socio-economic inequalities and geographic variations in the use of NHS primary care dental services, seen before the COVID-19 pandemic, have re-emerged afterwards.

Introduction

'Access' to dental care is a multi-dimensional concept. Dimensions include: 1) 'opportunity for access', which considers whether individuals are able to obtain needed dental care (influenced by supply), 2) 'realised access', which captures whether individuals utilise services (affected by both supply and demand), 3) 'equitable access', which considers whether utilisation is aligned with need, and 4) 'outcomes of care', which considers whether individuals benefit from their encounters with services.[1]

In England, dental care is included within the remit of the National Health Service (NHS). However, longstanding issues regarding access to NHS dental care have been experienced.[2,3,4] Prior to the COVID-19 pandemic, realised access to NHS primary care dental services fell significantly short of recommendations that all children should visit a dentist at least every year and adults at least every two years.[5,6] NHS Dental Statistics show that 58.4% of children were seen by an NHS primary care dentist in the 12 months up to 31st December 2019 and 49.6% of adults in the 24 months before this date.[7] Such shortfalls are probably partially attributable to a lack of demand – likely associated with perceptions about need and the importance of oral health, competing demands, dental anxiety and trust in dentists, amongst other factors[8,9,10,11] – and partially due to a lack of opportunity for access. According to GP Patient Surveys prior to the pandemic in England, around 5-6% of patients who tried to get an NHS dental appointment reported that they were unsuccessful.[9] Additional reports of patients unable to access NHS dental services, particularly in certain geographies, are also common.[4,12,13]

Inequalities in dental access were frequently noted before the pandemic: in relation to geographical location, socio-economic factors, age, sex, protected characteristics (e.g. disability) and vulnerable groups (e.g. homeless populations).[6,11,14,15] Unfortunately, many of these groups experience greater levels of dental disease which means an inverse relationship between need and care often exists.[11,14,16]

The arrival of the COVID-19 pandemic in England in early 2020 had an unprecedented impact upon access to dental services. Between 25th March and 8th June 2020, routine dental services were suspended, with the provision of care limited to urgent care available via Urgent Dental Care centres. From 8th June 2020, services were allowed to re-open, although service capacity was significantly reduced due to increased infection prevention and control (IPC) requirements.[17] IPC requirements were eased significantly in November 2021,[18] although expected volumes of work in dental practices only reverted to pre-pandemic levels in July 2022.[19] In addition to the burden of a change in IPC protocols, staff absence was high throughout the pandemic due to known or suspected COVID-19 infection or the need to isolate following close contact with a COVID-19 case.[20] Challenges in dental workforce recruitment and retention during the recovery period have also been reported. [6,21]

The impact of COVID-19 on health inequalities has also been well documented. For example, the restructuring of healthcare systems in response to the pandemic created collateral damage and widening inequalities in a number of areas, such as cancer diagnoses.[22,23] In relation to dental access, a previous study used NHS data to describe NHS primary dental care utilisation in England during the initial resumption of services, up until October 2020.[24] Clear deprivation-based inequalities were evident in child and older adult populations, with levels of recovery of service use increasing incrementally as levels of deprivation decreased. This study gave a national picture however, during a time when significant IPC restrictions were in place and there was an expectation that highest needs groups, such as children and those with disease, would be prioritised.[17] Since issues with access to NHS dental services particularly affect some areas of the country and more than two years has passed since October 2020, it is important that a more granular and up-to-date analysis of NHS dental service use and potential equity impacts is now undertaken.

This paper hence explores changes in realised access to NHS primary care dental services in child and adult populations in England throughout the COVID-19 pandemic and recovery (up until June 2022),

with a particular focus on exploring variation and inequality by geography and area-level deprivation.

Methods

This study involves secondary analysis of NHS primary care dental claims data from throughout the COVID-19 pandemic in England. The NHS Business Services Authority (NHSBSA) provided details of the number of unique patients resident within an area for whom an FP17 form had been processed within a certain time period (FP17 forms are submitted to the NHSBSA after the completion of an NHS course of treatment in primary dental care in England). For the purposes of this analysis, forms submitted for orthodontic treatment were excluded. The NHSBSA provided these data for each six-month period between 1st Jan 2019 and 30th June 2022, excluding January to June 2020 when routine dental services were largely suspended (hereafter, January to June periods are denoted as H1 and July to December periods as H2). This provided two pre-pandemic periods for baseline comparison and the most up-to-date information available from the post-pandemic period.

