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Abstract

Introduction: Despite a decline in the prevalence of dental caries among children in England and ongoing arrangements for the provision of free dental care up to the age of 18, there is limited information on the pattern and trend of socioeconomic inequalities in dental caries and dental attendance. **Methods:** We estimated the magnitude of deprivation-related inequalities for dental caries and dental attendance in young children using publicly available data and two regression-based summary measures of inequalities: Slope Index of Inequality (SII) and Relative Index of Inequality (RII). **Results:** We found no significant absolute or relative inequalities in dental attendance across English areas in the past decade while there were persistent absolute and relative inequalities in dental caries. Socioeconomic inequalities in dental caries decreased between 2007 and 2012 thereafter, the relative inequalities increased. **Conclusions:** The apparent widening inequality in child dental caries in England despite equal access to dental care is a challenge for policy makers.

Knowledge Transfer Statement:

While caries prevalence among English children has declined over the past decade, there has been an increase in socioeconomic inequalities in oral health despite there being no inequality in dental attendance. This has implications for the development of oral health strategy and planning dental services.

Keywords: socioeconomic factors, healthcare disparity, dental caries, tooth, Dental Care for Children, Dental Health Services

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Introduction

Forty years ago, when the first national survey of children was carried out in 1973, three out of four children had experienced dental caries by the age of 5 years (Murray et al. 2015). Since that survey, child oral health has improved remarkably with one out of four children aged five experiencing dental caries (Public Health England 2018a). In spite of these achievements, dental caries remains a major burden for children. Dental caries, in addition to affecting children's quality of life (Nora et al. 2018) and academic performance (Ruff 2018), place a huge burden on health care provision. Majority of hospital admissions for children in England between 1997-2006 were primarily due to dental caries (Moles and Ashley 2009). In 2016/17, a child had a decayed tooth removed in England every 10 minutes (Public Health England 2018b) and the NHS spent £36.2 million for the extractions of teeth in children (Local Government Association 2018).

Regular dental attendance has been one of the key recommendations of dental professionals. Longitudinal studies found that regular dental attendance is linked with better oral health outcomes even after adjusting for the effect of social status (Thomson et al. 2010). Barriers to dental attendance are thought to be one mechanism through which US children in low-income households develop higher prevalence of dental caries than those living in high-income households (Hargreaves et al. 2015). In addition to early detection and treatment of dental disease, preventive dental attendance has been seen thought of as an opportunity for provision of fluoride varnish treatments as well as increasing awareness of dental and general health problems. The relationship between dental attendance and dental health; however, is not straightforward. It is argued that the positive effect of attendance on dental health could be due to 'healthy user effect'; meaning healthier individuals attend more frequently (Åstrøm et al. 2014). Nevertheless, adoption of a biomedical approach to prevention which focuses on providing clinical preventive interventions in dental visits such as topical fluorides has been said to be ineffective in reducing inequalities in oral health (Watt et al. 2015).

In England, the NHS dental care is free for children and service uptake is high with nine out of ten reporting a dental check up in the past year (NHS Digital 2015). Appleby and colleagues reviewed multiple UK data sources and reported a "positive picture overall regarding access to dental care" (Appleby et al. 2017). Despite these seemingly satisfactory findings, there have been continued efforts to increase child dental attendance in England, such as the NHS Starting Well programme and the 'Dental Check by One' initiative (British Society of Paediatric Dentistry 2017). Although socioeconomic inequality in dental service utilisation has been reported globally (Reda et al. 2018), marked differences have also been reported between high income countries (Hargreaves et al. 2015). Evidence for social inequalities child dental attendance in England has been inconclusive. A recent national survey of children showed that dental visits for check-ups in England were slightly lower among those eligible for free school meals, an indicator of deprivation (Holmes et al. 2016). In contrast, our recent analyses of dental attendance for children aged one shows slightly higher rate in poorer areas. This analysis also found substantial geographical variations in child dental attendance in England (Salomon-Ibarra et al. 2019).

