



Investing to prevent: Description of an innovative approach to commissioning a supervised toothbrushing programme across multiple local authorities in England

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Introduction: The NHS Long Term Plan prioritises NHS action to reduce health inequalities and give children a good start in life. A Sustainability and Transformation Partnership (STP) is a collaborative working arrangement between local authorities and the NHS covering a defined population and geography. Within the STP in Devon, England, all three local authorities had separate supervised toothbrushing programmes; all were precariously funded. Devon has limited access to routine NHS dentistry and children in deprived areas have high rates of general anaesthetics for dental extractions. Consolidating the supervised toothbrushing programmes presented an opportunity to address oral health inequalities across Devon STP. **Objectives:** 1. Reduce oral health inequalities for children in deprived areas. 2. Reduce treatment need for children who have limited access to routine NHS dentistry. 3. Invest in prevention. **Methods:** A proposal, supported by local authorities in Devon STP, was developed for a targeted supervised toothbrushing programme at early years sites across the most deprived 50% of areas in Devon. Return on investment was estimated using a national resource. Methods are described for identifying eligible sites and defining procurement lots. The NHS dental services commissioner agreed to support this proposal using an innovative approach to commissioning. **Results:** Three lots, totalling 525 sites, were awarded to two providers. Mobilisation over summer 2019 led to implementation from September 2019. **Conclusion:** Partnership working and innovative commissioning can enable NHS England to invest in prevention at scale where options to increase dental access are limited. Implementation across a large geographical area creates challenges but facilitates equitable programme delivery.

Public health competencies being illustrated

4. Strategic leadership and collaborative working for health
5. Oral health improvement
7. Developing and monitoring quality dental services
8. Dental public health intelligence
10. Appropriate decision making and judgement

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Initial impetus for action

Children's dental caries experience in the county of Devon, England, indicates significant oral health inequalities, mirroring variations in deprivation. Caries prevalence in five-year olds appears to be higher in the cities of Plymouth and Exeter and the coastal area of Torbay, although there are also rural pockets of poorer oral health across Devon (Public Health England, 2018a). Torbay was in England's top 30 local authorities for high caries prevalence in five-year olds (34.7% in 2017), showing no significant improvement over nine years (Public Health England, 2018b).

Across Devon, 1773 children had a general anaesthetic (GA) for dental extractions in 2016-17, with rates (per 10,000 children) varying from 51.1 in Devon County Council area and 83.0 in Torbay to 143.9 in Plymouth (Peninsula Oral Health Task Group, 2018). The annual NHS costs of providing extractions under GA in Devon,

aside from the costs to children and their families, can be estimated at nearly £1.5 million (Public Health England 2016a, Peninsula Oral Health Task Group, 2018). Children living in the most deprived areas were up to four times more likely to experience dental extractions under GA than those in the least deprived areas of the same local authority (LA) (Peninsula Oral Health Task Group, 2018).

In 2018, existing child oral health improvement programmes in these areas of high need across Devon were funded by informal, time-limited budgets, due to historical arrangements. All existing programmes included some supervised toothbrushing, with 10% to 20% coverage of four to five-year olds in schools and nurseries, with participation mainly focused in the most deprived areas.

Access to routine NHS dentistry in general dental practices is very limited across much of Devon, with waiting lists of one to two years precluding children from reliable and timely access (Plymouth City Council,

2019). The commissioner for dental services, NHS England, recognised they were unlikely to be able increase service capacity to improve access in the medium term, despite having a budget available. They were keen to take an innovative approach to commissioning to prioritise prevention, in line with the NHS Long Term Plan (National Health Service, 2019), in order to reduce the population's future treatment needs and oral health inequalities through alternative spend.

Solution suggested

The three LAs that provide services for the population of Devon, worked together with NHS England and other organisations through a collaborative arrangement described as a Sustainability and Transformation Partnership (STP). STPs are intended to facilitate coordinated action for health across health, social care and local government, for a defined population and geography (NHS England, n.d., Lewney, 2017). These LA partners, supported by the Dental Public Health (DPH) team, developed a proposal for a targeted supervised toothbrushing programme, designed to reach four and five-year olds at nurseries and schools in the most deprived 50% of areas across Devon. This geography included around 56% of four and five-year old children living in Devon, totalling nearly 15,000 children across two cohorts. The purpose of targeting this proportion of young children was to reach those most likely to experience dental caries by the age of five years.