These claims data were subsequently combined with population estimate data published by the Office for National Statistics (ONS)[25,26,27] to calculate the proportion of a resident population for whom an FP17 form had been processed within each period. Mid-2019 population estimates were used to calculate this measure for the two 2019 periods, whilst mid-2020 estimates were used for all subsequent periods as more recent estimates were not yet available.

This measure of realised access was calculated for children (0-17) and adults (18+) separately, according to patient age at acceptance for the course of treatment, and at the following levels of geographical residence: nationally for England, English Regions (n=9), Lower Tier Local Authorities (LTLA) (n=309, utilising 2021 boundaries), Middle Super Output Areas (MSOA) (n=6,791) and Lower Super Output Areas (LSOA) (n=32,844). MSOAs and LSOAs are stable geographical areas designed to

improve the reporting of small-area statistics in England.[28] The measure of realised access was also calculated separately for quintiles of area-level deprivation. To do this, LSOAs across England were grouped according to the 2019 Index of Multiple Deprivation (IMD)[29] – the official measure of relative area-level deprivation in England – and NHSBSA and ONS data summed within these quintiles.

This paper presents the resultant trends over time in the aforementioned metric of realised access in both child and adult populations: 1) at a national level, 2) across different geographies, and 3) by area-level deprivation. Findings are presented using basic statistics (range, interquartile (IQ) range and ratios) and via graphs prepared using Excel for Microsoft 365 (Microsoft Corporation) and ARCGIS Desktop 10.5.1 software (Esri).

Results

National trends

FP17 forms were processed for a greater proportion of children than adults in England within the pre-pandemic timepoints (42.7% compared to 26.0% respectively, in H1 2019), (Figure 1). Submissions dropped substantially for both groups after the start of the COVID-19 pandemic. In H2 2020 (the first six-month period after practices were allowed to re-open), FP17s were processed for only 11.3% of children and 8.7% of adults. Figures then recovered to a similar extent in both child and adult populations by H1 2022, reaching 78.8% for children) and 76.4% for adults of pre-pandemic H1 2019 levels, (Figure 1).

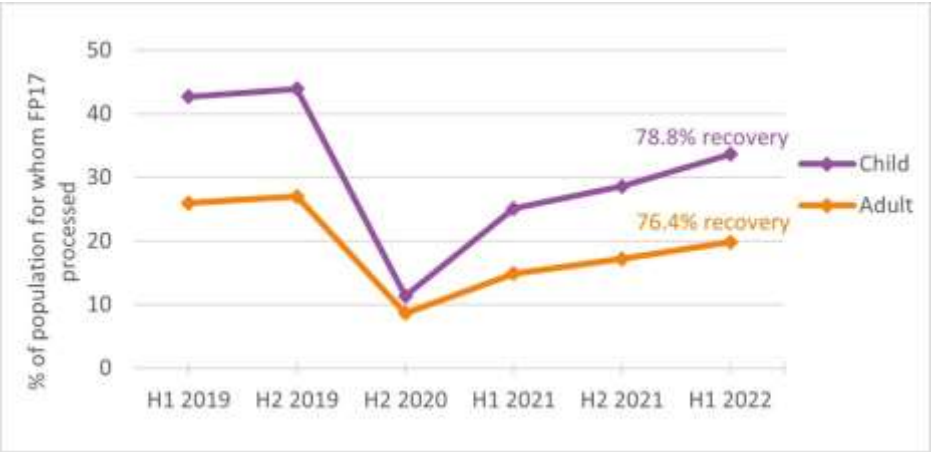

Figure 1: The percentage of child and adult populations in England for whom an FP17 was processed during six-month periods between 2019 and 2022 (H1 2020 not included).

Geographic variation

Substantial geographic variation in service use was observed in both child and adult populations over the 2019 to 2022 period. At a regional level pre-pandemic, realised access was highest in Yorkshire and The Humber and lowest in London for both children and adults, with substantial variation across other regions (Figure 2). Similar (although not identical) patterns re-emerged post-pandemically. Regional differences in the percentage recovery of realised access levels between H1 2019 and H1 2022 ranged between 73.3% (South West) and 82.7% (London) in child populations and between 69.7% (South West) and 83.0% (London) in adult populations (Figure 2).

Figure 2: The percentage of regional a) child and b) adult populations for whom an FP17 was processed during six-month periods between 2019 and 2022 (H1 2020 not included).

At the LTLA level in H1 2019 (pre-pandemic), FP17s were processed for between 11.1% and 57.2% of child populations (IQ range: 41.0% - 48.4%) and for between 7.8% and 38.8% of adult populations (IQ range: 22.9% - 30.4%). The ratio of the percentage of children to adults accessing services also varied between 1.2 and 2.7 (IQ range: 1.5 – 1.8) (Table 1).