It appears that health inequalities in England have been rising in the past decade despite a period of narrowing the deprivation gap. For example, infant mortality rate has been rising for the poorest children since 2010, whilst continuing to fall for more socially privileged groups, leading to an increase in inequalities (Taylor-Robinson and Barr 2017). Narrowing socioeconomic inequalities in life expectancy across England also reportedly reversed after 2010 (Barr et al. 2017). It is conceivable that this pattern has been mirrored for oral health in England. This study, therefore, reports on socioeconomic inequalities in child dental caries and attendance in England in the past decade.

Methods

We used both absolute and relative summary measures to estimate the magnitude of deprivation-related inequalities in dental caries and dental attendance. Socioeconomic inequalities were estimated at the area level between English geographical areas. Dental caries and dental attendance data were publicly available through Public Health England and NHS Dental Statistics, respectively.

In England, the national policies outlined in the 2016-2019 Public Health Outcomes Framework advised monitoring health inequalities for major indicators; and with regards to oral health, the prevalence of dental caries among 5 year old children has been identified (Department of Health 2016). Dental caries data for this age group in English Primary Care Trusts (PCTs) and local government authorities (LAs) were retrieved from four national surveys of 5 year old children in England, undertaken in 2007/8, 2011/12, 2014/15 and 2016/17 known as the National Dental Epidemiology Programme (NDEP). These surveys, their sampling frameworks, and documentation have been described (NHS Dental Epidemiology Programme). The surveys had common methodologies such as clinical criteria and consent process and therefore are comparable. These

surveys used positive consent and data were weighted for deprivation level of the area; therefore, they provide a more robust estimates of overall prevalence. Dental caries was analysed for upper tier LAs for consistency with the dental attendance data. Socioeconomic inequalities were reported for (1) prevalence of dental caries, (2) mean number of decayed, missing and filled teeth (dmft) and (3) mean number of teeth with untreated dental caries (dt).

Dental attendance data for children aged 0-18 were obtained from NHS Digital for PCTs and LAs from 2006 to 2017. Over these years the reporting of data has changed; prior to 2013 data were reported for PCTs, thereafter for LAs. The reporting period also changed from 2015, moving from a 24 month to 12 month basis. To estimate dental attendance rates, the NHS data used the most recent available mid-year population estimates which were available through the Office for National Statistics (ONS) at the time of publication.

Two regression-based summary measures of inequalities were used to estimate the magnitude of inequalities: Slope Index of Inequality (SII) and Relative Index of Inequality (RII) (World Health Organisation 2013). The values of SII & RII interpreted as the hypothetical absolute and relative difference between the least deprived and the most deprived. These summary measures take into account the distribution of the outcome across categories of deprivation, also account for the number of individuals in each category (English districts in study). The rank of average score on Index of Multiple Deprivation was used to determine relative ranking of English districts (Department of Communities & Local Government). Table 1 describes the dataset in terms of the type and number of areas, the mid-year population, and the deprivation indicator which used for ranking the English areas. Data were analysed using Stata 13.

Results

NHS Digital reported data for 151 PCTs (prior to 2013) and 151 upper tier LAs (after 2013). In two years (2013/14 & 2014/15), City of London had to be omitted from analyses due to estimated attendance rate greater than 100%. The overall 24 month dental attendance rate remained the same (69.1-70.1) between 2007 and 2015, when reporting moved to 12 months. Thereafter, the 12 month attendance rate was lower but also remained the same (57.5 and 58 percent) across 2015-2017 (Table 1).

Table 2 reports the values of SIIs and RIIs for dental attendance since 2007. The SIIs with positive values indicate increase in dental attendance with the increase in deprivation level and the values of RII greater than 1 indicate increase in dental attendance with the increase in deprivation level. In general, dental attendance was not related to deprivation. Only in 2011/2012, were there statistically significant absolute and relative inequalities in dental attendance, with the deprived area reporting higher attendance. The largest value of the SII and RII were reported in this year (SII=4.95, 95% CI (0.52, 9.37); RII= 1.07, 95% CI (1.01, 1.14)). In absolute terms, this implies there was nearly 5-percent point difference between the extreme ends of deprivation spectrum. In relative terms, dental attendance rate of the children from the most deprived district was 1.07 times higher than that of the least deprived. For the last year (2016/2017), we had the dental attendance data by age groups. We therefore, calculated the inequalities for children aged 5 and under and found no evidence of absolute or relative inequalities. (SII=059, 95% CI (-4, 5.17); RII= 1.02, 95% CI (0.9, 1.14))