This proposal was consistent with NICE guidance (National Institute for Health and Care Excellence, 2014) and the menu of evidence-based interventions to reduce health inequalities (NHS England and NHS Improvement, n.d.) which supports the NHS Long Term Plan. It was presented to NHS England, explaining the anticipated return on investment and the ethical benefits of the programme. The STP was particularly supportive of this investment in prevention as it set a precedent for further STP-wide prevention programmes with evidence-based returns on investment.

The objectives of the proposed programme were to:

1. Reduce oral health inequalities for children in deprived areas.
2. Reduce treatment need for children living in areas with limited access to routine NHS dentistry.
3. Invest in prevention.

An estimate of return on investment, calculated using a national resource for oral health interventions, suggested that investing in the programme would generate savings within two years (Public Health England, 2016a). Savings from oral health improvement programmes tend to release existing dental service resource for other purposes, rather than creating direct financial gains (Anopa *et al.*, 2015). However, in this circumstance, the health gains from the programme were more likely to reduce unmet needs, rather than releasing spare capacity.

NHS England adopted an innovative approach to commissioning the programme. Recent legislative changes to NHS contracting arrangements for primary dental care have permitted dental practices to receive a small proportion of their usual contract value, or some additional remuneration, in exchange for providing services other

than clinical dentistry, where commissioned to do so by NHS England (Department of Health and Social Care, 2018, Mustufvi *et al.*, 2020). However, in Devon, contract monitoring processes and workforce shortages indicated that few dental practices had the capacity to transfer or top up their contract value to contribute to oral health improvement through this route. It was also evident that a programme of this scale would benefit from significant coordination between providers to ensure equitable delivery across Devon STP and consistency of messages from the commissioned providers. Consequently, NHS England elected to consolidate, rather than disperse, their underspend to support the funding of a two-year pilot scheme from their dental budget. The DPH team supported service specification development, identification of suitable sites for programme delivery, bid evaluation and moderation.

Actual outcome

In accordance with national guidance to support the commissioning of supervised toothbrushing (Public Health England, 2016b), the programme was designed to reach children aged three to four years (final year of nursery) and four to five years (reception year at school). Ward level epidemiological data were not available, so resources were distributed according to deprivation, as a proxy for oral health needs, across the STP area as a whole.

Eligible sites were identified across all three LAs in the STP area. Schools and nurseries were considered eligible to host the programme if they were:

- LA-funded primary schools, academies and free schools (including special schools)
- Nurseries within LA-funded primary schools, academies and free schools
- Nurseries that offer Early Years Funded childcare places (15 or 30 hours), funded as part of government childcare policy (Department for Education, 2015).

All eligible primary schools and nurseries from the three LA areas were ranked by the English Index of Multiple Deprivation (IMD) 2015, using site postal codes (Department for Communities and Local Government, 2015). This was based on small geographical areas known as Lower Super Output Areas (LSOAs). The 50% of sites located in the more deprived LSOAs were selected for participation. In total, 525 sites were selected across Devon STP, approximately 60% of which were nurseries and 40% schools with reception classes.

The commissioner grouped sites into three lots, each covering a scale and geography considered to be of interest to prospective bidders by enabling sufficient economy of scale, balanced with geographical spread. The lots were designed to be coterminous with the three major postal code boundaries across the STP area (Exeter, Plymouth and Torquay). This produced two lots with 155 and 111 sites, predominantly expected to have larger numbers of children, each spanning one whole LA area and part of an adjacent one. One further lot was identified, comprising 259 sites, which covered a larger geography of most of one LA area, including a city and many rural towns and villages.

