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Dental Public Health in Action

Developing and implementing a fluoride varnish programme for young children in Bradford, UK

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Initial impetus for action

Bradford District is an area of approximately 400 square kilometres, in the Yorkshire and Humber region of Northern England, The population estimate for Bradford District for 2009 was 506,800 people and it is one of a few metropolitan districts experiencing population growth. The population is younger relative to England, and is more deprived. The district is ethnically diverse with 74% of the population white, 21% Asian, and 5% mixed race, black or other ethnicities (Office for National Statistics, 2009).

Regular National Dental Epidemiology Programme surveys demonstrate that five-year-old children living in Bradford District have disease levels significantly greater than the average for England, with very little improvement over the past ten years (Bradford and Airedale NHS, 2012). Results from the oral health survey of five-year-old children carried out in 2007/08 showed a mean number of decayed, missing and filled teeth ($d_3$mft) of 2.42 (Rooney *et al*., 2009).

In 2007/08 Primary Care Trusts (PCT) in England were responsible for assessing the oral health needs of their population, and for commissioning appropriate oral health programmes and dental services to meet those needs. A package of care aimed at improving oral health of young children in Bradford, had previously been commissioned by the former Bradford and Airedale teaching PCT under the name of 'Building Brighter Smiles' which was based on the principles of proportionate universalism with population-wide and targeted elements. The package followed an early life course approach and included breastfeeding advice, partnership working with health visitors to provide oral health advice, free toothpaste, toothbrush and trainer cups to under two-years-olds, a dental health award promoting healthy snacks in pre-school settings, toothbrushing programmes in schools and mosques, and providing oral-health based educational resources for pre-school and primary school children. This package of care provided by Bradford District Care Trust Community Dental Service (CDS) had been in place for over seven years commencing in 2000. Despite this intensive and proactive approach, dental disease at a population level in Bradford District remained high.

Solutions suggested

In the absence of water fluoridation, and in response to the continued high levels of dental disease in young children, to complement the package described above, a population based fluoride varnish programme was commissioned by Bradford and Airedale teaching PCT to reduce the prevalence and severity of dental caries amongst five-year-old children. The CDS developed and implemented this programme.

At the time, a Cochrane review demonstrated that the application of fluoride varnish twice a year was associated with a reduction of 33% in the decayed surfaces of primary teeth of children (Marinho *et al*., 2002). This has recently been updated and confirms the conclusions of the first review (Marinho *et al*., 2013).

The aim of the programme is that all children aged between two and four years old living in the district receive four applications of a safe measured dose of fluoride varnish over a two year period. This additional element of 'Building Brighter Smiles' is based upon the fluoride varnish element (delivered in nurseries and dental practices) of the Scottish national oral health programme Childsmile, but focuses on delivery through childcare settings more broadly.

A team consisting of a dentist, programme manager, dental nurse and administrator piloted the programme in 2007/08. This involved attending Children's Centres to assess the feasibility of the programme with this age group. These centres provide access to a range of early childhood services for children under five and their families. The team raised awareness of the programme, obtained informed consent, and provided oral health advice. The dentist applied the fluoride varnish. The pilot was successful, and the programme was rolled out to the wider two- to four-year-old population in 2008/09. The first year of the programme started on a small scale as it required the recruitment of dentists and dental therapists. Fluoride varnish could at that time only be applied by a dentist, or by a therapist or hygienist on a dentist's prescription.

Opportunities to use other members of the clinical team were taken up following the introduction and training of dental nurses to have additional skills in giving

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preventive advice and applying fluoride varnish. The training was commissioned by Yorkshire and Humber Deanery and was delivered by the former Bradford and Airedale teaching PCT in conjunction with the University of Central Lancashire. The dental nurses with additional skills took over the delivery of the programme in multiple Early Years settings, following a clear protocol written by the Consultant in Dental Public Health. The fluoride varnish programme has been developed and is overseen by a Specialist in Dental Public Health.

The dental nurses applied fluoride varnish to the teeth of all children whose parents consented to the programme unless there was a contraindication (hypersensitivity to colophony, ulcerative gingivitis and stomatitis, and hospitalisation with asthma). Systems were established to direct children whose medical histories may indicate a contraindication to either a general dental practitioner (GDP) or a CDS clinic for preventive advice. Dental nurses were trained and supported to report any incidents or adverse reactions occuring during the course of the programme through the Trust's incident reporting process, and for suspected side effects or adverse reactions to the fluoride varnish to be reported through the Medicines and Healthcare Products Regulatory Agency yellow card scheme

Referral pathways have been established for those children identified by the dental nurses as requiring further examination. To support these referrals four newly commissioned dental practices in Bradford were contracted to accept patients from the programme to supplement the CDS channels.

Key performance indicators were set for the programme by the commissioners based on the district's birth rate of approximately 8,600 per year. The three indicators were: number of new children recruited to the programme per year, number of children receiving one or more fluoride varnish applications per year and the total number of fluoride varnish applications per year.