The association between deprivation and indicators of dental caries is displayed in Figure 1. There was a graded relationship between dental caries and deprivation in all four surveys, with higher prevalence in more deprived categories. In general, the prevalence of dental caries reduced in all deprivation categories over time. There was, however, no reduction for the most deprived quintile in any of the three indicators in the last survey.

Table 3 shows the values of SIIs and RIIs for dental caries in the last four surveys. There were significant socioeconomic inequalities for all three dental caries outcomes with the more deprived areas reporting higher prevalence and severity of dental caries. SII values indicate that the prevalence of dental caries was 20.73 (95% CI 16.74, 24.73) percentage points higher in the most deprived areas compared to the least deprived areas in 2007/8; the equivalent values for other surveys were 13.07 (95% CI 8.89, 17.24), 15.72 (95% CI 12.02, 19.42), 16.73 (95% CI 13.07, 20.4) in 2011/12, 2014/15 and 2016/17, respectively. In terms of relative inequalities, RII values showed that the prevalence of dental caries was 1.92 (95% CI 1.68, 2.18), 1.6 (95% CI 1.38, 1.87), 1.86 (95% CI 1.6, 2.16), 1.99 (95% CI 1.7, 2.32) times greater in the most deprived English areas comparted to the least deprived areas in 2007/08, 2011/12, 2014/15 and 2016/17, respectively. Similar pattern of socioeconomic inequalities were recorded for other two indicators of dental caries.

In terms of trend, the values of SIIs dropped between the first (2007/08) and the second survey (2011/12) as indicated by the declining values of SIIs (statistically significant for all three indicators). (Table 3). Considering relative inequalities, there was a decrease in the values of RIIs between the first (2007/08) and the second survey (2011/12) for all three indicators of dental caries (none statistically significant). This decrease in relative inequalities, however, was followed up by a gradual increase between the second survey in 2011/12 and the most recent survey in 2016/17; which was statistically significant for the prevalence of caries experience (P=0.05). We tested the statistical difference in the magnitude of relative inequalities between the first and the last surveys as an indicator of overall reduction of socioeconomic inequalities in oral health which

showed no significant change for any indicator of dental caries (data not shown). Figure 2 shows the changes in the relative inequality for three indicators of dental caries.

Discussion

This was the first comprehensive analyses of inequality trends for children's dental health and dental attendance in England in the past decade. This study had two major findings; (1) there were no significant inequalities in dental attendance across English areas in the past decade; (2) relative inequalities in caries decreased between 2007/8 and 2011/12 and increased thereafter.

Given that the absolute inequality is sensitive to change in the prevalence of health condition (e.g. dental caries), the relative inequality is preferred for monitoring inequality trend over time (Blair et al. 2013). It is common to see a decrease in absolute and no change or even increase in relative inequalities if the frequency of the health problem declines (Regidor 2004). This was the case in our study which has also been observed for child dental caries in affluent countries where dental caries prevalence has declined such as Denmark (Sengupta et al. 2016) and Scotland (Blair et al. 2013). Although dental caries prevalence has declined over time, this change has not been evenly distributed and the prevalence of dental caries has not changed for the most deprived quintile between the last two surveys.

No deprivation-related inequalities were observed across English areas in the proportion of children who had seen a dentist within the specified years. This is in contrast with previous reports from England in which children from poorer areas had lower dental attendance rates (Jones 2001). It is worth mentioning that the dental attendance data for this study do not account for private dental visits in England. It is likely that more affluent areas reported less dental attendance under NHS arrangements as private dental care is being sought more often. However, as dental services are free for children under 18, nearly all child dental visits have been under NHS arrangements according to the latest national dental survey in England (NHS Digital 2015).