Commissioners dedicated a fixed contract value (based on total number of eligible children) to the programme, to encourage potential providers to demonstrate how they could add value and assure programme delivery, rather than compete on price. A unit cost per site was decided by dividing the total contract value by the number of sites. The financial value of each lot was calculated using the proportion of total sites included within each lot. It was considered that although urban sites were fewer in number, the costs associated with supplying larger urban sites with more consumable resources per site would be similar to the expense associated with supporting smaller, rural sites with higher travel, labour and delivery costs per site. There was sufficient market interest to procure the service, despite the rural context.

Key performance indicators (KPIs) of provider performance were based on similar programmes (Morgan, 2016), with a tolerance limit introduced because the exact number of eligible children in some sites was unknown. KPIs included milestones, participation rates, stakeholder engagement and satisfaction. KPI targets for site participation were set for each of the five IMD deciles included in the programme, to prioritise engagement in the most deprived areas. Milestones were set to allow for a gradual rollout period, given the large number of sites to be reached. Once mobilisation began, providers renegotiated some of the KPI targets with the commissioner where initial targets were found to be unrealistic for logistical reasons.

By early March 2020, providers had contacted at least 481 (91.3%) of eligible sites and trained 557 staff across 270 sites (see Table 1). Providers appeared to be keeping pace with training requirements despite the scale and geography involved, with 93.1% of schools that had agreed to participate having received training.

Challenges addressed

The call to action promoted partnership working across a wider geographic footprint than usual. The opportunity brought together representatives from three LAs, NHS England, a Commissioning Support Unit and the DPH team to commission the programme. By consolidating funding into three contracts, NHS England minimised their contract monitoring workload and duplication, whilst increasing consistent delivery across the STP.

NHS England applied the principle of prevention, set out in the NHS Long Term Plan, to invest in health improvement to reduce unmet need and oral health inequalities. The clinical and cost-effectiveness of supervised toothbrushing programmes has already been established, based upon a programme widely implemented across Scotland (Macpherson *et al.*, 2013, Anopa *et al.*, 2015). It will not be feasible to assess the effectiveness of the Devon programme fully using epidemiological data or the number of children receiving extractions under GA, as we cannot link data at an individual level and there are many other factors contributing to variations in population oral health in children. Measuring success in meeting the commissioning objectives of reducing oral health inequalities and dental treatment needs will therefore depend upon evaluating programme reach, engagement and adherence to the recommended protocol (Public Health England, 2016b), which will be monitored by NHS England during the pilot phase. Notably, uptake in the most deprived deciles was higher than in the least deprived, which may reflect providers prioritising contact and support for these sites at the start of implementation, as promoted by the deprivation-specific KPIs.

In the absence of ward-level epidemiological data, and due to the strong correlation between dental caries experience and deprivation, the IMD score for the LSOA of early years sites was used as a proxy measure for children's potential to benefit from the programme, accepting the ecological implications of this approach. The process of ranking LSOAs, identifying all eligible schools and nurseries and checking and excluding ineligible schools and nurseries across three LAs was relatively time-consuming and resource-intensive. It was not feasible to establish the number of children in their final year at nursery in some databases. Consequently, it was not possible to assign a financial value for each site based upon the estimated cost per child. This led to consideration of other factors that may affect the overall costs of delivering the programme, such as travelling long distances to small rural schools. The KPIs were designed to ensure that detailed information on the number of children aged three to four years attending nurseries is identified, enabling more accurate estimates of child participation for future years.

Table 1. Lot allocations and site participation for Devon supervised toothbrushing programme

| <i>Lot</i> | <i>Exeter postal codes</i> | <i>Plymouth postal codes</i> | <i>Torquay postal codes</i> | <i>Total for Devon STP area</i> |
|--|----------------------------|------------------------------|-----------------------------|---------------------------------|
| Information by date | 6/3/20 | 6/3/20 | 12/3/20 | N/A |
| Total number of sites | 261 | 155 | 111 | 527 |
| Sites signed up (of total sites in lot) | 119 (45.6%) | 91 (58.7%) | 80 (72.1%) | 290 (55.0%) |
| Of which, sites trained (of those signed up) | 107 (89.9%) | 84 (92.3%) | 79 (98.8%) | 270 (93.1%) |
| Sites declined (of total sites in lot) | 121 (46.4%) | 42 (27.1%) | 28 (25.2%) | 191 (36.2%) |
| Sites pending (of total sites in lot) | 21 (8.0%) | 23 (14.8%) | 3 (2.7%) | 47 (8.9%) |
| Number of staff trained | 172 | 139 | 246* | 557 |