Table 1: Variation between LTLAs in England in the percentage of child and adult populations for whom FP17s were processed (H1 2019 and H1 2022).

	H1 2019	**H1 2022**
Percentage of child populations for whom FP17 processed		
Range (%)	11.1 - 57.2	12.1 – 73.9
IQ Range (%)	41.0 – 48.4	33.2 – 40.1
Percentage of adult populations for whom FP17 processed		
Range (%)	7.8 – 38.8	6.7 – 30.6
IQ Range (%)	22.9 – 30.4	17.2 – 23.4

Ratio of child:adult percentage		
Range	1.2 – 2.7	1.3 – 3.8
IQ Range	1.5 – 1.8	1.6 – 2.0

In the most recent time period post-pandemic (H1 2022), substantial LTLA variation in levels of realised access appear to have re-emerged (Table 1). Recovery of realised access varied between LTLAs however: between H1 2019 and H1 2022, recovery ranged between 57.5% and 224.4% in child populations (IQ range: 78.6% - 87.4%) and between 54.8% and 129.4% in adult populations (IQ range: 72.4% – 81.1%).

Figure 3 illustrates the LTLA variation in realised access in H1 2022 graphically. LTLAs with the lowest access for children were particularly clustered around Greater London, Norfolk, Devon, Lincolnshire and parts of the West Midlands and, for adults, around Greater London, Surrey, Kent, Norfolk (extending into Peterborough and parts of Cambridgeshire) and Gloucestershire.

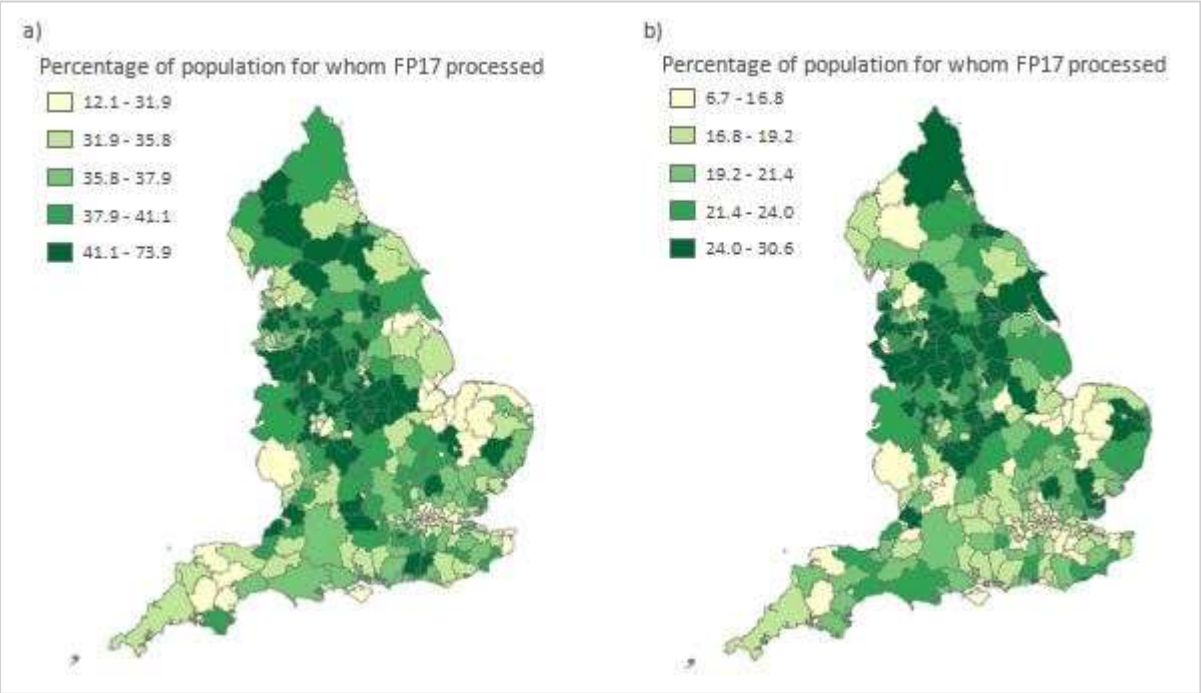

Figure 3: LTLA variation in the percentage of a) child and b) adult populations for whom an FP17 was processed in H1 2022 (presented by quintiles).