Regardless, evidence for socioeconomic inequalities in child dental attendance in England is not conclusive. In the 2003 national dental survey of children, deprived groups were less likely to visit dentist regularly, but there was no inequality in using preventive interventions (Shaban et al. 2017). The 2013 dental survey of children also reported less frequent dental check-ups among more deprived groups but this was not the case for all age groups of children (Holmes et al. 2016). Comparison of inequalities between 19 OECD countries ranked the UK inequality in dental attendance among three least unequal (Devaux and De Looper 2012). Socioeconomic inequalities in dental attendance has been widely reported globally; and in particular in North America and Southeast Asian countries (Reda et al. 2018).

This study shows the ongoing presence of socioeconomic inequalities in child dental health. Relative inequalities in dental caries decreased between 2007/08 and 2011/12, albeit not significantly. Relative inequalities increased thereafter and this increase was significant for at least one indicator of dental caries (prevalence of caries experience). The observed ongoing presence and changing direction of socioeconomic inequalities in dental caries despite apparent equal dental attendance, may highlight the limitations of dental services in reducing inequalities in dental health. The current dental health paradigm has been criticised (Watt et al. 2015) for delivery of clinical preventive measures which are 'isolationist in delivery' and 'lacking in theory base'; therefore, may in part explain the discrepancy we observed.

An inequality trend for dental caries should be interpreted in the light of changing patterns of socioeconomic inequalities in other health outcomes in England. Several reports and research papers have looked at the inequality trend for major health outcomes. Most notably is the report 'Fair society, healthy lives', named after its author Sir Michael Marmot. This report used the 1999-2003 data to demonstrate deprivation inequalities in life expectancy and disability-free life expectancy across areas in England (Marmot et al. 2010). Seven years after the publication of the Marmot Review, a Kings Fund report replicated the analyses using more recent 2006–10 data. These analyses showed improvement in life expectancy and some reduction in socioeconomic inequalities in health (Buck and Maguire 2017). While a narrowing of the health inequality gap might seem promising at the first glance, a more detailed analyses of inequality trend across English areas depicts a more complex picture (Barr et al. 2017). Barr et al showed that socioeconomic inequalities in life expectancy, in fact, had been increasing over past decades except during the period in which the UK government designed and implemented an English strategy to reduce socioeconomic inequalities in health. Although our study was not designed to examine the effect of policy changes on the magnitude of socioeconomic inequalities in oral health, there are similarities between the changing patterns of inequalities in our analyses of dental caries data with those of Barr's study. In both studies, there was a decline in the magnitude of health inequalities prior to 2010 and increase after that.

The 2017 State of Child Health reported that the downward trend in the proportion of UK children living in poverty has plateaued since 2010/11 (Royal College of Paediatrics and Child Health, 2017). The 2018 health profile for England also reported widening socioeconomic inequalities in child health outcomes such as being overweight or obese (Public Health England 2018c). Infant mortality rate increased for the second year in 2016 with a more pronounced effect on the poorest, which increased inequalities. Authors attributed the rise in inequality to a 'weakened social protection safety net' which

contradicts with the policy recommendations of Marmot's Fair Society, Healthy Lives report, "giving every child the best start in life" (Marmot et al. 2010). Another explanation for the recent increase in inequality could be the global economic downturn in the last years of 2000s; though this effect was not seen in a US study of children dental caries (Slade and Sanders 2018)

There is an ongoing debate about the role of dental attendance in reducing socioeconomic inequalities in dental health. Previously in the UK, socioeconomic inequalities in the number of sound teeth among adults was partially attributed to lower dental attendance of the less affluent (Donaldson et al. 2008). A study of dental caries in Finnish adults, for instance, suggested that regular dental attendance can justify only 7% of socioeconomic inequalities in comparison to other factors (Sabbah et al. 2015). Socioeconomic inequalities in being dentate among older adults in 14 European countries has also been attributed to dental attendance but to varying extent with the largest contribution in Netherlands (34%) and minimal contribution in some other countries (Shen and Listl 2018). It may not be accurate to compare the contribution of dental attendance from different countries as the effect of dental attendance heavily relates to the nature of attendance whether this was preventive oriented or a reaction to problems. In addition, the association between dental attendance and caries risk may be very different between young children and older adults. It is evident from the literature, however, that health services play at least some part in explaining socioeconomic inequalities in health.