*Staff trained by 25/2/20

A few sites, which had originally been identified as eligible, had subsequently closed or merged; a very small number operated only after school hours and were therefore unsuitable. Conversely, a few sites that were participating in pre-existing schemes did not meet the eligibility criteria for this programme. Providers arranged to continue the programmes at these sites, where site staff wished to do so. These local updates changed the total number of sites from 525 to 527. The cost of the additional delivery to these few sites could be absorbed in the existing financial model.

Commissioners recognised that providers needed to invest more time to engage sites in the first year and that some sites will require additional support in the second year to overcome challenges to participation, whilst retaining scope to review the funding model when moving into a maintenance phase. Between 25.2% and 46.4% of sites in each lot declined to participate, often due to concerns about lack of staff or time to include supervised toothbrushing in the daily schedule. As part of the stakeholder engagement process, staff and children at two participating schools have taken part in filming of supervised toothbrushing to produce a video to encourage remaining sites to participate in the next academic year, in collaboration with providers and NHS England. Given that site staff perceptions of capability and opportunity to deliver supervised toothbrushing appear to be the main barrier to site participation, it will be of interest to monitor whether viewing the video of the programme taking place in a similar local setting will influence those perceptions and encourage sites to participate in future years.

Future implications

The programme covers a range of urban and rural areas and includes both large and small sites, many of which are new to this type of programme. To improve long-term sustainability, NHS England will review the funding model in recognition of the higher initial costs of this type of programme. The cost of supporting sites may reduce after the first year once most staff engagement and training has been completed. Further evaluation of delivery costs across two academic years would help to inform future financial allocations, in particular, whether to weight funding towards the first year of a programme to allow for mobilisation costs and whether a per child or per site allocation model is preferable. This may also help to establish whether a premium for rural sites may be appropriate when significant travel time is required.

Learning points

Selection of a proxy for child caries risk

The use of the IMD decile for the LSOA of early years sites can only act as a proxy for child caries risk and will not reflect children's individual household deprivation status or caries risk. However, it was felt that, in Devon, there would be sufficient congruence to apply this targeted population approach, as there is a gradual geographic variation in deprivation deciles and children

generally attend a school or nursery close to home. This approach may be less appropriate for identifying suitable sites in areas where adjacent LSOAs have markedly different IMD profiles or where children are less likely to attend their local school or nursery.

Validity of nursery eligibility criteria

The use of government-funded nursery places as an eligibility criterion for nurseries may be complicated by the recent offer of 30 government-funded hours per week, which may discourage some nurseries from offering government-funded places (Pre-School Learning Alliance, 2017). This may restrict access to 15- and 30-hour government-funded nursery places in more deprived areas where there is limited scope for nurseries to subsidise government-funded nursery places through direct parental contributions (Pre-School Learning Alliance, 2017). In some areas, there has been more focus on providing government-funded places for two year olds, rather than three and four year olds (Akhil, 2019). In both situations, even if the children most likely to benefit from supervised toothbrushing can still access nursery places, the eligibility criteria for nurseries may need to change.

Timing for optimum parental consent

During the mobilisation phase, providers found that schools would have preferred to hear about the supervised toothbrushing programme before children were allocated their places at schools in April. This would enable them to send information and consent forms to parents along with other information about starting school, thus encouraging parental consent whilst minimising administration. Commissioning timetables should therefore be planned with this in mind.