Analysis by deprivation indicator

In child populations pre-pandemic, the proportion of children for whom FP17s were processed decreased incrementally as levels of deprivation increased (Figure 4). In H1 2019, realised access was 1.27 times greater in quintile 5 (least deprived) than quintile 1 (most deprived). Relative inequalities worsened in the initial pandemic period (the above ratio increased to 1.83 in H2 2020) but returned to near pre-pandemic levels by H1 2022 (a ratio of 1.34).

Deprivation-based inequalities in realised access in adult populations were lower (Figure 4). In H1 2019, the proportion of adults for whom FP17s were processed was 1.11 times greater in quintile 5 than in quintile 1. This ratio reduced to 1.04 in H2 2020, returning to 1.14 in H1 2022.

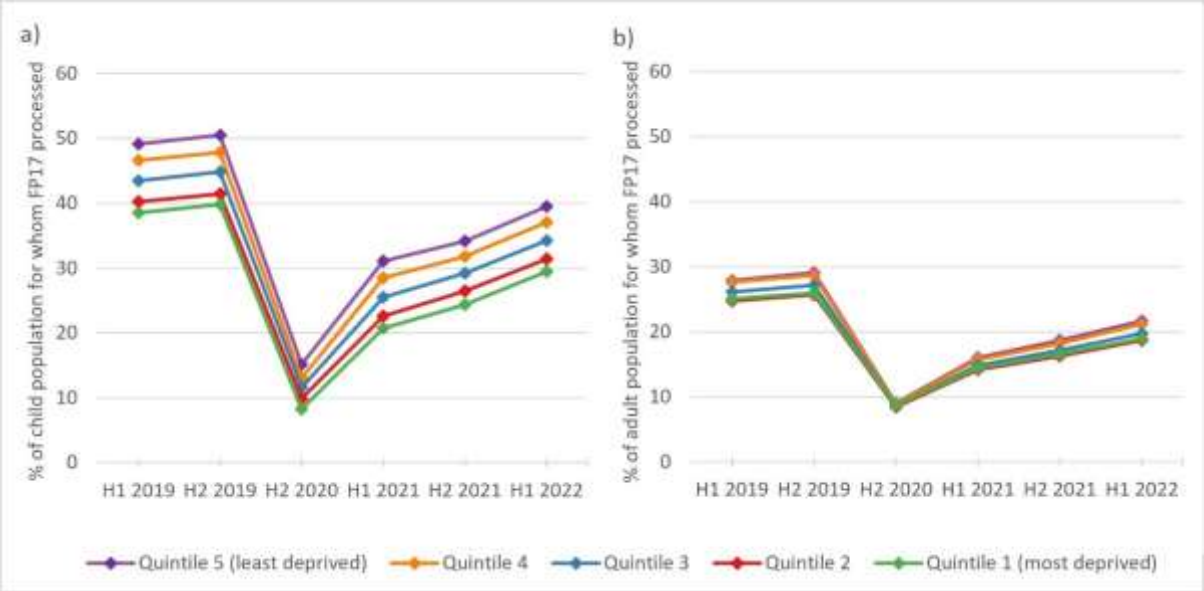

Figure 4: The percentage of a) child and b) adult populations, by deprivation quintile, for whom FP17s were processed during six-month periods between 2019 and 2022 (H1 2020 not included).

Discussion

This analysis shows that realised access to NHS primary care dental services in England fell after the arrival of the COVID-19 pandemic and, by H1 2022, had recovered to 75-80% of pre-pandemic levels. It finds that geographic variation in levels of NHS realised access existed both pre- and post-pandemically in both child and adult populations. In addition, it demonstrates that deprivation-based inequalities in NHS realised access existed in both child and adult populations pre- and post-pandemic, although have been consistently greater in the former. However, although a widening of inequalities was observed in child populations in the initial post-pandemic period, data shows that levels of inequality returned almost to pre-pandemic levels in both groups by H1 2022. It has to be also born in mind however, that the data used, only reflects the uptake of NHS dental services, and substantial numbers of the population also receive private care. For adults, while there is a less apparent socio-economic gradient in uptake of NHS dental services than for children, when use of private dental services is included, the socio-economic gradient for adults may be much greater, and may even be stronger than the pattern of inequalities in service utilisation seen for children.

The strength of this analysis is that it is a time series, providing two data points prior to the pandemic closure of dental services and four data points afterwards. The main pre-existing comparative source of data is that published biannually by NHS Digital.[6] The current work advances upon this data by exploring realised access at smaller geographical areas (NHS Digital data is segregated at the lowest level by Upper-Tier Local Authorities), detailing shorter-term changes throughout the pandemic (by using 6-monthly periods, rather than 12- or 24-month periods) and by exploring relationships with deprivation. It also measures the proportion of people resident in an area who have accessed services, irrespective of the location of these services, as opposed to comparing the number of individuals accessing services located within a specific area with the population of that area.[6] The former provides a better picture of area-level access given that individuals may travel outside of their area of residence for dental treatment.