Public health interventions focusing on downstream lifestyle factors have been criticised for failing to reduce socioeconomic inequalities in health as they often require the adherence of target populations (Baum 2014). Public Health England guidance on oral health promotion for local authorities recognises this dilemma (Public Health England 2014). Two important upstream interventions which have been recommended in this document are: fluoridation of public water supplies and fiscal policies to promote oral health. Health policy documents repeatedly advocate water fluoridation as an effective approach to reduce both dental caries prevalence and socioeconomic inequalities in dental caries (Public Health England 2018d) as access to water fluoridation has been shown to have the greater effect on dental caries of the most deprived children in England (Weston-Price et al. 2018). Inequalities in oral health may arise from higher, or more frequent, consumption of sugar among children from more deprived background and from lower use to fluoride toothpaste. Previous public health interventions focusing on health taxation have been successful in reducing socioeconomic inequalities in health (Wright et al. 2017). It is possible, therefore, that policy initiatives in relation to sugar taxation implemented since April 2018 have a beneficial effect in terms of reducing socioeconomic inequalities in dental caries. Further policy development to promote use of fluoride toothpaste and water fluoridation are also likely to be important.

Caution should be practiced when interpreting the findings of this study due to some limitations. The absence of socioeconomic inequalities for dental attendance in our study was based on the analyses of aggregate data from English areas rather than individuals; therefore, it does not imply equitable dental attendance within the areas. Further, we did not investigate whether there were socioeconomic inequalities in the number of visits, or the reason for attending, in particular whether these reflected preventative or reactive visiting patterns. It is also possible that a small number of children were seen under arrangements other than NHS primary care dental services and so were missing from the attendance data. Socioeconomic inequalities in dental attendance were calculated for children aged 18 and under while dental caries data were from 5 year old children. Finally, this study did not investigate the underlying reason for socioeconomic inequalities in dental caries, for example access to public health programmes.

Conclusion

We demonstrated the ongoing presence of socioeconomic inequalities in dental caries experience of young children in England despite a decade of maintained equality in dental attendance. Lessons can be learnt from English experience of dental care; that equality in dental attendance does not fully address inequalities in dental caries experience, at least at area level. We found no progress in terms of reducing relative inequalities in dental caries within this period despite the initial apparent decrease. Further, the consistent increase in inequalities in the past years is concerning.

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Table 1. Description of the datasets used in this study

[Table 1]

Table 2. Dental attendance among 0-18 year children (2007-2017): Absolute and Relative Inequalities between English geographical areas

[Table 2]

Table 3. Dental caries among 5 year old children (2007-2017): Absolute and Relative Inequalities between English geographical areas

[Table 3]

Figure 1. Distribution of dental caries outcome across deprivation categories of English area

[Figure 1]

Figure 2. Relative inequalities in dental caries between 2007 and 2017 (RIIs)

[Figure 2]