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References

- Akhil, A. (2019): *The impact of recent government policies on early years provision*. Education Policy Institute. https://epi.org.uk/wp-content/uploads/2019/01/Early-years-take-up_-EPI.pdf
- Anopa, Y., McMahon, A. D., Conway, D. I., Ball, G. E., McIntosh, E. & Macpherson, L. M. D. (2015): Improving Child Oral Health: Cost Analysis of a National Nursery Toothbrushing Programme. *PLoS ONE* **10**. 10.1371/journal.pone.0136211
- Department for Communities and Local Government (2015): *The English Index of Multiple Deprivation (IMD) 2015 - Guidance*. Department for Communities and Local Government. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/464430/English_Index_of_Multiple_Deprivation_2015_-_Guidance.pdf

- Department of Health and Social Care (2018): *The Primary Dental Services Statements of Financial Entitlements (Amendment) Directions 2018*. Department of Health and Social Care. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765878/primary-dental-services-statements-of-financial-entitlements-amendments-directions_2018.pdf
- Lewney, J. (2017): Sustainability and Transformation Partnerships: What are they and how do they affect dentistry? *British Dental Journal* **223**:565-566.
- Macpherson, L. M. D., Y. Anopa, D. I. Conway and A. D. McMahon (2013): National supervised toothbrushing program and dental decay in Scotland. *Journal of Dental Research* **92**:109-113.
- Morgan, M. Z. (2016): *Designed to Smile Activity Data: April 2015 – March 2016 Monitoring Report*. Cardiff: Cardiff University. https://www.cardiff.ac.uk/_data/assets/pdf_file/0015/1720302/Designed-to-Smile-Monitoring-Report-Apr-Mar-2015-16.pdf
- Mustufvi, Z., Barraclough, O., Hearnshaw, S., Whiston, S., Grant, S., Serban, S. and Douglas, G. (2020): A prevention and access focused approach in Yorkshire and the Humber. *BDJ in Practice* **33**. <https://doi.org/10.1038/s41404-020-0296-9>
- National Health Service (2019): *The NHS Long Term Plan*. National Health Service. <https://www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf>
- National Institute for Health and Care Excellence (2014): *Oral health: local authorities and partners*. National Institute for Health and Care Excellence. <https://www.nice.org.uk/guidance/ph55>
- NHS England (no date): *Sustainability and transformation partnerships*. NHS England. <https://www.england.nhs.uk/integratedcare/stps/>
- NHS England and NHS Improvement (no date): *Daily supervised brushing in early years and nursery school settings*. NHS England and NHS Improvement. <https://www.england.nhs.uk/ltphimenu/better-care-for-health-conditions-for-dental-healthcare/daily-supervised-brushing-in-early-years-and-nursery-school-settings/>
- Peninsula Oral Health Task Group (2018): *Dental extractions under general anaesthetic in children: A report for the Southwest Peninsula 2016-17*. Peninsula Oral Health Task Group.
- Plymouth City Council (2019): *Plymouth Oral Health Needs Assessment*. Plymouth City Council. <https://www.plymouth.gov.uk/sites/default/files/Oral%20Health%20Needs%20Assessment%202019%20%28v1.1%29.pdf>
- Pre-School Learning Alliance (2017): *Sector views on early years funding and the 30-hour offer*. Pre-School Learning Alliance. https://www.eyalliance.org.uk/sites/default/files/30-hour_and_funding_survey_-_pre-school_learning_alliance.pdf
- Public Health England (2016a): *Return on investment of oral health interventions tool*. London: Public Health England. <https://www.gov.uk/government/publications/improving-the-oral-health-of-children-cost-effective-commissioning>
- Public Health England (2016b). *Improving oral health: A toolkit to support commissioning of supervised toothbrushing programmes in early years and school settings*. London: Public Health England. <https://www.gov.uk/government/publications/improving-oral-health-supervised-tooth-brushing-programme-toolkit>
- Public Health England (2018a): *Results of the 5 year old oral health survey 2017*. London: Public Health England. <https://www.gov.uk/government/statistics/oral-health-survey-of-5-year-old-children-2017>
- Public Health England (2018b): *Local authority area variation in the oral health of five-year-olds*. London: Public Health England. <https://www.gov.uk/government/publications/oral-health-of-5-year-old-children-in-local-authorities>