Actual outcomes to date

Since the programme commenced, almost 30,000 children have been involved, with over 9,000 new children being recruited to the programme in the last financial year. The children have been seen in a total of 227 Early Years settings which include playgroups, private day nurseries, Children's Centres, childminders, school nurseries and reception classes, mother and toddler groups, kindergartens, and community events aimed at the under-fives. The numbers of staff and children involved in the programme are described in Tables 1 and 2.

Data from the most recent National Dental Epidemiology programme survey of five-year-old children indicates a significant improvement in decay levels at a population level compared with 2007/08 (PHE, 2013) as presented in Table 3.

Feedback collected by postal questionnaires from participating venues has been very positive in relation to organisation…

"Very pleased with the way it runs, staff are very flexible, well done"

"Everything was very well organised and efficiently carried out on the day. Parents were very pleased too."

… collaborative working …

"Varnishing team are very professional, fabulous with children of all ages and make everyone feel at ease"

"We found that together we planned and achieved a very good outcome, easier now as parents are more aware of the programme"

… and experiential learning …

"*You inspired an afternoon of dentist role play."*

Challenges addressed

Safety and child protection

Through piloting the programme in a number of venues, various issues were identified which have been addressed. All those involved with the programme ensure they take a copy of their recent criminal records bureau checks to all community settings to evidence their appropriateness for working with children. They take the minimum of bulky and heavy equipment. All venues are risk assessed to ensure safety of both children and staff. The fluoride

Table 1. Staff employed on the programme

Staff employed on the programme	*wte*
Senior dental nurse	1.0
Dental nurses with additional skills	5.9
Oral health promoter	0.3
Administrative staff	2.0

wte: whole time equivalent

Table 3. Caries experience data from surveys of five-year-old children

	dmft	*Confidence Interval*	*% caries free*	*Source*
2007/08	2.42	2.17, 2.67	48%	Rooney *et al.,* 2009
2012	1.90	1.80, 2.15	54%	PHE, 2013

Table 2. Numbers of children involved in the fluoride varnish programme each year 2008/9 to 2012/13

	2008/09	*2009/10*	*2010/11*	*2011/12*	*2012/13*
Number consented	175	2682	4357	8306	9169
Number of 1st applications	150	2135	3426	7004	8220
Number of subsequent applications	4	328	1954	3934	6953
Total applications	154	2463	5380	10938	15173
Children referred to dentist (GDP and CDS)	15	386	546	818	806

varnish team are clear at the outset that they need an adequately sized room which is well lit. All staff are fully compliant in mandatory training requirements of both the employing Trust and General Dental Council standards

Consent

The consent process has evolved with the programme, and a single consent process has now been developed allowing consent to be obtained at the start of the programme, with medical history being updated prior to each subsequent application. A variety of techniques are used to obtain informed consent, including attending parents' meetings, approaching parents in the playground and attending schools' parent/teacher events.

Partnerships

Early in the programme, a steering group was established to ensure engagement and good communication links with all partner agencies and stakeholders. Working collaboratively with the dental practices is of utmost importance and a steering group with GDP representatives helped to identify issues and provide direction for the programme. Other members of the steering group include representatives from Education Bradford, Children's Centres, members of the health and well-being children's services team, dental public health and health visitor leads.

When discussing consent, parents raised the point that a number of GDPs in the locality were not supportive of the programme and had been advising their patients not to participate. This resulted in lower consent rates in some areas. The GDPs concerns were mainly due to the age group being targeted. The GDPs were reluctant to direct two-year-old children for fluoride varnish applications, as guidance in Delivering Better Oral Health (Department of Health 2009) recommended applications from the age of three, but younger if at risk of developing caries. An oral health promoter assigned to the programme has worked in partnership with dental practices to ensure the evidence base for the programme is publicised and any concerns GDPs may have about the programme are addressed, in particular that this programme is based on Childsmile with evidence from the Scottish Intercollegiate Guidelines Network (2005)

Publicity

The oral health promoter has been responsible for organising the steering group's meetings, establishing partnerships and raising awareness of the programme. The steering group meets regularly and continues to guide the programme and its publicity. Developments have included adding information about the programme into the child health record book and establishing relationships with schools, Islamic settings and other partners. More recently, there has been awareness raising through video screens in general practice doctors' waiting areas, working partnerships with health professionals such as school nurses to target hard to reach settings, working with special school staff to improve consent levels and using pharmacy teams to disseminate information about the programme to their customers.

Alcohol in Duraphat

Concerns were raised about the appropriateness of the varnish for the Muslim population of the district as Duraphat contains 33.8% ethanol and each dose contains 0.2g of alcohol. The manufacturers have confirmed the alcohol is not derived from grape or grain but is an industrially produced alcohol. A letter from a senior adviser on Islamic law at the Institute of Islamic Jurisprudence endorsing the use of the varnish as a medicinal product has helped to improve its acceptability to the Muslim population and maintain levels of consent.