Tables

Table 1. Description of the datasets used in this study

NHS Dental Statistics	Period	Unit	Number of areas	Mid-year Population	Children Seen	Age	Dental Attendance	IMD[a]
2006/2007	2 year	PCT	151	2006	7,777,715	0-18	70.8	2007 IMD for PCTs
2007/2008	2 year	PCT	151	2007	7,586,989	0-18	69.0	2007 IMD for PCTs
2008/2009	2 year	PCT	151	2008	7,642,733	0-18	69.5	2010 IMD for PCTs
2009/2010	2 year	PCT	151	2009	7,707,209	0-18	70.0	2010 IMD for PCTs
2010/2011	2 year	PCT	151	2010	7,770,893	0-18	70.4	2010 IMD for PCTs
2011/2012	2 year	PCT	151	2010	7,813,017	0-18	70.7	2010 IMD for PCTs
2012/2013	2 year	PCT	151	2011	7,837,336	0-18	69.1	2010 IMD for PCTs
2013/2014	2 year	LA	150[b]	2012	7,897,589	0-18	69.1	2015 IMD for LAs
2014/2015	2 year	LA	150[b]	2012	7,944,654	0-18	69.1	2015 IMD for LAs
2015/2016	1 year	LA	151	2014	6,668,541	0-18	57.5	2015 IMD for LAs
2016/2017	1 Year	LA	151	2016	6,771,947	0-18	58.0	2015 IMD for LAs
National Dental Epidemiology Programme								
2007/08	N/A	PCT	147[c]		139,677	5 year olds	N/A	2007 IMD for PCTs
2011/12	N/A	LA	144[c]		126,474	5 year olds	N/A	2010 IMD for LAs
2014/15	N/A	LA	150[c]		111,500	5 year olds	N/A	2015 IMD for LAs
2016/17	N/A	LA	132[c]		95,904	5 year olds	N/A	2015 IMD for LAs

[a] The IMD indicators were used to calculate the relative and absolute inequalities for each year

[b] Missing areas: One LA was omitted from the analyses due to anomalous reporting of the dental Attendance rate

[c] Missing areas: 5, 9, and 2, 20 areas were missing from the 2007/2008, 2011/2012, 2014/2015, and 2016/2017 surveys, respectively (they did not participate or had very small number which was not deemed adequate for reporting by the providers of the data)

Table 2. Dental attendance among 0-18 year children (2007-2017): Absolute and Relative Inequalities between English geographical areas

NHS Dental Statistics	SII	P value		RII	P value
2006/2007	-0.69 (-5.67, 4.29)	0.79		0.99 (0.92, 1.06)	0.79
2007/2008	4.51 (-0.66, 9.68)	0.09		1.07 (0.99, 1.15)	0.09
2008/2009	4.33 (-0.8, 9.46)	0.10		1.06 (0.99, 1.14)	0.10
2009/2010	3.37 (-1.56, 8.29)	0.18		1.05 (0.98, 1.12)	0.18
2010/2011	3.66 (-1.02, 8.33)	0.13		1.05 (0.99, 1.12)	0.13
2011/2012	4.95 (0.52, 9.37)	**0.03**		1.07 (1.01, 1.14)	**0.03**
2012/2013	0.48 (-3.66, 4.62)	0.82		1.01 (0.95, 1.07)	0.82
2013/2014	3.67 (-0.69, 8.02)	0.10		1.05 (0.99, 1.12)	0.10
2014/2015	3.95 (-0.4, 8.3)	0.08		1.06 (0.99, 1.13)	0.08
2015/2016 [a]	-1.25 (-5.74, 3.24)	0.59		0.98 (0.91, 1.06)	0.58
2016/2017 [a]	-1.08 (-5.49, 3.32)	0.63		0.98 (0.91, 1.06)	0.63

Bold P Values: significant values at confidence level of 95% are in bold font

[a] The values of SIIs for these two years are not comparable with previous years due to the change in the reporting of attendance rate. The values of RIIs will not be influenced by this alteration.