A few limitations associated with the methodology utilised may have affected the results, although their effect is probably relatively minor. A slight underestimation of realised access may have resulted from 1) some FP17 forms (less than 1%) not containing an identifiable patient postcode and therefore being excluded from the analysis, and 2) individuals living near the Scottish border accessing services in Scotland, which would not have been captured by the NHSBSA. On the other hand, these underestimations may have been counteracted by overestimations due to other reasons. Firstly, the use of mid-2020 population estimates to calculate 2021 and 2022 access rates will have led to a slight overestimation of these rates in most areas. Secondly, NHSBSA systems were unable to automatically aggregate data at regional and deprivation quintile level, hence LTLA and LSOA data respectively were summed to produce these figures. This prevented the identification and removal of duplicate patient identities where individuals had moved residence between LTLAs in the same region or between LSOAs in the same deprivation quintile. A further limitation of this analysis is that it does not provide information about the use of private dental services.

The pattern of geographic inequalities shown highlights the importance of prioritising reducing inequalities when looking at policies to improve access. The cause of this geographic variation is likely to be multifactorial however, and hence any variation must be examined and addressed in a local context. Access rates in some areas may appear misleadingly low due to a high prevalence of mobile populations, such as students, armed forces or prison populations. For example, students may access dental services near their home address – entering their home address on an FP17 form – but are considered resident at their term-time address,[30] whilst armed-forces personnel, often considered resident at their military base,[30] may access non FP17-generating military dental services. Alternatively, differences in the utilisation of NHS primary care dental services may reflect variation in opportunities for access or demand for services. The former may be influenced by factors such as the commissioning of sufficient services, the accessibility of commissioned services, rates of population growth or local workforce recruitment and retention issues, and the latter by factors

such as the prioritisation of oral health, dental anxiety, the availability and affordability of private healthcare and, during the pandemic, preferences around social contact. Geographic variations in child access, relative to adult access, may additionally have been influenced by factors such as population age distributions, the commissioning of child-only NHS dental contracts or the use of local initiatives to encourage access in certain age groups.[31]

The geographic inequalities shown are also likely linked to area-deprivation levels. Adding to pre-pandemic evidence of socio-economic inequalities in dental access,[11,14,32] this research demonstrates the persistence of deprivation-based inequalities in realised access to NHS primary care dental services throughout the pandemic. This work reproduces the findings of previous research up to October 2020, showing that deprivation-based inequalities in realised access to NHS primary care dental services increased in child, but not adult, populations in the initial post-pandemic period.[24] However, the current analysis extends this previous work, demonstrating that inequalities in child and adult populations returned to around pre-pandemic levels by H1 2022. This is reassuring, although not a cause for complacency given that more deprived populations are likely to have poorer oral health.[11,16]

Due to the potential of the data from this work to inform the recovery and improvement of NHS dental services, particularly actions to address inequalities, the data have been uploaded onto an online Geographic Information Systems (GIS) 'National Dental Commissioning and Dental Access' tool,[33] with the support of the Office of the Chief Dental Officer, the National Dental Commissioning and Policy team at NHS England and NHS South, Central and West Commissioning Support Unit. This tool maps realised access to NHS primary care dental services in England at regional, LTLA and MSOA levels over the 2019 to 2022 period, alongside dental contract and demographic data. It is available to dental commissioning and dental public health teams across England and will be updated as new data become available.

Conclusions

Prior to the COVID-19 pandemic, access to NHS primary care dental services was not always realised ubiquitously or equitably across the population of England. By June 2022, realised access had recovered to around 75-80% of pre-pandemic levels, although levels of geographic variation and deprivation-based inequalities similar to those seen pre-pandemic had re-emerged. This work supports the view that improving access to NHS dental care should be a priority going forward, with focus given to strategies which address both geographic and deprivation-based inequalities.

Conflicts of Interest

Professor Rebecca Harris is also Deputy Chief Dental Officer for England and advises on dental clinical policy matters.

Author Contributions

RO contributed to conception, conducted the data analysis, drafted the manuscript and approved the final version. DL and RH contributed to conception, edited and revised the manuscript and approved the final version.

Acknowledgements

The authors thank the Dental Insight team at NHSBSA for providing the dental claims data.

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