Patient Group Direction and Clinical supervision

The dental nurses with additional skills in fluoride varnish application initially worked on the signed patient specific prescription of a dentist. In 2011, a Patient Group Direction was developed by the service and signed off by the Medical Director and Pharmaceutical lead. This allowed the dental nurses who signed it to administer fluoride varnish to the target group without the need for individual written prescriptions for each patient.

Clinical supervision is well established for nursing and allied health professionals. However, as the dental nurses are effectively working independently in the community settings, a programme of clinical supervision was devised and introduced to provide a formal process of professional support and development. Sessions with a facilitator are arranged bi-monthly and attendance is compulsory.

Referrals

Through the fluoride varnish programme, over 800 children with high levels of disease have been identified in the last year and referred to GDPs for a more detailed examination and ongoing care. Paediatric consultants and specialists working within the CDS have been providing support and delivered educational events for GDPs in managing the dental care of these young children.

Recording of applications

Challenging key performance indicators have been set for the programme. The target of enrolling 7,500 children in any one year was exceeded in 2012/13.

Recruiting new children onto the programme is relatively straightforward but the main challenges come with repeat applications, as the individual child has to be tracked. As the evidence base supports two applications per year over a two year period, the child has to be followed through a variety of Early Years settings over this time period. The tracking system is currently carried out manually so it is possible that some children may have had a repeat application recorded as a first application.

Holiday periods

Initially, school holidays resulted in considerable periods of inactivity for the programme as many venues were closed. With the challenging key performance indicators attached to the programme, it was essential to use this time effectively. Awareness raising and 'catch up' sessions in various localities throughout the district have now been arranged during the school holidays to reach those children who were absent on the day of application at their original venue.

Future implications

The major challenge encountered to date has been the computer database for the programme. Difficulties in developing the database have meant that the programme is still paper based, and manual counting is necessary. When dealing with so many new children being enrolled onto the programme each year, the magnitude of this task cannot be underestimated. A database has now been commissioned through the Bradford District Care Trust IT department and is being tested in the field, with the possibility of direct entry at venues. The database needs to be simple, user friendly, compliant with information governance guidance and with a search facility that can be used at any community setting, allowing the nurses to search for each child using their name, date of birth or postcode. Consent forms will still be paper-based, but follow up of each child will be improved.

As the programme is aimed specifically at young children aged two to four years, once the children on the programme have received four applications of fluoride varnish the aim for the future is to support them to attend GDPs for further applications as part of their preventive oral health care plan.

Learning points

- Introducing a population-based fluoride varnish programme for the under-fives to complement a range of other initiatives has been challenging. Enrolment and follow up of the children involved can be problematic as the young population is mobile, moving from one Early Years setting to another. Future efforts will focus on increasing the number of repeat applications.
- Effective partnership working is of paramount importance. Good working relationships were established and maintained with commissioners, the local authority, Early Years providers, general dental practitioners, health professionals, the communications team, the IT department, the dental public health team and the body responsible for dental professionals' development.
- A good team ethos and a flexible approach are essential.

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References

Bradford and Airedale NHS (2012): *Better Oral Health in Bradford and Airedale*. www.observatory.bradford.nhs.uk/Docs/Documents/Health%20Needs%20Assessments/Oral%20Health%20Needs%20Assessment/NHS%20Bradford%20and%20Airedale%20Oral%20Health%20Needs%20Assessment%202012.pdf

Department of Health (2012): *Public Health Outcomes Framework Autumn 2012*. www.gov.uk/government/uploads/system/uploads/attachment_data/file/193620/Improving-outcomes-and-supporting-transparency-part-1B1.pdf

Department of Health and British Association for the Study of Community Dentistry (2009): *Delivering Better Oral Health: An evidence based toolkit for prevention, 2nd edition*. London: DH Publications.

Marinho, V.C, Higgins, J.P., Logan, S. and Sheiham, A. (2002): *Fluoride varnishes for preventing dental caries in children and adolescents*. Cochrane Database of Systematic Reviews 3: CD002279.

Marinho, V.C., Worthington, H.V., Walsh, T. and Carkson, J.E. (2013): *Fluoride varnishes for preventing dental caries in children and adolescents*. Cochrane Database of Systematic Reviews: CD002279.

Office for National Statistics (2009): *Population estimates*: UK, England and Wales, Scotland and Northern Ireland.

Public Health England (2013): *National Dental Epidemiology Programme for England Oral Health survey of 5 year old children 2012*. London: PHE. www.nwph/dentalhealth/reports

Rooney, E., Davies, G., Neville, J., Tocque, K., Rogers, S., Jones, A., Perkins, C. and Bellis, M.A. (2009): *NHS Dental Epidemiology Programme for England. Oral Health survey of 5 year old children 2007/2008*. www.nwph/dentalhealth/reports, www.bascd.org

Scottish Intercollegiate Guidelines Network (2005): *Prevention and management of dental decay in the pre-school child*. Edinburgh: SIGN.