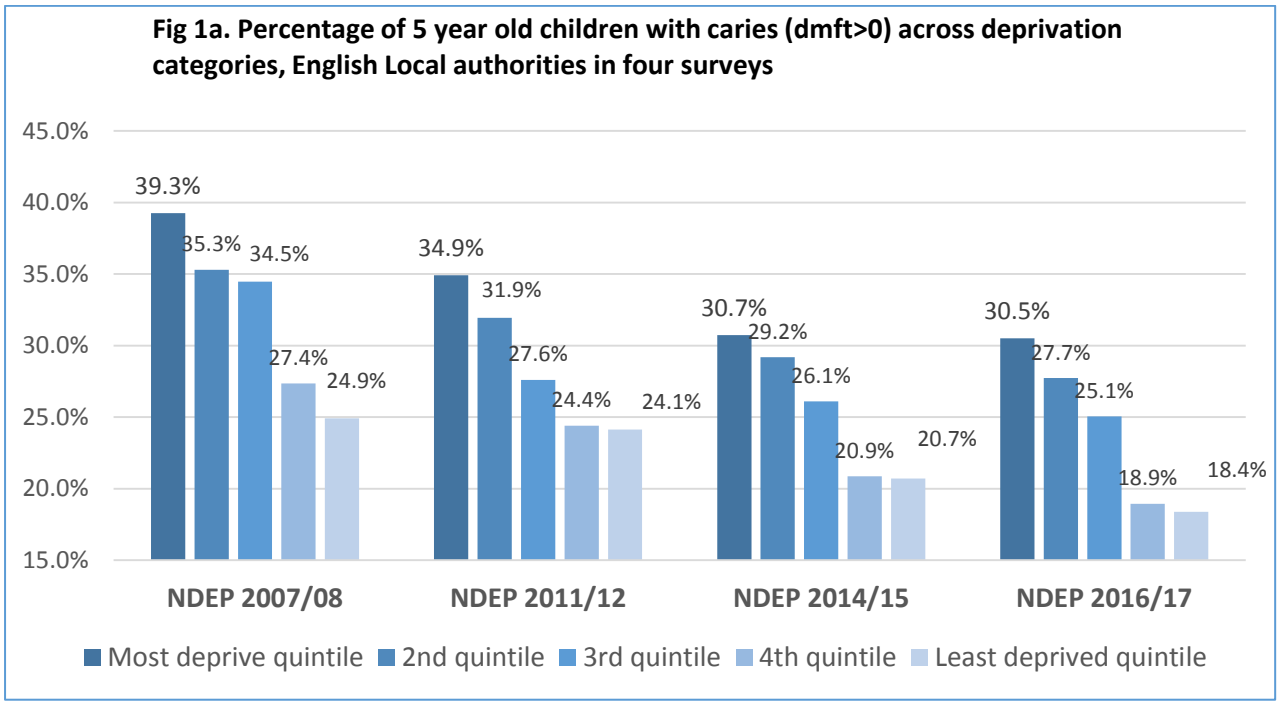
[b] Data providers have made data on dental attendance of the children by age groups in year 2016/2017 only.

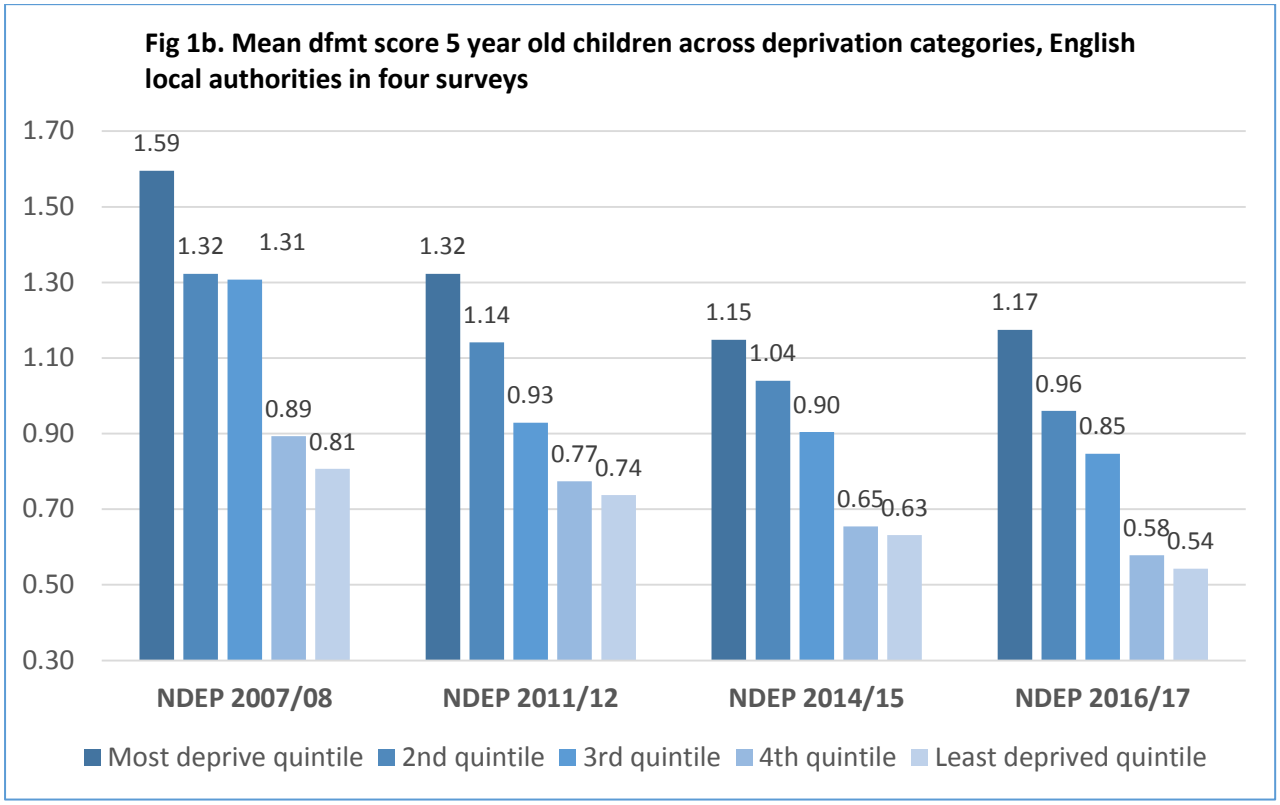
Table 3. Dental caries among 5 year old children (2007-2017): Absolute and Relative Inequalities between English geographical areas

		Caries Experience (%)				
NDEP Survey	**Prevalence**	**SII**	**P value**		**RII**	**P value**
2007/08	30.9%	20.73 (16.74, 24.73)	**<0.001**		1.92 (1.68, 2.18)	**<0.001**
2011/12	27.9%	13.07 (8.89, 17.24)	**<0.001**		1.60 (1.38, 1.87)	**<0.001**
2014/15	25.8%	15.72 (12.02, 19.42)	**<0.001**		1.86 (1.6, 2.16)	**<0.001**
2016/17	23.3%	16.73 (13.07, 20.4)	**<0.001**		1.99 (1.7, 2.32)	**<0.001**
P Value (First Vs. 2nd survey)		**0.01**			0.09	
P Value (2nd Vs. last survey)		0.21			**0.05**	
		dmft score (Mean)				
NDEP Survey	**Mean**	**SII**	**P value**		**RII**	**P value**
2007/08	1.11	1.1 (0.88, 1.32)	**<0.001**		2.61 (2.13, 3.18)	**<0.001**
2011/12	0.94	0.74 (0.53, 0.95)	**<0.001**		2.21 (1.76, 2.79)	**<0.001**
2014/15	0.81	0.8 (0.62, 0.99)	**<0.001**		2.54 (2.02, 3.19)	**<0.001**
2016/17	0.78	0.77 (0.59, 0.95)	**<0.001**		2.60 (2.05, 3.30)	**<0.001**
P Value (First Vs. 2nd survey)		**0.02**			0.27	
P Value (2nd Vs. last survey)		0.85			0.35	
		Untreated dental caries (Mean)				
NDEP Survey	**Mean**	**SII**	**P value**		**RII**	**P value**
2007/08	0.87	0.89 (0.7, 1.08)	**<0.001**		2.67 (2.14, 3.33)	**<0.001**
2011/12	0.73	0.57 (0.39, 0.75)	**<0.001**		2.19 (1.71, 2.82)	**<0.001**
2014/15	0.69	0.6 (0.43, 0.76)	**<0.001**		2.44 (1.89, 3.16)	**<0.001**
2016/17	0.60	0.61 (0.46, 0.76)	**<0.001**		2.71 (2.07, 3.53)	**<0.001**
P Value (First Vs. 2nd survey)		**0.02**			0.22	
P Value (2nd Vs. last survey)		0.75			0.25	

Bolded P values: significant values at confidence level of 95% are bolded

Figure 1. Distribution of dental caries outcome across deprivation categories of English areas






1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30

Figure 2. Relative inequalities in dental caries between 2007 and 2017 (RIIs)